Reviews of National Policies for Education

SANTA CATARINA STATE, BRAZIL

OECD

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Foreword

The State of Santa Catarina is one of the most prosperous regions of Brazil and its education system is considered to be one of the best in the country. Aware that the economic and social success of the region depends largely on the education and skills of its population, the state government invited the OECD to conduct an independent review of the education system and to formulate options for immediate and longer term policies for developing its human capital. Responsibility for education in Brazil is shared between federal, state and municipal entities, and this review looks primarily at the state level functions, but also covers some federal and municipal areas as they relate to Santa Catarina's education system.

The examiners' report recognises the reform efforts already invested, but it also recommends paying particular attention to the immediate need for better articulation between the different levels of education, for greater flexibility and efficiency in governance and institutional management of education, and for increasing the capacity of the education system to deliver relevant education to all citizens of Santa Catarina. The examiners' report was prepared against a background report provided by the Santa Catarina authorities and extensive site visits.

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Members of the review team were: John Coolahan (Ireland) Rapporteur, Professor Emeritus, National University of Ireland; Ian Whitman (OECD Secretariat), Review Team Leader, Head of the Programme for Co-operation with Non Member Economies of the OECD Directorate for Education; Mary Canning (Ireland), Higher Education Authority of Ireland, former Lead Education Specialist, World Bank; Eduarda Castel-Branco (Portugal), Expert on Education and Training Policies at the European Training Foundation; Johanna Crighton (The Netherlands), Independent Education Consultant and Assessment Specialist, Wolfson College, University of

Barbara Ischinger
Director for Education

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Acronyms

ACAFE	*Associação Catarinense das Fundações Educacionais* Santa Catarina Association of Educational Foundations
ACITA	*Associação Comercial e Industrial de Itapema* Commercial and Industrial Association of Itapema
APAE	*Associação de Pais e Amigos dos Excepcionais* Association of Parents and Friends of Exceptionals
APL	*Arranjos Produtivos Locais* Local Productive Partnerships
BADESC	*Agência de Fomento do Estado do Santa Catarina S.A.* Development Agency of the State of Santa Catarina
BNDES	*Banco Nacional do Desenvolvimento* Brazilian Development Bank
BPC	*Benefício de Prestação Continuada* Continued Payment Benefit
BRDE	*Banco Regional de Desenvolvimento do Extremo-Sul* Regional Bank for the Development of the Far South
BRL	*Real (moeda brasileira)* Brazilian Real (Brazilian currency)
CAESP	*Centro de Atendimento Educacional Especializado* Centre for Specialised Educational Service
CAPES	*Coordenação de Aperfeiçoamentos de Pessoal de Nível Superior* Co-ordination for the Improvement of Higher Education Personnel
CDE	*Conselho Deliberativo Escolar* Deliberative School Council
CEDUP	*Centro de Educação Profissional* Centre for Professional Education
CEE	*Conselho Estadual de Educação* State Education Council
CEFET	*Centro Federal de Educação Tecnológica* Federal Centre of Technological Education
CENPES	*Centro de Pesquisas e Desenvolvimento Leopoldo Américo Miguez de Mello (Centro de Pesquisas da Petrobrás)* Leopoldo Américo Miguez de Mello Research and Development Centre (Petrobras Research Centre)
CEPEL	*Centro de Pesquisas de Energia Elétrica* Eletrobrás Electric Power Research Centre

CERTI	*Fundação Centros de Referências em Tecnologias Inovadoras* Foundation of Reference Centres for Technological Innovation
CETEC	*Centro Tecnológico de Curitibanos e Região* Technological Centre of Curitibanos and the Region
CFI	*Fundação Canadense para Inovação* Canada Foundation for Innovation
CIEE	*Centro de Integração Empresa-Escola* Enterprise-School Integration Centre
CITEB	*Centro de Inovação e Tecnologia de Biguaçu* Innovation and Technology Centre of Biguaçu
CMM	*Modelo de potencialidade da maturidade* Capability Maturity Model
CNCST	*Catálogo Nacional de Cursos Superiores de Tecnologia* National Catalogue of Technological Courses at Undergraduate and Postgraduate Levels
CNCT	*Catálogo Nacional de Cursos Técnicos* National Catalogue of Technical Courses
CNE	*Conselho Nacional de Educação* National Education Council
CNI	*Confederação Nacional da Indústria* National Industry Confederation
CNPq	*Conselho Nacional de Desenvolvimento Científico e Tecnológico* National Council for Scientific and Technological Development
CoE	*Centro de Excelência* Centre of Excellence
CONAES	*Comitê Nacional de Avaliação da Educação Superior* National Committee for Evaluating Higher Education
CONCITI	*Conselho Estadual de Ciência, Tecnologia e Inovação* State Council for Science, Technology and Innovation
CONSUNI	*Conselho Universitário* University Council
CPA	*Comissão de Avaliação Interna* Internal Evaluation Commission
CPqD	*Centro de Pesquisa e Desenvolvimento da Telebrás* Telebrás Research and Development Center
CRIATEC	*Fundo de Investimento de Capital Semente (pequenas e médias empresas)* Investment Fund for Seed Capital (small and medium enterprises)
CRIE	*Centro Regional de Inovação e Empreendedorismo* Regional Centre for Innovation and Entrepreneurship
CTVRD	*Centro de Tecnologia Companhia Vale do Rio Doce* Technology Centre of the Rio Doce Valley Company
DCN	*Diretrizes Curriculares Nacionais* National Curriculum Framework
DINTER	*Doutorado Interinstitucional* Inter-institutional Doctorate

DIOC	*Diretoria de Organização, Controle e Avaliação* Directorate for Organisation, Control and Assessment
ECA	*Estatuto da Criança e do Adolescente* Statute on Children and Adolescents
ECEC	*Educação Infantil (creche e pré-escola)* Early Childhood Education and Care
ECT	*Empresa Brasileira de Correios e Telégrafos* Brazilian Post and Telegraph Enterprise
EEB	*Escola de Educação Básica* School of Integrated Basic Education
EFA/MDG	Education for All / Millennium Development Goals
EJA	*Educação de Jovens e Adultos* Youth and Adult Education
EMBRAER	*Empresa Brasileira de Aeronáutica S.A.* Brazilian Aeronautics Company
EMBRAPA	*Empresa Brasileira de Pesquisa Agropecuária* Brazilian Enterprise for Agricultural and Livestock Research
ENADE	*Exame Nacional de Desempenho de Estudantes* Students' National Performance Evaluation
ENCCEJA	*Exame Nacional para Certificação de Competências de Jovens e Adultos* National Examination for Certification of Youth and Adult Competencies
ENEM	*Exame Nacional do Ensino Médio* High School National Exam
EPAGRI	*Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina* Santa Catarina Enterprise for Agricultural and Livestock Research and Rural Outreach
EPT	*Educação Profissional e Tecnológica* Professional and Technological Education
EPTNM	*Educação Profissional Técnica de Nível Médio* Professional Technical Education at Secondary Level
EPTNS	*Educação Profissional e Tecnológica de Nível Superior* Professional and Technological Education at Undergraduate and Postgraduate Levels
E-Tec Brasil	*Escola Técnica Aberta do Brasil* Brazilian Open Technical School
ETF	*Escola Técnica Federal* Federal Technical School
EU	European Union
FAPESC	*Fundação de Apoio à Pesquisa Científica e Tecnológica do Estado de Santa Catarina* Santa Catarina Foundation for the Support of Scientific and Technological Research
FAPESP	*Fundação de Amparo à Pesquisa do Estado de São Paulo* São Paulo Research Foundation
FAPEU	*Fundação de Amparo à Pesquisa e Extensão Universitária* Foundation for the Support of University Research and Outreach

FCEE	*Fundação Catarinense de Educação Especial* Santa Catarina Foundation for Special Education
FCO	*Fundo Constitucional de Financiamento do Centro-Oeste* Constitutional Fund for the Financing of the Central-Western Region
FDI	Foreign Direct Investment
FEPEMA	*Fundo Especial de Proteção ao Meio Ambiente de Santa Catarina* Santa Catarina Special Fund for the Protection of the Environment
FETEP	*Fundação de Ensino, Tecnologia e Pesquisa de São Bento do Sul* São Bento do Sul Foundation for Teaching, Technology and Research
FIES	*Programa de Financiamento Estudantil* Student Financing Programme
FIESC	*Federação das Indústrias do Estado de Santa Catarina* Federation of Industries of the State of Santa Catarina
FINEP	*Financiadora de Estudos e Projetos* National Agency for Financing Studies and Research
FNDE	*Fundo Nacional de Desenvolvimento da Educação* National Education Development Fund
FNE	*Fundo Constitucional de Financiamento do Nordeste* Constitutional Fund for the Financing of the Northeastern Region
FNMA	*Fundo Nacional do Meio Ambiente* National Fund for the Environment
FNO	*Fundo Constitucional de Financiamento do Norte* Constitutional Fund for the Financing of the Northern Region
FPE	*Fundo de Participação dos Estados e do Distrito Federal* Federal District and States Participation Fund
FPEX	*Fundo de Compensação pela Exportação de Produtos Industrializados* Export Compensation Fund (Industrial Products)
FPM	*Fundo de Participação dos Municípios* Municipalities Participation Fund
FUMDES	*Fundo de Apoio à Manutenção e ao Desenvolvimento da Educação Superior no Estado de Santa Catarina* Supporting Fund for Operation and Development of Higher Education in the State of Santa Catarina
FUNAI	*Fundação Nacional do Índio* National Indian Foundation
FUNDEB	*Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação* Fund for the Improvement of Basic Education and for Enhancing the Value of the Education Profession (from 2007)
FUNDEF	*Fundo de Manutenção e Desenvolvimento do Ensino Fundamental e de Valorização do Magistério* Fund for the Improvement of Basic (*Fundamental*) Education and for Enhancing the value of the Teaching Profession (1997-2006)
FUNDEP	*Fundo Nacional de Desenvolvimento da Educação Profissional e Tecnológica* National Fund for Enhancing Professional and Technological Education
FUNDESCOLA	*Fundo de Fortalecimento da Escola* School Improvement Programme

FUNDOSOCIAL	*Fundo de Desenvolvimento Social* Social Development Fund
FUNTEC	*Fundo Tecnológico* Technological Fund
FURB	*Universidade Regional de Blumenau* Regional University of Blumenau
GC	Governing Council
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on Research and Development
GERED	*Gerência Regional de Educação* Regional Education Management Office
GIS	*Sistema de Informações Geográficas* Geographic Information System
GRDP	Gross Regional Domestic Product
HEI	Higher Education Institution
IDB	Inter-American Development Bank
HDI	Human Development Index
HIS	Health Information System
IBAMA	*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* Brazilian Institute of Environment and Renewable Natural Resources
IBGE	*Instituto Brasileiro de Geografia e Estatística* Brazilian Institute of Geography and Statistics
IBRAVIN	*Instituto Brasileiro do Vinho* Brazilian Wine Institute
ICMS	*Imposto sobre Operações relativas à Circulação de Mercadorias e Prestação de Serviços de Transporte Interestadual e Intermunicipal e de Comunicação* Tax on the Circulation of Goods and Transportation and Communication Services
ICT	Information and Communication Technology
IDEB	*Índice de Desenvolvimento da Educação Básica* Index of Basic Education Development
IE	*Imposto sobre Exportações* Tax on Exports
IEP	*Plano de Educação Individual* Individual Education Plan
IESJ	*Incubadora de Empresas de São José* Business Incubator of São José
IFET	*Instituto Federal de Educação, Ciência e Tecnologia* Federal Institute of Education, Science and Technology
IGC	*Índice Geral dos Cursos* General Index of Courses
IGF	*Imposto sobre Grandes Fortunas* Tax on Large Fortunes
II	*Imposto sobre Importações* Tax on Imports
IMHE	Institutional Management on Higher Education, OECD

INEP	*Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira* National Institute for Educational Studies and Research Teixeira
INSET	In-service Education and Training
IOF	*Imposto sobre Operações Financeiras* Tax on Financial Operations
IPCA	*Índice de Preços ao Consumidor Amplo* Brazilian Consumer Price Index
IPEA	*Instituto de Pesquisa Econômica Aplicada* Institute for Applied Economic Research
IPI	*Imposto sobre Produtos Industrializados* Tax on Industrialised Products
IPIexp	*Imposto sobre Produtos Industrializados Proporcional às Exportações* Tax on Industrialised Products (proportional to exports)
IPTU	*Imposto sobre a Propriedade Predial e Territorial Urbana* Tax on Urban Land and Property
IPVA	*Imposto sobre a Propriedade de Veículos Automotores* Tax on Motor Vehicles
IR	*Imposto de Renda* Income Tax
IRRF	*Imposto de Renda Retido na Fonte* Withholding Income Tax
ISS	*Imposto sobre Serviços* Tax on Services
IT	Information Technology
ITBI	*Imposto sobre a Transmissão de Bens Imóveis* Tax on Real Estate Conveyance
ITCMD	*Imposto sobre Transmissão Causa Mortis e Doação de quaisquer Bens ou Direitos* Tax on Inheritance and Donation of all types of Properties or Rights
ITE	Initial Teacher Education
ITR	*Imposto sobre a Propriedade Territorial Rural* Tax on Rural Land Property
LDB	*Lei de Diretrizes e Bases da Educação* National Education Guidelines and Framework Law
LIBRAS	*Lingua Brasileira de Sinais* Brazilian Sign Language
MEC	*Ministério da Educação* Ministry of Education (Brasília)
MCT	*Ministério da Ciência e Tecnologia* Ministry of Science and Technology
MDICE	*Ministério do Desenvolvimento, Indústria e Comércio Exterior* Ministry of Development, Industry and Foreign Trade
MERCOSUL	*Mercado Comum do Sul* Southern Common Market
MIC	Middle-income Countries

MINTER	*Mestrado Interinstitucional* Inter-institutional Master's Programme
OIP	*Serviço de Programas Internacionais* Office of International Programmes
OECD	Organisation for Economic Co-operation and Development
PAPPE	*Programa de Apoio à Pesquisa em Empresas* Research Support Programme for Enterprises
PBA	*Programa Brasil Alfabetizado* Literate Brazil Programme
PCD	*Plano Catarinense de Desenvolvimento* Development Plan of Santa Catarina
PCN	*Parâmetros Curriculares Nacionais* National Curriculum Parameters
PCSC	*Proposta Curricular de Santa Catarina* Curricular Proposal of Santa Catarina
PDE	*Plano de Desenvolvimento da Educação* Education Development Plan
PISA	*Programa Internacional de Avaliação de Alunos (OCDE)* Programme for International Student Assessment (OECD)
PNAD	*Pesquisa Nacional par Amostra de Domicílios* National Household Sample Survey, conducted annually by IBGE
PNE	*Plano Nacional de Educação* National Education Plan
PNLA	*Programa Nacional do Livro Didático para a Alfabetização de Jovens e Adultos* National Literacy Programme for Youth and Adults
PNLD	*Programa Nacional do Livro Didático* National School Textbook Programme
PNLEM	*Programa Nacional do Livro Didático para o Ensino Médio* National Textbook Programme for Secondary Schools
PPA	*Plano Plurianual* Multi-annual Plan
PPP	*Projeto politico-pedagógico* Political-pedagogical project
PROEJA	*Programa Nacional de Integração da Educação Profissional com a Educação Básica na Modalidade de Educação de Jovens e Adultos* EJA integrated with professional education
PRONEX	*Programa de Apoio aos Núcleos de Excelência* Centres of Excellence Support Programme
ProUni	*Programa Universidade para Todos* University for All Program
RCCT	*Rede Catarinense de Ciência e Tecnologia* Science and Technology Network of Santa Catarina
REESC	*Reengenharia do Ensino de Engenharia em Santa Catarina* Re-engineering of Engineering Education in Santa Catarina

RIPA	*Rede de Inovação e Prospecção Tecnológica para o Agronegócio* Innovation and Technological Forecasting Network for Agribusiness
RPSC	*Rede de Proteoma do Estado de Santa Catarina* Proteomics Network of Santa Catarina
SAEB	*Sistema Nacional de Avaliação da Educação Básica* National Basic Education Assessment
SAEDE	*Serviço de Atendimento Educacional Especializado* Specialised Educational Services
SDR	*Secretaria de Estado de Desenvolvimento Regional* State Secretariat for Regional Development
SEBRAE	*Serviço Brasileiro de Apoio às Micro e Pequenas Empresas* Brazilian National Service to Support Micro and Small Enterprises
SECAD	*Secretarìa de Educação Continuada, Alfabetização e Diversidade* Secretariat for Continuing Education, Literacy and Diversity
SED	*Secretaria de Estado da Educação de Santa Catarina* State Secretariat for Education of Santa Catarina
SEESP	*Secretaria de Educação Especial* National Secretariat for Special Education, linked to MEC
SEN/CWD	Special Educational Needs/Children with Disabilities
SENAC	*Serviço Nacional de Aprendizagem Comercial* National Service for Commercial Apprenticeship
SENAI	*Serviço Nacional de Aprendizagen Industrial* National Service for Industrial Apprenticeship
SENAR	*Serviço Nacional de Aprendizagem Rural* National Service for Rural Apprenticeship
SESC	*Serviço Social do Comércio* National Social Service of Commerce
SESI	*Serviço Social da Indústria* National Social Service of Industry
SESU	*Secretaria de Educação Superior* Secretariat for Higher Education
SETEC	*Secretaria de Educação Profissional e Tecnológica (linked to MEC)* Secretariat for Professional and Technological Education
SINAES	*Sistema Nacional de Avaliação de Educação Superior* National Higher Education Assessment System
SISTEC	*Sistema Nacional de Informações da Educação Profissional e Tecnológica* National Information System for Professional and Technological Education
SMEs	*Pequenas e médias empresas* Small and medium enterprises
SPE	*Serviço Pedagógico Específico* Pedagogical Service for Special Education
TALIS	OECD Teaching and Learning International Survey
TVET	Technical and Vocational Education and Training
TIIP	*Centro de Inovação Tecnológica e Propriedade Intelectual* Centre of Technological Innovation and Intellectual Property

UDESC	*Universidade do Estado de Santa Catarina* State University of Santa Catarina
UEM	*Universidade Estadual de Maringá* State University of Maringá
UFC	*Universidade Federal do Ceará* Federal University of Ceará
UFF	*Universidade Federal Fluminense* Fluminense Federal University
UFMG	*Universidade Federal de Minas Gerais* Federal University of Minas Gerais
UFRJ	*Universidade Federal do Rio de Janeiro* Federal University of Rio de Janeiro
UFSC	*Universidade Federal de Santa Catarina* Federal University of Santa Catarina
UFV	*Universidade Federal de Viçosa* Federal University of Viçosa
UNB	*Universidade de Brasília* University of Brasília
UNESC	*Universidade do Extremo-Sul Catarinense* University of Santa Catarina's Far-Southern Region
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNESP	*Universidade Estadual Paulista* Paulista State University
UNICAMP	*Universidade de Campinas* University of Campinas
UNICEF	United Nations International Children's Fund
UNIPLAC	*Universidade do Planalto Catarinense* University of Santa Catarina's Plateau
UNISUL	*Universidade do Sul de Santa Catarina* University of Santa Catarina's Southern Region
UNIVALI	*Universidade do Vale do Itajaí* University of Vale do Itajaí
UNIVILLE	*Universidade da Região de Joinville* Regional University of Joinville
UNOESC	*Universidade do Oeste de Santa Catarina* University of Santa Catarina's Western Region
USP	*Universidade de São Paulo* University of São Paulo
VET	Vocational Education and Training

Executive Summary

The present general review of the education system in Santa Catarina State, Brazil, examines the whole spectrum of education and research provision, and offers policy recommendations.

With a population of about 6.2 million, Santa Catarina is a relatively wealthy and economically progressive state. Both the federal government and the state authorities have invested significant resources in expanding education provision at all levels. An extensive raft of legislation and educational policy initiatives has been introduced, and education in all public education institutions is free.

Despite such praiseworthy efforts, the quantitative expansion of provision is not matched by the quality of the education provided, as measured by national and international tests. The key target for the future is therefore to raise the quality of student achievement, through improvements in all sub-sets of the education system, as summarised below.

The financing of public schooling

In Brazil the three levels of government – federal, state and municipal – are jointly responsible for running and financing basic education. The valuation of education as a priority area in Santa Catarina is reflected in the pattern of the expenditure allocated to it. In 2009 Santa Catarina devoted 19.3% of its revenues to education services, which was, by a margin, the highest proportion for any category, including health and social security. In the same year, the tax revenue of Santa Catarina allocated to education was 29.5%, or 4.5% higher than the constitutionally decreed minimum of each Brazilian state's tax revenues to be reserved for education.

While public spending on schooling is high in relation to the Gross Regional Domestic Product, outcome indicators are not commensurate with the level of investment in Santa Catarina, suggesting that service delivery is inefficient, rather than under-funded. The federal and state governments could strengthen incentives for efficiency enhancement by adding conditionality to

some budget transfers and by introducing rewards for performance. Budget rigidities should be removed, especially those related to revenue earmarking. Policy action should aim at making budgeting more flexible, which would allow budget-making and planning to be guided by efficiency considerations and policy priorities in the first place.

School-based accountability pressures are important for efficient use of education resources. Funding should be geared towards enhancing school-level outcomes, such as learning achievement and school improvement.

Governance: system and quality management

There are three types of public schools in Santa Catarina – federal, state and municipal – and a fourth category of private, fee-paying schools. The Secretariat for Education (SED) in Santa Catarina is responsible for the overall steering and monitoring of the system and for strategic planning and reforms. However, its remit is limited due to fragmented governance arrangements. A municipalisation process currently underway will further limit its competencies by putting all pre-schools and primary schools under municipal responsibility.

The capacity of the education system to manage change is relatively weak. Proper interfaces should be established between governance levels and between private and state providers of education. Without proper institutional arrangements to co-ordinate polices, the decentralisation process could negatively impact education quality by further fragmenting the system.

The review team recommends introducing state-based regulatory mechanisms for monitoring and co-ordinating education policies, to be complemented by regular institutional audits for quality assurance. Quality-related data about the system should be diversified beyond information on immediate learning acquisition and test performance. Data and policy analysis should be undertaken and distributed more widely and actively, possibly through an independent body for educational policy, research and analysis.

Access and equity including special education provision

Santa Catarina, as Brazil itself, has a creditable record in honouring its commitments towards equality of educational provision, under a range of international agreements, and there is no gender imbalance in the participation of boys and girls in education.

Special education in Santa Catarina is run by the SED, with the support of the Santa Catarina Foundation for Special Education (FCEE, *Fundação Catarinense de Educação Especial*), assisted by local Associations of Parents and Friends of Exceptionals (APAEs, *Associações de Pais e Amigos dos Excepcionais*). In the absence of obligation for co-ordination, the links between governance levels and service providers in many municipalities seem to work on *ad hoc* basis. This likely impacts the reliability of diagnostic procedures, the rate of identification of children with special educational needs/children with disabilities (SEN/CWD), and ultimately, their access to education. In 2009, Santa Catarina devoted only 3.4% of its education budget to SEN/CWD, and many APAEs, despite their crucial role for the provision of services to SEN/CWD, need to raise income from other sources.

Less than one-third of all registered children with SEN/CWD are in mainstream schooling. Additionally, the review team is concerned that a substantial number of children with SEN/CWD remain unreached by and "invisible" to the education system or simply drop out before time. Statistical data is weak and there is a shortage of special needs education in general courses of teacher education.

SED should implement measures for improving accurate data gathering and data sharing among various levels of government and among ministries, and all APAEs should be encouraged to strengthen their links with health and social welfare agencies, and to publicise their services more widely. An agreement between municipalities, private providers and the state should be reached on what are the obstacles for children with SEN/CWD in regular schools. These obstacles should be removed in a joint effort.

Curriculum and textbooks in pre-school, basic and secondary education

The Federal Ministry of Education (MEC) in Brasília sets the curriculum policy, operates standardised learning assessments and provides textbooks for students in public schools. The SED of Santa Catarina is responsible for implementing national policy, and for shaping the educational experiences of the citizens in the state.

As most schools work on a three-shift basis, the maximum hours of instruction available for individual pupils per week are 20 "clock" hours. There is a mismatch between the *intended curriculum* and the *time available* for teaching and learning in the classroom. The subjects are treated as compartmentalised entities, rather than in a cross-curricular fashion.

Teachers expressed satisfaction to the review team on the general quality of the textbooks available. There were reservations that the vocabulary was pitched too high for many pupils, and disquiet was also expressed that textbooks were not always delivered in time for the start of the new school year.

If the learning time available to students cannot be increased at present, then the review team recommends reduction of the number of compulsory subjects. There should be more room for individual choice of subjects by students. A new approach to classroom teaching and learning is required, with much more scope for teacher-pupil interaction. Furthermore, the state policy on inclusive education must be accompanied by a much more individualised approach to teaching and learning.

Student assessment

Perhaps the most central concern of the Santa Catarina authorities regarding education is the poor level of performance of students as measured on national and international tests. Student outcomes remain well below what might be expected. Significant new targets are being set for improved performance by 2022, and the challenge now is how to bring them about.

Santa Catarina uses a combination of national assessment tools, and Brazil has participated in the OECD Programme for International Student Assessment (PISA) since 2000. Santa Catarina will also participate as an adjudicated region in PISA 2012. The performance of Santa Catarina has been better than that of other Brazilian states, although overall the performance of Brazilian students on the tests continues to be in the bottom category of countries participating in the survey.

It is essential that the SED and the CEE (*Conselho Estadual de Educação*, State Education Council) shift their attention from inputs and processes to effective ways to improve student *learning*. There is need for clear guidelines, including mark descriptors, so that teachers can make valid decisions in evaluating students' learning and their eligibility for promotion. With the support of key stakeholders, the examinations for entering higher education should be reformed to ensure more fairness and transparency in the examination process.

Professional and technological education

In Brazil, professional-technical education at secondary level is termed EPTNM (*Educação Profissional Técnica de Nível Médio*), while that at undergraduate and postgraduate levels is referred to as EPTNS (*Educação*

Profissional e Tecnológica de Nível Superior). EPT (*Educação Profissional e Tecnológica*) is the overall term for the multi-level professional and technological sector. There has been considerable public debate on the appropriate content framework of technical education in Brazil and what is now favoured is the integration of professional-technical education with general academic education.

Santa Catarina is not in the forefront of the national movement for change in professional education. The review team considers that the integrated approach to EPT is recommendable also for Santa Catarina State. It weakens the division lines between regular and professional education, and has the potential to improve the permeability of learning pathways across secondary and higher education, hence motivating upward professional development.

The report further recommends a single strategy integrating all existing initiatives and programmes, irrespective of their origin or jurisdiction, whether federal, state or private. A system of indicators for measuring performance, the analysis of data and the establishment of a qualifications system with a sound grounding in learning outcomes should be introduced. Furthermore, SED should support the establishment of career guidance services, which are missing at present.

The teaching career and teacher education

Teachers need to form a central dimension of any policy focussed on the improvement of the quality of education. The review team found that the image of teaching as a career in Santa Catarina was poor and in decline. There is an urgent necessity to rebuild the status of the profession and to project it as a career choice of value and importance.

A shift system and large classes impinge significantly on teachers' time for planning, evaluation and pupil feedback. Much of the teaching is of a traditional, teacher-centred model, and classroom environment of some schools is inimical to high quality teaching and learning. Quality teaching input is also affected by high rates of teacher absenteeism. The practice of relying on a very large cohort of "temporary" teachers is also not conducive to sustained, progressive teaching. Santa Catarina has no school inspectorate, and the evaluation of teachers' work hitherto has not been well structured.

The review team formed the view that the quality of teacher education is seriously unsatisfactory and that there is great quality unevenness. The team recognises that both federal and state authorities are undertaking steps in reforming initial teacher education, and in improving in-service teacher education.

The team recommends that SED draw up a comprehensive policy paper on its policies related to the teaching career. The proportion of "temporary" teachers and the currently heavy teaching loads should be reduced. Ideally, the recently introduced school management assessment scheme should incorporate a teacher evaluation dimension, and salary schemes should provide incentives for improving quality.

Higher education

To achieve its economic and social goals, Santa Catarina faces two main challenges regarding higher education – increasing participation and graduation rates, and improving the quality and efficiency of the education provided.

Student participation in Santa Catarina was 26% of the 18 to 26 age group, slightly above the average for the rest of Brazil (25%), but below the South American average of 30.3%. The most successful students apply to the federal and state higher education institutions (HEIs), but they only cater for 18.3% of enrolment. About 66% of all enrolled students are evening students. The mixture of governance and funding models in the public sector, as well as the proliferation of small private institutions makes for a complex system of tertiary education that potentially fosters inequality of access, distorts student preferences and is inefficient in the use of resources.

Federal and state universities, which are free, have the highest demand for entry and, consequently, are highly selective. Admission decisions are made on the basis of results achieved at the entrance examination, the *Vestibular,* and due to that a proportionately higher number of accepted students come from private schools and from homes able to pay the fees for such schools. About a quarter of the student places available in the non-public universities remain unfilled.

Quality assurance is too institution-centred and input-based. More importance should be given to the analysis of educational outcomes and institutional impact. The feasibility of founding a state-wide independent quality assurance agency should be explored. The agency would establish internationally accepted, relevant accreditation criteria. Part of the quality concept should be the internationalisation of higher education, which is highly desirable but to date very marginal. If it is to have real impact, internationalisation will require special efforts by all actors involved, in particular promotion of second language proficiency at all levels of the education system.

The team recommends that the National Education Council (CNE, *Conselho Nacional de Educação*) take the lead in formulating a strategic approach to the development of the higher education system. A number of affirmative initiatives are in place in support of equality of opportunity for poorer students, yet funding through loans is not easily available. Changing this and allowing for a better use of federal and state funding for direct financing of students would help to improve access to tertiary education for all students in Santa Catarina.

Research, development and innovation

Because of its significance for economic and social development in contemporary society, the reform of the RDI system in Santa Catarina is an essential element in the reform of higher education in the state and of its knowledge institutions.

In 2007, over 75% of researchers were located in Brazilian universities, with 20% in private enterprises. By contrast, in OECD countries, almost 70% of RDI workers were either directly employed, or actively collaborating with counterparts in enterprises, and less than 25% were in the university sector. In Santa Catarina, the Federal University (UFSC) is the only university in the state which is regarded as a leading RDI institution, by international standards.

At a time of consistent growth in Brazil's output in basic sciences, which reached a 2.02% share of international published articles in 2007, Brazil's share of the world's registered patents was only 0.06%. One reason for Brazil's poor record in converting scientific knowledge into practical results is the country's low level of investment in RDI. While Brazil dedicates only 0.98% of its GDP to RDI, China invests 1.22%, and Brazilian corporations, which should be most responsible for creating patents, are investing little in their own research.

Currently Santa Catarina supports a range of networks, incubators and innovation centres. The state government should consider the development of a comprehensive policy and governance framework and the introduction of internationally recognised indicators and metrics for monitoring and evaluation of RDI outcomes. The gross expenditure in RDI should be increased and the funding mechanisms restructured. There also needs to be a co-ordination of RDI resource allocation, a co-ordinated effort to promote English as a second language for RDI workers and the adoption of contemporary RDI performance assessment tools. There is also a need to improve the relevance, quality and impact of RDI initiatives and programmes.

Chapter 1. Introduction

This chapter gives a general introduction to key features of Santa Catarina and its society. It aims to provide a contextual framework against which to view the various features of the education system which are examined in the body of the report. The chapter highlights key information on the state's history, economy, population and landscape. It sets out an overview of Santa Catarina's education system. The chapter concludes with an outline of the review process and an identification of the main themes which were examined.

Santa Catarina: the general context

A historical note

While Brazil's history is an ancient one, European settlement began with the arrival of Spanish settlers on Santa Catarina Island in 1542. The Portuguese took control in 1675, and the "captaincy" of Santa Catarina was established in 1738. From 1746, inhabitants of the Azores islands (attracted by incentives offered by Portugal) started to emigrate to the south of Brazil; in Santa Catarina, there are still traces of Azorean architecture and traditions, notably in coastal regions – for example, in São Francisco do Sul, one of the oldest cities of Santa Catarina, first established by the Spanish in around 1555 and taken over by the Portuguese in 1658. It still maintains its Azorean fishing traditions, as observed by the OECD review team during its visit in October 2009 on a visit to the "fisherman's school" (*Casa familiar do Mar São Francisco do Sul)*, a part-time boarding school for boys over the age of 14).

Brazil won its independence from Portugal in 1822. The first German immigrants started arriving on Brazilian soil shortly after Brazil's independence. Over the following century, more than 250 000 German immigrants entered the country, a large number of them settling in the southern states and especially in Santa Catarina. They were followed by immigrants from Italy, Poland, Russia, Ukraine and other parts of Europe.

Of course, the African American heritage is also represented in the population. Africans and "*pardos*" (mix of Africans, Caucasians and/or Amerindians) account for about 12% of the overall population. The small indigenous population, estimated to be about 10 000, are mainly settled on reservation lands outside the major metropolitan areas.

Santa Catarina, thus, has a large diversity of social, cultural and ethnic groups. While sharing a common sense of statehood and nationhood, groups are conscious of and celebrate their diverse cultural and social traditions, particularly in the contemporary pluralistic climate which exists. Santa Catarina cherishes the mosaic of cultures which comprises its society and sees a richness in this cultural diversity.

The contemporary profile

Brazil is a federal country with the federal government located in Brasília. Santa Catarina is one of 27 states within the country. The estimated population of Santa Catarina, in 2009, was 6.2 million. The state covers a large area of 95 346 181 square kilometres, with a population density of 62.5 people per square kilometre. The landscape is very varied and attractive, with some areas more densely populated than others. People's occupations vary, influenced by the area in which they are located. Florianópolis, the capital, is on the east coast, close to many popular beaches. Santa Catarina is divided into 36 regional administrative divisions, and there are 293 cities. The urban/rural distribution of population is about 82% urban to 18% rural.

Santa Catarina is a relatively wealthy and economically progressive state. It ranks fourth among all 27 Brazilian states, within the country, in terms of economic development and GDP per capita. Its GNP is USD 45.9 billion, while its GDP per capita is USD 15 200 (2007 figures). The Human Development Index, at 0.84, is the second highest in Brazil. The general literacy rate of persons 15 years and older is ranked as 96%, with the functional literacy rate, of the same age cohort, put at 85%. The average years of schooling for 15 year olds and above is about 8 years, but variation can exist between different categories of the population. School attendance patterns also vary according to family income. For the age group 15-17, families categorised in quintile 1 income have a 69% attendance rate, but those in quintile 5 have a rate of 84% attendance.

Economy

Santa Catarina has one of the highest standards of living in Brazil and is a major industrial and agricultural centre. In 2008, the industrial sector in Santa Catarina was the largest sector, contributing 51% the state's GDP;

followed by the service sector at 32.5% and agriculture at 14.5%. In the northeast of the state, the electro-mechanical, textile and furniture industries are the main contributors to economic development; in the west, cattle, poultry and related agribusiness predominate, while in the south the economy is focused on coal mining, ceramics and fishing. The northern corridor that includes Joinville, Jaraguá do Sul and Blumenau is heavily industrialised – more than 50% of the state's industrial output is concentrated in this small, but highly developed area. Tourism is another major (and growing) part of Santa Catarina's economy. The state has some of the best beaches in Brazil, and during the summer months (December-March) they are one of the most popular travel destinations in South America.

Brazil is already self-sufficient in oil and large new offshore discoveries have been made which are likely to make it a big oil exporter in future years, and this is likely to benefit Santa Catarina's economy. It is also noteworthy that even in recent world recessionary times foreign direct investment (FDI) in Brazil has increased greatly (*The Economist*, November 2009). Santa Catarina is well poised to benefit from foreign investment. As with the case of Brazil in general, Santa Catarina has been successful in reducing the traditionally high levels of social inequality within its population. The federal government's economic research agency, IPEA (*Instituto de Pesquisa Econômica Aplicada*), records that extreme poverty was halved in Brazil between 2003 and 2008 (*The Economist*, November 2009). The extremes were less in Santa Catarina than in many other states, and improved economic performance, coupled with more progressive social policy, has led to more improvement there.

Among issues identified as causing difficulties for greater economic development are inadequacies in the physical infrastructure of the state and weaknesses in human capital skills for innovation. The World Bank study of innovation (2008) found that the lack of basic skills among workers was probably the single most significant obstacle to the free flow of innovative practices across firms (Rodríguez *et al.*, 2008). The report pointed to many weaknesses in the education system relating to the preparation of people for success within the knowledge economy. Economic development has also been impeded by the relatively low level of investment in research, development and innovation (RDI) by the federal government and by the State of Santa Catarina. There are signs that this policy is changing and Santa Catarina's *Innovation Law* of June 2009, allows for a series of incentives for scientific and technological research and innovation which should have long term benefits for its economy. (The RDI issues are discussed in detail in Chapter 10.)

Overview of the education system

History of education in Brazil

In the 19th century, Brazil was a very poor country, and it had an educational level to match. Rough estimates for the end of the Empire (1822-1889) show that no more than 15% of the population had attended school. In 1872 – the year of the first General Census of Brazil – about 140 000 children were enrolled in the old primary school system (grades 1-4), out of a total of one million children aged 7-10 (about 1.4%).

Even worse was the performance of the Old Republic (1889-1930), which did practically nothing to improve the meagre efforts of the Empire. The General Census of 1920 recorded that only 20% of children aged 7 to 14 years were able to read and write, which means that at some time they must have attended school even if they did not complete primary education. Among people aged 15 or older, 35% were able to read and write.

As early as the turn of the 20th century, Argentina and Uruguay – both enjoying rapid economic development – were advocating universal primary education; indeed Argentina had nearly reached this goal before the First World War, with Uruguay not far behind. Brazil, on the other hand, remained poor far longer, and education was mostly limited to the aristocracy and an emerging bourgeoisie.

All this changed dramatically with the rapid growth of the Brazilian economy, especially after 1950. From a *per capita* income as low as that of Bolivia, Brazil achieved near-equivalence with that of Argentina, which at the start of the 20th century was almost five times higher than Brazil's. But the gap between a sky-rocketing economy and a poorly educated workforce became painfully obvious.

The first decisive action to narrow this gap started in mid-century and was led by industry. The National Service for Industrial Apprenticeship (SENAI, *Serviço Nacional de Aprendizagem Industrial*) was created, later becoming a model for many other Latin American countries. It created a federal network of technical schools, expensive, well-equipped, and initially focused on the training of technicians for the rapidly growing Brazilian industry. Of equal importance was the strengthening of federal universities: expanded to all states, with good infrastructure, and laying the foundations for postgraduate courses to educate the intellectual and economic leadership the country needed at a time of astronomical growth.

Fundamental and secondary education, however, at first did not benefit from the same energy and purpose that drove SENAI and the federal universities. Quantitative expansion of enrolment in *fundamental* education began only in the post-World War II period, but with little effort or political

will to ensure its quality. Around 1950, 50% of the primary-education age group was enrolled in school, due to the expansion of increasingly decentralised state and municipal networks.

Expansion in the late 20th century

Primary enrolments grew steadily, from about 16 million students in 1970 to nearly 36 million in 1998; and in just nine years between 1991 and 1999 there was an increase of 6.5 million students (22.3%), reaching 95% of the school-age population. This went beyond the target set by Brazil's *Ten-Year Plan for Education for All* which projected raising the school-age population covered to at least 94% by the year 2003 (MEC/SEE/INEP, 2000). The expansion of the primary education system began to slow down in the 1990s after it had already reached a high level of coverage, but secondary school attendance rates continued to grow at a rapid pace. According to the 2006 National Household Sample Survey (PNAD, 2006, *Pesquisa Nacional par Amostra de Domicílios*), among persons born in 1990, 98% attended primary school and 90% attended secondary school. Among persons born in 1994, 99% attended primary school. The peak value for participation in secondary education, according to PNAD 2006, is 91% for persons born in 1988.

Before 1996, tertiary enrolments were low by international standards. However, in line with Brazil as a whole, since 1996 participation has been steadily rising. (see Chapter 9 on Higher Education in this review), and almost one-fifth of the population born around 1980 had attended a university or other institution of higher education by the time the PNAD 2006 survey was conducted.

Unfortunately, a perhaps inevitable consequence of this massive expansion is that what has been gained in quantity appears to have been at the expense of the overall quality of the system. One indication of this is the high rate of grade repetition, an issue that is well understood by the education policy makers at federal, state and municipal levels. Unless students progress well, perform in line with standards set by the Ministry of Education (MEC, *Ministério da Educação*) and the State Secretariats for Education (*Secretarias de Estado de Educação*), and eventually leave secondary education with sound basic and higher-level skills, it will not be possible to provide the labour market and the higher education sector with the high-quality entrants they need to support Brazil's and Santa Catarina's economic and social development.

A key factor in improving both quantity and quality of education over the past 90 years is the vast improvement in the professional quality and expertise of education secretaries at all levels, as they meet the responsibilities

that result from decentralisation and (more recently) the municipalisation of pre-school and *fundamental* education. One remaining challenge for them now is to break the log-jam created by students who are still in *fundamental* education at age 15, as well as by the growing number of older students who are returning to school because they realise what they need to compete in the labour market. Because this, the first year in secondary school can have as much as 30% more students than the last year of *fundamental* school.

The present situation

Both the federal government and the Santa Catarina authorities clearly recognise that the education of citizens is of crucial importance to the economic, social and cultural well-being of the societies in the context of globalisation and the knowledge economy. The higher profile of education within Brazilian government policy is reflected in the extensive legislative and educational policy initiatives which have been taking place. It is also noteworthy that educational policy formulation is not of the "top-down" variety, but has been, particularly over the last two decades, involving widespread consultation with the chief stakeholders. Education is less seen as just a social provision but more as an essential investment in human capital which produces significant dividends for society, as well as individuals. A driving force of education policy is the realisation that improving the knowledge, skills, and attitudes of citizens is a *sine qua non* for a country which aspires to be a major player on the world stage in the twenty first century. Education has been benefiting from an increasing percentage of an expanding GDP.

As well as the expansion of educational provision, the federal and state governments have been resourcing schooling by a range of supportive interventions. All education in public schools is free. Furthermore, textbooks are provided free, on a three-yearly cycle. Free school transport exists for pupils who live more than three kilometres from a school. Schemes exist for the provision of school uniforms and for school meals. As well as the provision of the teaching force, there is a generous scheme of support staff for administrative, caretaker and security roles. From the early nineties, the curriculum has been under continual review, in association with stakeholders, and has been adapted and up-dated on a regular basis.

One of the key challenges facing a system seeking extensive expansion, in a short-time frame, is the availability of a satisfactory infrastructure of schools. While the physical fabric of many of the schools in Santa Catarina is satisfactory, there are not enough of them. The only way in which the increased schooling population can be accommodated is that the great majority of schools have to accommodate three shifts per day, from early in the morning to late at night. The maximum class time per shift is four hours,

including a break period. (Some schools have projects and programmes to enable students to stay at school after classes, *e.g.* extra-curricular activities and Open School). Even with good management of the shift system, the fact remains that current schooling provision has impacts on the extent of schooling available to enrolled pupils, on the optimal times for many pupils' engagement with school, and on a variety of other qualitative issues, including the quality of teacher input.

Schooling in Santa Catarina also exhibits a complex, inherited, pattern of schooling provision. There are four types of schools. These include three public ones – federal, state and municipal. A fourth category is made up of privately-owned, fee-paying schools. Each of these categories of school operates independently of each other, and under different management and regulatory arrangements. Currently, national policy is that the municipalities should become responsible, for all public pre-schools and primary schools, while the state would be responsible for all public secondary schools. However, this is proving to be a controversial policy issue in Santa Catarina.

A study published in the mid-1990s characterised education in Brazil as *a bad hand, played badly* (Birdsall *et al.*, 1996, pp. 7-49); not only were policy makers dealt a bad hand in terms of post-war socio-economic and political conditions, but they made policy choices that failed to help (and sometimes worsened) the country's education situation. The study highlights some of these choices as follows:

- Chronic under-investment in education, at the same time as the numbers of students were growing rapidly.

- Favouring tertiary over basic and secondary education in allocating public funds.

- Low and declining quality of basic education, made worse by large variances in spending per students across municipalities, and even between state and municipal systems *within* the same municipality.

- Inefficient use of resources, *e.g.* in student-to-staffing ratios, and also in teaching-to-non teaching personnel.

While some of these problems persist, there is no doubt that today's Brazil has great strengths: stable politics, an open and fairly harmonious society, and an economy that is growing rapidly after decades of stagnation. And among the country's 26 states and one (Federal) District, Santa Catarina is one of the most prosperous and forward-looking.

In his presentation to the OECD review team on 13 October 2009, the Secretary of State for Education set out an impressive programme for the development of Santa Catarina's education system, including universal

secondary education, mainstreaming of children with special needs, addition of optional extra-curricular activities including sports, foreign language study, as well as the development of cross-curricular themes such as citizenship education, prevention of violence and drug addiction, and environmental awareness.

Indeed, much has been done to raise enrolment rates (especially in secondary education); to equalise spending capacity among state and municipal jurisdictions, where a large proportion of education funding is spent; and to introduce systematic performance assessment for students and institutions. These initiatives have been highly successful, particularly in terms of delivering near-full enrolment rates, at least during the compulsory years (age 6-14).[1] For example, in 1930 only 20% of children aged 7-14 went to school; by 1985 this had risen to 81% and in 2008⁄9, nearly 97% of 7-14 year olds were enrolled. In general, attendance is good, and repetition rates are coming down.

Demographic advantage

It is also important to bear in mind the rapid changes in Brazil's demographic structure. Since the 1990s, after the birth rate dropped by half in less than 20 years, the pressures on the country's education system have eased. Until then, these pressures came from two sides: on the one hand, the need to include previously marginalised children; and on the other hand, the need to provide places for large numbers of new entrants, resulting from a very high birth rate.[2] Resources were necessarily concentrated on providing quantitative access to schools.

Given Santa Catarina's very slow population growth rate (see Table 1.1) and low birth rate (1.60%, compared to 1.83% for Brazil) in recent years, the state should now be able to benefit from the "demographic dividend" this provides.

Table 1.1 **Growth rates from 1950-2010**

	Average annual population growth rate (%)					
	1950-60	1960-70	1970-80	1980-91	1991-96	2005-10
Brazil (total population, December 2009: 192 130 296)	3.04	2.89	2.48	1.93	1.38	1.24
Santa Catarina	**4.14**	3.45	1.44	1.38	1.24	**0.99**

Source: IBGE, Demographic Censuses of 1940-1991 and Population Counts 1996 – December 2009. See www.ibge.gov.br/english/.

The quality gap

But there is no denying the fact that the *quality* of Brazil's (and even Santa Catarina's) schools still falls short, despite heavy public spending on education (nationally 5.1% of GDP in 2006, intended to rise to 6% by 2012).[3] The performance of Brazilian students in reading, mathematics and science remains comparatively low, in relation to other countries with similar levels of development. Now that nearly all youngsters of compulsory schooling age are in school, the policy and funding focus has, quite rightly, shifted to improving education quality.

Finance

Under federal regulations, all states and municipalities must earmark a minimum of 25% of their budget for education.[4] For 2009, the student per capita expenditure was between BRL 1 100 and 2 300, depending on the level (pre-school, primary, or secondary, vocational, special needs, or indigenous schools). This is added to Santa Catarina's budget, and at least 25% of the total must be spent on education, although in practice the state spends about 28%. Santa Catarina's education budget for the 2009 school year was approximately BRL 2 billion; however, due to the economic recession and the severe storms that hit parts of the state in 2008, about BRL 372 million were lost.

Policy framework and provision in fundamental and secondary education

The Federal Ministry of Education (MEC) in Brasília – which sets the national curriculum framework, implements standardised learning assessments, and acquires core-subject textbooks for students in public schools across the nation – clearly has a key role in formulating national education laws and setting and monitoring standards. But with a total of more than 50 million students in its education system, there is only so much MEC can do: the actual task of delivering quality falls to state and (increasingly) to municipal governments. The State Secretariat for Education in Santa Catarina, and its municipalities, are among the most successful in the country.

Improving quality in schools

Nevertheless, as is set out in more detail elsewhere in this review, the authorities face serious problems in seeking to improve the quality of education. Among the problems most seriously affecting the quality of

schooling are: time in school, the nature of the curriculum, pedagogic styles (issues discussed in detail in later chapters), teacher absenteeism and grade repetition.

Teacher absenteeism

As the OECD review team found during its field visits, teacher non-attendance is widespread. It appears that teachers are "entitled" to three days' absence per school year with no warning or explanation, but some take many more. In public schools, as many as 13% of all school days were lost in 2006 due to teacher absence; and "on a bad day in bad schools in bad jurisdictions, teacher absenteeism can reach 30%" (*The Economist,* 6 June 2009*,* p. 51). Substitute teachers are in theory available, but this is not always the case at short notice, and continuity in teaching – as well as effective "time on task" in the classroom – are lost to students.

School directors are powerless to dismiss permanent teachers for non-attendance; and teacher unions present an unacceptable obstacle to improvement. Even the slightest change in working conditions can lead to strikes. While the OECD review team appreciates that many teachers have two or more jobs in different schools, and that the three-shift system prevailing in schools means that many teachers have workloads of 40 to 60 hours per week, it is clear that the conditions for *student learning* become unacceptable if teachers simply do not turn up for class. Inevitably this is reflected in learning outcomes, as demonstrated by the various national and international assessments.

Grade repetition

Although attempts are being made to improve the situation, too many students are still repeating whole school years, sometimes more than once. Brazil's average repetition rate of 19% is the highest in Latin America, and one of the highest in the developing world. Apart from being inefficient and wasteful of resources, high repetition is often linked to high drop-out, especially among older students who, after long years of getting nowhere, leave school in search of employment or to help their families at home. National secondary school completion rates are just 42%, and as many as half of secondary school students are more than two years "over age" for their grade.

Nevertheless, repeaters are, at least, still attending school. A high repetition rate is far better than a high drop-out rate, especially in the early primary years. For example, 1988 figures for Brazil as a whole showed that just over half (54%) of all first-graders had to repeat the year, while only 2% dropped out (Fletcher and Ribeiro, 1988).[5]

In Santa Catarina, the policy "*Sistema de avanços progressivos*" (System of Continuous Advancement) was, implemented between 1970 and 1984. It allowed all students in all primary grades to be promoted automatically. Some studies that assessed this policy consider that it was intended simply to reduce failure rates, which had been unacceptably high (Senna and Medeiros, 1984; Pereira *et al.*, 1984). However, it should be remembered that the rapid expansion of primary enrolment rates at that time brought many previously excluded children into the schools; and the "automatic promotion" policy prevented massive "failure" rates in the first years and improved social inclusion, by allowing disadvantaged children more time to adapt and by encouraging parents to keep sending their children to school.

Although the *avanços progressivos* policy was abandoned in 1984, Santa Catarina has recently introduced a similar policy by designating the first two or three years of primary as a single cycle *(ciclo básico)* during which no marks are given and no repetition is allowed. This "*ciclo básico*" approach is aimed not only at reducing repetition rates, but also at ensuring that *all* children acquire basic literacy and numeracy skills and reach acceptable levels of "alphabetisation" before continuing in the higher grades. This is particularly important now that children enter school at age 6, and many of them have not had pre-school experience.[6]

INEP, IDEB and School Census

Educational quality is the main concern of the National Institute of Studies and Educational Research Teixeira (INEP, *Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira*), the professional arm of the MEC, which provides education policy support through research and system evaluation. In addition, INEP conducts an annual *School Census* – a national survey education system statistics.

In 2007 INEP also created the Index of Basic Education Development (IDEB, *Índice de Desenvolvimento da Educação Básica*), which monitors student flow and academic performance. The Index reflects system performance, based on data provided by schools, obtained in the School Census, in the National Basic Education Assessment (SAEB, *Sistema Nacional de Avaliação da Educação Básica*), and in the *Prova Brasil* (Test Brazil, see section on Assessment in Chapter 6).

Enrolment trends (Brazil)

According to the School Census 2009 conducted by INEP, there were 52 580 452 students enrolled in basic education in Brazil, in a total of 197 468 schools. Compared with 2008, this represents a drop in enrolment of 652 416 students (1.2%). However, there was a small increase of 0.6% in the number of children in pre-school education (*educação infantil*, ages 0-5/6), particularly in crèches (day care, ages 0-3) where enrolments rose by 8.3%. Enrolments of children aged 4-6 dropped by 2%, as a result of the introduction of the nine-year school where children can enrol from age 6. A recent Constitutional Amendment (No. 59, 2009) making education compulsory from 4-17 years of age with full implementation expected by 2016 will certainly affect enrolment.

Of the 52 580 452 students enrolled in basic education in Brazil, most (86.1%, or 45 270 710) were in public schools; of these, about 45% (24 315 309) were in schools run by municipalities. INEP notes that the fastest growing sector is the federal schools network. The private school sector enrolled about 13.9% (7 309 742 students). In private education, the main increases were in the provision of day care (5.8%) and vocational education (10.7%).

Overall, secondary education *(ensino médio)* enrolments showed a slight decrease of 0.3%; however, there was a sharp increase of 8% in secondary vocational enrolments. Secondary programmes for out-of-school youth and adults also grew, by 7.3% compared with 2008.

The 2009 Census also shows a significant increase (21.3%) of full-time students in public schools with extended hours, although this still represents only 4.7% of the total number of students.

Enrolment trends (Santa Catarina)

In basic education, the overall number of students is decreasing gradually, probably as a result of changes in the birth rate over the past decade. It is, however, notable that the state sector had more schools (but fewer students!) in 2009 than in 2005, while in the municipal sector the opposite is true – fewer schools, but more students. On the other hand, there are more federal schools, and more students enrol in them. In the private sector, both the number of schools and the number of students declined between 2005 and 2009.

Table 1.2 **Basic (*ensino fundamental*) schools in Santa Catarina 2005-2009**

Year	Total		Federal schools		State schools	
	Schools	Enrolment	Schools	Enrolment	Schools	Enrolment
2005	6 660	1 696 248	10	8 095	1 281	832 950
2007	6 699	1 574 212	13	7 250	1 417	738 642
2009	6 352	1 546 738	14	9 484	1 334	681 205

Year	Total		Municipal schools		Private schools	
	Schools	Enrolment	Schools	Enrolment	Schools	Enrolment
2005	6 660	1 696 248	4 361	636 954	1 008	218 240
2007	6 699	1 574 212	4 218	640 965	1 051	187 355
2009	6 352	1 546 738	4 119	656 992	885	199 057

Note: Additional data for early childhood, *fundamental* and secondary education are found in Chapter 3.
Source: SED Directorate for Organisation, Control and Assessment (DIOC), 2009.

In secondary education, the trend in Santa Catarina shows a different picture: enrolments in federal and municipal schools went down, but state-run secondary schools grew rapidly between 2000 and 2003 but remained steady between 2003 and 2007. Private sector enrolments are also more or less steady (8.75% of secondary students in 2000, and 7.97% in 2007), as shown in Table 1.3.

Table 1.3 **Secondary (*ensino médio*) schools in Santa Catarina 2000-2007**

Year	School type	Enrolment	% of age group 15-17
	Federal	2 730	0.85
	State	114 067	35.68
2000	Municipal	944	0.30
	Private	27 969	8.75
	Total	**145 710**	**45.58**
	Federal	2 256	0.67
	State	155 969	46.64
2003	Municipal	993	0.30
	Private	32 131	9.61
	Total	**191 349**	**57.22**
	Federal	1 458	0.40
	State	154 673	42.93
2007	Municipal	501	0.14
	Private	28 718	7.97
	Total	**185 350**	**51.44**

Source: SED Directorate for Organisation, Control and Assessment, 2009.

However, it is of some concern to the OECD team that, according to these data, total secondary enrolments went *down* between 2003 and 2007, both in absolute numbers and in the percentage of the 15-17 age group covered (57.22% down to 51.44%). Given the SED's stated intention to expand post-basic education, the trend appears to go in the opposite direction.

Professional (vocational) and technical education

Vocational and technical education has a deep-rooted tradition in Brazil. It celebrated its centenary in 2009 and has a rather complex historical background which did not follow a European-type model. In general, in Brazil there has been strong public regard for technical education, with some states championing it more than others. Santa Catarina would not be in the forefront in this regard. In Santa Catarina, professional and technological education is provided by four agencies – the federal, state and municipal authorities, and the private sector. The federal and private sector institutions tend to be the best resourced and organised. The private sector institutions come under the aegis of SENAI – set up by the National Industry Confederation (CNI, *Confederação Nacional da Indústria*) and financed by a levy on industry. The SENAI institutions are particularly strong in Santa Catarina. However, they tend to be compartmentalised from the state and municipal institutions.

There are two levels of professional and technical education – one is termed EPTNM (*Educação Profissional Técnica de Nível Médio*), and is largely school-level training. The other, EPTNS (*Educação Profissional e Tecnológica de Nível Superior*), is mainly at tertiary education level. Since 2004-05, government policy has encouraged greater integration of technical education with general academic education at upper secondary school level, somewhat on the lines of what would be termed a comprehensive curriculum. Permeability and linkages are encouraged between EPTNM schools and the higher level EPTNS institutions. Current policy is in line with a lifelong learning approach. The federal government has been backing the provision of professional and technical education, and providing increased resources for it. However, the satisfactory implementation of policies is causing difficulties, particularly regarding pupil readiness for the challenges involved. In Santa Catarina, the provision of technical education tends to be patchy from a geographical point of view. Support for EPTNM by distance education (*E-Tec Brasil, Escola Técnica Aberta do Brasil*) is also weak. Overall, there is scope for an improved, coherent strategy for professional and technical education to position Santa Catarina well in this area, for the future.

Higher education

Since 1996, there has been a very large increase in the number of higher education institutions in Santa Catarina. In 1996, there were 21 such institutions of which 11 were private, for-profit. By 2009, the total number of higher education institutions had increased to 121, of which 102 are private, for-profit. The federal, state and municipal universities are free, the community (ACAFE, *Associação Catarinense das Fundações Educacionais*) universities are fee paying, but not for profit, while the remainder are fee-paying, for profit institutions. For a population of 6 million people, the number of HEIs would seem very large. While 84% of the HEIs are private, for profit, they only enrol 27.5% of students, mainly part-time, and the average size of these institutions is less than 600 students. Most of the staff in these institutions are part-time and the qualifications of 51% of them are less than Master's level. Standards and levels of study vary across the higher education sector. The federal and state universities are the most prestigious, the best endowed, and have the greatest capacity for conducting research. Student-staff ratios across the sector are generous by comparative standards. Staff in the federal and state universities enjoy permanent employment status, on the lines of civil servants.

Student numbers grew from 70 000 in 1996 to reach 216 000 by 2009, with about 140 000 of them categorised as evening students. Only a very small proportion of the students are engaged in postgraduate Master's or Doctorate courses. The prestigious federal and state universities offer free courses, and have the highest demand and can be highly selective. A considerable degree of social inequality operates in higher education. Most of the students who qualify for the free public universities come from middle and high income families, who usually graduate from fee-paying, private secondary schools. As a counterweight to this regressive social pattern, the authorities have introduced a scholarship scheme (ProUni, *Programa Universidade para Todos*), an affirmative action programme, and a scheme of student loans (FIES, *Programa de Financiamento Estudantil*).

Among challenges facing the higher education system in Santa Catarina are: more rigorous quality assurance, greater equity in participation, more efficient use of the higher education infrastructure, expanded postgraduate provision, increasing the research capacity, and a more sophisticated form of internationalism.

The teaching force

One of the great challenges in the successful expansion of a schooling system is the availability of a teaching force capacitated to deliver successfully the qualitative educational reforms which are required. Teachers

are crucial agents if the quality of the education system is to be improved. At present, the image of teaching as a career in Santa Catarina is poor, and many teachers are unhappy with their circumstances.

Following appointment based on performance in a public competitive examination, teachers undergo a three-year probationary period. If employed in a state or municipal school the appointment is generally a permanent one. The salary framework for state employed teachers is based on a horizontal and a vertical scale. The horizontal has seven stages and is based on such things as seniority, in-service education, exercise of responsibility, good attendance. The vertical scale is based on qualifications. This scale goes from *Magistério* level to *Licenctiatura Plena,* involving nine levels. Subsequent to that, there are three levels, linked to postgraduate qualifications. Within the shift-school system, the great majority of teachers teach two shifts, involving 40 hours engagement, with a minority taking three shifts, or up to 60 hours engagement. A teacher, with a Full Licence, and teaching two shifts earns about BRL 2 400. Certain bonuses can also be earned by teachers, but there is not an incentive scheme linked to performance.

As well as the heavy workload of teachers, class sizes tend to be high. The curriculum tends to be crowded, and the pedagogy employed is more reflective of a traditional teacher focused style than of a child-centred, activity-based, problem-solving type. Pupil behaviour tends to be disruptive, and some schools experience a good deal of pupil violence and bullying. Teacher absenteeism is high by comparative standards. Almost half the teaching force is categorised as "Temporary", which presents problems for school staffing of a teamwork type. Principal teachers are either elected by their school communities, or are political appointees, rather than being appointed by open competition, with an independent interview panel. This can present problems for the quality of school leadership, which is also hampered by inadequate discretionary powers for school leaders.

Teacher education, both pre-service and in-service is provided by the great majority of higher education institutions. It is regarded as of uneven standard, with low entry standards and high drop-out rates. The course of initial training is of four years duration. There has been dissatisfaction with the quality and character of this training and the federal and state governments have recently initiated a major reform measure for initial teacher education, which holds much promise for improvement. They have also launched a reform programme for in-service teacher education which should lead to improvements for in-career teachers.

The review process and themes examined

Process

Arising from a request from the state government of Santa Catarina, the OECD Education Directorate's Programme for Co-operation with Non Member Economies agreed to conduct a general review of the education system in that state. Following initial planning, the Santa Catarina authorities prepared a Country Background Report which was circulated to team members, in advance of the review visit. The team reflected on this report and considered other documentation, in preparation for the site visit. The review mission took place from the 12 to the 23 October 2009.

At the outset, the team held a plenary meeting with the Secretary of State for Education and his senior officials. The Secretariat was very keen that the team should visit as many educational institutions and agencies as possible throughout the geographically widespread state. It was considered important that the review should be informed by direct contact with the varying circumstances to be found in different regions of the state. To fulfil this remit the team divided into three sub-groups, who travelled widely. In total, team members visited 69 educational locations. These included regional offices, universities, vocational colleges and a great variety of schools of different levels – pre-school, *fundamental* (basic) and secondary – under state and municipal control. They visited university centres and university institutes. In the course of such visits they met directors, senior staff, general staff, students, parents and local authority representatives. The review team also visited and interviewed a range of agencies with responsibilities in education such as the ACAFE university organisation, the Federation of Industries (FIESC, *Federação das Indústrias do Estado de Santa Catarina*), Chambers of Commerce, teachers' union. When the sub-groups returned to Florianópolis a range of meetings were held with the State Education Council and senior Secretariat officials who had various responsibilities for elements of the education system. Finally, a debriefing session was held with the Secretary of Education and senior staff.

In all their meetings with a great range of personnel, the team was met at all times with great courtesy, co-operation and constructive discussion. Team members wish to place on record their warm appreciation of all the assistance received, and the generosity of time given by their interlocutors. Team members learned a great deal from the direct contact they had with such a range of personnel, and the visits to institutions. This has greatly

complemented their study of documentary material. The team was also greatly facilitated by the assistance of the officials who accompanied them on their travels, and by the skills of the language interpreters allocated to them.

Themes

The features of the education system which are analysed in the review, and about which recommendations are made are as follows.

- The Financing of Public Schooling;

- Governance: System and Quality Management;

- Access and Equity, including Special Education Provision;

- Curriculum and Textbooks in Pre-School, Basic and Secondary Education;

- Student Assessment;

- Professional and Technological Education;

- The Teaching Career and Teacher Education;

- Higher Education;

- Research, Development and Innovation.

Notes

1. Enrolments in secondary education are rising rapidly but are still relatively low (51.44% of the age group 15-17 in 2007). It is expected that the new FUNDEB (Fund for the Improvement of Basic Education and for Enhancing the Value of the Education Profession, *Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação*) arrangements will benefit secondary as well as early childhood education in Santa Catarina.

2. Until the late 1960s, Brazil's overall birth rate was above 6% a year. It began to fall in the next decade – in 1980 it had fallen to about 4%, and in 1990 it was less than 3%. By September 2009 it had dropped to 1.83%. See www.indexmundi.com/brazil/birth_rate.html .

3. Government spending on health and education account for nearly 9%, the second largest item of spending after social protection. See OECD (2009), p. 9.

4. If a poor state or municipality receives more than 25% of its budget from the federal level, they must use the full *per capita* allocation (between BRL 1 100 and BRL 2 300 per student). There is also a possibility for the federal level to "top up" the allocation for poor municipalities, for up to 10% of the total.

5. After grade 4, the figures were 29% repetition and 18% drop-out (Fletcher and Ribeiro, 1988).

6. The OECD review team was not able to find out to what extent the *ciclo básico* non-repetition approach is actually practised in schools. The public education system in Brazil is strongly decentralised; each state or municipality can have its own system of promotion, *e.g.* conventional grades with retention, integrated "cycles", or grades with continuous progress. Since municipalities are responsible for the first years of primary, there are likely to be differences in practice from one municipality to another.

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Chapter 2. The Financing of Public Schooling

This chapter offers an overview of the sources of funding (federal, state, local) and the distribution of budgetary burden for the education sector. It provides a description and analysis of the education funding system in the state, focusing especially on the fiscal inter-governmental relations. The review team discusses the challenges related to the financing of education, and concludes by offering policy options to assist the state government in achieving its goals.

Introduction and background

International experience (including Brazil's) shows clearly that progress in education does not depend solely on the amount of money spent, or on the number of young people enrolled in schools and universities. The focus needs to be on providing high-*quality* education for all, in order to drive the emerging knowledge economy and to ensure equity of opportunity. For example, investment in early-childhood education is needed not only to prepare pre-schoolers better for school success, but to ensure that disparities in social equity are not reinforced from the start.

Through its policy-setting and budget allocation roles, the federal government has vast scope to set performance standards, re-shape curriculum content, finance pilot initiatives, and broadly encourage innovation. The State of Santa Catarina, likewise, needs to be capable of mobilising its resources and support structures, in order to re-shape the formation of human capital for the state's knowledge economy. While more strategic planning on education would help, the harder questions have to do with the priorities, distribution, efficiency, and public expectations for education expenditure.

The financing of public schooling in Santa Catarina is governed by stipulations in the Federal Constitution and through federal legislation. The State of Santa Catarina itself, aiming to serve the entire student population, executes programmes financed with its own resources as well as with resources coming from federal government transfers.

The main sources of federal financing are:

1. FUNDEB: Fund for the Improvement of Basic Education and for Enhancing the Value of the Education Profession *(Fundo de Manutenção e Desenvolvimento da Educação Básica e de Valorização dos Profissionais da Educação)*. This is used to financially support basic education, professional education integrated to middle education (*ensino médio*), special education and youth and adult education. The resources are transferred to the states by the federal government, to support public education programmes.

2. "Educational Salary": this is the Social Contribution made by companies in general, and by private and public entities linked to the general regime of social security, to be used to finance programmes, projects and activities concerned with basic public education. It is similar to payroll tax in the United States.

These, together with resources from the state government, support the needs of the following public-education programmes and activities:

- teacher salaries;

- acquisition of educational materials, equipment and laboratories;

- libraries and collections for reading;

- school materials for students;

- service for children with special needs;

- construction and remodelling in schools;

- school transportation;

- adult literacy programmes;

- professional development for teachers;

- acquisition of furniture and materials for schools;

- specialised services for native and rural schools.

At the state level, access to funding and accounting for expenditures are regulated by law, via the State Secretariat of Finance, under the scrutiny of the State Board of Public Accounting. The use of resources, and the management of the programmes for which they are used, are the responsibility of the agents of the State Secretariat for Education (SED, *Secretaria de Estado da Educação*) and of the State Secretariat for Regional Development (SDR, *Secretaria de Estado de Desenvolvimento Regional*), and administered via the education networks at state and municipal levels.

This chapter explores these issues. (The financing of higher education is dealt with in Chapter 9). This chapter also provides a description and analysis of the current education finance system in the state, especially focussing on the fiscal inter-governmental relations. Finally, it discusses the challenges confronting the education system, and concludes by offering some policy options to assist the state government in achieving its goals.

The education finance system in Santa Catarina

Inter-governmental fiscal relations

In Brazil the three levels of government are jointly responsible for running and financing basic education. The federal government holds overall responsibility for the administration of the national education system, while the municipal governments are in charge of pre-school and (increasingly) the *fundamental* cycle of education; and the state governments (plus the Federal District) are responsible for secondary education, and in some cases overlap with the municipalities in the provision of *fundamental* education.

The system of educational financing reflects the overlapping responsibilities of different levels of government for ensuring a functioning system, and cannot be understood without some general knowledge of the Brazilian system of inter-governmental fiscal relations.

To strengthen the administrative-political and financial autonomy of governmental levels, the Brazilian Constitution defines a system of unconditional transfers between the Union, the states and the municipalities, which can be either direct or through creation of special funds (indirect). Regardless of their type, transfers always occur from higher to lower levels of government; that is, from the Union to the states and from the Union to the municipalities or from states to their respective municipalities.

Table 2.1 **Tax competence of taxing powers as established
by the Brazilian Constitution**

Tax Competence	Taxes
Federal Union	On foreign trade – on imports (II) and exports (IE) of goods and services
	On income and earnings (IR)
	On industrialised products (IPI), a value added tax levied on manufactured goods
	On financial operations (IOF)
	On rural land property (ITR)
States and the Federal District	On inheritance and gifts (ITCD)
	On the circulation of goods and transportation and communication services (ICMS), a value added tax levied on goods in general and some services
	On motor vehicles (IPVA)
Municipalities and the Federal District	On urban land and property (IPTU)
	On real estate conveyance (ITBI)
	On services (ISS), except those subject to ICMS

Source: World Bank, 2008.

Direct transfers, as Constitutionally defined, are the following:

- States and municipalities are entitled to keep total collection of income tax they withhold at source, on income payments they make, or on payments made by their jurisdictions or foundations they constitute and maintain.

- Municipalities are entitled to 50% of the collection of tax on rural land property levied on real estate within their territory.

- Municipalities are entitled to 50% of the collection of tax on motor vehicles registered in their territories.

- Municipalities are entitled to 25% of the collection on the circulation of goods and transportation and communication services.

- States and municipalities of origin receive by transfer respectively 30% and 70% of the collection of IOF – gold (as a financial asset).

The following funds are used to carry out *indirect transfers*:

- Export Compensation Fund (FPEX, *Fundo de Compensação pela Exportação de Produtos Industrializados*): composed of 10% of the total IPI collection.

- Federal District and States Participation Fund (FPE, *Fundo de Participação dos Estados e do Distrito Federal*): composed of 21.5% of the total IPI and IR collection. It is distributed in direct proportion to state population and size and inverse proportion to *per capita* income.

- Municipalities Participation Fund (FPM, *Fundo de Participação dos Municípios*): composed of 22.5% of the total IPI and IR collection.

Thus, 47% of the income tax and 57% of the tax on industrialised products collected by the Union go to the states and the municipalities as constitutional transfers through funds. The flow of direct and indirect constitutional transfers is represented in Table 2.2.

Table 2.2 **Sharing of tax revenue** (%)

Tax competence	Taxes	Shares			
		Union	**Regional Funds**	**States**	**Municipalities**
Union	IR[1]	53.0	3.0	21.5	22.5
	IPI	43.0	3.0	21.5 + 10.0	22.5
	IOF-Gold	-	-	30.0	70.0
	ITR	50.0	-	-	50.0
States	ITCD	--	--	100.0	-
	ICMS	-	-	75.0	25.0
	IPVA	-	-	50.0	50.0

Note (1): States and municipalities keep 100% of the income tax withheld at source levied on their civil servants' salaries.

Source: Federal Revenue Secretariat of Brazil (*Receita Federal*) – intergovernmental transfer, 2009.

After the tax revenue transfers, the shares of the Union, states and municipalities were respectively 58.4%, 25.9% and 15.7% of the total disposable tax revenue in 2007. The table shows the composition of tax revenue before and after transfers. The Union transfers more than 10% points of its revenue collection to sub national levels of government. The municipalities clearly receive the largest share of transfers, as the states lose less than 1% point due to transfers to the municipalities.

Table 2.3 **Disposable tax revenue (after constitutional transfers)**

Tax competence	Tax revenue			
	Total collection		Disposable revenue	
	%	% of GDP	%	% of GDP
Union	69.4	23.8	58.4	20.0
States	26.3	9.0	25.9	8.9
Municipalities	4.3	1.5	15.7	5.4
Total	100.0	34.2	100.0	34.2

Source: The Fiscal Load in Brazil, 2006, published by *Receita Federal*, Brasília, July 2007.

This tax revenue reallocation is complemented by transfers embodied in agreements, that is, voluntary transfers – transfers of federal funds to states and municipalities (or of state funds to municipalities) – to finance activities of federal (or state) responsibility they carry out on behalf of the Union (or the state). Agreements are means of effecting transfers provided for in specific laws or established voluntarily between the different levels of government.

Fiscal outlook of the State of Santa Catarina

The budgetary revenue of the fiscal budget and social security is estimated as BRL 12 196 million. Of this, the portion of education is 19.3%, the highest category in the State of Santa Catarina.

Educational finance

The current national goal is to increase overall spending on education from 4.7% of GDP currently to 6% of GDP by 2012. The proposed target is very high, compared to the current OECD average of 5% of GDP or to the East Asian MIC (middle-income country) average of 3.5 % of GDP. Brazil has set this target, moreover, in a demographic context of a declining school-age population. A major reform of education finance adopted in 2006 created FUNDEB, replacing FUNDEF, the Fund for the Improvement of *Fundamental* Education and for Enhancing the Value of the Teaching Profession *(Fundo de Manutenção e Desenvolvimento do Ensino Fundamental e de Valorização do Magistério)*, used from 1996-2006 as an accounting fund designed for redistributing revenues at state level to the elementary education sector. FUNDEB extended the national funding equalisation formula for basic education (grades 1-8) to both secondary level education (grades 9-11) and pre-primary education (*crèches* and pre-schools covering ages 0-5). This reform can be expected to have a significant impact on state and municipal education resources and spending patterns (for example, supporting a relative shift in resources from basic education to secondary and pre-primary levels).

Funding for public education in Brazil is drawn predominantly from taxation. The 1988 Federal Constitution lays down that the 26 states (including Saint Catarina), the Federal District and municipalities should allocate 25% of tax and transfer revenues to education, while the federal government would be responsible for earmarking 18% for the sector. The Constitution also determined which sources of funding (*i.e.* taxes and transfers) were to be used for education by each of the three levels of government, federal, state and municipalities (see Table 2.2). As a result of these Constitutional mandates, the amount of resources allocated to education has come to depend solely and exclusively on the tax-raising capacities of the federal, state and municipal governments.

Table 2.4 **State of Santa Catarina government expenditure (2009)**
(BRL millions)

Function	BRL millions	%
Legal	811.5	6.7
Justice	274.4	2.2
Administration	856.7	7.0
Public safety	1177.0	9.7
Foreign relations	1.4	0.0
Social work	62.7	0.5
Social security	1911.9	15.7
Health	1847.4	15.1
Work of employees	7.2	0.1
Education	2351.9	19.3
Culture	52.4	0.4
Civil rights	3.8	0.0
Urbanism	59.5	0.5
Housing	29.2	0.2
Sanitation	3.1	0.0
Environment management	110.2	0.9
Science and technology	95.4	0.8
Agriculture	443.0	3.6
Industry	0.0	0.0
Trade and services	58.8	0.5
Communication	46.2	0.4
Energy	0.0	0.0
Transportation	566.3	4.6
Sport, tourism, leisure	107.5	0.9
Others (special demand)	937.6	7.7
Total	12 195.1	100.0

Source: Compiled by the OECD review team, 2009.

Table 2.5 **Taxes and transfers earmarked to education since the 1988 Federal Constitution, by the three levels of government[1]**

Federal	State	Municipal
Own taxes	Federal transfers	Federal transfers
IR	FPE	FPM
IPI	IPIexp	IPIexp
IOF	IRRF- state employees	IRRF- municipal employees
ITR	IOF-Ouro (IOF-Gold)	IOF-Ouro (IOF-Gold)
Export tax (IE)		
Tax on large fortunes (IGF)	Own taxes	State transfers
	ICMS	ICMS
	IPVA	IPCA
		Own taxes
		IPTU
		ITBI
		ISS

Note (1): 18% of the taxes of the Federal Administration and 25% of the taxes and transfers of the states and municipalities are earmarked for education. If a poor state or municipality receives more than 25% of its budget from the federal level, it must use the full per capita allocation (between BRL 1 100 and BRL 2 300 per student). There is also a possibility for the federal level to "top up" the allocation for poor municipalities, for up to 10% of the total.

Source: Federal Constitution of 1988.

Figure 2.1 provides an idea of the way in which total public expenditure on education is divided.

The application of tax revenue to the maintenance and development of the education system is shown in Table 2.6. The state tax revenue covers 92.2% of the total revenue. On the circulation of goods and transportation and communication services (ICMS), a value-added tax levied on goods in general and some services is the most important source of the state revenue, covering 87% of the total tax revenue of the state. The minimum to be spent on education is 25%, according to the Constitution, however, the State of Santa Catarina spends 29.5% of total state government budget. The UDESC (State University of Santa Catarina, *Universidade do Estado de Santa Catarina*) spends almost 7.3% of total state education expenditure. The Secretariat for Education spends 75.1% and the Secretariat for Regional Development spends 14.2% of the education budget.

Figure 2.1 **Flow of Constitutional Transfers**
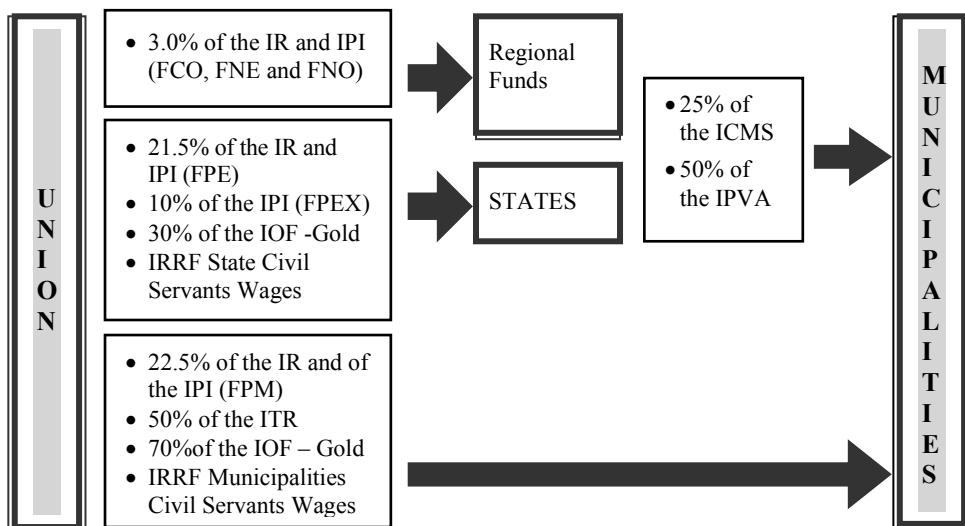
Table 2.6 **Tax revenue in maintenance and development of the education system in Santa Catarina in BRL millions**

Specification	Amount	
Total receipt	10.529	
Total state tax revenue	9 703	
ITBI	--	
IRRF	397	
IPVA	812	
ITCMD	53	
ICMS – state	8 441	
Federal transfers	917	
Share of IPI – exporting state	235	
Financial transfer	64	
Share of FPE – state	618	
Minimum % to be applied	2 146 (25%)	
Total expenditure	**2 535 (29.52%)**	
Secretariat of Education	1 905	
FUNDEB		*1 067*
Secretariat for Regional Development	360	
FUNDEB		*345*
UDESC (state university)	184	
Special education	86	
FUNDEB		*61*

Fundamental education receives the largest share (62.6%) of the total education budget, and secondary education *(ensino médio)* comes second (with 18.2%). However, the functions of pre-school (*ensino infantil*) education and youth education receive only 2.3% and 3.2%, respectively.

Table 2.7 **Synthesis framework for education in BRL millions**

Function	Amount
General administration	**106**
Information technology	4
Human resources training	11
Fundamental education	997
Middle education	290
Professional education	49
Superior education	48
Infantile education	36
Youth education	51
Total	**1 592**

Source: Compiled by the OECD review team, 2009.

The annual per-student unit cost for distribution of FUNDEB of the State of Santa Catarina (SC) is above that of Rio de Janeiro (RJ), but far below that of São Paulo (SP) and Rio Grande do Sul (RS).

Table 2.8 **FUNDEB: annual estimated amounts for basic education (2008) in BRL**

State	Public education (per student)				Accredited institutions (per student)	Transfers to states (total)
	*ECEC (*full time)	*Fundamental*	*Upper secondary*	*EJA*	ECEC full time)	Total (BRL millions)
SC	1 798.45	1 954.84	2 033.04	1 094.71	1 485.68	1 945.19
SP	2 365.19	2 570.86	2 673.69	1 439.68	1 953.85	16 243.93
RJ	1 547.66	1 682.24	1 749.53	942.05	1 278.50	3 760.43
RS	1 937.23	2 105.69	2 189.92	1 179.19	1 600.32	3 498.57

Source: Compiled by the OECD review team, 2009.

Table 2.9 **FUNDEB system**

FUNDEB	
Operating timeframe	14 years (commencing in 2007)
Area targeted by Fund	Basic education (crèche, pre-school, elementary and secondary education)
Number of students benefited	48.1 million students
Funding sources	Contribution of the states, municipalities and the Federal District: - 1st year(2007): 16.66% of the following taxes and transfers – FPM, FPE, ICM, IPIexp and LC 87/96; 6.66% of the ITCMD, IPVA quota part of the ITR. - 2nd year (2008): 18.33% of the following taxes and transfers – FPM, FPE, ICM, IPIexp and LC 87/96; 13.33% of ITCMD, IPVA & share part of ITR. - 3rd year (2008): 20% of taxes and transfers. Complementary resources of the federal government.
Amount of resources forecast (excluding complementary contributions by the Federal Administration)	According to estimates (in 2005 terms) and the gradual implementation of the Fund, the total funds forecast (contribution by the states, the DF and the municipalities, without the complementary contribution of the Federal Administration) would be: · BRL 34.3 billion during the first year · BRL 37.4 billion during the second year · BRL 40.6 billion during the third year · BRL 43.7 billion during the fourth year
Complementary resources allocated by the Federal Administration	BRL 2 billion during the first year BRL 3 billion during the 2nd ear BRL 4 billion during the 3rd year 10% from the 4th year
Total resources of the Fund	Forecast amounts (in 2005 terms) · BRL 36.2 billion during the 1st year · BRL 40.1 billion during the 2nd year · BRL 44.1 billion during the 3rd year · BRL 48.0 billion during the 4th year
Distribution of funds	Based on: **Number of students** in elementary school (crèche, pre-school, elementary and secondary school), according to the data in the school; **Census of the previous year**, taking into account the following: · *Students in regular elementary and special education* :100% from the 1st year · *Students pre-school education, secondary education and youth and adult Education*: 25% during the 1st year, 50% in the 2nd, 75% in the 3rd year, 100% from the 4th year
Distribution of funds	· Minimum of 60% for salaries payment · The remainder for maintenance and development of basic education
Value weights per student/year	Fixed annually with variations forecast for · Crèches (0 to 3 years) · Pre-school education · Initial "urban" grades · Initial "rural" grades · Four final "urban" grades · Four final "rural" grades · Urban secondary education
Education-salary	Linked to basic education

Source: Federal Senate, 2008.

The main challenges facing FUNDEB

- *Quality versus quantity*. A major challenge which the FUNDEB system needs to address is the urgent need to improve the quality of basic education, at the same time as access to other levels and forms of education is being expanded. The initial design of FUNDEB did not take account of this emphasis on quality improvement.

- *Discrepancy between high inputs and poor outcomes*. The issue of student learning is discussed in detail in Chapter 5 of this report. Some reasons mentioned for the decline in student performance on national tests (*e.g.* at grade 8/9) include: a change in the profile of students being assessed as a result of rapidly expanding access; the effect of grade repetition (*e.g.* over-age repeaters generally perform worse than those who progress according to their age group); lack of classroom time, and teacher absenteeism. These factors add up to a lack of internal efficiency, which raises the cost of education without improving quality.

- *Supply and demand*. In relation to EJA (Youth and Adult Education, *Educação de Jovens e Adultos)* there is a shift from compensatory education for those who missed out on education opportunities, to continuing education within the school system itself. This often means that there are more students in the first year of secondary than graduated from the final year of *fundamental* education. This, too, is an internal efficiency issue not foreseen by FUNDEB.

- *Competition between the public state and municipal school systems*. The inclusion of all types of basic education in FUNDEB blurs the lines of responsibility among the levels of government: basic education, secondary education and EJA are not clearly delineated. Since "municipalisation" of the *fundamental* school system is a clear policy priority in Santa Catarina, state and municipal schools find themselves competing for the same funds.

However, the problems faced by FUNDEF are, to a large extent, still present under FUNDEB (with the exception of the introduction of new teaching methods in basic education, and the establishment of the base salary for teachers).

The issue of quality remains. Therefore, Santa Catarina's PDE (*Plano de Desenvolvimento da Educação*, policy and institutional development plan for education) should be in line with Santa Catarina's priorities in terms of the allocation of resources. IDEB should provide an important source of data to achieve this. Successful practices should be more publicly and officially credited throughout the entire state so that managers and teachers can adapt them to their own situations, thereby improving the education performance.

And above all, why not spell out precisely how the actions under the PDE relate to each other, and in particular to the FUNDEB, since it is the largest source of funding for basic education in Brazil?

Challenges and recommendations

Budget effectiveness

There is considerable scope for making government operations more cost-effective. The level of public spending in education in Santa Catarina is high in relation to the GRDP (gross regional domestic product) level, and in comparison with its emerging market peers. State government outlays on education account for nearly 19% of the total expenditure, the largest item of spending.

But outcome indicators are not always commensurate with the state's high level of government-financed spending, suggesting that service delivery is inefficient, rather than under-funded. Throughout this review, the OECD review team acknowledges that much has been done in education, for example to raise enrolment rates, especially for secondary education; to increase spending on education; and to introduce systematic performance assessments for students and institutions. These initiatives have been highly successful, particularly in terms of delivering near-full enrolment at primary and lower-secondary levels. But it remains the case that the performance of students in Santa Catarina is still comparatively low, when judged on the basis of innovation policy initiatives to deliver sustained improvements in performance. Follow-through is now essential, because the largest pay-off from growth-enhancing reforms is likely to come from further improvements in human capital, especially from emphasis on basic skills.

Inter-governmental transfers can be used to encourage cost-effectiveness at the state and municipal levels of government. As in other federal countries, mechanisms for financing decentralised provision often rely on inter-governmental transfers. The bulk of federal transfers to the states and municipalities are in the form of block grants related to the sharing of revenue collected by the federal government. Sub-national governments have full autonomy to use these resources, a prerogative that is awarded to them by the Constitution. Voluntary grants account for a small share of inter-governmental transfers. On the face of it, there appears to be limited scope for building incentives for cost-effectiveness into the transfer system. Under FUNDEF and subsequently FUNDEB, these initiatives suggest that the federal and state governments could strengthen incentives for efficiency enhancement, by making more extensive use of conditionality

in voluntary transfers, and by introducing rewards for performance. Initiatives to this effect would go in the direction of using the inter-governmental transfer system as a vehicle for efficiency enhancement, without infringing on sub-national autonomy in policy-making and the use of shareable funds.

Budget rigidities should be removed, especially those related to revenue earmarking. Largely, this arrangement is federal mandate and regulation rather than state government's own decision. However, efforts to enhance the efficiency of government operations will not come to fruition unless budgetary appropriations can be re-allocated towards the most cost-effective programmes. The physical network of schools and regional administrative organs are under the responsibility of the State Secretariats for Regional Development (SDRs, *Secretarias Estaduais de Desenvolvimento Regional*). And SDRs have their own budget allocation without harmonisation to chose of SED.

The flexibility required for performance-oriented budgeting is constrained by a number of institutional rigidities. For example, considerable revenue is earmarked, including that of federal levies introduced over time to finance a variety of social programmes. Including the compulsory sharing of Federal Revenue Secretariat with the sub-national governments, almost 90% of federal funds is estimated to be earmarked. Mandated aggregate spending floors, including educational resources earmarking, have been applied regardless of their cost-effectiveness. Through programmes like FUNDEB the government has worked to insure minimum funding. In addition, schools also receive direct aid through specific categorical grants like PDE (Education Development Plan). And specific support programmes are in place to provide items such as textbooks and school meals and for school improvement through federal efforts such as FUNDESCOLA (School Improvement Programme, *Fundo de Fortalecimento da Escola*).

Policy action to make budgeting more flexible should focus on a gradual elimination of revenue earmarking and aggregate spending floors. This would allow budget-making and planning to be guided more by efficiency considerations and the government's policy priorities, rather than by historical costing and short-term revenue trends. Greater budget flexibility could also underscore efforts to contain the rise in current spending, by making it easier to discontinue programmes that are not deemed cost-effective but whose financing is assured by spending covenants.

Delivery efficiency

The fiscal relationships between municipalities and the state government should be enhanced towards strengthening basic education quality. The state government tries to decentralise *fundamental* education to municipalities; however, change management is not well prepared, and the benefits of municipalisation are not communicated well to the stakeholders in basic education in the State of Santa Catarina. And bad memories of the decentralisation experience of pre-schooling cause stakeholders a great deal of worry. Much more strategic co-ordination through inter-governmental fiscal relations (including a special task force monitoring resource transfers) is urgently needed for the smooth and fruitful municipalisation of *fundamental* education.

Primary and secondary education budgetary allocation is currently based on the federal standard formula (FUNDEB and "education salary" from federal government). Including federal funds, the state government is supposed to spend 25% of its budget on basic education; however, there are few incentives to recognise or reward high performance. And the process of allocation of resources is heavily concentrated on the State Secretariat for Education through the State Secretariat for Regional Development (SDR, *Secretaria de Estado de Desenvolvimento Regional*) on the basis of line-item transfers, but during its field visits in Santa Catarina the OECD team could not find any room for efficiency gain. School funding is too fragmented, and should be enhanced through an integrated format that would also strengthen school-based management.

Teacher salaries, including pensions to retirees, currently absorb 75% of the education budget. However, teacher salaries and the level of morale and social respect for the profession are perceived to be low. Higher entry salaries are needed to attract qualified teachers, as well as fewer automatic pay raises on the basis of seniority.

Summary of recommendations

To improve the quality of public spending on schooling in the State of Santa Catarina, these key aspects are to be considered:

- First, continuity is needed. The practices that have been implemented and have proved to be successful should be given an institutional framework in order to ensure that they are not subjected to the whims of different political cycles. There should be systematic evaluation processes of these practices; they should be the target for permanent and systematic assessments geared to long-term improvement and efficiency.

- Second, dissemination of innovative experiences is important. Successful practices should be more widely publicised throughout the entire state so that managers, educators and civil society in general can be made aware of initiatives and, wherever possible, can adapt them to their own situation, thereby contributing to improving the education system overall.

- Third, school-based accountability pressures are important for efficient use of education resources, but three-levels funding (federal-state-municipal) system of Santa Catarina is too complicated. Therefore, it should be restructured toward school-level outcome enhancement, such as learning achievement and school improvement. Santa Catarina is considered to be lagging far behind with respect to school-based management.

- A crucial issue for education policy-makers is that research indicates a very weak correlation between teachers' actual effectiveness in the classroom and the proxy measures most commonly used for hiring and rewarding teachers, namely years of education and experience. Innovative teacher bonus reform experiments carried out in three states (São Paulo, Pernambuco and Minas Gerais) could be recommended to the State of Santa Catarina.

- The fundamental constraint to education quality improvement in Santa Catarina is the low average quality of teachers – both in terms of their content mastery and the effectiveness of pedagogical practice. This is analysed in detail in the Chapter on teachers and the teaching career in this review.

- While significant additional investments in education will be important, it is equally clear that more money alone will not be enough. Investment in education will also need to become more efficient. The education sector has not yet re-invented itself in ways that other sectors have done to improve outcomes and raise productivity. Indeed, the evidence suggests the reverse, namely that productivity in education has generally declined because the quality of schooling has broadly remained constant, while the cost of the inputs has markedly increased. As the place and mode of educational provision have largely remained unchanged, the labour-intensiveness of education – and the predominance of teachers' salaries in overall costs – have made personnel costs rise over time.

- Despite steady improvement in education funding, Santa Catarina still lags behind its neighbouring and developed countries in spending per student. The comparatively low levels of per-pupil spending in Santa Catarina have serious consequences for quality and equity. Substantial improvement in spending is needed, to achieve quality upgrades.

Further challenges

- The increase of human capital is largely responsible for the remarkable social and economic development of Santa Catarina. The costs that are required to increase human capital through its education system are worthwhile. The most important producer of human capital is the public education system. It is the conduit that transfers resources from the private sector to education consumers, the future producers of the state. The human capital generated in public schools and elsewhere is needed to ensure a dynamic economy, provide an adequate standard of living, reinforce domestic security, as well as sustain Santa Catarina's prominence in the country and its competitiveness in the world.

- Emphasis must be placed on the quality of education, so that diminishing marginal utility is minimised. While striving for adequacy and equity in educational funding, its leaders especially must make certain that funds are expended wisely. Any additional expenditure must bring greater satisfaction, more worth, better pedagogy to educational stakeholders.

- Education is foremost among state responsibilities, and financial support should come from that source; but local control should be maintained. Other states (for example, São Paulo, Pernambuco and Minas Gerais) in Brazil have used a relatively uncomplicated approach for the municipalisation of basic education; Santa Catarina should follow this experience, step by step, to benefit from the practice of others.

- There has been extensive progress over the years in providing more equitable financing of education for students in Brazil. The State of Santa Catarina should view education as the key to economic growth. Policy-makers and educators should conduct wide-ranging debates for profound governance change, including charter schools, vouchers, and other public or private choices and options, as many OECD countries do.

- Educators, including principals, in Santa Catarina express frustration with the cumulative effects of state and federal mandates that place a great deal of pressure on schools without providing much guidance or support. In particular, the OECD team was told on many occasions that there is a lack of careful "change management" in relation the municipalisation process; this creates unnecessary levels of anxiety and uncertainty among teachers and parents, and could jeopardise smooth transition to municipal control.

- Improving instruction is the ultimate purpose of school reform. Therefore, ambitious reform agendas are unlikely to succeed unless they include strategies for providing professional development to current teachers and improving the preparation of prospective teachers. The OECD team supports the SED in its search for more effective ways to attract and retain the best new teachers, and to make coherent reforms in the whole enterprise of teacher preparation and professional development, for the future prosperity of Santa Catarina. The most critical issues for the State of Santa Catarina are the strengthening the quality transformation process. Funding schematic change for performance enhancement can initiate student learning outcome reform in the state.

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Chapter 3. Governance: System and Quality Management

This chapter gives an overview of the structure of formal education in Santa Catarina, of the distribution of responsibilities for the system and the implementation of policies and reforms, as well as institutional arrangements for quality management. The reviewers thereby look into selected aspects of the decentralisation reform and discuss the drawbacks of fragmentation of responsibilities for the education system of Santa Catarina. The chapter also focuses on the importance of proper co-ordination between governance levels and of evidence-based policies, of building sufficient capacities on local level for monitoring and reporting on education quality, and of working with quality criteria based on outcomes and relevance.

Management of the educational system and schools

Overview

The structure of education in Santa Catarina is uniform for all schools irrespective of ownership and comprises pre-school, basic (*fundamental*) education, secondary education including VET (see Chapter 7) and higher education. School starts at the age of 6. Education is compulsory until grade 8, and beginning with 2007, it is gradually being expanded to include grade 9 (a 2009 amendment to the Constitution stipulates that basic education is compulsory from 4-17 years of age and will be progressively implemented by 2016). Compulsory education is provided free of charge in both state and municipal education institutions. Primary and secondary schooling is also offered as a second chance education via programmes for youth and adults through the EJAs which are maintained by municipal, state and private school networks.

Figure 3.1 **General structure of formal education in Santa Catarina**

POST GRADUATE	*STRICTO SENSU*	**DOCTORATE**			**POST DOCTORATE**	
		MASTERS		*LATO SENSU*	**SPECIALISATION IMPROVEMENT AND OTHERS**	
UNDER GRADUATE	From 18 years of age	**HIGHER EDUCATION** Variable duration	YEARS OF STUDY	3 to 6 years	"SEQUENTIAL" COURSES	**EXTENSION COURSES**
					VOCATIONAL EDUCATION	
		COLLEGE ENTRANCE EXAMINATIONS				
BASIC EDUCATION	From 15 years of age	AGE	**MIDDLE SCHOOL**	YEARS OF STUDY	3 to 4 years	**VET**
						YOUTH AND ADULT EDUCATION Minimum age: 18 years
	From 6 to 14 years	AGE	**FUNDAMENTAL EDUCATION**	YEARS OF STUDY	9 anos	**YOUTH AND ADULT EDUCATION** Minimum age: 15 years
						SPECIAL EDUCATION: integrated, preferably in regular education; attendance in classes, schools and specialised services; education for work.
	4 to 5	AGE	**CHILDHOOD EDUCATION**		Pre-School	
	0 to 3	AGE			Kinder-garten	

Note: Basic education is compulsory from 4 to 17 years of age (Constitutional amendment No. 59 of 11 November 2009 with full implementation expected by 2016).

Source: Santa Catarina State Secretariat for Education (SED).

The Background Report indicates that the *Conselho Estadual de Educação* (CEE, State Education Council) and the *Secretaria de Estado da Educação* (SED, State Secretariat for Education) are the highest-level bodies in education system management. The CEE is set-up as an advisory forum with regulatory powers, which serves as a focal point for education policy deliberations among all carriers of school ownership in the state (or their special interest groups) (CEE, 2005). SED is in charge of system administration and the orientation, formulation, co-ordination, control and execution of educational policies. SED is also expected to deliver a strategic vision for the sector and to provide funding. The report also underlines the significance of the Deliberative School Councils (CDE, *Conselho Deliberativo Escolar*) as warrants for the democratic character of management of public education institutions. One of the tasks of the councils is to contribute to the elaboration and execution of the so-called *projeto político-pedagógico* (PPP, political-pedagogical project) of schools.[1]

The responsibilities for education are in reality shared between state, municipalities and private (including religious) providers, following the distribution of financing for the sector. The management of the education system appears fragmented: schools on the payroll of the state are dealt with by the SED, those funded by the municipalities are the responsibility of the respective municipal departments of education, and privately funded education institutions are in the competence of private providers or religious communities, but subordinated to the state system.

Governance arrangements and reform

The State Secretariat for Education (SED) is the largest institution in the system in terms of number of schools under its direct responsibility. The 1 353 state schools (2009) are managed with the help of an elaborate system of data collection which allows for regular flows of information on performance and school statistics from the regions. SED has most of Santa Catarina's analytical and administrative capacity, and its policy decisions enjoy good visibility in the public domain. Its work is supported by a network of 36 regional units – Regional Education Management Offices (*Gerências Regionais de Educação*, GEREDs) – which interact directly with the schools in the regions and are charged with providing support and guidance, exercising control and reporting back to the capital.

Decentralisation and leadership

The SED seems well equipped to exercise its mandate along the lines of policy leadership and strategic thinking for the sector, of making informed policy decisions, of managing education quality, and of assuming a pro-

active role in shaping the overall development of education in the state. The review team was, therefore, surprised to note that SED is responsible for roughly only half of the children in the schools of Santa Catarina (SED, 2009).

Table 3.1 **Distribution of school population according to school ownership agencies (2008)**

School/pre-school type (ownership)	Pre-school	Primary	Secondary	Share of total, in %
Federal schools			X	0.27
Municipal schools	X	X	X	37.28
Private schools	X	X	X	9.69
State schools	X[1]	X[1]	X	52.76

Note (1): Starting with 2009, ownership for all pre-schools and primary schools is being gradually transferred to the municipalities.
Source: Calculations based on the Background Report.

Since 2007 efforts have been made to improve school management and the quality of education, and good results have been achieved in terms of improvement of the Human Development Index (HDI) ranking and other test results (SED, 2009). Some of the reform efforts though may produce challenging side effects.

For example, as part of a governance reform which started in 2009 to streamline ownership structures and remove overlaps, all pre-schools and schools are being gradually transferred to the municipalities. This "municipalisation" process doubtlessly has many of the benefits of decentralisation, such as increase in ownership, more flexibility in budget allocation, better responsiveness to regional needs. School mergers (which are envisaged in the mid-term perspective) might help create economy-of-scale effects, and municipalities that are accountable for education outcomes and competence development with the local economy could energise the school system, help achieve better planning, and contribute to better student performance.

The reform is shifting the burden of education provision away from the Secretariat to the local level. At the end of the municipalisation process, the managerial responsibilities of SED will be reduced to only secondary education, but its ambitious leadership mandate for the whole system will remain. Once again, the possibility of further fragmentation of responsibilities within Santa Catarina's education system must be carefully watched.

Although the review team encountered some degree of apprehension about the effects of municipalisation on FUNDEB and operational capacity, it is generally recognised that the process is well established elsewhere in Brazil, and is well under way in Santa Catarina. The focus now should be on making it work for the benefit of students, families and communities. Part of this must be that municipal leaders are supported in implementing the policy, and that likewise school principals and teachers should not be left on their own in coping with the challenge. This requires more than financing alone: there must be guidance and clarity for those who actually deal with change at the school level. Finally, the main criterion for success should be the *quality* of education provided, and how well the reformed system is able to ensure it.

Table 3.2 **Shift of managerial responsibility,
measured in % of the total school population[1]**

	% of school population before reform		% of school population after reform	Shift
State level	52.76		17.58	Threefold decrease (1/3)
Municipal level	37.28		72.47	Twofold increase (2)
Private and federal providers[2]	9.96		9.96	---
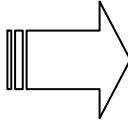
Notes:

(1): Simulation based on data from 2008.

(2): The table does not take into account demographic variations in school population and enrolment over time, so that in the simulation above the number of students in private and federal schools remains constant.

Source: Team calculations based on data from the Background Report.

Table 3.2 illustrates the shift of the managerial role caused by decentralisation, on the basis of data from 2008. It shows that as a consequence of the reform, the number of students in schools under municipal responsibility would double, while the number of those attending SED schools would decrease by three times. Many municipalities, in particular the poorer ones, will have difficulties to meet the expectations related to the new task. In addition, the rather weak managerial links between governance levels will, in practice, lead to more than 80% of the school population being cut off from the policy planning process at state level.

Policy interfaces

The availability and proper functioning of interfaces between the central and local levels of governance and between state and private providers are paramount for the monitoring of quality, and for enabling informed policies which address the system *as a whole*. Yet, at present the municipalities, state and private providers seem to lack direct, day-to-day managerial co-ordination and interact only loosely through intermediaries such as Regional Development Councils (*Conselhos de Desenvolvimento Regional*, CDRs), federal level instruments of data collection or performance monitoring like the IDEB and the *Censo Escolar* (School Census), or through the deliberative CEE.

The education departments of the municipalities are responsible for monitoring and guidance of schools and pre-schools under their responsibility, and for quality assurance including pedagogical and professional support for students and teachers. The solid network of GEREDs is at the disposal of only the SED and the state schools and the connection of SED to the municipal and private schools is limited to the co-ordination of data collection, most of which is done for IDEB.

Municipal education departments and the GEREDs interact via the CDRs of which they are members, and via the CEE, in the work of which the municipalities participate via representation. Municipalities have no formal, horizontal co-operation. Private education providers are not represented in the CDR, and their only link to the other segments of the education system is provided at the level of the State Education Council. This can be considered a management handicap particularly in the domain of secondary education, because private schools – although covering only 15% of the secondary school population – are still the second-largest provider of education on secondary level (35 513 students in 2008), after the state school network. The governance reform will not change this balance.

Figure 3.2 shows that CDR and CEE are the two main hubs for education policy co-ordination on local and state level respectively.

The State Education Council, although it is the highest-level focal point for co-ordination of education policies among all carriers of school ownership in the state, is not equipped to (and not in charge of) exercising executive authority over the system. Its statute sets it up as a deliberative, advisory body with regulatory powers only (CEE, 2005). The RDCs are in charge of all sectors, including education, but their approach is mostly from the point of view of prioritising expenditures and, in some cases, of formulating regional development strategies. In the competition for resources

on this level, education is treated as if it was a single sector, but in reality the split between municipalities and state is replicated on every level and within every body. This makes co-ordination very difficult, and the need to speak with one voice about a set of common needs becomes a serious challenge.

Figure 3.2 **Interfaces and interactions between governance levels in Santa Catarina**
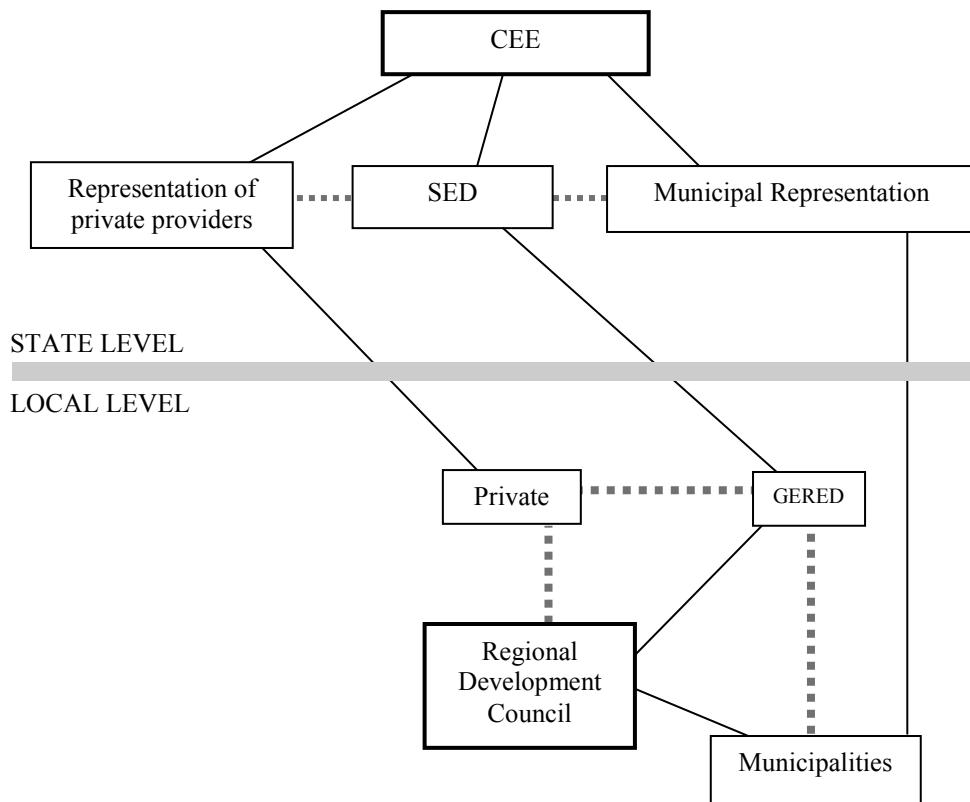
CEE: State Education Council
SED: State Education Secretariat
GERED: Regional Education Management Office

▪▪▪▪▪▪▪▪▪▪ : Missing links

Source: Review team.

Governance arrangements for quality management

The fragmentation of the system affects also the availability of quality-related evidence at the disposal of decision makers. The evaluation of schools is regulated on the basis of resolution CEE/SC No. 158/08, and is binding only for SED and the schools under its responsibility. The review team was informed that in practice all municipalities (and also some private schools) are applying SED-type monitoring and evaluation, but only on a voluntary basis so that the assessment / analysis of results does not necessarily feed back into the overall system, but remains for use at the local level. The evaluation autonomy thus leads to variations in the quality of data and availability of analysis, and to a policy environment with a limited use of evidence for decision making. The review team considers this to be a shortcoming which seriously impedes the reliability of monitoring of the system, and the timely identification of its needs.

A further issue which deserves mentioning is the *narrow focus* of quality management, which at present looks primarily into immediate learning acquisition and test performance, leaving out quality related sources of information such as the students (beneficiaries or paying customers, depending on whether they receive a tuition free education) and the social stakeholders such as employers.

Quality and evaluation – state level

In 2007, a Directorate for Organisation Control and Assessment *(Diretoria de Organização, Controle e Avaliação*, DIOC) was set up in SED to improve the management efficiency of the Secretariat, to define the competencies of the GEREDs and to improve school management quality (SED, 2009).[2] Its scope of work included *(a)* strategic analysis at the state level which involves the SAEB, *Prova Brasil* and *Provinha Brasil*; *(b)* School management assessment.

The mandate of the DIOC includes:

- Developing a technical and management information system (MIS) infrastructure within the state schools and the offices of the GEREDs.

- Conducting census surveys on a semester basis to collect data on student attendance in all schools (public and private) since 2007. This operation is linked to INEP (*Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira*, National Institute for Educational Studies and Research Teixeira).

- Collecting quality information on school management through school management assessment which covers all aspects of school operation and infrastructure, excluding learning outcomes.

- Carrying out spot-checks for audit purpose, such as instances of corruption, or abuses regarding apprenticeships and internships. The latter is based on a Labour Court ruling.

In 2008, 50 schools were assessed. By September 2009, an additional 65 schools were assessed against the planned target of 90 schools. In order to facilitate the work, six audit/inspection regions were drawn up, with an equal number of state schools in each "audit region". Each month a different region is visited and one school within that region is randomly selected for site inspection. Results of such audits include feedback and recommendations to the school administration and regional managers, and subsequently a process of improvement is initiated by the GEREDs when major gaps or problems are identified.

The outcomes of assessment are not linked to the work of the municipalities or the network of private schools. There is no systematic assessment of secondary outcomes which would look into graduates' employability, earnings after graduation, and other indicators of education quality in terms of its relevance to social and economic needs.

Quality and evaluation – federal level

Reviewing and assessing learning outcomes is under the mandate of INEP, which is also co-ordinating the participation of Brazil in the Programme for International Student Assessment (PISA). The team was informed that state-level data from PISA are not being used as reference in the regular assessments of education quality in Santa Catarina. Chapter 6 on assessment looks in greater detail into the work of INEP, but here it is important to note that the definition of learning outcomes – as applied both in Brazil and in Santa Catarina – tends to concentrate only on knowledge acquisition. As on state level, assessment does not focus on secondary outcomes of education.

Quality and evaluation – municipal level

Quality assurance at municipal level is carried out by the municipal public authority, in co-operation with the respective CDE. Schools are being assessed against the background of their PPPs which do not necessarily contain performance/quality benchmarks, and on the basis of the performance of their students.

In most schools there is a specialist who is in charge of quality issues regarding pedagogy and student counselling. These specialists act as the bridge between students, teachers and school management, but most schools visited by the team were in need of additional support in this area.

Strengthening the capacities of educational institutions

Integrated schools

Most of the senior high schools have 70%-80% of their students working during the day once they reach age 16, the legal age for employment. Most of these students attend evening classes for four hours a day. Secondary schools often offer three shifts of teaching, with the senior classes held in the evening. A shift consists of 5 classes of 45 minutes each. The law regulates such teaching inputs as 800 teaching hours per year or 200 school days per year. Teachers are often asked to teach three shifts a day if they are working full time, or they take part time posts at other schools after their regular shifts at their "home" school.

As discussed in Chapter 5 on curriculum and textbooks, there is not enough time to teach the existing curricula, in particular for subjects such as the sciences or languages. Homework is used to compensate for the shortage in hours, but in most cases the time at school is the only learning time, as the vast majority of students work and/or come from disrupted families.

Aware of this and of the fact that homework can only be supplementary to classroom learning but not a substitution, the education community in Santa Catarina is very supportive of the introduction of integrated schools which will run on the basis of full-day curricula. Students in these schools will study different subjects in the morning and participate in extracurricular learning activities in the afternoons.

Integrated model schools are being piloted in different regions of the state, and most if not all of them are under municipal responsibility. Should ownership for the integrated schooling project remain with the municipalities, scaling-up will depend heavily on the economic situation of the respective region.

Attendance in the schools visited by the review team was adjusted to the shifts in the regular schools: the morning shift of the regular school would attend the afternoon shift in the model school and *vice versa*. In terms of ownership and funding, legal status, shifts and hours in the integrated schools are identical with the regular schools. A major difference is contained in the education offered, which is only supplementary to the one

provided in regular schools. Yet, the institutional capacity of the model schools appears to be much higher than that of the regular ones. For example, in the model school of Rio do Sul visited by the review team, the ratio of support staff to teachers was exceeding 3:1, the infrastructure appeared to be in excellent condition, and the community was actively involved in the decision-making and funding for the school. The team was told that model schools are overall highly attractive for both children and parents, and that the waiting lists for enrolment are long.

It appears that the success of the model schools is not measured in terms of remedial or other effects. The evaluation process, as far as it takes place, does not differ from the one applied in the "regular" system and there is no systematic measurement of the impact model schools have on student performance in regular schools. Decisions about investments in integrated schools seem to be taken independently of how well these address the needs of regular education. Indeed, the links to the surrounding education institutions are more of an administrative than of methodological and curricular nature. One of the conditions for enrolment in an integrated school is admission to one of the regular schools in vicinity. This raises the attractiveness of such schools irrespective of the quality of education offered there.

The initial investment and the cost of running a model school is above the average for "regular" education institutions of comparable size, but the team does not have specific budget figures. Having in mind that the model schools are funded from the municipal budgets, it is likely that the resources they absorb would otherwise be benefiting the regular schools. The impact of model schools on the regular school system in terms of quality and institutional strength should, therefore, be seriously taken into consideration when evaluating how successful the integrated approach works.

Relevance of education

Initiatives have been taken to strengthen the management of education institutions as well as programmes to enrich teaching and learning. In addition to curriculum improvements and new education programmes such as sustainable development, outreach programmes have also been encouraged. Tertiary education institutions have been providing outreach services in the hospitals and prisons in addition to other community services as a means to add practical experience for the students as well as means to improve the relevance of education to societal needs.

Other outreach activities also include the establishment of business incubators, innovation parks, adult learning classes, continuous education programmes, etc. Business incubators and innovation parks will have particular significance when the resident entrepreneurial ventures take off in terms of regional development and employment creation.

The school system and community based universities are also encouraged to develop courses that can support the internationalisation of the local economy. In addition to raising proficiency in the Portuguese language, second language courses other than Spanish have also been added in order to be connected to the global economy.

Many regular secondary schools offer apprenticeship programmes to their students, or internships to university students who are undergoing teacher education. Apprenticeship programmes last for two years. Schools establish a contract with companies to set up apprenticeship opportunities for the students. Implementation of this apprenticeship programme can be brokered by the Enterprise-School Integration Centre (*Centro de Integração Empresa-Escola*, CIEE). CIEE has the mandate to enforce the proper treatment of the apprentice. CIEE conducts programme quality control by questionnaire surveys twice a year. The condition for remaining in the apprenticeship programme is passing the grade, so that failing school means exclusion from the programme (for more details on VET see Chapter 7).

Infrastructure, security, support

Work began also to improve the infrastructure of the school system by investing in computers and equipment, teaching materials and upgrading security in the schools. Since 2007, 1 300 schools have been equipped with PCs and internet connections so that students could become IT literate. Schools are supported to develop e-learning programmes and blended learning opportunities for students, teachers and community to use. School libraries are also been given resources for subscriptions to magazines and other reading materials.

Security at the schools has been improved. There are guards during the day in addition to the night time alarm system to reduce theft, drug peddling and other problems. Schools in the most disadvantaged areas continue to suffer from problems of theft and other security issues, however.

Increased cost for security measures is at present considered to be an indicator for state schools operating in difficult community environments. Such schools, around 300 at the time of preparation of this report,[3] have a low IDEB (*Índice de Desenvolvimento da Educação Básica*, Index of Basic Education Development) performance, higher-than-average numbers of

children from dysfunctional families, and additional needs for outreach work in the community in order to secure attendance – needs which the system is either not able to detect or in most cases, not in a position to remedy. Municipal schools with problems are known on local level, but not necessarily perceived as such on state level. Following the path of strengthening institutional capacity, it would be recommendable to reach a state-wide consensus on the categorisation of such schools in need of special support (schools operating in challenging environments). This would help target investments at the school level in economically weaker regions.

Recommendations

Governance

The major institutional management issues confronting the education system of Santa Catarina stem from fragmentation of existing institutional arrangements for the regulatory and management functions. The current management system of the education system consists of four sub-sectors, *i.e.* federal, state, municipality and private; which do not share a coherent policy framework, common standards and management information.

This fragmentation is further exacerbated by:

- Overlaps in the division of labour among various levels of public administration, *i.e.* federal government, state government and municipality.

- Mismatch between SED's mandate and its actual competencies.

- Weak interfaces between governance levels.

- Lack of a shared, reliable evidence base on education quality.

In the view of the OECD team, the following measures should be undertaken:

- Harmonise the management of education in Santa Catarina. This could be done through the establishment of state-based regulatory mechanisms for co-ordination and operational oversight, and by strengthening the co-ordination of education policies on local level, in particular among municipalities that will now take on the lion's share of pre-school and basic school provision.

- Enhance the monitoring and oversight function at state level by scheduled audits for quality assurance and continuous improvement of all schools within Santa Catarina. This would allow the state (in collaboration with

regions and municipalities) to audit the operational aspect of education institutions when indicators, such as participation rate, approval rate, enrolment rate, coverage rate etc. are deemed unsatisfactory, and to ensure a continuous process of improvement.

- Expand the coverage of the existing Institutional Audit to 100% within the state schools while concurrently recruiting municipalities to participate. This audit has already shown positive outcomes for the schools reviewed, and expanding its coverage would benefit the system as a whole.

- Enlarge the formal or informal mandate and work of the SED's Directorate for Organisation, Control and Assessment (DIOC). This would be very useful in providing feedback for policy considerations both to the SED and CEE. In the long run, feedback and information gathered by the Directorate would help achieve greater harmonisation of the system and convergence of minimum management standard of schools.

Use of evidence

SED collects and processes data on the entire education system of Santa Catarina, although formally only on the state school network. Unfortunately, decision-making and budget formulation on different governance levels are detached from the use of this evidence, and in many cases SED does not produce and represent its findings in a way that would allow for dissemination among policy-makers and stakeholders.

- Distribute the aggregated findings and analyses more actively and widely, as a means to tune up feedback signals within the system concerning state level educational policies and school level practices. This could be achieved by producing policy briefs, synthesis reports and similar materials, and through better visualisation of summative information, such as scorecards or performance maps for easy access and use.

- Last but not least, formalise the SED data analysis and reporting as a reference for policy making on all governance levels. One way to achieve this would be through the establishment of an independent body for education policy research and analysis. This would facilitate the co-ordination of policies; and the neutrality of such an institution would facilitate a national consensus on the direction and scope of education reforms.

Accountability

There is *no real consequence for poor performance* of state owned schools within the education administration system of Santa Catarina. The human resource function within the SED does not seem to attribute accountability to individual administrators when their school district or sector does not perform on a par with state averages in terms of targeted indexes. This situation appears to be linked to the bureaucratic tradition of the public administration, and to a highly centralised approach to operational management.

- Set up a performance based reward system that gives more weight to *results* rather than to process only, and make performance results transparent by setting up measurable objectives and targets at different aggregate levels and assign accountability through performance contracts.

Notes

1. The PPP (political-pedagogical project) of a school unit sets out the general principles of its academic regime, administrative principles, curriculum and other processes of academic activity.

2. SED, presentation made to the OECD review team in October 2009.

3. Information provided during interviews with SED staff.

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Chapter 4. Access and Equity including Special Education Provision

This chapter looks at access and equity issues for education in Santa Catarina. It also covers the area of children at risk and those with disabilities. It covers the provision for these categories provided by the state. Finally, the chapter recapitulates the issues and offers recommendations.

In Brazil, education is defined as a collective good as well as an individual public right (and thus a public responsibility). Indeed, there is a strong public and political support for the provision of free, universal *fundamental* education, and for honouring the country's commitments under such international agreements as the United Nations Declaration on Human Rights, the Convention on the Rights of the Child, the Education for All and Millennium Development Goals programmes, and most recently the Convention on the Rights of Disabled People.

As is set out in Chapter 2 (Finance) of this review, the 1988 Constitution specifies obligatory allocations of 18% for the federal budget, and 25% for state and municipal budgets. More recently, funding mechanisms such as FUNDEF (up to 2007) and FUNDEB (since 2007) were introduced, with the immediate objective of ensuring a minimum expenditure per student and a minimum wage for teachers (Moreno and Taranto Goulart, 2005). The responsibility for providing the necessary funding falls within the competence of the states, the Federal District and the municipalities.[1]

However, this raises the issue of accountability and monitoring, to ensure that funds earmarked for education are used as they should be. Not surprisingly, there is a range of best and worst practices in this huge and diverse country. A study by Transparency Brazil (*Transparência Brasil*, 2005) found that in 63% of municipalities there were cases of embezzlement, and in 60% the funds earmarked for education were used for other purposes.[2] Although such practices are a frequent "hidden cost" of

decentralisation, there is convincing evidence that misuse of funds affects both the quality of schools and the learning achievement of children in Brazil (Ferraz *et al.*, 2009).

Improving access for disadvantaged children

One of the most successful school payment programmes in the developing world was created in Brazil: the *Bolsa Escola*, a conditional cash transfer programme that started in 1996 in partnership with UNICEF. At first, the *Bolsa Escola* was limited to a few areas, but as the programme became more and more successful, other regions of Brazil adopted it as well. *Bolsa Escola* paid cash stipends directly to mothers, to send their children aged 6 to 15 to school. Though the payments were small – approximately USD 5 per child, per month – they helped many poor families improve their quality of life (for example, some families used the stipends to purchase electricity), while also encouraging education for their children. A pioneering feature of the programme was its decentralisation to the municipal level, entrusting the municipal authorities with the selection of beneficiaries and making the transfers. Eventually, *Bolsa Escola* reached some 10 million children, until in 2003 it was folded into the broader, much-praised *Bolsa Família* programme.

Gender access and equity

UNICEF maintains a data base on children worldwide, based on household surveys and MICs data.[3] Annually, a summary of key indicators is published under the title *The State of the World's Children.* For Brazil nationally, the gender-related figures are as follows:

Table 4.1 **Education in Brazil, by gender 2000-2007**

Adult literacy rate: females as a % of males, 2000–2007	101
Enrolment and attendance ratios: females as a % of males Net primary school 2000–2007, **enrolled**	102
Enrolment and attendance ratios: females as a % of males Net primary school 2000–2007, **attending**	100
Enrolment and attendance ratios: females as a % of males Net secondary school 2000–2007, **enrolled**	111
Enrolment and attendance ratios: females as a % of males Net secondary school 2000–2007, **attending**	119

Source: UNICEF, www.unicef.org/infobycountry/brazil_statistics .

Gender equity in Santa Catarina's education system

Primary: For Santa Catarina, the Background Report provided to the OECD review team shows that boys and girls have fairly equal rates of enrolment in primary education, with boys representing on average 51% of the primary school population and girls 49%. Actual attendance rates, although not reported separately from enrolment rates, are slightly better for girls than for boys. Figure 4.1 confirms that in primary education in Santa Catarina the greatest difference in enrolment between boys and girls occurs in municipal schools (52% boys *vs.* 48% girls):

Figure 4.1 **Santa Catarina primary enrolment by gender and type of school**
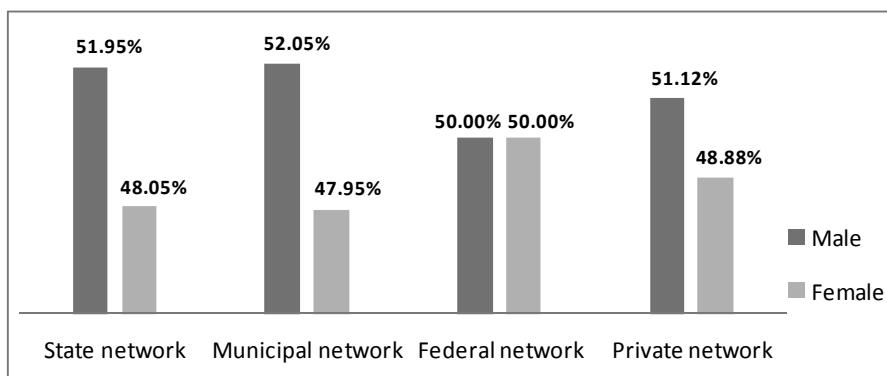
Source: SED, 2009, Background Report.

Secondary: In secondary schools (*ensino médio),* the balance shifts in favour of girls, except in federal schools where the predominance of boys is striking.

Figure 4.2 **Santa Catarina secondary enrolment by gender and type of school**
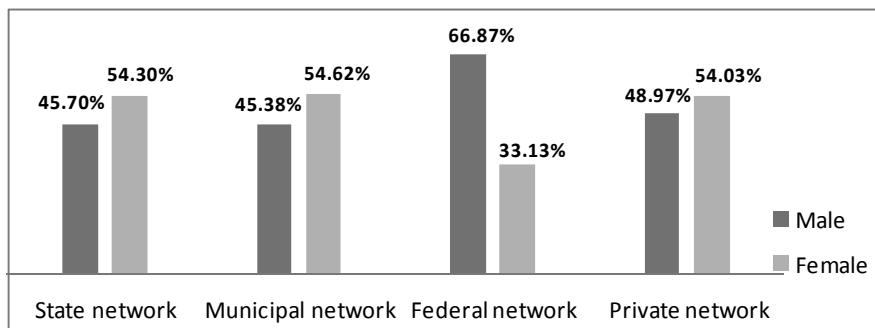
Source: SED, 2009, Background Report.

Youth and Adult Education (Educação de Jovens e Adultos): In supplementary and "second chance" education for youth and adults (EJA), more males than females choose to attend municipal and private courses while it appears that state and federal courses attract more females, as Figure 4.3 indicates.

Figure 4.3 **Santa Catarina Youth and Adults (EJA) enrolment by gender and type of school**
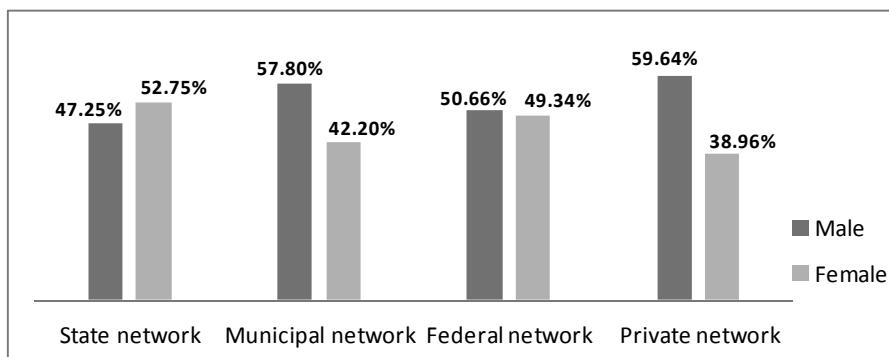
Source: SED, 2009, Background Report.

Ethnicity and inclusive education in Brazil

In 2004, the Secretariat for Continuing Education, Literacy and Diversity (SECAD, *Secretarìa de Educação Continuada, Alfabetização e Diversidade*) was set up under the auspices of the Ministry of Education (MEC). The SECAD accommodates all the projects and programmes that serve minority populations. Its objective is "to contribute to reducing educational inequalities through the participation of citizens, in particular youth and adults, in public policies which ensure the broadening the access to continuing education". It also has responsibility for devising political-pedagogical projects (PPPs), with the aim of including disadvantaged students.

Indigenous students

There are relatively few indigenous students in Santa Catarina, although there are schools throughout the state (see Box 4.1). In Brazil as a whole, in 2006, there were 173 341 students of indigenous descent in education, almost all of whom were in the state and municipal systems. While in 2000 there were 1 318 schools on indigenous lands, in 2005 this figure had risen to 2 235, *i.e.* an increase of 70%. Of these, 53% were located in the northern

region and 22% in the northeast. There were also 161 625 *quilombolas*, that is students enrolled in *quilombos,* settlements set up by fugitive black and indigenous slaves (Neri and Buchmann, 2007, p. 52).

Ethnicity and education in Santa Catarina

While Santa Catarina is rightly proud of its harmonious mix of cultures, traditions, and ethnic backgrounds, and of its success in ensuring that "education for all" is indeed becoming a reality, there are still discrepancies that show that some ethnic groups are educationally disadvantaged. Generally speaking, white students have slightly better rates of basic literacy, and more years of schooling, than blacks or *pardos*. [4]

Box 4.1 **Visit to "*Escola Indígena Cacique Vanhkre*" (Ipuaçu)**

This school serves a large (15 623 hectares) state reservation where about 4 500 Brazilian-Indian Kaingáng and Guarani people live in 15 villages. Each village has a captain, and a Kaingáng Chief heads the entire settlement. Their autonomy is guaranteed by law. Kaingáng speak their own (tonal) language which belongs to the Macro-Je language group (14 consonants and 14 vowels). Traditionally the Kaingáng were hunters, fishers and gatherers. There are two types of property: indigenous property and community property. The state is responsible for maintaining the school and hiring teachers, since 1993, as outlined in Decree (*Portaria*) No. 16207/93. The points of reference are the National Indian Foundation (*Fundação Nacional do Índio*, FUNAI) which was created in 1933 and the GERED of Xanxerê.

In 2010, there are 919 students and 40 teachers in this school. All teachers in this school are former students. For reasons of identity and respect of Kaingáng culture, most of the teachers are Kaingáng, and the objective is that eventually all of them be Kaingáng. Of the 40 teachers, only three do not have a higher education degree. The school's curriculum is bilingual. "Indigenous education" means that, in addition to the national core curriculum, Kaingáng language and culture are taught so that students become familiar with *"our own world and the white man's world"*. The school has a policy of inclusion, and there are some students with disabilities; for example, a special set of Kaingáng signs has been developed to enable deaf students to communicate (one 15-year-old hearing-impaired boy is able to communicate in four different sign languages).

According to the Kaingáng bilingual teacher, there was a huge integration of indigenous people with Portuguese, so that most of the children forgot their native language. This school is thus an important factor in revitalising the native language and culture. Kaingáng language has the same workload as regular disciplines taught in Portuguese – about three periods a week. Most (90%) of children speak Portuguese at home and learn Kaingáng at school. It is very rare for children to come to school speaking Kaingáng and in need of being taught Portuguese; there is some feeling among these children that they should not speak Kaingáng in the classroom, because their classmates all speak Portuguese.

Box 4.1 **Visit to "*Escola Indígena Cacique Vanhkre*" (Ipuaçu)** (continued)

There are other villages and three other multiple-grade schools (*escolas multiseriadas*) around the municipality of Ipuaçu, serving small communities (Kaingáng and Guarani); there is a great deal of moving around among the native population, so that the schools are strongly connected to accommodate this. The school day starts at 7:45 a.m. with three shifts until 5:00 p.m. The roads are difficult, so that children living in the most remote parts of the settlement may have to travel up to 1.5 hours. There are also evening classes.

Drop-outs are monitored by their own (native) administration, through house visits by school staff and reports to the village Chief. Only if problems continue are they referred to the "Children's Council" which is part of the white administration). In 2008, the drop-out rate in this school was 7%; transfers were 5%; repetition/failure rates were 9% (attributed to absenteeism). One problem is that youngsters are considered adults very early (girls at the age of 12, and boys at the age of 15), and most marry and have children very early. Families with seven or eight children are not uncommon; and there is widespread poverty. The main source of income is seasonal agricultural labour; buses can leave as early as 3:00 a.m. and children are often taken out of school to go with their parents to their place of work.

Issue 1: There is a need to develop programmes to prevent teen-age pregnancy, drug and alcohol use, HIV/Aids, etc. The most urgent project is drop-out prevention. Because transport to and from school is often a problem (made worse by the shift system, especially for families with children attending different shifts), irregular attendance often leads to failure and drop-out.

Issue 2: The government's provision of books and materials remains insufficient. This affects attendance as well as student learning; not all children have books; books have to be shared, and many are old and in poor condition. With some families with six or eight children subsisting on the minimum wage, parents cannot buy school supplies. The school has ten computers and in theory there is internet connection, but this only works erratically.

Issue 3: For Kaingáng language teaching they cannot use computers because the keyboards do not have Kaingáng characters, so everything has to be written out and photocopied. The Indigenous History Laboratory at the Federal University has helped by compiling a book of indigenous myths and legends.

Issue 4: Some youngsters from the settlement do continue into tertiary education, and there are scholarships for indigenous students in most HEIs. But more is needed to help the community develop socially and economically. Because of the limited opportunities within the settlement and its surrounding area, talented young people look for work outside.

Issue 5: The school urgently needs to be renovated and expanded.

Child poverty and education in Brazil

Despite strong economic growth and sustained international assistance, anti-poverty policies in Brazil have not been as successful as they might have been; mainly due to lack of co-ordination among programmes, even within the same policy area. An exception is the widely praised *Bolsa Família,* a compensatory programme based on monetary transfers to poor families. This grew out of the earlier *Bolsa Escola* which provided cash payments to mothers on condition that their children attended school. *Bolsa Família* is considered one of the factors behind Brazil's significant social progress since the mid-1990s. The programme reaches over 11 million families – more than 46 million people – a large part of the country's low income population, and was recently expanded as part of the government's efforts to shield the poorest from the economic slowdown.

Child poverty, however, remains an issue. Moreover, the likelihood of a child living in poverty depends heavily on the child's state of residence, urban or rural location within the state, ethnicity, number of other children in the family, and the level of education of parents. Recently, a large study of childhood and poverty in Brazil (IPEA, 2008) calculated that a black child living in a rural area of a northeast state, with three siblings and a parent with no education, is 70.8% likely to be in poverty or extreme poverty; while a white child living in an urban area in a southern state, with three siblings and a parent with some education, has only 3% chance of being poor, and less than 1% of living in extreme poverty.

On the positive side, in terms of poverty reduction, Brazil and Santa Catarina have already achieved the first of the Millennium Development Goals ("to reduce by half the proportion of the population living in extreme poverty by 2015"). For Brazil as a whole, income inequality has continued to decline sharply since 1996 – an average annual reduction of 1.2% – but the decline has not benefited all population groups equally. According to the IPEA study, the degree of extreme poverty among children is much higher that that in other age groups, for example among the elderly who appear to have benefited most (IPEA, 2008).

The second EFA/MDG goal – achieving universal primary education by 2015 – is also on the right track, with the World Bank reporting that in 2008 Brazil's total net enrolment in primary stood at 89% and primary completion rate at 87%, and in Santa Catarina in the 2008⁄2009 school year about 97% of children aged 6-14 were enrolled (SED, 2009). Nevertheless, "universal" primary of acceptable quality has not yet been achieved.

Child poverty and education in Santa Catarina

Children of compulsory schooling age still not in school in Santa Catarina (according to 2008/9 SED statistics, about 46 000) are, inevitably, those hardest to reach: special-needs children and children in poor families among them. The strong link between poverty and educational attainment is confirmed by the international literature.

Santa Catarina is one of the most prosperous states in Brazil, ranking fourth among 27 states in terms of the level of economic development and GDP per capita. In 2007, only 10% of the population lived below the international poverty line.[5] Santa Catarina has a Human Development Index (HDI) of 0.84, the second-highest in Brazil; and in the ten years between 1993 and 2003 Santa Catarina was able to reduce by 46% percent the number of individuals living in poverty (Andrews, 2004). But still, about 20% of Santa Catarina families with children between 0 and 6 years old have incomes below one-half of the minimum wage. During its visit to the municipality of Ipuaçu, the OECD review team learned that many indigenous (Indian) families – often with six or more children – survive on the minimum wage or less.

Given Santa Catarina's very slow population growth rate and low birth rate (1.60%, compared to 1.83% for Brazil) in recent years, the state should now start to benefit from the "demographic advantage" this provides. There is no longer any need for a Santa Catarina child to be deprived – on the basis of poverty – of his or her basic right to nine-year education of acceptable quality, as required by the EFA/Millennium Development Goals.

Family income also has a strong effect on student enrolment in secondary school (*ensino médio,* age 15-17). In Santa Catarina, 84% of youngsters in the top income quintile continue their education beyond age 14, while only 69% of those in the bottom quintile do (2008 figures).

Special needs education in Brazil

What is meant by "special needs"?

Countries and agencies differ in how they define children with special needs. To clarify the situation, OECD has developed a three-part, cross-national classification that assigns children to one of three categories: (A) disabilities, (B) difficulties, or (C) disadvantages (Table 4.2).

Table 4.2 **Cross-national categories of children with special needs[1]**

Category	Definition
A. Disabilities	Students with disabilities or impairments viewed in medical terms as organic disorders attributable to organic pathologies (*e.g.* in relation to sensory, motor or neurological defects). The educational need is considered to arise primarily from problems attributable to these difficulties.
B. Difficulties	Students with behavioural or emotional disorders, or specific difficulties in learning. The educational need is considered to arise primarily from problems in the interaction between the student and the educational context.
C. Disadvantages	Students with disadvantages arising primarily from socio-economic, cultural and/or linguistic factors. The educational need is to compensate for the disadvantages attributable to these factors.

Note (1): In this review, the term "children with special needs" is used to cover all three categories, although there are of course issues and resource needs specific to each category.

Source: OECD, 2007.

Although at present Brazil (and Santa Catarina) do not use these categories, "special education" is understood mainly in terms of category A with far less emphasis on categories B and C. MEC's policy includes the expression "global development disorders", which covers typical high-functioning behaviours such as mild forms of autism.

Other categorisations distinguish among "children at risk", "children with disabilities" and those with "special educational needs":

- "At risk" is the broadest category and can include children living in severe poverty, children without parental care, children at risk of being abused, abandoned or trafficked, children in the street, children in prison and children living with HIV/Aids.

- In any country, "children with disabilities" (physical, sensory, intellectual) constitute on average about 2.5% of all children, according to European Academy of Childhood Disability (EACD) estimates; they are a sub-set of "children with special needs" who are estimated to include 10% of all children in any country. The actual number depends on country definitions.

- In terms of schooling, generally about 10% have special *educational* needs (SEN) – about 2 or 3 % with disabilities (CWD), and about 8% other learners with "special-needs". In practice, it is the 8% that present the definition difficulties.

Legal framework: inclusive education

The central, rights-based concept that unifies the laws and regulations in Brazil is that of "inclusive education". This includes commitments made under the Education for All/Millennium Development Goals programme (EFA/MDG) as well as international conventions such as the UN Universal Declaration of Human Rights, the Convention on the Rights of the Child, the Convention on the Rights of Persons with Disabilities, all of which have been signed by Brazil's federal government, most recently the Convention related to disabled persons (2008), giving this Convention a status equal to the Brazilian Federal Constitution.

The right to education is therefore declared to be *a universal right*, further strengthened by national and state laws and policies. Key documents include:

- The Federal Constitution of 1988 (Art. 3, item IV) which prohibits discrimination on the basis of origin, race, sex, colour, age and "other forms of discrimination".

- The Statute on Children and Adolescents of 1990 (ECA, *Estatuto da Criança e do Adolescente*, Law No. 8069/90), as well as the Declaration on Education for All (1990) and the Salamanca Declaration (1994).

- The National Policy on Special Education (1994), which sees "instructional integration" of special-needs children as a pre-condition for access to curricular activities and types of schooling on the same basis as any other children.

- The National Education Guidelines and Framework Law (LDB, *Lei de Diretrizes e Bases da Educação)* (1996).

- The Guatemala Convention (1999), enacted in Brazil by decree in 2001, which affirms that persons with disabilities have the same human rights and fundamental liberties that other people have, and demands a re-interpretation of "special education" in the context of differentiation and universal access.

- The National Guidelines for Special Education in Basic Education (CNE/CEB No. 2, 2001), which provide that "the education systems must enrol all students, leaving schools to care for students with special educational needs, ensuring quality education for all.

- The National Education Plan of 2001 (PNE, *Plano Nacional de Educação*) Law No. 10.172/2001), aiming to build "an inclusive service that respects human diversity".

- Law No. 10.436/02 which recognises the Brazilian sign language (LIBRAS, *Língua Brasileira de Sinais*), and Ordinance No. 2.678/02 of the Ministry of Education approving guidelines and standards for the use of Braille in all forms of education.

- The Education Development Plan (PDE) of 2007.

- The National Policy on Special Education: Perspective of Inclusive Education of the Ministry of Education (MEC/SEESP 2007).

Finance

The Federal Decree No. 6571 (Government of Brazil, 2008), which regulates the Special Education Service, establishes that, from 2010, students in public special education will receive double FUNDEB funding: one for enrolment in a regular public school, and one for the specialised, complementary and supplementary services they require in order to participate in regular schooling.

Enrolment statistics for SEN/CWD

In Brazil as a whole between 1998 and 2006, the number of children with special needs or disabilities who participated in some form of education more than doubled. By far the largest change was in enrolment of these students in mainstream schools and classes (from about 44 000 in 1998 to more than 325 000 in 2006, a 640% increase), while enrolments in special schools and special classes grew more slowly, at 28% over the nine-year period.

According to 2006 Census data, by level and type of education, 16% of registered SEN/CWD children were in early childhood education; 66.5% in *fundamental* education, 2% in secondary education; 8.3% in youth and adult education (EJA), and 6.3% in vocational education.

Changes in definition?

However, in 2007, important changes were made in the way School Census data are collected. Instead of using paper questionnaires, data are now collected on-line. The reference date for data collection was moved from end-March to end-May, to avoid duplications and errors due to transfers and late entries. The unit of reference changed from school to student, teacher and class. While the new system is said to yield more accurate data, in the case of Special Needs students it has resulted in a number of discrepancies that are not easily explained.

In 2008 and 2009, for example, the part of the census questionnaire that pertains to special education was modified by changing the definitions of "special needs". Prior to 2009, students with attention deficit, learning deficit, dyslexia and hyper-activity were included, but this is no longer allowed. Moreover, in order for a child to be classified as having special needs, a formal doctor's declaration is now required. Special-needs students who participate in other activities but are not formally identified and placed in a specific grade can no longer be counted. Taken together, these changes resulted in a dramatic decrease in the number of students identified as having special educational needs. For Brazil as a whole, the 2007 total of 354 202 fell to a total of 252 687 in 2009, a difference of more than 101 000 students. In the same period, the number of SEN students enrolled in mainstream education rose by 38 551, from 348 480 in 2007 to 387 031 in 2009. The OECD team was unable to discover where the "missing" 62 000 students (previously considered as having SEN) have gone.

Inclusion in mainstream schooling (Brazil)

Table 4.3 **Special needs students in mainstream schools (Brazil), 2007-2008**

	Federal		State		Municipal		Private	
	SEN students	**% of total SEN enrolment**	**SEN students**	**% of total SEN enrolment**	**SEN students**	**% of total SEN enrolment**	**SEN students**	**% of total SEN enrolment**
2007	830	0.2	55 151	15.8	68 377	19.6	224 122	64.3
2008	820	0.3	46 795	14.6	66 834	20.9	205 475	64.2

Total			
	SEN Students	**% change**	**% of total Brazil student enrolment**
2007	348 480	+7.2	0.7
2008	319 924	-8.2	0.6

Source: MEC/INEP, Censo Escolar 2008.
Data source: MEC/INEP, School Census 2008.

It is striking that, according to Census figures, only very few special-needs students (2%) continue from *fundamental* to regular secondary (*ensino médio)*. The great majority (83.4%) apparently leave school altogether; and 14.6% continue in supplementary (EJA) courses or in vocational programmes. Apparently "inclusion" in academic types of post-basic education still has some way to go; the expectation seems to be that youngsters with special needs will leave school early. In 2006 only 6.3%

were enrolled in vocational programmes – with at least some hope of acquiring employable skills – but for most SEN/CWD youngsters, the link with the labour market is still very weak.

Other figures also indicate that there are still a considerable number of children who remain unreached by – and "invisible" to – the education system in Brazil. It was reported in 2008 that 71% of disabled beneficiaries of the continued payment benefit (BPC, *Benefício de Prestação Continuada*)[6] between the ages of zero and 18 were not in school. Partly, this is due to the lack of suitable facilities for children with various types of disability, but partly also to a reluctance of mainstream schools to include these students. Inclusive education is welcomed by schools as long as it does not disturb the usual school routine; especially children with behavioural and psychiatric disorders still find it difficult to be accepted in public mainstream as well as private schools.

Special education in Santa Catarina

Organisation

The background report notes that special education in Santa Catarina is run by the SED, with the support of the Santa Catarina Foundation for Special Education (FCEE*, Fundação Catarinense de Educação Especial*), which is an organisation linked to the SED, as well as partnered with the Centres for Specialised Educational Service (CAESPs, *Centros de Atendimento Educacional Especializado*), maintained by local Associations of Parents and Friends of Exceptionals (APAEs, *Associações de Pais e Amigos dos Excepcionais*) or other similar institutions. The APAEs have federal as well as state networks, and in Santa Catarina they are subjected to overall co-ordination via the FCEE.[7]

The FCEE is entrusted with the implementation of policies for children with SEN/CWD, in particular referral and access to educational services on state and municipal levels and to that of private providers, co-ordination between municipalities and GEREDs, research and quality assurance.[8] The set-up for education provision comprises mainly of the APAEs offering stimulative instruction and activities for children aged 0-4, the SAEDEs *(Serviços de Atendimento Educacional Especializado)* which, often as sub-units of the APAEs, work with children aged 4-14 by providing support via the Pedagogical Service for Special Education (SPE, *Serviço Pedagógico Específico*), and over 230 further disability NGOs partnering with municipal and other organisations to offer occupational education (*Educação Profissional)*, rehabilitation, and other forms of support for students aged 14 and older.

Figure 4.4 shows the main connections between state, foundation, APAEs and SAEDEs, and education institutions. In order to gain access to SAEDE assistance, a school must submit an application. Assistance may then be provided either by the SED (via SAEDE) for public schools, or via an APAE depending upon the type of need and the location or type of school. The municipal and private schools have access to services like SAEDEs only via the local APAE.

The collaboration between the State Secretariat for Education and the municipalities appears to be close, and the SED has a permanent liaison officer assigned to work with the FCEE. The municipal, private and federal schools which between 2007 and 2009 were providing education to over 75% of the registered children with SEN/CWD[9] on average, have no institutionalised connection to the state system and the Foundation other than through NGOs like the APAEs. Despite the state-wide mandate of the FCEE to establish and monitor the work of commissions for identification, diagnosis and referral of SEN, municipalities are not obliged to co-ordinate and indeed many of them seem to convene their own medical and pedagogical commissions, the composition (and likely quality) of which varies from municipality to municipality. Alternatively local authorities may rely on specialists available through the respective local APAE.

In the absence of an obligation for co-ordination, the links between governance levels and service providers in many municipalities seem to work on an *ad hoc* basis and often depend on the availability of personal contacts or political "compatibility" of municipal with GERED leadership. This is likely to have an impact on the reliability of diagnostic procedures, the rate of identification of children with SEN/CWD and ultimately – their access to education.

In all of the cases described, the APAEs are acting as hubs between municipalities, state structures, schools and stakeholders. In 2009, in Santa Catarina there were 190 APAEs, all of which are non-governmental entities offering day-care services, basic numeracy, literacy and VET (for adults with disabilities) education, home visits and stimulative instruction. Furthermore, APAEs with sufficient resources are putting together diagnostic commissions comprising a range of experts (psychologists, physiotherapists, pedagogues, speech therapists, physicians, social workers), and are offering teacher training and technical support to a selection of registered, inclusive education schools. Many of the APAEs also have agreements with local authorities and businesses, and about 78, as of 2009, had agreements with local health care providers.

Figure 4.4 **Services for Special Education in Santa Catarina**

STATE LEVEL

SED, GEREDs

FCEE

SEN/SWD NGOs

SAEDEs, technical assistance

Other NGOs

State Schools

Local APAES, SAEDEs at the APAEs, other services

Municipal schools

Private schools

Partnerships with health care providers, professional education, and social work with families; agreements with municipalities which pay for services.

Municipalities

- - - - - - Contractual/institutional link

⟶ Access to services/guidance

——— Sub-category

MUNICIPAL LEVEL, PRIVATE EDUCATION

Source: OECD Review team.

In most regions, the concentration of expertise and the availability of infrastructure render the APAEs the main and often only local resource for schools, parents and education authorities in dealing with children with SEN/CWD. Given the increased responsibility of municipalities, not only for nursery and pre-school education but also for *fundamental* education up to the age of 14/15, the significance of the APAEs as resource centres is likely to increase further.

Finance

In 2009, the State of Santa Catarina spent a total of BRL 86 million (from FUNDEB: BRL 61 million) on special education, out of a total budget of BRL 2 535 million. This means that 3.4% of Santa Catarina's education budget goes to SEN/CWD, and that (of this) 2.5% comes from FUNDEB so that the state itself contributes less than 1% to SEN/CWD. An additional source of funding is the VAT revenue, 1% of which, according to Law No. 381, is earmarked for contribution to the "*Fundo Social*", and via this Fund directly benefits the APAEs.

The team does not dispose of a break-down of spending on SEN/CWD, but it seems that the main share of the budget for this area remains in Florianópolis and is absorbed by the FCEE. Transfers to the regions are limited mainly to salaries for the APAEs staff, leaving the APAEs dependant on alternative, often irregular sources of funding for their activities and services. In the financially better off municipalities in the south of Santa Catarina third-party support can amount to as much as 80% of the total APAE budget.

Figure 4.5 **Example of a typical APAE budget composition, Municipality of Rio do Sul (2009)**
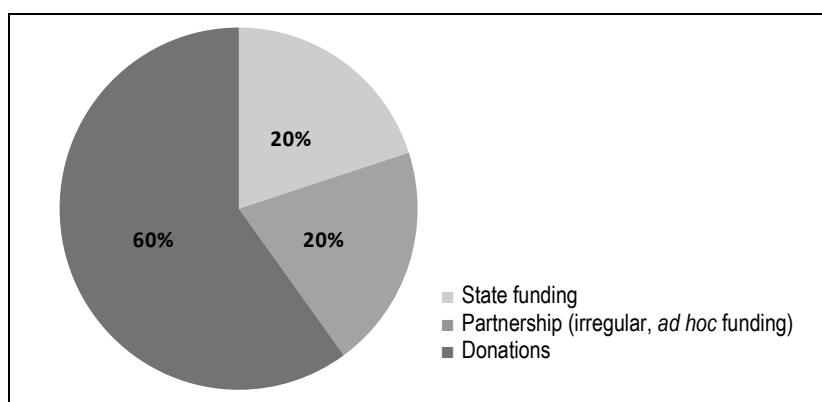
Source: Review team visit at the APAE of Rio do Sul, Santa Catarina.

APAEs in less developed regions consequently have less potential sources of funding, which limits the scope and quality of their services. As already indicated, around 75% of all registered children with SEN/CWD are provided education in municipal, federal or private schools which rely mainly on the APAE network. The existing funding arrangements, therefore, not only tend to disadvantage children and families living in economically weaker regions, but are also likely to bring considerable variation in the quality of provision for children with SEN/CWD in Santa Catarina as a whole. It must also be noted that, on the positive side, the dependency on external funding allows for raising awareness and civil society involvement.

Provision of education

Following commitments to inclusive education from 2006 (Board of Trustees of the Santa Catarina FCEE) and 2008 (The Federal MEC), the State of Santa Catarina has set itself the commendable, ambitious aim to provide all children with SEN/CWD with education in regular schools.[10] The team was positively impressed by the motivation of SED, the professionals from FCEE, the municipalities, the APAEs and other stakeholders and institutions to make this difficult endeavour a success. At the time of preparation of the present report the transition to inclusive education was still underway, providing a window of opportunity for reinforcement of positive developments, and for fine tuning the reform effort where needed.

Mainstreaming of children with SEN/CWD in regular schools can be counterproductive if the education system is not sufficiently equipped to deal with the challenges coming along with it, such as increased diversity in classrooms and additional demand for staff and resources. In Santa Catarina potential shortcomings can be observed in two areas – provision of education and identification of children with SEN/CWD.

The Background Report provided to the OECD review team is virtually silent on provision for children with special educational needs and disabilities. In 2008, the SED had a total of 4 082 SEN students in mainstream public (state and municipal) schools, with the involvement of FCEE and CAESPs. The Background Report adds that, in 2009, a total of around 17 000 students with special needs were receiving education in a variety of settings in Santa Catarina, with the aim of developing vocational skills and social integration (SED, 2009, p. 35).

At present, the burden of inclusive education reform in Santa Catarina is carried by regular schools (for the most part municipal and private, and some state schools), the APAE network and the FCEE. The biggest advantage, but also main challenge and weakest link in this reform set-up is

the envisaged role of regular schools as the only providers of education for children with SEN/CWD which are outside of the capital. Most of the schools visited by the review team claimed they have insufficient resources, staffing and preparation to deal with the task and only few of them had access to support and capacity building through the local APAEs.

In fact, the higher the degree of disability of a child, the less likely it would be that it will be able to stay in school. For those confined to staying at home, the APAEs organise home visits. Yet APAE staff are for the most part social workers (not teachers), and therefore the *educational* value of these home visits is not clear to the OECD team. The fact that APAEs at present do not employ teachers[11] means also that they cannot address the capacity shortages of schools related to education. In recognition of the APAEs potential to compensate for school-level deficits and as a next step in the inclusive reform effort, the SED intends to deploy SEN teachers to the institutions of the network APAEs and to grant them additional financial support.[12]

This does not mean that education institutions are not doing their best to meet expectations. On the contrary, during its visits around the State of Santa Catarina, the team was impressed by the inclusion of children with sensory disabilities in mainstream schools. Especially for hearing- and vision-impaired children, the provision of classroom assistants and sign-language interpreters appears to be very good; even in the remote indigenous school visited by the OECD team in Ipuaçu (see Box 4.1) there is a dedicated sign-language teacher able to work with deaf children not only in LIBRAS (the Brazilian sign language) but in the native Kaingáng language. In addition, the children are well accepted and included in the school community, and there is no apparent opposition from parents of other children or from school staff.

The team did not observe many *physically* or *multiple-disabled* children in the schools visited. While this appears to be in line with the *Politica* which states that severely disabled children or those lacking interaction with their environment will be treated only in service centres for mentally disabled (SED/FCEE 2009), the number of "mainstreamed" children in Santa Catarina schools still seems overall to be very small compared with the internationally accepted norm that about 2 to 3% of any country's entire school population needs some form of extra educational support because of disability. In Santa Catarina, this would mean that there are at least 25 000 to 30 000 primary school-age children (grades 1-8) with category A[13] special needs. But only about 9 700 are in regular basic schools, and the total number of students with special needs enrolled at *all* levels and *all* types of pre-tertiary education is 12 271 (see Table 4.4, School Census 2009).

Table 4.4 **Number of students with special needs
in Santa Catarina's education system (2009)**

Type of education	In *fundamental* education	In secondary education	In vocational education
Regular (mainstream) education	9 700	607	36
Regular youth & adult education	644	118	20
Special education classes	297	23	0
Special youth & adult classes	144	78	0
Special education schools	534	0	0
Special schools for youth and adults	16	30	24
Total number of SEN/CWD students in education in Santa Catarina	11 335	856	80

Source: MEC/INEP School Census 2009.

Calculations based on SED data for the period 1999-2009 show that the share of children with SEN exposed to some form of education provision remained constantly below 2% since 1999 (see Table 4.5). The sudden increase in figures between 2004 and 2008 is unlikely to reflect a real improvement in inclusion levels, but is rather due to the changes in census questionnaires and categorisation criteria, partly reversed in 2009.

Table 4.5 **Share of SEN students in some form of education
of the total school population**

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009[1]
Share in %	1.03	0.95	0.97	1.04	1.07	1.65	1.58	1.69	1.79	1.95	0.9

Note (1): Preliminary data.
Source: OECD review team calculations based on *Censo Escolar/Educacenso* 1999/2009.

Assuming that trends of previous years (2004 to 2006) would hold,[14] today less than one-third of all registered children with SEN/CWD in Santa Catarina are in mainstream education.

The OECD team, therefore, is concerned that a substantial number of children remain unreached by, and "invisible" to, the education system or simply drop out before time. As mentioned above, structural weaknesses in the identification process for children with SEN are likely to be among the main reasons and are the second main challenge on the way to a more inclusive education system in the state.

Identification, diagnosis and categorisation of children with SEN/CWD

The annual School Census for Basic Education conducted by INEP uses a set of indicators including the types of disability, developmental disorders, or giftedness; placement of students with SEN/CWD (in mainstream or specialised public or private education), accessibility of school buildings, resources and specialised equipment available, and training of special-needs teachers.

International experience shows that early identification and intervention are crucial. Because in Brazil enrolments in early childhood education are low – especially in disadvantaged areas where child poverty, poor housing and poor nutrition are most likely while access to pre-school programmes is least likely – many children will not be identified as having special needs until they are 5 or 6 years old, or even later. The introduction of a "zero" year for 6-year-olds will go some way towards improving this, but clearly municipal health agencies and social protection departments should work closely with local APAEs to ensure that early identification and intervention services are available, and that all relevant information is shared with the school system as early as possible.

At present, however, numerous municipalities (and in particular the better off ones), operate independently when it comes to identification of children with SEN/CWD and convene their own assessment commissions. The review team is not aware of the existence of a uniform regulation on the composition of these commissions, but they seem to usually include a psychologist, a speech therapist and a pedagogue. The commissions convened by the APAEs tend to comprise a broader set of experts.

The referrals of children with SEN/CWD can come from three sides: schools and pre-schools, the local medical service (PSF, *Programa de Saúde da Família*), and the family. The state puts the main burden of responsibility for registration of children with SEN/CWD on the families. Especially in socially and economically weaker areas, families have many problems, and also some of them are simply reluctant to admit having a child with disability. Often parents are also unaware of their rights and the support infrastructure in place. According to information gathered during review visits, some 70% of the referrals are, therefore, coming at a relatively late stage, from the schools. Early identification, important as it is, hence seems to take place only rarely.

None of the institutions involved in services provision for children with SEN/CWD is pro-actively "scanning" for unregistered children, and there appears to be no link with the School Census, so that even the APAEs are mostly in the passive position of delivering services and support, but not offering them.

Curriculum, books and materials for SEN/CWD

In mainstream schools, the Curricular Matrix offers contact time with a specialised teacher to according to a rota, through SAEDE (*Serviço de Atendimento Educacional Especializado*). For children with hearing disabilities, this is called SAEDE-DA; for those with visual disabilities SAEDE-DV; and for those with mental disabilities SAEDE-DM. In some cases, a second teacher may be provided to accompany a student with special needs in regular schools; for example, a qualified sign language interpreter for deaf children (Art. 5 of LCD 170/98, subsection IV).

As for textbooks and materials, the (federal) National School Textbook Programme (*Programa Nacional do Livro Didático*, PNLD) procures textbooks for students of all grades of basic education in public schools. In addition, blind or visually impaired students receive materials in Braille, and free books are also provided to students with special educational needs in public institutions, as well as in private institutions designated under the School Census as being philanthropic or community-based. Specialised teaching and learning materials are also published by the FCEE; their catalogue, *Catálogo de Materiais Pedagógicos Adaptados da FCEE,* has a comprehensive list of materials specially adapted for use with SEN/CWD students. These materials are printed and financed by the State Secretariat for Education but have the *imprimatur* of the FCEE.

Issues in education of children with special educational needs and those with disabilities

- *Early identification and early intervention.* Early childhood education covers day care (age 0-3+) and pre-school services (age 4-5+) for young children. In Santa Catarina, about 33% of all children ages 0-6 are enrolled in some form of day care or education programme, rising to about 60% for age 5-6, the final year before school entrance.

- For children with special needs, it is essential that they come into contact with social welfare, health and early-education services as early as possible. The OECD team noted that about one-third of local APAEs in Santa Catarina have agreements with health care agencies so that early diagnosis and interventions are easier; however, in other localities

(especially in disadvantaged areas) parents may not be aware of services that are available, either through their municipality or through local APAEs, so that inevitably some children will not be identified as having special needs until they enter school at age 6 or even later. Moreover, the receiving school will not be aware until the children actually arrive, preventing them from making suitable arrangements in terms of staffing and resources.

- *Barriers to, and facilitators of, inclusion.* The *facilitators* most often mentioned to the OECD team were: adequate funding and co-ordination among responsible authorities; reform of the education system to remove unnecessary obstacles, *e.g.* in too-inflexible curricula and inadequate teacher training; and fostering a positive attitude towards inclusion. *Barriers* are lack of money at local and school level; lack of reliable data; lack of clarity in law; overcrowded classes and shift arrangements; inadequate training of teachers to work in inclusive settings; inappropriate buildings and facilities; and – in some cases – negative public attitudes, although the OECD team did not encounter these during their school visits in Santa Catarina. In fact there was much evidence that SEN/CWD children were very well accepted and supported by other students, parents and teachers.

- *Statistics and indicators.* The OECD team encountered a lack of accurate information, and there is little co-ordination in data gathering among ministries (health, social welfare, education) as well as among the levels of the education system (federal, state, municipal, private). Therefore, data are often contradictory because different indicators have been used. While data exist about children in public and private special schools – and to some extent about children in special classes in regular schools – it is far less clear how many children with mild special needs (dyslexia, behavioural problems) are not properly diagnosed, but are struggling to cope in regular classes. Also, a substantial number of SEN/CWD children are not in school at all, and thus "invisible" in the statistics.

- *Teacher training.* This emerged as a key issue, in terms of pre-service (initial) and in-service teacher training. Special-needs education is not generally part of pre-service training of teachers in *regular schools*; in-service (professional development) training in SEN is patchy, and often left to NGOs. As a result, many regular teachers who are now expected to include SEN children in their classes are un-prepared Training for special-needs teachers in *special schools* is generally available, and university faculties are now modernising their curricula. Teachers in

pre-schools get very little or no training in special needs. Much is being done by international agencies (UNICEF), APAEs and NGOs, rather than ministries or universities.

- *Training for other professionals*. Some psychologists, speech therapists, pedagogues and social workers are trained for work with special-needs children, but not all schools have access to specialist professionals able to support teachers in inclusive settings. However, the OECD team was impressed by the availability in many schools of special assistants such as sign language interpreters for hearing-impaired and teachers of Braille for vision-impaired students. The use of the Brazilian sign language (LIBRAS) is widespread.

- *School organisation*. Timetables and standards are set centrally, but pupil: teacher ratios are usually much more favourable in special schools than in regular schools. The shift system does not work well for SEN children or their parents, especially when parents work and have to make arrangements for transport for their SEN child during working hours. Physical access to and within school buildings remains a serious problem (too many steps, stairs, no disabled toilets, etc.).

- *Parents*. As in most systems, parents have a legal right to decide about their child's placement, or at least to be an equal partner with experts in making such decisions. Parents mention *transport* to and from school as a key problem; also the lack of trained teachers and advisors in schools to help with day-to-day concerns in looking after their children. In Santa Catarina, the APAEs are the main advocates of the rights of SEN/CWD children, and they provide information, mutual support, lobby the authorities, and assist the schools. However, home visits to children who cannot attend school are often done by social workers in the municipalities, rather than by trained special-needs teachers who can ensure that every child is educated to the full extent of his/her abilities.

- *Pedagogy*. New approaches to teaching and learning are beginning to have an effect, for example where innovative methods such as Active Learning are used in pre-schools and early grades of primary. The trend is clearly towards individualised teaching and child-centred education for all, but is severely hampered by the lack of time on the time-table and the shift system.

- *Materials and resources*. In Santa Catarina, the FCEE provides an excellent array of teaching and learning materials for specialised schools and classes (*e.g.* for vision-impaired and mentally impaired children), but because the prescribed national curriculum for mainstream schools is not easily adapted to individual needs, SEN/CWD children in regular classes experience a serious lack of materials suitable for them.

- *Academic access beyond basic education.* There is still a tendency to assume that SEN/CWD children will not go to academic upper-secondary or higher education, and that they need (often low-level) vocational skills instead. International experience shows that many special-needs youngsters are perfectly capable of learning in more challenging settings, and indeed flourish when given the chance.

Recommendations

1. Step up the active involvement of the SED in ensuring that *every* child of compulsory school age is adequately served. This means paying closer attention to issues related to family and child poverty, as well as being more directly engaged in the education of children with special educational needs. At present, it seems that much of the actual work is done by the FCEE, the APAEs and NGOs; however, the state has a legal as well as a moral obligation to look after *all* children of compulsory school age, not only those who are capable of fitting into the standard school routine and following the standard curriculum.

2. Improve accurate data gathering and data sharing among various levels of government and among ministries most likely to be aware of families with children who have poverty, health or disability problems (social welfare, health, housing). The OECD team found that various agencies use different definitions, different methodologies, and different ways of collecting and reporting data, making it almost impossible to determine what is actually the case.

3. Expand the provision of pre-school services to include more children especially in deprived areas where children are more likely to have health, housing and nutrition problems. Encourage all APAEs to strengthen links with health and social welfare agencies in their municipalities, and to publicise their services in the local press and in clinics and hospitals where parents are likely to visit.

4. Encourage active "outreach" projects to identify and support families with children who, for whatever reason, are not in the school system and are not receiving the help and education they are entitled to under the law.

5. Investigate to what extent SEN/CWD children in public schools are negatively affected by the organisation or physical accessibility of the school they attend: specifically, the shift system, possibilities for transport, physical access to and within school buildings, sanitary facilities, and suitable arrangements such as class sizes, materials and teaching assistants in the classroom. Identify and remove unnecessary barriers that prevent SEN/CWD students from reaching their full potential as members of the community.

Notes

1. Because of the widely varying social and economic conditions across the country, the federal government may supplement the amounts allocated via FUNDEB when the allocation per student falls below a nationally defined minimum level.

2. See *Transparência Brasil* (2005). A 2003 study of irregularities by the Inspector General's Office (*Controladoria-Geral da União*, CGU) estimated that some 13% of FUNDEF's total budget was lost to fraud during procurement, with some municipalities losing up to 55% of their allocation. See www.acaoeducativa.org.

3. UNICEF, www.unicef.org/infobycountry/brazil_statistics.html#56; and Child Info Brazil, 2008, available at www.childinfo.org/files/LAC_Brazil.pdf. Total enrolment is the number of pupils of the school-age group for primary education, enrolled either in primary or secondary education, expressed as a percentage of the total population in that age group. *Source*: United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics.

4. In Brazil, *pardo* is a category used by the Brazilian Institute of Geography and Statistics (IBGE) in Brazilian censuses. It refers to persons of mixed race, mainly black and white.

5. The international poverty lines are based on nationally representative primary household surveys conducted by national statistical offices or by private agencies, under the supervision of government or international agencies and obtained from government statistical offices.

6. The Continued Payment Benefit (BPC, *Benefício de Prestação Continuada*) and Monthly Income for Life (*Renda Mensal Vitalícia*) are paid by the Brazilian government to people age 65 and over, and to those who cannot work due to disability. See Ministry of Social Welfare (2009), pp. 39 *et seq.*

7. The first APAE was established in 1954 in Rio de Janeiro, and the first APAE in Santa Catarina was set up in 1968. See the website of FCEE, www.fcee.sc.gov.br.

8. As stated in Law No. 381 and in the policy paper "*Política de Educação Especial do Estado de Santa Catarina*" (SED, 2009).

9. 82.57% in 2007, 80.95% in 2008, 62.09% in 2009 (Based on data provided by SED).

10. Presentation of P. R. Bauer, Secretary of State for Education, to the review team on 13 October 2009.

11. The regular APAE staff consists of social workers.

12. Presentation of P. R. Bauer, Secretary of State for Education to the review team on 13 October 2009.

13. OECD cross-national classification: 2007; see Table 4.2.

14. 27.7% in 2004, 25.8% in 2005, 31.05% in 2006 according to calculations based on data provided by SED.

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Chapter 5. Curriculum and Textbooks in Pre-school, Basic and Secondary Education

This chapter covers the federal curriculum for all levels of education through upper secondary and the "Curricular Proposal of Santa Catarina State". It also deals with how textbooks and other learning materials are produced, approved and distributed. The chapter also list the issues involved and provides key recommendations.

Introduction: notes on the general education system

From 2008, a new system has become mandatory (on the basis of Law 11.274 of 2006), known as "9-Year *Fundamental* Education". Under the new system, instead of "*grades* 1-8", progression is indicated by *year*: *i.e.* "*year* 1-9", in order to take into account the extra year added through the new school entrance age of 6. At present, during the transition phase from 8- to 9-year compulsory education, both terms – "year" and "grade" – are used; *i.e.* "*grade* 8" under the previous system becomes "*year 9*" in the reformed system. At the time of the OECD visit, many schools had both 8- and 9-year basic (called *fundamental* in Brazil) education.[1] A recent amendment to the Constitution (No. 59 of 11 November 2009) stipulates that basic education is compulsory from 4 to 17 years of age, and is expected to be fully implemented by 2016).

Early childhood education covers day care (age 0-3+) and pre-school services (age 4-5+) for young children. *Primary education or elementary education* in this section refers to the first five years ("years 1-5") of formal schooling, or "grades 1-4" in the 8-year system.[2] *Fundamental* education currently covers "years 1-9" or "grades 1-8". *Secondary* education or "middle school" *(ensino médio)* covers the following three years.

Data. In preparing this review, the OECD team used a variety of data sources that may not always be in agreement, either in their numbers or in the terms used. For example, "Attendance ratio" is the term used by the IBGE's National Household Sample Survey (PNAD), while INEP's School

Census uses the terms "net enrolment" and "gross enrolment". Enrolment rates reported by the School Census tend to be lower than those of the IBGE, because the School Census includes only registered services, and especially in early childhood care and education many services are not registered. Every effort has been made to use the most recent and reliable data available to the team.

The Federal Ministry of Education (MEC) in Brasília – which sets the curriculum framework, implements standardised learning assessments, and acquires core-subject textbooks for students in public schools across the nation – clearly has a key role in formulating national education laws and setting and monitoring standards. But with a total of more than 50 million students in its education system, there is only so much MEC can do: the actual task of delivering quality falls to state and municipal governments. The State Secretariat for Education in Santa Catarina and its municipalities are among the most successful in the country.

Class sizes in *fundamental* and secondary education vary from a maximum of 25 students per class for grades 1 to 4 ("years" 1-5), 35 students for upper primary years, and 40 students for secondary education. Overall, pupil/teacher ratios in Santa Catarina are 19.56, but they vary from 11.52 in federal schools to 16.55 in municipal schools and 27.84 in state schools. Private schools have lower ratios, at about 12.2 (2007 data). Considering Santa Catarina's very slow population growth rate (less than 1% per year) and low birth rate (1.60%, compared to 1.83% for Brazil) in recent years, the state should soon be able take advantage of this "demographic dividend" and reduce class sizes especially in grades 5-8.

The school year by law must have a minimum of 200 days, usually divided into four terms. It starts in early February and ends the third week of December; there is only one short holiday in July (two weeks), and a longer one between the middle of December and the start of February (about six weeks). There are seven national or state holidays per year.

Early childhood education (*Educação infantil*)

- In the 1996 National Education Guidelines and Framework Law (LDB), the term "early childhood education" refers to both care and education services catering for children aged 0-6 (or aged 0-5+, after the lowering of the primary school entrance age, in 2007). Early childhood education is delivered through two age-specific services: day care centres for children aged 0-3+, and pre-schools for ages 4-5+.

- Since 1999, there are federal quality standards as well as a national curriculum framework *(Diretrizes Curriculares Nacionais para a Educação Infantil)* for the entire 0-5+ age group. However, many of these quality requirements have not been put into practice, and thus far there is very little in the way of supervision and enforcement. Although the federal legislation allows schools to work out their own pedagogical plans, it is mandatory for both day care centres and pre-schools to take the federal guidelines into account. Control of implementation is weak, especially in non-public early childhood care and education.

- As part of introducing 9-year compulsory education, the decision to lower the primary entrance age from 7 to 6 is important to ensure that the whole age cohort is in education from the age of 6. Previously, only a proportion of 5-6 year olds received any form of school-readiness programmes (in Santa Catarina about 33% overall for ages 0-6; rising to about 60% for age 5-6, the final year before school entrance). Expanding 60% to 100% of the cohort is important to improve readiness-to-learn, especially for disadvantaged children who have not had a chance to develop social and language skills during their early years.

- Municipalities are responsible for financing and providing early childhood education. Under FUNDEB (2007), 20% of state and municipal tax revenue is reserved for basic education, including the age group 0-5+.

Literacy classes

- This early childhood service, though not recognised by the 1996 Law, is included in the annual School Census. Some primary schools insist on children being able to read and write before entering; they set up so-called "literacy classes", and children who have not passed literacy tests are often found in these classes. With the new entrance age for primary school set at 6, the number of literacy classes is declining, but according to UNESCO, in 2003 there were still 600 000 six- and seven-year olds in Brazil attending them (UNESCO, 2007, p. 7).

Fundamental and secondary education[3]

- *Ensino Fundamental* (*Fundamental* or Basic Education). As noted earlier, from 2008 a new system has become mandatory, known as "9-Year *Fundamental* Education". Under the new system, instead of "*grades* 1-8", progression is indicated by *year*: *i.e.* "*year* 1-9", in order

to accommodate the new school entrance age of 6. Completion age (14) remains the same. At the time of the OECD visit, schools had simultaneously 8- and 9-year basic education; this meant that students graduating from "*grade 8*" will continue in year 1 of secondary education.

Under Art. 24 of the Complementary Law 170⁄1998, *fundamental* education is organised in two stages: primary (grades 1-4, or "years" 1-5, for children aged 6 to 10), and upper primary (grades 5-8, or "years" 6-9) for children aged 11-14. By starting *fundamental* education at age 6, the large majority of children will now reach secondary education before they are 15.

There is no school-leaving exam, but a certificate (proof of completion of *fundamental* education) is issued. Some employers may require this certificate.

- *Ensino Médio* or *Educação Geral e Profissionalizante* (secondary education: general and vocational education covers three years (years 1-3), and aims to provide students with the knowledge and skills they need to either continue studying at tertiary level, or to enter the job market.

- In general, students enter into year 1 of secondary without entrance examination, but they have to show that they have successfully completed *fundamental* education. For federal schools, there are entrance exams; these are technical schools and they prepare both for tertiary education and for technical jobs, *e.g.* in areas like chemistry, biology, agriculture, design, etc. In federal schools, *ensino médio* takes four years.

- The Curricular Matrix for Secondary Education emphasises scientific education, an introduction to technology, and the duties and rights of citizenship.

- *Integrated Secondary Education (EEB, Escola de Educação Básica).* Recognising that many teenagers will leave academic education after the secondary phase and will then need to have practical and vocational skills, many schools now offer technical-vocational courses (for instance for teaching) alongside the regular secondary curriculum. Nearly all these courses are offered in the evenings.

- *Special Educational Needs.* For children with special needs in mainstream schools, the Curricular Matrix also offers contact time with a specialised teacher to students with special needs, according to a special rota, and through the SAEDEs (*Serviços de Atendimento Educacional Especializado)* for children with hearing disabilities (DA),

visual disabilities (DV) or mental disabilities (DM). In certain cases, a second teacher may be made available to accompany a student with special needs in regular schools; for example, a qualified sign language interpreter for deaf children (Art. 5 of LCD 170/98, subsection IV).

Tables 5.1, 5.2 and 5.3 show the basic system statistics for Santa Catarina. They show clearly the expansion of education coverage, both at compulsory (*fundamental*) level and at post-compulsory (secondary) level, although pre-school coverage is still low at about 33% of the 0-6 age group (2005 data).[4]

Table 5.1 **Early childhood care and education in Santa Catarina by type of school, 1996-2007 (selected years)**

Year	School type	Total age cohort	Enrolment	% of age group 0-6
1996	Federal		352	0.05
	State		37 945	5.68
	Municipal	668 227	96 983	14.51
	Private		37 097	5.55
	Total		172 377	25.80
2000	Federal		256	0.04
	State		24 132	3.55
	Municipal	679534	138 400	20.37
	Private		43 146	6.35
	Total		205 934	30.31
2003	Federal		276	0.04
	State		22 261	3.13
	Municipal	711 128	160 742	22.60
	Private		49 383	6.94
	Total		232 664	32.72
2007 (0-5)[1]	Federal		224	0.03
	State		6 880	1.05
	Municipal	654 709[1]	139 527	21.31
	Private		35 074	5.36
	Total		181 705	27.75

Note (1): From 2007, children enter primary year 1 at age 6, reducing the number of children in pre-school care and education.

Data Source: SED Directorate for Organisation, Control and Assessment, 2009.

Table 5.2 **Basic education in Santa Catarina by type of school (1998-2009)**

	Basic (*Fundamental*) Schools in Santa Catarina					
Year	**Total**		**Federal**		**State**	
	School	**Enrolment**	**School**	**Enrolment**	**School**	**Enrolment**
1998	7 715	1 383 805	11	5 513	1 376	744 314
1999	7 744	1 423 047	10	6 049	1 377	756 474
2000	7 336	1 449 076	10	5 664	1 352	756 961
2001	7 364	1 450 263	10	5 646	1 322	734 599
2002	7 128	1 611 480	10	5 356	1 301	805 251
2003	6 924	1 617 644	10	4 556	1 303	805 940
2004	6 803	1 716 257	10	3 815	1 298	873 436
2005	6 660	1 696 248	10	8 095	1 281	832 950
2006	6 624	1 711 245	10	8 216	1 310	846 976
2007	6 699	1 574 212	13	7 250	1 417	738 642
2008	6 635	1 575 221	14	7 850	1 353	714 061
2009	6 352	1 546 738	14	9 484	1 334	681 205

	Basic (*Fundamental*) Schools in Santa Catarina			
Year	**Municipal**		**Private**	
	School	**Enrolment**	**School**	**Enrolment**
1998	5 558	477 400	770	156 578
1999	5 194	502 836	863	157 415
2000	5 071	527 013	903	159 438
2001	4 977	543 514	1 055	166 504
2002	4 753	593 842	1 064	207 031
2003	4 565	609 170	1 046	197 978
2004	4 482	635 905	1 013	203 111
2005	4 361	636 954	1 008	218 240
2006	4 272	641 911	1 032	214 322
2007	4 218	640 965	1 051	187 355
2008	4 209	648 692	1 059	204 618
2009	4 119	656 992	885	199 057

Note: Since 2007, basic (*fundamental*) education starts at the age of 6, and in the 2008⁄2009 school year about 97% of children aged 6-14 were enrolled. This is obviously a great achievement.

Data Source: SED Directorate for Organisation, Control and Assessment, 2009.

Table 5.3 **Secondary education by type of school and as % of age group 15-17 in Santa Catarina (selected years)**

Year	School type	Total age cohort	Enrolment	% of age group 15-17
1996	Federal		2 496	0.83
	State		74 510	24.83
	Municipal	300 083	1 568	0.52
	Private		28 714	9.57
	Total		**107 288**	**35.75**
2000	Federal		2 730	0.85
	State		114 067	35.68
	Municipal	319 694	944	0.30
	Private		27 969	8.75
	Total		**145 710**	**45.58**
2003	Federal		2 256	0.67
	State		155 969	46.64
	Municipal	334 400	993	0.30
	Private		32 131	9.61
	Total		**191 349**	**57.22**
2007	Federal		1 458	0.40
	State		154 673	42.93
	Municipal	360 290	501	0.14
	Private		28 718	7.97
	Total		**185 350**	**51.44**

Data Source: SED Directorate for Organisation, Control and Assessment, 2009.

Accelerated and distance education

In order to reduce grade repetition and improve completion rates, states and municipalities have invested significantly in programmes aimed at over-age students and those who attend school intermittently or are in danger of dropping out. The main programme, aimed at secondary school students, is *Novo Telecurso*, launched in 2000 and re-launched in an updated format in 2008. In addition to a wide range of TV programmes of 15 minutes each, videos, DVDs and books are commercially available at reasonable prices, also in Santa Catarina.

In addition, the *Fundação Roberto Marinho* (FRM) offers a distance education version of the entire *fundamental* (basic) curriculum, mostly aimed at highly dispersed rural populations and multi-grade schools, where

it is difficult to recruit enough teachers especially in upper-primary grade subjects such as science, foreign languages and the social sciences. The World Bank plans to evaluate the impact of these initiatives in 2010.

The curriculum in Brazil

At the federal level, the National Education Guidelines and Framework Law *(Lei de Diretrizes e Bases da Educação,* LDB 9394/1996) defines the areas of knowledge and the required courses for the curriculum of basic and secondary education in Brazil. The National Curriculum Parameters (PCN, *Parâmetros Curriculares Nacionais*), defined in 1997, set out official goals or guidelines, but they are not a nationally *mandated* curriculum; and implementation is not monitored, except perhaps indirectly through national tests such as the SAEB and the *Prova Brasil.* The curriculum standards contained in the PCN cover only 75% of curriculum content, leaving the remaining 25% to the schools.

In the 1990s, the MEC introduced several measures to improve accountability. For example, the entire system is evaluated every two years through the SAEB, a national standardised testing system which uses tests closely aligned with the curricular goals laid out by the PCN, to assess students in grades 4, 8 and 11. From 2005 the SAEB reaches all schools, rather than a sample; with the introduction of the *Prova Brasil* in grades 4 and 8, to provide additional information about learning achievement. Schools also report enrolment, repetition and drop-out rates, through the annual School Census. It should therefore be possible to construct an accurate overall picture of education quality, which in turn might be linked to financial incentives, for example through FUNDEF.

Even in the relatively well provided schools of Santa Catarina, it seems clear from the performance of students that the curriculum standards implied by the PCN are not being fully met. In the view of the OECD team, this is due primarily to the large number of "compulsory" subjects being crammed into very little classroom time.[5]

The curriculum in Santa Catarina

Starting in 1988, the State Secretariat for Education (SED) developed its own "Curricular Proposal of Santa Catarina" (PCSC, *Proposta Curricular de Santa Catarina*), intended to guide educational practice in Santa Catarina schools. The PCSC was created by a representative group of educators, co-ordinated by the SED, who put together a number of documents published in the form of a "contract" in its first version of 1991. This study gave the

school curriculum in Santa Catarina a certain unity based on educational concepts that are in harmony with Santa Catarina's history and culture. The second edition published in 1998 extended and revised the previous one, incorporating contributions resulting from discussions held (over a period of two years) throughout the state, with teachers and university professors. The 1998 PCSC, published in several volumes, sets out the curriculum framework for each subject and advocates a multi-disciplinary approach. There is also an extensive bibliography, aimed at teachers, in order to widen their understanding of the concepts on which the PCSC is based.

In 2004, the then-Secretariat of State for Education and Innovation, through the Directorate for Basic Education and Training, set up six thematic working groups to develop curriculum guidelines for Early Childhood Education; Alphabetisation and Literacy; Education and Labour; Vocational Education; Evening Classes; and Education for Out-of-School Youth. The texts were added to the set of curriculum guidelines contained in the PCSC, and were introduced in 2006.

At the time of the OECD visit (2009), the SED was in the process of revising the secondary school curriculum, with the aim of integrating it more effectively with national education policy. Also, in line with the National Education Plan (PNE, *Plano Nacional de Educação*), since 2004 the SED has promoted various extra-curricular programmes and projects, in arts, sports, music and other activities, in order to encourage public participation and social inclusion. The OECD review team visited an "Open School" in Fortaleza (district in the municipality of Blumenau) where on Saturdays parents and students come together for karate classes, football, volleyball and traditional music and dance.

Political-pedagogical projects

As noted earlier, Santa Catarina's own PCSC was first published in 1991 and amended in 1998. Part of the PCSC was the introduction of PPPs whereby public schools are required to create their own statement of educational practice. They receive special funding for the development of PPPs, and in Santa Catarina workshops and training were provided to help in their preparation. The national Education Law of 1996 (LDB 9394/96) and guidelines issued by the CEE (State Education Council, latest dated 2009), also require schools to regularly evaluate and re-design their PPPs.

Within schools, these policy documents function as a way to stimulate and co-ordinate school-community participation in planning and priority-setting. A PPP does not mean that a school can set its own curriculum;

however, within the framework of the MEC's and Santa Catarina's *Proposta Curricular* and applicable legal requirements, the school can make its own teaching arrangements, including setting timetables.

Standards

The Federal Ministry of Education (MEC) sets national quality standards, as well as the national curriculum frameworks *(Diretrizes Curriculares Nacionais para a Educação),* for all levels of education including pre-school, basic, secondary, vocational/technical, and higher education. According to Article 8 of the LDB, these standards define the "minimum content" of the basic education programmes, the minimum number of hours for students, requirements for learner achievement, and the certification of completion of programmes (diplomas, degrees etc). The standards are regularly reviewed by the Federal Ministry of Education and the National Education Council *(Conselho Nacional de Educação).* At state and municipal levels, these frameworks and standards are confirmed by the *Conselho Estadual de Educação* (CEE) of Santa Catarina. There is only limited local flexibility in their application in various types of schools.

Curriculum subjects[6]

- Compulsory subjects in *fundamental* (basic) education include: Portuguese language, arts, physical education, modern foreign language, mathematics, science, history and geography.[7]

- Compulsory subjects in secondary school are: Portuguese language and Brazilian and Portuguese literatures, arts, physical education, modern foreign language, mathematics, biology, chemistry, physics, history, geography, philosophy and sociology.

Timetables

Art. 24 of the 1996 LDB states that schools must offer a *minimum* of 800 instructional periods of 45 minutes per year, over 200 school days, usually divided into four 10-week terms. All schools visited by the OECD review team interpreted this to mean that a school week consists of 20 class periods; *i.e.* they considered that the 800 hours per year is the *maximum* workload for students. Therefore, it was noted that, over a five-day week, students receive no more than 20 "clock" hours, or up to about 25 instructional hours of 45 minutes, although productive "time on task" is much less (the length of the classes in public schools in Santa Catarina is 48 minutes for day-classes and 40 minutes for evening classes).

The reality is that this interpretation allows schools to run three shifts per day, of four [clock] hours each, regardless of the demands of the curriculum or the ability of the students. Considerations of "time on task" and "opportunity to learn" for students must therefore give rise to concern; several subjects can be taught for only one or two hours per week, and given the conditions in some schools (teacher absenteeism, lack of teaching materials), effective learning time is severely limited.

Fundamental (primary) school grades 1-4 ("Years 1-5")

All eight subjects are mandatory from grade 1 onwards, although the first "*ciclo básico*" (two or three years) is known as the "alphabetisation" phase with emphasis on basic literacy and numeracy, with the other subjects fitted in as the student progresses.

No specific number of hours is allocated for each subject; the class teacher can decide how to organise the time (20 instructional hours⁄week total). There is one class teacher for all academic subjects, plus one specialist for Physical Education and Arts.

Fundamental (upper primary) school grades 5-8 ("Years 6-9")

Over the four years of this phase, all grades have not only the same subjects but the same hours per subject, as follows:

Table 5.4 **Teaching Plan for grades 5-8 in regular schools, 2009 school year**

	Subjects	All grades 5-8
1	Portuguese language	4
2	Mathematics	4
3	Foreign language	3
4	History	3
5	Geography	3
6	Science	3
7	Arts	2
8	Physical education	3
[9]	Religious education	[1]
Intended number of lessons[1] per week		**26**

Note (1): Daily shifts are four (clock) hours long, so that – in theory– it is just possible to fit 26 class periods of 45 minutes into 20 (clock) hours per week. The OECD review team observed that most schools cannot manage more than four or five class periods per day, reducing the number of weekly instructional periods to between 20 and 25.

Data Source: SED Directorate for Organisation, Control and Assessment, 2009.

Secondary school (*ensino médio*) years 1-3

In "regular" secondary schools, too, the same subjects are taught in all three years, with the same number of classroom hours, as follows:

Table 5.5 **General teaching plan for secondary years 1-3 (regular schools), 2009**

	Subjects	**Years 1 through 3**
1	Portuguese language (stylistics) and Portuguese and Brazilian literature	3
2	Mathematics	3
3	Foreign language	2
4	History	2
5	Geography	2
6	Physics	2
7	Biology	2
8	Chemistry	2
9	Arts	2
10	Philosophy	1
11	Sociology	2
12	Physical education	2
Intended number of lessons[1] per week		**25**

Note (1): Daily shifts are four (clock) hours long, so that – in theory– it is just possible to fit 26 class periods of 45 minutes into 20 (clock) hours per week. The OECD review team observed that most schools cannot manage more than four or five class periods per day, reducing the number of weekly instructional periods to between 20 and 25.

Data Source: SED Directorate for Organisation, Control and Assessment, 2009.

Integrated secondary schools (EEB;regular +VET), 2009

In "integrated" secondary schools that combine the regular secondary curriculum with vocational or "professional" courses, students follow the same curriculum for secondary schools as outlined in Table 5.5, but two vocational courses are added; students study approximately eight (instead of four) hours per day. This means that the regular curriculum is taught in the morning, and the professional technical courses in the afternoon or evening. This is the approach now used in the federal institutes of professional technical education, which are expanding rapidly in all states. In Santa Catarina, the expected growth by the year 2010 is huge – more than doubling the present number of students.

In the final year of integrated secondary, the emphasis on vocational topics is stronger, and practical training is added, depending on the type of vocational course followed by the student. For example, the nursing course has 3 200 class hours plus 25% for practical training; the tourism course has 3 200 hours plus 10% practical training; and information technology has 3 000 hours which includes practical training.

From EEB schools visited by the OECD team, a different picture emerged. Since according to the principals many of their students have jobs or are looking for jobs, those following a vocational course attend only in the evenings, and therefore have only four hours of class time per day. It is clearly not possible to cover both the regular *and* the vocational courses, and vocational ones win out because they have a direct bearing on job skills. Moreover, since evening classes end as late as 10 or 10:30 p.m., girls are often not allowed to attend by their parents; and there is also a high drop-out rate among students (both boys and girls) who are working, because attending evening classes five times per week is difficult to sustain, especially if course-related practical work is also required.

Issues in the curriculum

- The *fundamental* and secondary curriculum is "*one size fits all*": with the exception of religious studies, all subjects are compulsory for all students, regardless of their ability, maturity or interests; there are no electives or optional subjects within the regular curriculum. Teachers and principals told the OECD review team that they have "no control" over the federally-set curriculum, and that they are obliged to follow it exactly. If this were indeed the case, it would be excessively prescriptive. But as far as could be ascertained, the LDB *Diretrizes* and the National Curriculum Parameters (PCN) are more flexible than teachers believe; for example, the standards contained in the PCN allow teachers and schools to use 25% of classroom time at their own discretion, to fit their students' needs and the conditions of the school. Teachers and schools do not make use of this (limited) freedom because *(a)* there simply is not enough time even to cover the compulsory content, *(b)* few teachers have the skills or experience to design school-based courses; and *(c)* since the SAEB and the *Prova Brasil* can test only the compulsory content, inevitably that is what teachers will teach, and what students will learn.

- The curriculum is *monotonous*. No allowance is made for changing interests and needs as children's cognitive abilities develop: the *same* subjects are taught year after year for the *same* number of hours. This

may be organisationally convenient for schools, teachers and textbook publishers, but it is not very stimulating for students, many of whom will also repeat at least one year during their school career,[8] spending once again the same number of hours studying the same lessons as the year before. Research in the United States indicates that learning achievement is actually *worse* after repeating a grade, possibly because of boredom and de-motivation; other researchers in Latin American countries find that repeating does improve achievement, but only if remedial support is available (Batista Gomes Neto and Hanushek, 1996, pp. 425-460).

- There is a *mismatch between the intended curriculum* and *the time available* for learning and teaching in the classroom. Although in theory there are up to 25 class periods per week, in practice the three-shift system puts a straitjacket on purposeful, active teaching and learning. Lessons change every 45 or 90 minutes (*aula-faixa,* or two consecutive classes of the same subject), and time is inevitably lost in between. So there is no time for teachers to make sure that their students understand and master the content covered. The result is rushed teaching and shallow learning.

- *No horizontal co-ordination among subjects*. The subject-based *Matrizes* constitute a collection of discrete programmes, rather than a *coherent system* based on national policy objectives. What is lacking is a clear view of what each stage of education should achieve, in terms of overall student development and learning. Curriculum development is done by expert groups on a subject-by-subject basis, and curriculum sequences are designed "vertically" from one grade level to the next. There seems to be little interest in looking at the curriculum *horizontally, across* subjects at each grade level, to see whether what is expected of – say – a typical 12-year-old of average ability is reasonable, coherent and in line with educational objectives. Each curriculum subject expert group seems preoccupied with maintaining or increasing that subject's share of the weekly timetable, rather than taking a cold, hard look at ways to weed out outdated and repetitive content, and focus on essentials such as reading with understanding, functional numeracy and higher-level thinking skills.

- Lack of time. Because most schools operate on a two- or three-shift system, each shift has no more than five instructional periods (45 minutes) per four-hour shift. The number of subjects studied in the higher grades is large; clearly teachers and students have little time to cover curriculum content, and even less time to acquire or consolidate higher-level thinking skills, do independent work, or read outside the textbook.

- Lack of individual choice. The stated policy of MEC and the State Secretariat to move towards "inclusive" education will require a much more systematic use of an individualised approach to teaching and learning, in order to accommodate the needs of children with various learning modes and abilities. However, teachers are not, at this time, able to develop individual education plans (IEP) for their students, nor do they have experience in evaluating each individual child's progress in terms of his or her expected development. Moreover, from grade 4 ("year" 5) onwards students are taught by a large number of subject teachers, so that it will be difficult to ensure that all teachers follow a consistent individual education plan for each student across subjects. Materials that can be adapted for children of different abilities are also lacking, so that a "one-size-fits-all" approach remains the norm.

- Santa Catarina's stated objective of expanding after-school activities (sports, music, languages) is hampered by the three-shift system, whereby school facilities are in use from about 7:30 a.m. to about 10:30 p.m. five days per week. "Open School" initiatives, where youngsters and families take part in extra-curricular activities on Saturdays, are highly popular, but these are not widely available and depend almost entirely on community volunteers.

Recommendations related to curriculum

1. The tension between the number of compulsory subjects and the learning time available *must* be resolved. Rushed teaching and shallow learning inevitably lead to poor student achievement. The OECD team appreciates that the three-shift system in most schools leaves very little room for increasing classroom time, and also that the compulsory subjects are largely defined at federal level. However, the PCN are more flexible than is generally believed; for example, the standards contained in the PCN allow teachers and schools to use 25% of classroom time at their own discretion, to fit their students' needs and the conditions of the school. If timetables cannot be changed for organisational reasons, then the number of compulsory subjects and the curriculum content must be reduced. "*Less is more*"!

2. Because of the tightly constrained classroom time, there is no opportunity for teachers and students to engage in discussion, ensuring mastery of new concepts, and other ways to develop students' higher-level critical thinking skills. These are exactly the skills young people need in order to function in Brazil's modern society, and are also the skills required in international comparative surveys such as PISA. If

Brazil wishes to improve its standing, a new approach to classroom teaching and learning will be essential; but active learning methods require more time for learners and teachers to interact.

3. There should be more individual choice for students. In addition, the move towards inclusive education and mainstreaming children of various abilities in regular schools must be accompanied by a more individualised approach to teaching and learning, so that *all* students receive an education that is meaningful to them and relevant to their individual abilities and life goals.

Textbooks and learning materials

Books used in schools are generally of four types: *(1)* school books, including textbooks and manuals usually presenting curriculum content in progressive order according to the grades, and used by students and teachers in the classroom or at home; *(2)* complementary texts, to highlight or expand on specific curriculum topics; *(3)* reference books such as dictionaries, atlases etc.; and *(4)* school editions of literary classics, annotated for use by students (Choppin, 1992). In this section, the emphasis is on the first category, because under the present national policy these are the books that are acquired and distributed free of charge to public schools throughout Brazil, by the federal government.

Learning materials *other than* textbooks for public schools in Santa Catarina are generally acquired with state funds, and distributed by SED. They are selected by a Committee on Institutional Evaluation Materials, appointed by decree, and composed of teachers and technical analysts in various curriculum subjects. All procurement, distribution, monitoring and evaluation of materials in the schools are conducted by the Directorate for Basic Education and Training, through the Co-ordinator of Educational Resources and Educational Support.

Textbook policy

The current policy of the Federal MEC is to provide free textbooks for all grades of basic education (grades 1-8), on a three-year renewal cycle.[9] Private enterprise is in charge of production and distribution, and is regulated via the rules of the *Programa Nacional do Livro Didático* (PNLD), established in 1985 by the MEC. Furthermore, although from 1997 the MEC has been issuing curriculum guidelines – known as the National Curriculum Parameters – these guidelines are not binding under Brazilian law; teaching programmers, which in most countries provide the framework

for textbook content, are left to the states and municipalities whereas publishing takes place at the national level; in effect there is no connection between textbook production and teaching programmes in a particular school (Rojo, 2006, p. 283).

Despite these liberal policies, the federal government has considerable control over the production and use of textbooks, and through them, on the curriculum. There are in fact three federal programmes related to books for schools: the National School Textbook Programme (PNLD, *Programa Nacional do Livro Didático*) for basic education, set up under Decree-Law 91.542 of 1985 to oversee and regulate the acquisition and distribution of textbooks for public basic education; the *Programa Nacional do Livro Didático para o Ensino Médio* (PNLEM) for secondary school books; and the *Programa Nacional do Livro Didático para a Alfabetização de Jovens e Adultos* (PNLA) for literacy programmes for out-of-school youth and adults. The overall objective is to provide schools in federal, state and municipal entities and partners of the "Literate Brazil" programme with high quality teaching materials.

Finance and acquisition

Funding is provided via the National Education Development Fund (FNDE, *Fundo Nacional de Desenvolvimento da Educação*). FNDE runs the acquisition programmes directly. The books are held centrally, and subsequently distributed to states, municipalities, community organisations and philanthropic entities and partners of the "Literate Brazil" programme.

Quantities are based on the annual School Census conducted by the *National Institute of Studies and Research Anísio Teixeira* (INEP/MEC), which sets the regulations for all transactions conducted by the FNDE, and on the selections made by teachers and schools. The results of the selection process are published in the Official Gazette for Information of states and municipalities.

In 2009, the federal government invested a total of USD 577.6 million in the purchase of textbooks for basic education, and USD 112.8 million in their distribution throughout Brazil, under contract with the Brazilian Post and Telegraph Enterprise (ECT, *Empresa Brasileira de Correios e Telégrafos*). For 2010, the budget is USD 427.7 million to buy books for grades 1-4, and USD 85.8 million for their distribution. In addition, also in 2010, replacement books will be purchased and distributed to students in grades 5-8 (USD 80 million) and three years of secondary school (USD 97 million). Table 5.6 shows quantities and value of books provided under all three national programmes, for Brazil as a whole and for Santa Catarina in particular.

Table 5.6 **Number and value of textbook copies procured in 2008 and 2009 in textbook programmes PNLD, PNLEM and PNLA**

	PNLD 2009			PNLEM 2009		
	Number of students served	Number of copies provided	Value (BRL)	Number of students served	Number of copies provided	Value (BRL)
Brazil (total)	29 158 208	60 542 424	302 621 896	7 249 774	43 108 350	416 907 918
Santa Catarina	940 219	1 693 707	8 637 871	196 357	1 105 730	10 473 657

	PNLA 2008		
	Number of students served	Number of copies provided	Value (BRL)
Brazil (total)	1 609 554	1 721 451	11 842 738
Northeastern region, total	1 253 120	1 339 549	9 366 305
Southern region, total	117 832	127 226	785 700
Santa Catarina State	20 361	22 245	146 485

Source: FNDE, 2009 (National Education Development Fund, *Fundo Nacional de Desenvolvimento da Educação*).

The PNLA table is of particular interest, because it shows that not only have the southern region states (Paraná, Rio Grande do Sul and Santa Catarina) a much lower demand for literacy programmes than other (poorer) regions of Brazil, but even within the region Santa Catarina's needs are modest, indicating a high level of literacy among the population.

The National School Textbook Programme (PNLD)

Since its establishment in 1985, the main agency for school textbook supply is the PNLD (*Programa Nacional do Livro Didático*), which has laid down the main guidelines for the implementation of textbook policy in Brazil. These guidelines are based on five principles: *(1)* centralisation of planning, purchasing and distribution; *(2)* exclusive use of federal resources; *(3)* responsibilities restricted to the purchase of books, without involvement in publishing or printing, which are left to private enterprise; *(4)* selection of books by schools and teachers; and *(5)* distribution of books free of charge to students and teachers (Rojo, 2006, p. 289).

The PNLD procures textbooks for students of all grades of basic education in public schools. In addition, blind or visually impaired students receive materials in Braille, and books are also provided to students with

special educational needs in public institutions, as well as in private institutions designated under the School Census as being philanthropic or community-based. In practice, this means that every student is entitled to a free textbook for the compulsory subjects of English, mathematics, science, history and geography. The books are intended to be used for a minimum of three years; they remain the property of the school, and are passed on to the next cohort of students at the start of a new school year.

Under the PNLEM, each secondary school student receives a textbook for Portuguese, mathematics, history, biology and chemistry. From 2009, they also receive books for geography and physics.

Textbook development, publishing and distribution

Direct government involvement in textbook publishing and manufacture is now rare; indeed, no industrial democracy in Europe or North America does so.[10] Figure 5.1 shows how a modern system typically works; and this, *mutatis mutandis,* is how the Brazilian system works as well.

In practice, the Federal Ministry of Education (MEC) acts as an intermediary between a given *demand* (from the teachers) and a given *supply* of books (from the publishers). This role left the Ministry and the PNLD with little scope to establish a link between national education policy and textbook content and quality (Rojo, 2006, p. 289). It was only after 1996, with the introduction of a set of measures for the systematic assessment of school textbooks in Brazil, that the Ministry was able to establish such a link, and to ensure the quality and suitability of the books it bought for use in its schools. The catalyst for this development was the 1993 *Ten Year Plan for Education for All,* on the basis of which a specialist committee was set up to establish general criteria for textbook quality.

Textbook quality assessment since 1996

Apart from subject-specific criteria, the specialist committee defined a number of common criteria including didactic and pedagogic suitability, editorial and graphic quality, and the usefulness of teachers' guides to support the classroom use of the textbook. In addition, books must not express religious or political proselytism or prejudices related to origin, race, gender, colour, age, or any other form of discrimination; and they must not induce error or contain serious mistakes in relation to subject content (Rojo, 2006, p. 286). These criteria were applied to the first assessment, in 1996, of books for grades 1-4 in Portuguese, mathematics, science and social studies registered by their publishers for the 1997 PNLD.

Figure 5.1 **Standard textbook acquisition process**
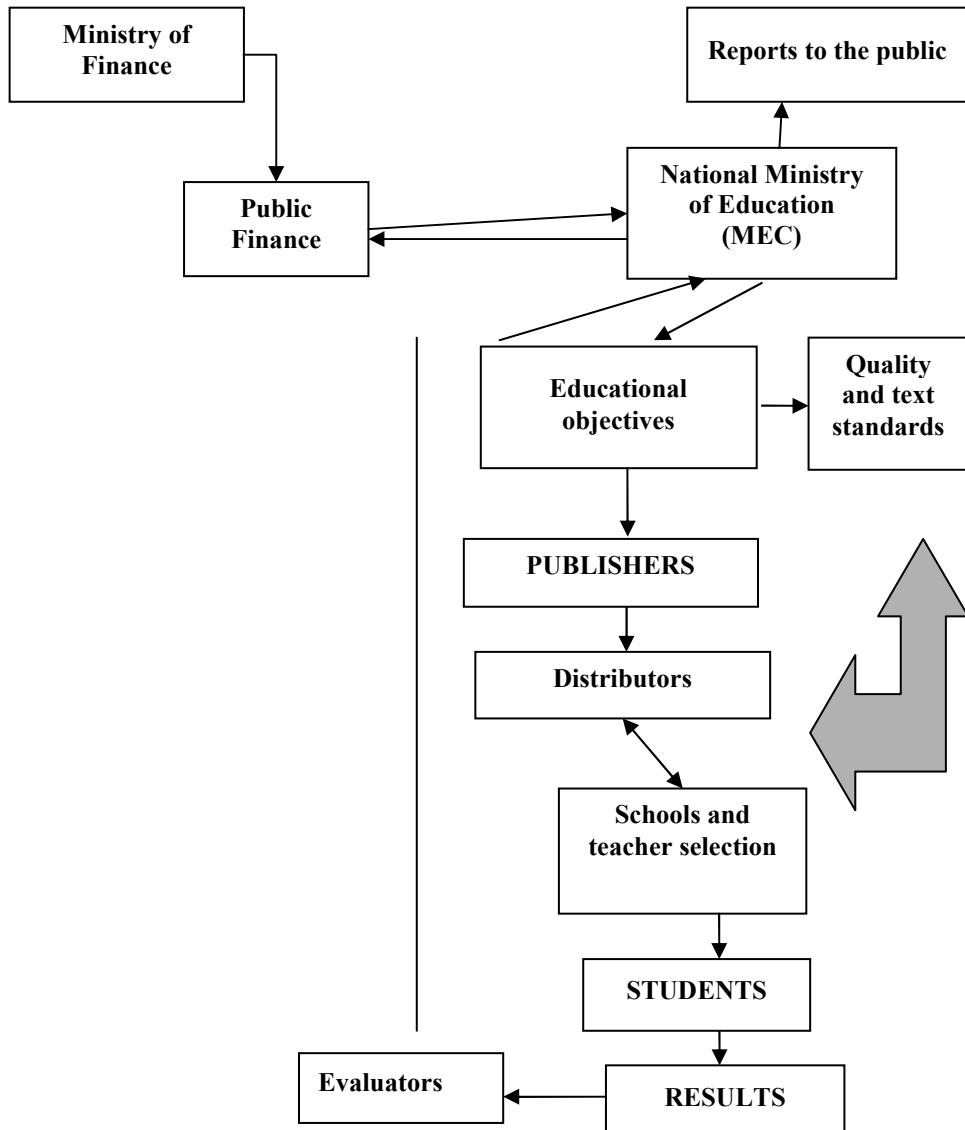
OECD team's diagramme, based on Heyneman, 2006, p. 50.

The following four categories emerged:

- *Excluded:* Books that contain conceptual errors or may lead to errors; books that are out of date, or that contain prejudice or discrimination of any kind.

- *Not recommended:* Books that contain inadequate concepts; that contain inappropriate features; or that are inappropriate from a didactic or pedagogic point of view.

- *Recommended with reservation*: Books that comply with the common criteria, but that have some minor problems that can be resolved by the teacher.

- *Recommended:* Books that serve their proper purpose, complying not only with all the common criteria but also with the most important subject criteria.

Results were communicated to publishers, together with a technical evaluation of books categorised as *excluded* or *not recommended.* For the users of textbooks (teachers and students), the results led to the publication – for the first time – of a School Textbook Guide (*Guia de Livros Didáticos,* PNLD 1996), listing all the books to be *recommended* and *recommended with reservation.*[11]

The PNLD has continued these assessments in the years following 1996. From 1998, the assessment includes literacy books (including readers) for the first four grades of basic education; and a fifth category was introduced: *Recommended with distinction,* for books that stand out because they provide creative and stimulating material to be used by teachers in the classroom. Other changes include an assessment (1999) of books for the final grades of basic education (grades 5-8), the elimination (also in 1999) of the *Not recommended* category, and the extension of *exclusion* criteria to "methodological inaccuracy and incoherence". Portuguese dictionaries have been assessed in PNLD 2002, 2004 and 2006.

Textbook publishing

Textbook publishers respond to a call for tenders in the *Diário Oficial* of the federal government, also published in the country's major newspapers. They then submit books for assessment by the PNLD, as described above; if their books are approved for use in the public schools, they are listed in the *Guide* and marketed to teachers and schools.

Because of the high volume and steady, predictable schedule of acquisition (on rotation every three years between grades 1-4 and 5-8, plus a partial programme each year to replace the books for grade 1[12] and for

literacy classes, as well a growing number of titles supplied to secondary schools), the Brazilian publishing industry is heavily dependent upon the school textbook market. Although in recent years there has been a small decrease in the proportion of textbooks within Brazil's total book production, the purchases made by the MEC are vital for the publishing sector. As Table 5.6 shows, in 2009 the total number of copies provided under the PNLD, the PNLEM and the PNLA exceeded 105 million, for a total value of more than BRL 700 million (USD 408 million).

The introduction of the PNLD's pedagogic assessment system therefore had a major impact upon the publishing industry. For example, the first two assessments for grades 1-4 in 1997 and 1998 either excluded or did not recommend 77.56% and 63.22% respectively of all the titles assessed; even after 2001, when the "not recommended" category was abolished, the percentage of "excluded" books was still 43.59%. A similar picture emerged for the textbooks grades 5-8; the 2002 PNLD, for example, excluded 37% of the titles assessed.

Three important consequences can be observed. First, through its intervention in the assessment and selection of textbooks, the Federal Ministry of Education indirectly steers the curriculum and its management, not only in terms of content but also in terms of the methods through which content is taught in classrooms. Second, authors and publishers now take careful account of the assessment criteria, as shown by the declining percentages of "excluded" books and by an increase in completely new titles (many by "new" authors) submitted for assessment. Third, textbook supply is now heavily dominated by a small number of major publishers, nearly all located in the State of São Paulo. This may not seem an important factor, but because teachers prefer to choose textbooks they have been able to see for themselves, the large publishing houses are better able to launch book fairs and advertising campaigns.[13]

Textbook selection

As noted earlier, teachers select the books, mostly in consultation with other teachers in the school teaching the same grade. There may also be some municipal involvement, although the OECD review team was unable to ascertain whether this is the case in Santa Catarina. What is surprising, however, is that teachers are often unaware of the federal list of selected titles and their preferences differ markedly from those provided on the basis of PNLD assessments and a *School Textbook Guide* with reviews of all recommended books.

A study carried out in 2000 (Rojo, 2006, p. 302 *et seq.*) found that the majority of teachers surveyed (62.67%) did not base their choices on the *Guide,* either because they had no access to it or because they only looked at it after making their selection. Other reasons for not using the *Guide* for book selection were the instability in teachers' posts and functions in the school, and the short time available for making decisions; in most cases the *Guide* arrives only shortly before the deadline for selection, and teachers have little time for meetings or extra work outside their teaching schedules. Moreover, some principals and teachers considered that the PNLD assessments and the *Guide* infringed their autonomy, by imposing what they saw as a form of censorship on their choice of materials. Finally, teachers in general tended to stay with publishers or titles they were familiar with; before the PNLD assessment, book selection was influenced only by the active presence of publishers' representatives in the schools, and in many cases they had established a relationship of some trust with the teachers.

One remarkable finding of the study was that teachers tended to stay away from titles awarded a "*recommendation with distinction (RD)"* label by the PNLD. Although in principle they liked the quality of the RD books, some stated that they believed the books to be too difficult, or not suitable for "the practical reality of the school" or "the situation of the students". More likely, however, is that teachers rejected the RD books because they often require teaching approaches that differ from the methods they traditionally use in their classrooms. (Rojo, 2006, p. 304).

Supply, distribution and period of use

Teachers' choices are sent directly to the PNLD for processing. Improvements have been made in the collection of data for the annual census, so that a more accurate estimate can be arrived at for the number of copies needed, even though the census date refer to the year *before* the books are actually delivered. Also, teachers' orders are now computerised, so that the processing time is reduced to about three or four weeks. A technical reserve of about 3% of the total quantity of books is set aside to meet the requirements of new schools, changes in enrolment, or to replace lost or damaged books.

The books are intended to be used for three years, except for grade 1 workbooks and books for literacy classes, which are renewed every year. The OECD team was not able to discover what happens to books after their three-year service; it would seem that a good quality book would still be useable for at least one more year, especially in curriculum subjects not affected by frequent changes, such as mathematics or Portuguese language.

Logistics are handled by the Brazilian Post Office (ECT), and specialised companies are contracted to check that the books are in good physical condition. Together with the Municipal Secretariats of Education in the state capitals (including Florianópolis), the State Secretariats are involved in the monitoring of textbook distribution.

Issues in textbooks and materials

- As far as the OECD team could ascertain, the MEC's current policy is "one textbook per learner per [core] subject per level". In practice, this means that supplementary readers, workbooks and literature are often not supplied. In secondary school, for example, learners study Portuguese language and Portuguese and Brazilian literature (language book, up to four literature books); foreign language (language book, at least one literature book), and in some cases a third language (language book, one literature book). These would not be covered under the current policy.

- The State Secretariat for Education in Santa Catarina supplies additional learning materials through its Directorate for Basic Education and Training. In 2009 and 2010, maps, dictionaries and literature books of Santa Catarina, Brazil and the world, some of them in English and Spanish, were purchased and distributed in all classrooms of the state public schools, for both students and teachers.

- Even though states and municipalities can develop their own policies, in fact they follow the federal policies and regulations. Generally speaking, Santa Catarina teachers are satisfied with the quality of the textbooks they select, and in fact the books shown to the OECD team were attractive and well produced, especially those for primary grades. However, during some school visits the team heard about problems of missing or insufficient textbooks, especially in secondary education (*ensino médio*)**.** For example, in one secondary school (not integrated), there were classes where students had to buy half of the needed textbooks (*e.g.* in biology, English and chemistry), since there were not enough free textbooks or they were simply not available. Moreover, this school was located in a socially disadvantaged zone of the city, and most of students came from low income families.

- Given that the national (and thus the Santa Catarina) curriculum is under revision, all existing books would need to be replaced with new ones based on the new standards and curricula, at least in the core compulsory subjects. Meanwhile, there will still be a substantial need for reprints of books for those grades that are waiting to benefit from the

new curriculum, but that will have to use the existing books while they wait. Given the evidence that many students are not achieving even the most basic levels of reading and mathematical literacy, and that they are graduating from grade 8 (and even *ensino médio)* with insufficient skills to participate productively in a modern economy, the MEC and the Ministry of Finance must continue to support the PNLD so that all students who are entitled to free textbooks do in fact receive them.

Quality

- In the past few years, the MEC (through the PNLD) has issued guidelines aimed at improving textbook quality, and in general the OECD team was impressed with the quality of the books they saw in schools. Most teachers said they liked the books they had selected. However, a few concerns were also expressed:

    − Mismatch among the curriculum guidelines, textbook content, and time available in the classroom.

    − The level of difficulty is set too high for some less able students, and because no alternative books are available, all students must use the same book regardless of their interest or ability.

    − Likewise, the language used in textbooks is too "academic" for some students to understand, and teachers do not have time to explain concepts or go over the material again if students have not mastered it in the (short) time available on the time-table.

- Teachers appear not to make much use of the *Guide* provided by the PNLD for selecting books for their classes. One reason for this is that each school has only a few copies of the *Guide*, and some teachers are unaware of its existence. Also, the time between the arrival of the *Guide* and the deadline for ordering is very short, and teachers do not have the time or the opportunity to make an informed choice.

Supply

- On the positive side, there is a systematic, long-term plan with a multi-year time-table, but it is difficult for the MEC to anticipate costings because the Ministry responds to *annual* requests from schools and tries to fit them into its *annual* state textbook budget, which in turn is based on the *previous* year's census. Inevitably this means that priorities have to be set, and that schools may not always receive all the books they need in the right quantity. As Brazil's school-age population declines, it

should be possible for the census to provide multi-year forecasts of the number of learners in each cohort, enabling the Ministry to anticipate likely longer-term demand.

- Publishers are not always able to deliver all the books in time for the new school year. Deliveries that are late, not co-ordinated or partial disrupt teaching and learning, especially in the situation where compulsory subjects have only very few hours on the time-table, so that every lesson counts.

Recommendations related to textbooks and learning materials

1. *Encourage the MEC/PNLD to consider a four-year instead of a three-year renewal cycle for textbooks.* Since the books now are of good quality, they should last longer, and remain useful especially in subjects whose contents are not likely to change radically, for example in mathematics and Portuguese language. This would result in a savings of about 8% in the national budget for school books; these savings could be spent on providing books in additional subjects, or supplementary materials for teachers and students.

2. *Invest in school libraries.* Most schools have libraries, but in rural and less affluent municipalities they tend to contain little more than copies of the prescribed textbooks. If, as is planned, the emphasis will shift to competence and self-directed learning, school libraries will need to be "resource centres", and therefore they will need good dictionaries, encyclopedias, atlases and reference books. A basic "library package" could be prepared for all schools, on the basis of suggestions made by teachers at all levels as well as by experienced librarians with an informed view of what is available nationally and internationally.

3. *Invest in readers and story books for primary schools.* In addition, it is important that young children have access to books to read for pleasure, which will help them to see reading as an enjoyable thing to do.

4. *Provide differentiated teaching and studying materials for students with special educational needs.* While books in Braille are available for vision impaired youngsters, and there are other forms of support to help hearing impaired students, the OECD team is concerned that students of *all* abilities are expected to use the same (standard) book for academic subjects. Especially children who have difficulties with reading, or who have other types of mild learning difficulties, are likely to struggle and fall behind. Teachers now have no alternative materials to work with slower learners.

Notes

1. It is important to note that data available to the OECD review team do not always make it clear whether they pertain to the "old" grade system or to the "new" year system, so caution is advised.

2. In fact, some sources refer to grades 1-4 (years 1-5) as "initial grades of *fundamental* school" and to the remaining grades as "last grades of *fundamental* school". In the law (LDB), "basic education" (*educação básica*) comprises childhood, *fundamental* and "middle" school (*ensino médio*).

3. Education laws are found on the MEC website:

   http://portal.mec.gov.br/index.php?option=com_content&view=articl e&id=12907:legislacoes&catid=70:legislacoes. According to Art. 5 of the 1998 Law, *ensino fundamental* is a collaborative system between municipalities and states. However, the trend is toward "municipalisation" of *ensino fundamental* (all grades/"years"), while the priority for the state is secondary education (*ensino médio).* See also the LDB (*Lei de diretrizes e bases da educação nacional*), www.planalto.gov.br/ccivil_03/Leis/L9394.htm.

4. Projections show that by the year 2020 there will be about 18 million children under the age of 6 in Brazil, down from about 25 million in 1990 and 22 million in 2010 (IBGE, population forecast up to 2050).

5. The three-shift system that prevails in nearly all schools visited by the OECD team further restricts learning time. In poorer schools where basic resources such as books are lacking, teachers often write out the lesson on the board and students copy it down in their notebooks, leaving even less time for questions, explanations, or active participation by students.

6. The OECD team heard that at the federal level as well as within SED there are discussions about integrating subjects into broader disciplines, and shifting the emphasis from content-based to competence-based teaching and learning. These strategic directions are in line with international practice, and are in fact already reflected in some national assessment instruments such as the *Prova Brasil* and the ENEM (*Exame Nacional do Ensino Médio*, High School National Exam).

7. Religious education must be offered by schools, but is optional for students. Otherwise, *all* subjects are compulsory for *all students*. There are no optional or elective subjects.

8. By the time they graduate from secondary school, as many as half of the students are more than two years "over age" for their grade.

9. From 2004, the MEC has started to acquire and distribute a number of titles for secondary schools, for Portuguese language, mathematics, geography and history. See PNLA.

10. Exceptions are instances where a linguistic minority group is not adequately provided for by commercial publishers because of small print runs and high design costs; then, a national ministry may take responsibility. See Heyneman, 2006, p. 82.

11. The PNLD has never published a list of excluded works. Moreover, the fact that a book is excluded by the PNLD does not mean that it cannot be produced or marketed; just that it cannot be adopted for public schools, although it is still available for sale to the private school system.

12. Grade 1 books are "workbooks" for children to write in, and thus they cannot be re-used.

13. In addition, large publishing houses and their retailers distribute "teachers' manuals" free of charge; these manuals include annotations and teaching notes as well as the text of the book. Smaller publishers are rarely able to cover the cost of large-scale free distribution of teachers' materials.

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Chapter 6. Student Assessment

This chapter discusses policies on grade repetition as well describing federal testing at various stages of the education system, including entry into higher education. It also contains a section on Brazil's performance in PISA. It raises a number of issues and provides recommendations on the assessment system and learning outcomes.

When the results of the 2006 PISA study[1] were released in December 2007, there was great concern about Brazil's low standing in the "league table" of 57 participating countries; the overall score was 390 (OECD average: 500), putting Brazil in 54th place in science and 49th out of 56 countries in reading.[2] Given that PISA 2006 focused on science knowledge and skills – essential for Brazil's economic development – such poor results are worrying. Clearly, despite substantial national investments in education *inputs* (policy, finance, infrastructure, books and materials) and *processes (teacher training, timetables),* student *outcomes* remain well below what could be expected. The Ministry of Education has now set a goal of raising the average learning achievement of 15-year-olds to the level of the OECD average by 2022. On Brazil's new IDEB index, this would mean raising average achievement from the current level of 3.2 to 6, in about 12 years.

This can only be achieved by identifying and removing barriers that now stand in the way of students acquiring and demonstrating the skills they need for life and work in the 21st century (See Cavalcanti *et al.*, 2009). Learning achievement depends on many factors, not all of them within the control of the education system; for example, family background, family income and geographical location. But others are directly relevant to learning, such as school and teaching quality, the curricular approach, the availability of materials, and effective "time-on-task" for teachers and students. Issues of teacher quality and curriculum matters are addressed elsewhere in this report.

- One barrier is that too many students leave *fundamental* education with low levels of literacy and numeracy skills. Basic to nearly all learning is the ability to read with understanding; it is hoped that the emphasis on "alphabetisation" in the initial years of *fundamental* education will improve matters, but this will come too late for many youngsters who are already in the system now. The question then arises whether, after grade 4 (year 5) a "wide and shallow" approach across a wide range of subjects is the right one, or whether a reduced number of subjects would free up some time for intensive remedial work for youngsters who are in danger of falling behind.

- Another key barrier to learning is the very limited "time-on-task" for students in the classroom. The nominal number of contact hours is between 20 and 25 per week; actual time spent on productive teaching and learning is considerably less. Because most teachers teach more than one shift and some also teach in more than one school, student "time-on-task" is diminished: teaching hours are lost through teacher absenteeism, lack of preparation, and unproductive work such as copying notes from the blackboard. Increasing "time-on-task" would bring significant improvements, as would (in the higher grades) meaningful homework, strict enforcement of attendance by both teachers and students, and good support materials that encourage independent study after school.

Assessment of student learning in Brazil and Santa Catarina

As noted in the Curriculum section of Chapter 5, concerns over education quality led to the establishment of INEP (*Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira*, National Institute for Educational Studies and Research Teixeira) which, among other things, is responsible for system evaluation. It conducts an annual *School Census,* and since 2007 it monitors student flow and academic performance under the IDEB (*Índice de Desenvolvimento da Educação Básica*, Index of Basic Education Development). The Index uses a range of data, including those generated by national tests such as the SAEB and the *Prova Brasil*. While these tests are national, all states participate and in some cases they conduct additional evaluations of school and student performance within their own jurisdictions.

The following sections describe the current assessment system, including classroom- and school-based assessment as well as the main large-scale (national) tests and the international PISA surveys.

School-based assessment and testing

Continuous assessment in the classroom

The school year is divided into four terms of approximately two months, for a minimum of 200 days per year. Teachers give marks in class, and an average mark per subject for the term. Marking scale is 1 to 10, with 10 being highest. A recent decree stipulates that teachers may use "half" marks (*e.g.* 6.5, 8.5) so that in essence the marking scale has 19 points (presumably there is no 10.5 mark). At the end of each term, the average subject marks are aggregated into a term mark; over the four-term school year, students must have an average of "7" in order to be promoted to the next grade.[3]

Recently in Santa Catarina a decision has been made that no marks are given in grades 1 and 2, only a "descriptive evaluation" (*avaliação descritiva)*, and no child repeats a grade. Instead, parents are invited to come to school and discuss their child's progress with the teacher. From grade 3, marks are given but there is no repetition. At the end of grade 3 ("year 4"), there is a national test called the *Provinha Brasil,* intended to assess literacy and numeracy skills. This is a whole-population test set at the federal level; it is low-stakes for students because individual scores are not reported and children are not held back if they have poor results. However, schools are expected to use the results as a useful check in advance of the more formal *Prova Brasil* at the end of grade 4 (year 5). To what extent remedial work is offered to students who are having difficulty inevitably depends on the conditions in the school; the OECD review team is concerned that remediation is rarely available where it is needed most – in disadvantaged areas, where children are also unlikely to have had pre-school experience.

From grade 4 onwards, marks are given as described above, and students can be held back if they do not average a "7" over the school year. Because of the SED's efforts to reduce grade repetition in *fundamental* education, some schools now offer extra tutoring to "failing" students in order to allow them to progress to the next grade.

Grade-to-grade progression

At present, student assessment in schools is governed by Resolution No. 158/2008 of the *Conselho Estadual de Educação de Santa Catarina* (CEE). In order for a student to be promoted from one grade to the next, he or she must have mastered at least 70% of the prescribed curriculum content for the relevant grade, and must have attended for at least 75% of class time. If by the end of the school year the student has not attained at least 70% of the prescribed curriculum, he or she must take a final examination. To be promoted, the sum of the average mark obtained during the school year, plus

the average mark obtained on the final examination, must be 14 points or more. (For many students this is a formidable requirement: since by definition their average year mark is below 7, they must score high on the examination in order to reach the 14-point mark. It is not clear to the OECD review team how a student who is obviously not doing well in class can suddenly perform exceptionally well on an examination covering the same content.)

In *fundamental* and secondary schools, teachers design, administer and score the tests. Each test must be accompanied by a marking scheme; for example, 0.5 marks for an objective (multiple choice) question; 2 marks for composition or essay; 1 mark for extended answer, etc. The results are referred to a Class Council, and subsequently made available to the students and also to parents, via report cards or the internet.

Grade repetition and drop-out in Santa Catarina

According to the 2006 PNAD (National Household Sample Survey) nearly 15% of 15-year-olds in Brazil were no longer in school, while another 15.4% were still in basic education below the PISA age limit. This means that only 69.8% of youngsters born between 1 May 1990 and 30 April 1991 were, in principle, eligible to participate in PISA. Although the figures for Santa Catarina are more favourable, grade repetition and drop-out during compulsory schooling cannot be ignored. Age-appropriate progression throughout basic education is an important objective, and the authorities in Santa Catarina are taking steps to prevent repetition especially in the lower grades, for example through the "no marks, no repetition" policy in the initial years of *fundamental* education (grades 1-3).[4]

Santa Catarina's current policy of "alphabetisation" during the first years of primary school, which also permits automatic promotion in grades 1-3, is founded on the recognition that many children – especially those without pre-school experience – benefit from a longer period during which they are not given marks, or judged to be "failures" so early in their school careers. However, even if no marks are given, continuous in-class evaluation and constructive feedback are still needed to avoid simply passing-on low achievers to the next grade. Parents must also be kept informed of their child's progress, even if no formal report cards are issued by the school.

As long as a strong, effective learner support/remediation strategy is in place, the OECD team agrees with these policies. Grade repetition is rarely the right response to under-achievement. International studies suggest that keeping under-achieving learners in the same grade significantly increases the probability of dropping out, while keeping a learner back for a third year makes dropping out a virtual certainty. The ultimate "cost" of repetition,

therefore, is sharply increased risk of drop-out, and thus increased probability of life-long economic and social consequences, both for the individual and for the nation.

Instead, the best approach to under-achievement is *early diagnosis* of learner difficulties, and *prompt*, targeted support and remediation. The OECD team is well aware that teachers with large classes and little experience in diagnostic assessment and remediation will find it difficult to pay close attention to each child's progress towards achievement of specific learning outcomes. In practice, therefore, under-achievers may well find themselves passed on from grade to grade, eventually becoming victims of "silent exclusion" because they cannot keep up with classroom work.

Index of Basic Education Development (IDEB)

This index (IDEB, *Índice de Desenvolvimento da Educação Básica*), established at INEP in 2007, monitors student achievement and transition flows in *fundamental* education, and assigns an overall (national) score between zero and 10. The current score is 3.2 (2007), and according to the Education Development Plan (PDE) it should reach 6.0 by 2022, the 200th anniversary of Brazil's independence. Data are drawn from the School Census, and from performance averages obtained from SAEB (for federal and state institutions), and the *Prova Brasil* for municipal schools.

Goals are differentiated for each network and school, and results are presented every two years. The Ministry of Education is expected to provide special support to the poorest-performing states and municipalities, mostly in Brazil's northeast and north regions.

National Basic Education Assessment (SAEB)

These are large-scale diagnostic assessments for federal, state, municipal and private schools*,* based on the *Matrizes de Referência*, which set out the content to be assessed in each subject and grade or year level in *fundamental* education. They were introduced in 1991.

SAEB (*Sistema Nacional de Avaliação da Educação Básica*) exams consist of standardised tests and socio-economical questionnaires. The tests cover Portuguese language, reading and mathematics, with a focus on problem solving. In the socio-economical questionnaire, students provide contextual information about factors associated with their development, such as family background, parents' education levels and family income. Teachers and school directors are also given questionnaires that gather demographic data, professional profiles of staff, and working conditions.

Until recently, participating schools were randomly selected. SAEB now reaches all federal and state schools, but still retains its original sampling frame in order to follow trends over time (see below). Scores do not range from zero to 10 (as do traditional student assessments); the objective is not to assess the performance of individual students, but the quality of the education system as a whole. There is a descriptive scale for the abilities demonstrated by students in Portuguese Language and mathematics, at grade 4 (year 5) and grade 8 (year 9) in *fundamental* education. SAEB also assesses the last year of upper secondary (year 3 of *ensino médio*), and includes private schools.

Prova Brasil and SAEB: how do they relate?

At first glance, these two assessments appear to cover the same ground. In fact, SAEB is a *sub-sample* of *Prova Brasil*, for the 4th and 8th grade. SAEB is almost 20 years old, and the sub-sample now is still as originally defined, to monitor trends. In 2003, the *Prova Brasil* was created in order to widen its scope from sampling to a population-based assessment at grade 4 and grade 8.[5]

However, *Prova Brasil* does not cover the final year of secondary schools, and does not include private schools: it is aimed only at public schools of primary and lower secondary education (*ensino fundamental*). In summary:

- For grades 4 and 8, the SAEB and the *Prova Brasil* are administered at the same time (every two years), and use the same (identical) question papers for both, in the two main subjects. But the results are then disaggregated by INEP, so that one part (the SAEB sample only) can be used to follow trends over time.

- The public schools that are both in *Prova Brasil* and the SAEB sample take the test at 4th, 8th and 11th grades (if they have the 11th grade). The private schools in the SAEB sample also take the test at those grades. The private schools do not take *Prova Brasil*. The public schools in the SAEB sample know beforehand that they will be in that sample.

- In addition, the SAEB assesses two groups not covered by the *Prova Brasil*: the final grade of secondary and private schools. This is also done every two years.

- Results of SAEB are reported only by state; *Prova Brasil* results are reported to schools, but not to individual students because the SAEB data are not collected at per-student level.

- The explanation given is that SAEB was always a *system* evaluation, meant to provide a national comparison of all state education *systems*; and there is no need to assess the whole population of schools. On the other hand, *Prova Brasil* – being population-based – assesses public *schools* and is used to monitor the public system of basic education throughout the country. But not all students take it: only *one* class of students in grade 4 and *one* class in grade 8 take the test in each school. Thus, depending on the size of the school, many students are not assessed. Since the target of *Prova Brasil* is the school, not the individual student, results are not reported by student.

- Because those students who do participate in the federal samples will never know how they performed, these assessments (for them) are low-stakes, and no feedback is possible either to the participants or their parents.

Provinha Brasil ("Little Prova Brazil")

The *Provinha Brasil* is a national diagnostic assessment of reading literacy that allows teachers, co-ordonators and managers to evaluate their students' performance. It is usually carried out by the end of grade 2 (year 3) of *fundamental* education. It is meant to diagnose, at an early stage, the basic literacy of students, and resolve any difficulties they may have. The assessment instruments, developed by INEP, are made available to the State and Municipal Secretariats for Education, which are responsible for their dissemination to schools. Teachers administer the tests in accordance with a "*Caderno do professor/aplicador*" (Teacher's/Applicator's Notes). Results are not given to individual students, but are intended to be used by teachers and school directors for information and remedial action where needed.

National Examination for Certification of Youth and Adult Competencies (ENCCEJA)

The purpose of this examination (*Exame Nacional para Certificação de Competências de Jovens e Adultos*), which is also administered by INEP, is to assess the basic abilities and competences of young persons and adults who have not had the opportunity of attending regular education at the appropriate age. A candidate who attains the minimum score required for the relevant stage of education (*fundamental* or secondary) receives a "certificate of completion" for that stage.

- Participation in ENCCEJA is voluntary, both on the part of individual candidates and of municipalities and State Secretariats for Education. CEE Santa Catarina participates, as do a number of municipalities in the

state. Candidates for the *fundamental* (*ensino fundamental*) level must be at least 15 years old; for secondary (*ensino médio)* the minimum age is 18. Registration can be done on-line or by sending in a form that is available in all post offices; exams are held in a participating municipality near the candidate's home.

- Since 2001, ENCCEJA is also available to Brazilians living abroad, so that they can acquire formal "certificates of completion" for basic and secondary education. INEP works with the State Secretariat for Education of Paraná in organising and marking (scoring) these exams abroad. There are examination centres in Japan and in Europe.

University entrance examinations

In most countries, the interface between the final year in secondary school and entrance into university marks a decisive moment for students, both in terms of their education and their future career prospects. Therefore, it is characterised by high-stakes selection procedures and examinations that have a strong backwash effect on upper-secondary teaching and learning, and often give rise to an extensive (and lucrative) "industry" of private tutoring or other types of preparatory courses, sometimes offered by the same institutions that set the requirements for entrance (Bray, 2009).

Vestibular

Brazil is no different in this respect, except that for many years university entrance throughout the country has been determined on the basis of a curriculum-based examination called the *Vestibular*. This is a written test, set and administered by each university, other institution of tertiary education or groups of HEIs, such as ACAFE.[6] Candidates must choose their field of study when they register for the *Vestibular* at their chosen university (or universities), and must then take the examination that relates to their chosen field. The receiving university sets cut-off points by field of study, depending upon each faculty's requirements and number of places available. For example, the cut-off point for highly selective courses such as engineering and medicine will be set high (*e.g.* 89 points out of a possible 96), whereas for less selective courses the cut-off points will be lower.

To maximise their options, many secondary school students apply to take the *Vestibular* in more than one university as well as in more than one field of study. This inflates the number of applicants for each available place, which is wasteful for both the candidate and the receiving institution.

High School National Exam (ENEM)

This national examination (ENEM or *Exame Nacional do Ensino Médio)* is a voluntary, multiple-choice, "objective" test aimed at secondary school leavers. It is administered by INEP, and was first introduced in 1998. The initial idea, in fact, was to use this examination as a kind of "national *Vestibular*"; but the exam was not well regarded at first and only a few universities accepted it. Until 2003, it was administered every year to around 1.5 million students throughout Brazil. In 2004, the Lula government created the ProUni (*Programa Universidade para Todos*, University for All Program), a scholarship programme that is linked to good performance on ENEM. By 2005, the number of students taking the ENEM practically doubled, and the most recent exam (December 2009) attracted more than 2.5 million students nationwide.[7]

Registration for ENEM is co-ordinated by INEP; candidates can register only via the internet. Public school students and those from low income families are fee-exempt, as are all candidates who have completed secondary school. Candidates must request the exemption when they register for ENEM. Students in private secondary education must pay the registration fee (BRL 35 in 2009); fees are not refundable in case a student withdraws. Because students must register for ENEM several months before the exam date, a significant percentage of candidates do not appear for the examination. INEP reports a national absentee rate of 37.7% for the December 2009 ENEM; in São Paulo, the absentee rate was as high as 46.9% (INEP attributes this to a late change in the 2009 exam dates, causing scheduling problems).

The main advantage of ENEM is that, unlike the *Vestibular*, it is not specifically curriculum-based but asks for higher-level thinking skills such as application of concepts, problem solving and critical analysis. In the last few years, the influence of PISA on ENEM – in terms of strong emphasis on higher-level thinking skills – has been beneficial; and because of its multiple-choice "objective" format, ENEM also lends itself to large-scale computerised processing and scoring. The more traditional essay format of the *Vestibular* would make it more difficult to operate nationally, although rapid technical advances in computerised scoring of essays and extended-answer items would help overcome this.[8]

Towards a unified, national university entrance exam?

In 2009, for the first time, the government stated its objective to transform the ENEM into a national *Vestibular*. However, it will take some time before the universities will accept the change, although a good number

of public universities (but not all) have adopted ENEM instead of (or as part of) their *Vestibular*. The reasons include the fact that many public universities are reticent for reasons of autonomy in the selection of students and the content of the examinations. Although the MEC has offered some budgetary compensation, public universities are not ready to accept a (national) ENEM as a full replacement of their own (institutional) *Vestibular*. As for the private universities, they accept ENEM, mostly because the government offers them tax incentives as part of the ProUni initiative.

Higher education: equity and access issues[9]

Public (federal and state) higher education institutions – usually the most prestigious and high-quality – do not charge fees. Students coming from relatively affluent backgrounds often attend private secondary schools and have access also to private tutoring, making it more likely for them to gain admission to free public higher education. By contrast, students from less privileged backgrounds are more likely to attend public *fundamental* and secondary schools, are less likely to receive special tuition, and are thus less able to compete for free university places. As a result, poorer students have little option but to attend fee-paying private universities.

To improve equity in admissions, in recent years many universities have introduced quotas (typically between 10 and 20%) for black students and for students coming from public schools. Although there is some controversy about the fairness or even legitimacy of these quotas, it has given youngsters from less advantaged backgrounds a better chance for a university education. And recent research indicates that, once they are in higher education, public-school students do as well as – or better than – those coming from the private sector (See Cavalcanti *et al.*, 2009).

In addition, full or partial government scholarships are available via a scheme called ProUni which selected its first group of scholarship students in October 2009.[10] There are tax incentives for private universities that provide scholarships to needy students, with added incentives for those who are indigenous or Afro-Brazilian. Participating private universities must give at least one scholarship for every ten students enrolled, although that proportion dropped to 8.5% in 2010.

Programme for International Student Assessment (PISA)

Since the first survey in 2000, Brazil has participated in OECD's Programme for International Student Assessment (PISA). This is a triennial survey of the knowledge and skills of 15-year-olds, designed to develop

valid comparisons across countries and cultures. More than 400 000 students from 57 countries (representing close to 90% of the world economy) took part in PISA 2006.[11] The focus in that year was on science, but the assessment also included reading and mathematics and collected data on student, family and institutional factors that could help to explain differences in performance.

PISA assesses the extent to which students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society, focusing on student competences in the key domains of reading, mathematics and science. PISA seeks to assess not merely whether students can reproduce what they have learned, but also how well they can extrapolate from what they have learned and apply their knowledge in novel settings, both in school- and non-school contexts.

PISA reports students' performance in two different ways: performance scales and proficiency levels. *Performance scales* were constructed for each of the three domains – science, mathematics and reading – to have a mean score among OECD countries of 500 points, with about two-thirds of students across OECD countries scoring between 400 and 600 points (*e.g.* one standard deviation is 100). *Proficiency levels* are defined for the purpose of describing what competencies students at each level are able to demonstrate. Proficiency levels were defined for each of the three subject domains. Student scores in science and mathematics were grouped into six proficiency levels, with Level 6 representing the highest scores (and hence the most difficult tasks) and Level 1 the lowest scores (and hence the easiest tasks). As an example, Figure 6.1 below presents the descriptions of the six proficiency levels on the science scale.

For Brazil, PISA is an important indicator of the learning achievement of its 15-year-olds in relation to their peers around the world, and the government is to be commended for its willingness to persevere although the results, thus far, have been disappointing. Despite large expenditures on primary schooling per student, Brazil's performance is among the worst in the world. Brazil was in last place (overall) of 32 countries in 2000; in 37th place in reading and 40th place in science of 41 countries 2003; and in 54th place in science and 49th in reading out of 56 countries in 2006.[12] Even more worrying is the very high percentage of Brazilian 15-year-olds who score *below or at Level 1;* in mathematics, for example, this includes fully 72.5% of the 2006 sample, as shown in Table 6.1.

Figure 6.1 **Summary descriptions of the six proficiency levels on the science scale**

Level	Lower score limit	Percentage of students able to perform tasks at or above each level (OECD) average	
6	707.9	1.3% of students across the OECD can perform tasks at Level 6 on the combined science scale.	At Level 6, students can consistently identify, explain and apply scientific knowledge and *knowledge about science* in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they demonstrate willingness to use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social or global situations.
5	633.3	9.0% of students across the OECD can perform tasks at least at Level 5 on the combined science scale	At Level 5, students can identify the scientific components of many complex life situations, apply both scientific concepts and *knowledge about science* to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to situations. They can construct explanations based on evidence and arguments based on their critical analysis.
4	558.7	29.3% of students across the OECD can perform tasks at least at Level 4 on the combined science scale	At Level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of science or technology. They can select and integrate explanations from different disciplines of science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.
3	484.1	56.7% of students across the OECD can perform tasks at least at Level 3 on the combined science scale.	At Level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short statements using facts and make decisions based on scientific knowledge.
2	409.5	80.8% of students across the OECD can perform tasks at least at Level 2 on the combined science scale.	At Level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
1	334.9	94.8% of students across the OECD can perform tasks at least at Level 1 on the combined science scale.	At Level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow explicitly from given evidence.

Source: PISA 2006: Science Competencies for Tomorrow's World, Vol. 1: *Analysis* (OECD, 2007).

Table 6.1 **Performance below or at Level 1 in PISA 2006, in percentages**

Domain	Below Level 1	At Level 1	Below Level 1	At Level 1
	Brazil[1]	Brazil	OECD average[1]	OECD average
Science	**27.9**	**33.1**	6.9	16.3
Mathematics	**46.6**	**25.9**	10.2	16.2
Reading	**27.8**	**27.7**	8.9	14.2

Note (1): "Below Level 1" means that the student is "unable to use (scientific or mathematical or reading) skills in ways required by the easiest PISA tasks".
Source: INEP/PISA, 2007, pp. 60-61**.**

In science, this means that 61% of Brazilian 15-year-olds do not reach Level 2, which is the baseline level of achievement on the PISA scale at which students begin to demonstrate the science competencies that will enable them to participate actively in life situations related to science and technology. To reach Level 2 requires competencies such as identifying key features of a scientific investigation, recalling single scientific concepts and information relating to a situation, and using results of a scientific experiment represented in a data table as they support a personal decision. In contrast, students at Level 1 often confuse key features of an investigation, apply incorrect scientific information, and mix personal beliefs with scientific facts in support of a decision.

As noted earlier, Brazil's Ministry of Education has set an ambitious goal of raising the average learning achievement of 15-year-olds to the level of the OECD average by 2022. On the IDEB index, this means raising average achievement from the current level of 3.2 to 6, in about 12 years. Judging by the 2006 results, it will not be an easy task.

Santa Catarina's PISA 2006 results

Table 6.2 shows that Santa Catarina's sample of 15-year-olds did better than those in other states in the region, and also considerably better than Brazil's overall performance in all three domains assessed by PISA 2006 (science, mathematics and reading). The SED is rightly proud of these results, and the OECD team was told that, if Santa Catarina had participated separately from Brazil in PISA 2006, it would have been ranked in 44th or 45th place out of the 57 participating countries.[13] While this is, of course, encouraging, to be placed 44th is still disappointing given the state's favourable socio-economic conditions and high investments in basic and secondary education.

Table 6.2 **PISA 2006 - Results by region and state**

Science

Region / State	Average	SE	Lower limit	Upper limit
Total Brazil	390	2.8	384.9	395.8
Southern region	424	6.5	411.4	437.0
Paraná	422	9.5	403.9	441.0
Santa Catarina	**427**	**12.7**	**402.3**	**452.2**
Rio Grande do Sul	424	11.0	402.6	445.8

Mathematics

Region / State	Average	SE.	Lower limit	Upper limit
Total Brazil	370	2.9	363.8	375.3
Southern region	405	6.9	391.4	418.2
Paraná	400	9.4	381.7	418.4
Santa Catarina	**413**	**13.7**	**386.0**	**439.6**
Rio Grande do Sul	405	11.6	382.2	427.8

Reading

Region / State	Average	SE	Lower limit	Upper limit
Total Brazil	393	3.7	385.6	400.2
Southern region	419	8.1	402.6	434.5
Paraná	418	9.5	399.8	436.9
Santa Catarina	**431**	**13.1**	**405.2**	**456.6**
Rio Grande do Sul	412	17.1	378.9	446.0

Data source: INEP, PISA National Report 2006, Table 14, p. 67.

Issues related to assessment of student learning

These fall into two main categories: issues related to the assessment *system*, and issues related to *learning outcomes*.

System issues

- As has been noted earlier, the Secretariat of State for Education in Santa Catarina has direct responsibility for *less than half* the student population: only about 622 000 out of 1 400 000 students are in public state schools, with the remaining 778 000 in federal, municipal, or private schools. There appear to be no clear lines of accountability for

the *quality* of education delivered by non-state schools. The SED has apparently no power to hold (*e.g.*) municipal schools accountable for the learning achievements of their students, or to close down schools that fail to serve their students adequately according to MEC standards. As "municipalisation" of *ensino fundamental* progresses to include all eight or nine grades/years, quality assurance and accountability issues become ever more urgent.

- As far as could be ascertained, the only standardised assessments relevant to Santa Catarina are carried out at the federal level, are sample-based, run on a two-year cycle, and are intended to evaluate system outcomes only. While this generates useful, national and state-level statistics that are comparable over time, there is no systematic, standards-linked assessment of student learning where it actually *happens:* in schools and classrooms.

- Classroom teachers give marks on a scale of 1-10, but these marks are not standardised and not comparable. Because they are not explicitly linked to a set of performance descriptors showing what level of knowledge or skill they represent, a mark of (*e.g.*) "7" given by one teacher is not comparable to a mark of "7" given by another in the same school, subject or grade level, and thus does not represent a reasonably accurate picture of what these students actually know and can do in relation to curriculum standards.

- Four times per year, students and parents receive a report showing each term's marks in various subjects, plus an average mark for the term. In order to be promoted to the next grade, a student must obtain a minimum of 28 marks for the year (*i.e.* must have an average mark of 7 for the four terms); the underlying assumption is that the student has therefore mastered at least "70%" of the curriculum. The OECD team could not discover how this percentage is calculated: 70% of what, exactly? And which 70% is more important than the 30% that has not been achieved? Who decides where the cut-off line is drawn between "69%" and "70%" in terms of curriculum mastery?

- While these numerical calculations appear to reflect an accurately *measured* amount of student learning, they are in fact based on subjective judgments made by teachers who have no way of knowing how their students' performance compares to others – in other schools, municipalities, or states. Not surprising, then, that when external assessments are made (*e.g. Prova Brasil* or PISA), there are discrepancies between what teachers believe their students to have achieved, and their actual performance on standards-based tests.

- One major issue is the MEC's stated objective (2009) to transform the ENEM into a "new style", national *Vestibular* to be accepted by all institutions of tertiary education. Clearly this will meet with considerable opposition on the part of universities; it will also need a painstaking process of design and trialling in order to ensure that the exam is valid, reliable, fair and "clean" in terms of possibilities of undue influence or corruption.

Issues in learning outcomes: results

- There is no need to repeat here the concerns raised by the poor performance of Brazilian students on national surveys as shown by IDEB, or on international surveys such as PISA. IDEB's national average stood at 3.2 (on a scale of 1-10) in 2007, and while Santa Catarina's overall score (2007) was "the best" at 3.5,[14] this is hardly a cause for celebration. Likewise, Santa Catarina's scores in PISA 2006 were better than those of (nearly all) other states,[15] but here, too, there is no room for complacency. Given Santa Catarina's high levels of literacy (97%) and good socio-economic situation, there is no reason why its 15-year-olds should not be able to perform *at least* as well as their peers in countries far less advantaged than Santa Catarina.

- Since 1990, SAEB has maintained a statistically stable sub-sample (now within the *Prova Brasil)* in order to monitor learning achievement over time. Using Item Response Theory methods, SAEB results are comparable over time because they are independent of the specific group tested or of the difficulty of the tests.[16] INEP's report dated February 2007 contains comparative data for the period 1995-2005. Generally speaking, the results for Portuguese language and mathematics at all three levels tested (grades 4 and 8, and year 3 in secondary) are disappointing, more so because they *remain flat or even decline slightly* over the ten years covered by the report. For example:

Table 6.3 **SAEB results in Portuguese language at grade 4**

	1995	1997	1999	2001	2003	2005
Brazil	*191.6*	*187.8*	*172.3*	*168.3*	*173.1*	*175.5*
Paraná	200.4	195.0	179.6	173.1	175.8	183.8
Santa Catarina	**193.4**	**197.7**	**180.9**	**176.6**	**182.5**	**181.2**
Rio Grande do Sul	191.7	186.8	177.7	178.7	183.0	182.0

Data source: INEP (2007), Results for SAEB 1995-2005, Table 3, page 9.

A similar picture is shown in Portuguese language at grade 8:

Table 6.4 **SAEB results in Portuguese language at grade 8**

	1995	1997	1999	2001	2003	2005
Brazil	*256.9*	*250.7*	*232.9*	*235.2*	*231.9*	*231.7*
Paraná	259.8	262.4	235.3	240.5	238.3	230.0
Santa Catarina	**256.5**	**257.4**	**242.1**	**245.9**	**242.5**	**246.1**
Rio Grande do Sul	268.8	259.5	242.4	252.4	245.9	244.5

Data source: INEP (2007), Results for SAEB 1995-2005, Table 25, page 29.

- Given the investments made in basic education during these ten years, such lacklustre results are frustrating, and again show that students are not served as well as they should be, even in relatively affluent states such as Santa Catarina.

- The section in this Chapter devoted to PISA comes to a similar conclusion: a dismal performance country-wide, with Santa Catarina showing slightly better (but hardly satisfactory) results compared to other regions and states.

- In its report on PISA 2006, the OECD itself raises the same concern: between 2000 and 2006, expenditure per primary and secondary student increased across OECD countries by 39% (in real terms), while PISA outcomes generally remained flat, with only a few notable exceptions, *e.g.* Poland improved its performance in reading by 28 points, equivalent to three-quarters of a school year, mostly by concentrating on low achievers, thus reducing the percentage of students performing at or below Level 1 without harming the performance of the high achievers.

- Compared with many countries participating in PISA, Brazil has a very high proportion of its 15-year-olds still in *fundamental* education, due either to a late start or to grade repetition. Elsewhere, the large majority of 15-year-olds are already in their first or second year in secondary education, and some commentators have pointed to this difference as a partial explanation for Brazil's poor showing (De Moura Castro, 2007). In the view of the OECD team, however, it is more likely that the higher-level "thinking" skills and competencies tested by PISA are simply not taught in most of Brazil's (and Santa Catarina's) public school classrooms.

- It is true, however (as Table 6.5 shows), that fewer than half the students who participated in the assessment in Brazil were in the age-appropriate grade (*i.e.* year 1 in secondary school); about 40% of students were still in *fundamental* education, with more than 20% *below* grade 8.

In the regions, the north and northeast had high percentages of students still in grades 7 or 8, while in the south (including Santa Catarina) the majority of students were in year 1 or even years 2 or 3 in secondary school. Although PISA does not assess the curriculum *per se,* it is likely that these 15-year-olds had been working at a more demanding level, and also that they were probably the more able students, who had progressed without repeating grades. This will go some way towards explaining why PISA results were better in the south, and in Santa Catarina in particular.

Table 6.5 **Fifteen-year-old PISA 2006 participants by schooling level, in percentages**

Level	*Fundamental* education grades				Secondary education		
	0-4th	5-6th	7th	8th	Year 1	Year 2	Year 3
Brazil	4.2	11.2	8.2	15.9	30.4	14.2	1.1
Paraná	2.3	8.3	6.6	15.8	25.4	25.5	0.9
Santa Catarina	**0.9**	**5.0**	**2.7**	**11.3**	**33.8**	**31.1**	**2.3**
Rio Grande do Sul	1.1	7.3	9.5	15.5	26.1	25.0	0.8

Data source: INEP/PISA, 2006, p. 28.

Recommendations related to assessment

1. The OECD team is concerned that the SED has only limited power to ensure that non-state schools are held accountable for the learning achievements of their students. As "municipalisation" extends gradually to include all grades of *ensino fundamental*, and secondary education becomes the state priority, it is urgent to establish quality assurance mechanisms and clear accountability lines to make sure that *every* student of compulsory schooling age in Santa Catarina – regardless of school type – receives a level and quality of basic education that is in line with federal and state standards.

2. Although Santa Catarina does *relatively* well in national and international assessments in terms of national curriculum standards and international comparisons, the results still show that most Santa Catarina students are not learning what they need in order to function effectively in 21st century society. Moreover, results remain "flat" over time, despite increased investments and improved infrastructure.

3. It is now essential that SED (and in particular the State Education Council, CEE) shift their attention from inputs (such as finance, teacher salaries, textbooks, computers, buildings) and processes (such as municipalisation, curriculum, timetables) to effective ways to improve *learning.* In its meetings with SED and CEE, the OECD team was told in impressive detail about the former, but very little about the latter. The point of education is *learning* – and this is where Santa Catarina's youngsters are let down.

4. The main sticking point is that schools are not teaching students to read a written text and draw the conclusions and ideas that logically flow from it. "Reading with understanding" is fundamental to all learning, and mastery of language – with intelligent interpretation – must be the top priority especially in the lower grades. If this could be achieved, "failure" and grade repetition could be greatly reduced, and scores on national and international tests would improve significantly.

5. Sample-based, periodic assessments such as the *Prova Brasil,* SAEB and PISA give useful information about system quality over time, but the OECD team was surprised at how little schools, classroom teachers and students really know about their own learning achievements. There is almost no useful feedback to individual schools or students: the available statistics remain at the federal and state levels and do not penetrate the teaching/learning process where it actually happens – in classrooms. The SED in Santa Catarina should take steps to ensure that national statistics are analysed and reported in ways that are useful to schools and teachers.

6. Teachers give marks, but they have no clear understanding what these marks mean in relation to federal or state curriculum criteria. Yet, when it comes to grade promotion, these same unreliable (not to say arbitrary) marks are used to determine whether a student has learned "at least 70%" of what is required. The SED in Santa Catarina, probably through its Directorate of Basic and Professional Education, should develop clear guidelines, including mark descriptors, so that teachers and principals can make valid decisions in evaluating students' learning and their eligibility for promotion.

7. Examples of "descriptors" are readily available in the international literature (see, for instance, those used for SAEB, as well as Figure 6.1), and could be adapted for use by teachers in classrooms. Of course, this would require in-service training, as well as good communication with parents so that they can interpret their child's marks in relation to what he or she has learned.

8. In moving towards a new-style, national university entrance examination combining the best features of the *Vestibular* and ENEM, the MEC must prepare the ground very carefully, above all ensuring that universities and other tertiary institutions are in agreement with the change. Also, since this will in due course become a national, high-stakes selection examination for higher education entrance, the "fairness" and anti-corruption safeguards must be set very high in order that no student is disadvantaged by the new system.

Notes

1. OECD Programme for International Student Assessment (PISA), 2006. This study of 15-year-old students in 57 countries focused on their knowledge and skills in science, and also updated assessments of mathematics and reading. For PISA 2009 the major assessment domain is reading, including reading literacy using electronic texts. Data collection for PISA 2009 was undertaken in 2009 and analysis of data will be conducted during 2010. The international report is due for release in December 2010.

2. It is true that the three southern states (Paraná, Rio Grande do Sul and Santa Catarina) had the highest scores, with 422, 424 and 427 respectively, which could put Santa Catarina in 45th place if it were assessed separately from Brazil as a whole. But that still means that 15-year-olds in Santa Catarina performed considerably below their peers in 44 countries around the world.

3. This means that a student must accumulate at least 28 points over the year. For example: term 1 = 6; term 2 = 8; term 3 = 7; and term 4 = 7, added up to 28, divided by four terms = 7 average for the year.

4. Automatic promotion or similar policies are sometimes used to solve statistical problems; indeed, the policy called *"Sistema de avanços progressi*vos" (System of Continuous Advance), implemented in Santa Catarina State between 1970-1984, is an example of this. Under this policy, all students of all grades of primary school were promoted automatically. Later studies of the effects of this policy concluded that it was introduced mainly to reduce failure statistics (Sena and Medeiros, 1984; Pereira *et al.*, 1984) but that it simply moved the low-achievement problem on to higher grades without seriously addressing it.

5. Note however that "population-based" does not mean that every student is assessed. In each basic school, only one class at grade 4 and one class at grade 8 take the *Prova Brasil*.

6. The item format may differ; some have multiple choice questions, while others (such as FUVEST, for the state universities of São Paulo) begin with an eliminatory multiple choice phase followed by a second essay-format phase; and a few others have essay-format exams only.

7. Compared with about 1.8 million students who complete secondary education in Brazil every year.

8. Large-scale electronic registration and marking systems, including electronic marking of essays and long-answer items, are widely used by international examination bodies and have proved to be reliable when compared with traditional methods using trained examiners.

9. For an in-depth discussion of higher education, see Chapter 9. Here, the focus is on access as it relates to entrance requirements such as examinations.

10. Eligibility for ProUni (*Programa Universidade para Todos*) requires that applicants have attended either public schools (or private schools with a full scholarship), or have a disability. Also, they must meet income requirements and compete for the scholarships on the basis of their scores on ENEM (see text). To keep their ProUni scholarship, students must maintain a B average in their courses. Teachers in public primary education who wish to study for a degree in pedagogy may also qualify for ProUni support; in their case, family income is not considered.

11. PISA 2009 included 66 countries, six of them in Latin America (Brazil, Chile, Mexico, Panama, Uruguay and Paraguay). A further eight countries are implementing PISA 2009 on a one-year delayed timeline. Results will be released in December 2010. The emphasis in 2009 was on reading, but mathematics and science were also assessed.

12. For full details, see *OECD PISA 2006 database,* www.pisa.oecd.org.

13. For this reason, from 2012 Santa Catarina will participate separately in PISA, as well as part of Brazil.

14. On IDEB 2007, Santa Catarina State occupied first place at grade 8, fourth place at grade 4, and first place at the end of year 3 in secondary school. However, Santa Catarina's "best" performance (at 3.5 on a 10-point scale) only confirms the unacceptably low quality of Brazil's education system as a whole.

15. Santa Catarina's PISA 2006 scores in reading (431), in science (427) and in mathematics (413) were above the Brazil overall score of 390 but still well below the OECD average of 500.

16. Item Response Theory (IRT) is the study of test and item scores based on assumptions concerning the mathematical relationship between abilities (or other hypothesised traits) and item responses. Other names include Item Characteristic Curve Theory, Latent Trait Theory and Rasch Model. See Baker, 2001. SAEB also uses a small number of common items ("anchor items") across test administrations to further ensure comparability over time.

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Chapter 7. Professional and Technological Education

This chapter analyses the policies, trends and challenges of the overall professional and technological education (EPT) system in Santa Catarina, with reference to the federal policies and Brazil's legislative framework that determine the scope, opportunities and constraints in which the state operates. The chapter looks into the regulatory framework and the distribution of responsibilities for EPT, analyses enrolment patterns and education provision by state and private providers, and discusses links and transitions to the labour market.

Notes and terminology

The professional and technical education system (EPT) in Brazil is a multi-level sector, composed of three segments, according to the amended National Education Guidelines and Framework Law (LDB): *(i)* initial and continuing training or professional qualification; *(ii)* professional technical education of secondary level (*Educação Profissional Técnica de Nível Médio*, EPTNM) and *(iii)* professional and technological education at undergraduate and postgraduate levels (*Educação Profissional e Técnológica de Nível Superior*, EPTNS).

The following notes may be helpful. First, the Chapter avoids using internationally accepted terms, such as *TVET* and *VET*, because they can be misleading given the particular nature of the corresponding segments of education in Brazil. Therefore translations of the Brazilian nomenclature are used for practically all levels, structures, policies and instruments. Thus, the acronym EPTNM in Portuguese means "Professional Technical Education of Secondary Level"; EPTNS refers to "Professional and Technological Education at Undergraduate and Postgraduate Levels".

Second, the articulation of secondary and post-secondary levels of professional education within a single framework is not a very common approach. According to policy, EPTNM and EPTNS share common purposes; therefore educational institutions – following the relevant legal

procedures and principles – are multi-level, and can offer EPTNM and EPTNS,[1] as well as initial and continuing training. There are technical schools of secondary level at universities, and federal institutes that offer EPTNM and EPTNS.[2] This approach of multi-level educational institution has advantages for students, in that it offers a more efficient progression and links with lifelong learning.

The Brazilian *ensino básico* and *ensino médio* education include all pre-tertiary levels, from early childhood education and care (ECEC) through upper-secondary. EPTNM is part of *ensino médio*, and EPTNS is part of post-secondary education. Therefore this chapter refers to both secondary and post-secondary education frameworks, and will devote more attention to EPTNM and EPTNS, rather than to the other category of professional technical education defined by the amended law: "initial and continued professional qualification". The main reason behind this choice is that little information and data were available to the OECD review team. Some attention is also paid to youth and adult education integrated with professional education. In statistics and in mode of delivery, this type of education is different from *regular* EPTNM.

Third, limited attention is given to the "*S System*"[3] in this Chapter. This is partly because this network is largely independent and operates outside the jurisdiction of the Secretariat for Education, although it is governed by the same federal laws that regulate other types of professional and technological education. It is also partly because the "*S System*" publishes few reports and data, and those that could be found are discussed in this review in connection with SENAI. Hence this Chapter will look mainly at public EPTNM and EPTNS, under federal and state responsibility.

Introduction

The system of Professional Technical Education of secondary level (EPTNM) and Professional Technological Education at undergraduate and postgraduate level (EPTNS) in Brazil is complex. Understanding the nuances and meanings of current political debates about this combined sector is a challenge for any external observer. While to some extent this is true also for TVET in Europe and elsewhere, the debate in Brazil is different: policy analyses and recommendations are deeply imbued with the history of social struggle, of ideological debate, of disappointments due to unfulfilled expectations, and of system reforms hotly contested between supporters and opponents.

In Brazil, part of the discussion about the future of EPTNM is about ensuring that this segment of education plays a strong role in the formation of well adjusted, independently thinking, and free citizens, equipped with a

good combination of knowledge about science and technology and as well as cultural sensitivity. According to the current political vision, this is the right basis for public EPTNM policy. The interface of EPTNM with employment and labour is perceived in a wider sense than in most countries: in Brazil, EPTNM and EPTNS are expected to have a tight bond with the world of work, but also with creative active life, and with the capacity of citizens to transform and manage resources. It is not just about training for specific jobs, or for the market of jobs. The reasons for this wider purpose are again political: the intention is to free the Brazilian economy of its dependency on a poorly equipped labour force, and of being a consumer rather than a creator of technology and innovation.

The site visit to Santa Catarina presented the review team with a challenge to understand and explore in depth a range of sources: legislation, policies, statistics, and expert analyses. The team accepts that this chapter can hardly convey the complexity of the subject in all its social and political contexts; the recommendations are offered in the knowledge that the whole picture has not yet been uncovered, but in the hope that they serve to encourage the efforts made by the State Secretariat.

EPTNM in Brazil celebrated 100 years in 2009. Started as a refuge for the "poor and humble", EPTNM is now an area where the federal government invests significant resources to expand access and guarantee quality. EPTNM is diversified in Brazil, combining the quasi co-operative system linked with key sector employers ("*S System*"), with the federal policy and network, the state networks and myriad of private players. EPTNM is now more closely linked with *post-secondary* technological education (EPTNS) as established by the legislative changes of 2008.

Legal and policy basis

The structure of professional and technological education (EPT)

Table 7.1 offers a schematic description. It is important to underline that EPT in Brazil is not limited to the well-known "*S System*", which provides support and training services to various economic sectors, under the governance of the National Industrial Confederation.

In 2008, Law No. 11.741 amended the provisions on EPT included in the 1996 LDB, by introducing a whole new section (IV-A) under Chapter II (*Educação Básica*) and amending several articles of Chapter III (on Professional Education). The key novelty introduced by this Law is stipulated in Art. 39.

Table 7.1 **Structure of the EPT system (LDB amended by Law N° 11.741)**

Levels			Structuring elements	
Level	**Approaches**	**Legal basis: article in amended LDB**	**Elements**	**Legal basis**
Initial and continuing training, or professional qualification	Not defined in amended LDB	39, 2° I	No Catalogue of courses yet, but according to MEC-SETEC,[1] this Catalogue is in preparation	
Professional technical education of **secondary** level (EPTNM)		39, 2° II	1) National Catalogue of Technical Courses	**1)** *Portaria* [Decree] MEC 870, 16/07/2008
				Resolution CNE/CEB No. 3 of 09/07/2008
	1) *Articulated* with regular upper-secondary education	36-B, I		CEE Resolution No. 115 of 26/08/2008
	a) Integrated: after lower-secondary education, single enrolment in the same school that organised integrated curriculum	36-C, I	2) National Curriculum Framework (*Diretrizes Curriculares Nacionais*)	**2)** Resolution CNE/CEB No. 04/1999 amended by CNE/CEB No. 1/2005 (changed the structure of professional areas of EPTNM: thematic architecture of 12 areas based on technological innovation principle, instead of economic sector principle as it had been before)
	b) Parallel: for students enrolled in upper-secondary and professional education, with two distinct enrolments for each course (general and technical)			
	2) *Subsequent:* (for those who completed upper-secondary education)			
Professional technological education at **graduate and postgraduate** levels **(EPTNS)**	39, 2° III		1) National Catalogue of Technological Courses at undergraduate and postgraduate levels	1) Portaria (Decree) MEC No. 10 of 28/7/2006, on the basis of Decree No. 5.154 of 23/7/2004, No. 5.773 of 9/5/2006 and of CNE Resolution CNE/CP No.°3 of 18/12/2002

Note (1): Meeting on 29 November 2009 between the author and the Head of the programme *Brasil Profissionalizado*, in Brasília.

Source: Amended LDB, and indicated Resolutions of CNE and CEE.

The two structuring elements in Table 7.1 provide the framework for course design used for all approaches of EPTNM and EPTNS. For EPTNM, the Catalogue provides the thematic architecture of courses on the basis of 12 large areas of technological innovation and knowledge – (discussed below), as well as the nomenclature used for areas and courses per area. The two Catalogues also provide: a short description of main learning outcomes (professional profiles at course completion), a short proposal of main subjects of study linked with the specified learning outcomes and the minimum workload (in hours) for all courses. The workload per course is confirmed by the Resolution of the CNE (for EPTNM: CNE/CEB 1/2005).

Law No. 11.741 also introduced another novelty, which widened the scope of training activity of schools and institutes that provide regular EPTNM and EPTNS courses: they are now allowed to offer special courses designed to meet the needs of the community. Access to such courses is subject to the learning capacity of the interested persons, and *not* to their level of formal schooling. This approach applies also to institutions that provide regular EPTNS courses, and tends to take into account the results of informal learning (*i.e.* learning acquired in ways other than through formal schooling).

Legal basis

In a federal country the size of Brazil, the legal basis of EPT and its processes is unavoidably complex. The following documents are most relevant to EPT in Santa Catarina:

I) Brazil – Union level

- National Education Guidelines and Framework Law (LDB), No. 9.394, dated 20 December 1996. Covers the principles, purposes and organisation of all levels of education (infant to tertiary, including adult education), and provisions on teachers.

- Law No. 11.741 of 2008: important amendments concerning the scope of EPT sector, the segments of EPT, the articulation of professional education with upper-secondary (*ensino médio*) education.

- Law No. 11.892 of 29 December 2008: establishes the Federal Network of Professional Scientific and Technological Education and creates the Federal Institutes of Education, Science and Technology.

- Law No. 11.788 of 25 September 2008: regulates the terms, conditions and purposes of curricular practice internships *(estágios)* in enterprises. Defines the educational nature of this practice/internship, and introduces a number of rights (remunerated leave, insurance) for students.

- *Portaria* (Decree) No. 10, MEC of 28 July 2006, adopting the National Catalogue of Technological Courses at undergraduate and postgraduate levels.

- *Portaria* (Decree) No. 870, MEC of 16 July 2008, adopting the National Catalogue of Technical Courses.

- Resolution CNE/CEB No. 1/2005 that modifies and updates the National Curriculum Framework for EPTNM.

- Resolution CNE/CEB No. 3/2008: adopting the National Catalogue of Technical Courses for secondary level.

II) Santa Catarina: state-level legal and regulatory basis

CEE opinions and resolutions:

- Resolution No. 054 of 20 September 2005. Regulates the organisation of EPTNM and reiterates Resolution CNE/CEB No. 1/1005.

- Resolution No. 115 of 26 August 2008. Establishes complementary rules on EPTNM with respect to the establishment of the National Catalogue of Technical Courses of secondary level. It states that all EPTNM courses shall be adapted to the structure and terms of the Catalogue from academic year 2009.

- Resolution No. 158 of 25 November 2008. Establishes the framework for assessment of the teaching and learning process in EPTNM institutions that are integrated into the state education system.

Strategic programmes:

- PNE (National Education Plan, *Plano Nacional de Educação*) (2001-2011), adopted by Law No. 10.182 of 09 January 2001. Establishes the national objectives, priorities and targets for the decade and sets the basis for the definition of the State Education Plans for a ten year period.

- PDE (Education Development Plan, *Plano de Desenvolvimento da Educação*): PDE is one of the pillars of the Multi-Annual Development Plan of the Brazilian Federal Government for the 2008-2011 period (PPA, *Plano Plurianual*) and the main reference for education in Brazil.

It is organised around four main themes: *(1)* improve the quality and coverage of basic education; *(2)* improve literacy programmes and continuing education; *(3)* expand vocational and technological education; and *(4)* expand and democratise access to higher education.

- Multi-Annual Development Plan of the Brazilian Federal Government for the 2008-2011 period (PPA 2008-2011), designated "*Development with Social Inclusion and Quality Education*". Considers the improvement of the Brazilian education system a top priority of the country development strategy. Intends to increase federal resources for education from BRL 9 billion (around EUR 3 billion) in 2007 to BRL 22.5 billion (nearly EUR 7.5 billion) in 2011, which represents an increase of almost 150% over the four-year period of the Plan.

Institutions and governance

EPTNM in Santa Catarina operates within four main types of governance:

- Federal;

- State;

- Municipal;

- Private: "*S System"* and other private forms of provision.

At federal level, the Ministry of Education (MEC), and more specifically the Secretariat for Professional and Technological Education (SETEC, *Secretaria de Educação Profissional e Tecnológica*), leads and co-ordinates policies, programmes and actions that concern EPTNM in each state, through:

a) Policies and their regulatory-legal tools that are *obligatory* for the whole Union, for public and private players in the EPTNM system. SETEC is also responsible for the supervision of this level. New legislative proposals and decrees require prior endorsement by the National Education Council (CNE). The CNE issues decisions through a *Parecer* (technical and legal analysis and opinion), which precedes the actual *Resolution* by the CNE.

b) Programmes targeted at and *optional* for *the states and the municipalities* ("*Brazil Profissionalizado*", "*E-Tec Brasil*"). SETEC is responsible for information on the programmes rules, follow-up, supervision and evaluation; financial rules and procedures, and control of physical and financial execution are ascertained by the FNDE (National Education Development Fund); while the interested

beneficiary (state, municipality) is in charge of the feasibility study for its own project, submission of the application and implementation. Some programmes are open only to public providers (state and municipality).

c) Actions targeted at *specific categories* of the population (such as "*Mulheres Mil*", or "A Thousand Women"*).*

d) Operation of schools and institutes under the jurisdiction of the federal government (Federal Institutes of Education Science and Technology, and schools) established throughout the territory of the states.

CNE establishes and updates the national curriculum framework (*Diretrizes Curriculares Nacionais,* DCN), including for professional and technical education, based on adopted decrees and laws. For example, the new DCN for EPTNM was updated/modified by Resolution CNE/CEB No. 01/2005, adjusting the framework to decree No. 5154/2004.

DCN is a framework that defines the structure and levels of EPTNM, the overall purposes of EPTNM and the overall workload of different levels. The amended LDB stipulates that EPTNM establishments shall combine their own school requirements (PPP) with the complementary legislation of the respective system – within the overall framework of the DCN.

At state level, the State Secretariat for Education (SED) – through the Directorate of Basic and Professional Education (*Diretoria de Educação Básica e Profissional*) – is directly responsible, through its local/municipal representations, for co-ordination, funding and supervision of the work of the schools and professional centres that are under the jurisdiction of the state government: schools of general education (upper-secondary) that offer also professional courses in the approaches foreseen by the law; and Centres for Professional Education (*Centros de Educação Profissional*, CEDUPs) that are specialised in professional education only. The school level (EEBs and CEDUPs) has a certain autonomy in the design of portfolios of EPTNM courses, recruitment of teachers and organisation of the learning process. But in matters of financial management they operate within a tightly prescribed "box" within which they have little room for the kind of flexibility that is essential for institutions that deal with professional and technical education. By its very nature, this type of education serves a variety of functions, and its management needs more flexibility and autonomy at the provider's level.

The State Education Council (CEE**),** through its specialised chambers, analyses and expresses opinions (*Parecer*) on new legal-regulatory initiatives and legal documents approved at federal level that concern the

state ETPNM system; and adopts the respective Resolutions that might include complementary rules applicable with the state EPTNM system. In the period 2005-2009, CEE Santa Catarina issued three main Resolutions (see above) that endorsed the respective legal basis from the federal level: reform of the National Curriculum Framework for EPTNM (2005); application of the National Catalogue of Technical Courses (2008); and on the assessment of students.

The *private segment* of EPTNM is subject to federal and state legislation, of which the most important are the LDB and its amendments and the Catalogues of Technical and Technological Courses. These organisations may be entitled to implement programmes financed by public resources, depending on the rules of the programme. The "*S System*" follows specific governing principles that reflect the participation of the enterprises of the relevant sectors (mainly: industry, commerce, transport, services), in particular the financial contribution of the affiliated enterprises through a specific levy.

The *economic sectors*, through employers/enterprises, are an essential and institutionalised part of the governance of EPTNM within the "*S System*". The federal and the state EPTNM systems interact with the economic sectors/enterprises through the system of "*arranjos produtivos locais*" (APL, local productive partnerships). These APLs are the institutionalised form of co-operation and interaction, and agreement with the relevant APL is required for participation of public EPTNM providers in certain federally-funded programmes.

Struggle and peace

Supporters and opponents of the current political orientation all agree that Brazil has built a system of technical schools that has earned the trust and admiration of the whole population. The excellent reputation of technical schools – particularly those of the federal network, now called IFETs (*Institutos Federais de Educação, Ciência e Tecnologia*) – justifies the high number of candidates from upper social classes wishing to study in these schools. According to some analysts, in a debate that is not deprived of political nuances, most (federal) technical schools had, in the 1990s, lost sight of their main purpose – to train workers for the economy – because the majority of their students were not interested in entering the labour market after graduation, but wanted high quality (and free) education that ensured them entrance into good (federal) universities. Technical schools were considered the only high quality public (free) schools, competing with the good private schools.[4]

Box 7.1 **A century of history**	
Year	**Key events, decisions related to professional education and training in Brazil**
1909	Decree 7.566, which created 19 "Schools for apprentices". Later: first agricultural school created (now a Federal Institute of Rio de Janeiro).
1937	Law 378 that transformed the Schools for Apprentices into Industrial Lyceums, focussed on professional education.
1942	Set of organic laws on education adopted, namely the Organic Laws of Professional Education. Established the National Services for Apprenticeship (SENAI for industry and SENAC for services sector). Former industrial Lyceums become Industrial and Technical Schools that provide professional education with a level equivalent to secondary education.
1959	Industrial and technical schools are transformed into autonomous entities – Federal Technical Schools (*Escolas Técnicas Federais*, ETFs). They have didactic and management autonomy.
1961	Professional education is equivalent to academic education. Profound reforms in professional education.
1967	Model farms of Ministry of Agriculture are transferred to Ministry of Education and become Agricultural Schools.
1994	Law 8.948 established the National System of Technological Education, and gradually transformed the technical and agricultural schools into CEFETs (Federal Centres of Technological Education, *Centros Federais de Educação Tecnológica*). But the expansion of professional education will be based on partnership agreements with the states, municipalities, Federal District, productive sector and NGOs that endorse the maintenance, functioning and management of the new schools.
1996	LDB (Law No. 9.394), *Lei de Diretrizes e Bases da Educação*.
1997	PROEP: Programme for Expansion of Professional Education (*Programa de Expansão da Educação Profissional*).
2004	Decree No. 5.154 allows integration of professional technical education of secondary level with regular secondary education
2005	Federal strategy for expansion of Federal Technical Schools – first phase: construction of 60 new Federal Technical Schools (ETF)
2006	Post-secondary technological education (EPTNS): regulation, supervision and evaluation. Launch of PROEJA (National Programme of Integration of Professional Education with Youth and Adult Education). National Catalogue of Technological Courses at undergraduate and postgraduate levels launched.
2007	Federal strategy for expansion of Federal Technical Schools (ETF) – second phase: a total of 354 units will be reached by 2010 (old + new schools). *Brazil Profissionalizado:* Decree No. 6.302. National Catalogue of Technical Courses launched. *E-Tec Brasil* programme created (distance learning).
2008	Network of IFETs established.
2009	World Forum of Professional Technical Education in Brasília.

Source: SETEC, 2009*a*; *Parecer CNE/CEB No. 16/99.*[5]

Reform and controversy: 1997 to 2005

In 1997-1998, a reform took place with the aim t*o* reorient technical schools to their original purpose and social target group, *i.e.* youth from middle or lower social status interested in employment right after graduation. This reform basically led to the separation of the technical part of curriculum from the academic part; or, to the split of technical-professional education from upper-secondary. This way, the government expected to stop the inflow into technical schools of students from higher social categories, or at least to limit them to academic courses, in which they were fundamentally interested. Technical courses of shorter duration were established for the sons and daughters of families of lower social status, leading them directly to the labour market.

In the first decade of 2000, and particularly under President Lula, the many opponents of the previous (1997-1998) reform argued in favour of re-integration of professional-technical education with secondary education, in order to build the desired combination of science, technology and culture and eliminate the divisive effects of a policy that created one group of students with wider knowledge and skills and better prospects of further study and careers, and another group who received only technical skills in public professional education, disconnected from broader knowledge and from upper-secondary education.

Finally, with the support of the new government, in 2005 the CNE/CEB approved its Resolution that re-established the integrated approach; and the amendment of 2008 (No. 11.741) to the LDB clarified the scope of EPT and the three approaches of EPTNM – with the emphasis on integration.

Even before the new legal basis (2005, confirmed in 2008) was endorsed, some states had already started the attack against the separation of technical education from the framework of upper-secondary education. This was, for example, the case of Santa Catarina and Paraná. The State Secretariat for Education of Paraná led a long-term project aiming to design, develop and test a new approach to integration in which inter-disciplinarity and convergence of knowledge areas was aligned with employability and labour objectives.

The current situation

At present, the enrolment figures show a very substantial predominance of EPTNM enrolment in the approaches *parallel and subsequent* over the *integrated* approach. This might demonstrate the complexities linked with the re-integration of technical and secondary education (workload, teachers, and study places in full-time courses). Integrated EPTNM also requires

career information and guidance for students, and also demands better learning outcomes from lower secondary education. Integrated public EPTNM has demonstrated good results in many European countries, and also in Brazil; many users see its advantages in terms of learning outcomes over regular public education of an academic-only curriculum.

In fact, during the OECD field mission in Santa Catarina, EPTNM teachers interviewed in one of the IFET campuses said that they had problems helping pupils catch up with the science and mathematics requirements of the integrated EPTNM curriculum. These teachers had to work extra hours with their pupils to help them learn what they did not learn in lower-secondary school; and despite the additional workload, they were pessimistic about the likelihood of fulfilling the actual EPTNM curriculum given the weakness of basic knowledge of many pupils after they leave compulsory school for upper-secondary.

Conclusion

The advantages of integrated EPTNM are not in question, but high-quality implementation of its objectives requires co-ordinated actions among the various departments at MEC. Most importantly, it requires better learning outcomes from compulsory school, where the root problem of low education quality seems to lie. Moreover, SETEC needs to evaluate the integrated EPTNM programmes, to identify and address in a systematic way their constraints and needs; not only to avoid discouragement of teachers, students and employers with the new policy, but also to minimise possible attacks from its opponents that might harm the policy framework at a fragile stage of its implementation. The new political picture in Brazil after 2010 will certainly determine much in EPTNM policies; all the more important, then, to demonstrate their advantages and combat their problems in a transparent manner. It is important not to hide behind politically convenient decisions, but to gather clear evidence to guide EPTNM's future direction.

Currently, EPT policy in Brazil seems to have reached a good level of development, reflection and justification. Technical papers justifying the new programmes are available, web resources (information, dissemination) are open and updated, and there seems to be a coherent set of policy instruments and of programmes to deal with the challenges highlighted in the EPT part of PPA 2008-2011 (see above).

Evidence and data analysis seem to have improved as well, with the results of INEP's latest Education Census promptly posted on the web, in addition to some recent studies. But more and better analysis will still be necessary, using available data, and some quality assurance work to

eliminate the mismatches between different sources of information. For example, some of the new EPTNM data collection and dissemination tools seem to be partially at odds with the Census data, *e.g.* with regard to the EPTNM school information for Santa Catarina available online in SISTEC (*Sistema Nacional de Informações da Educação Profissional e Tecnológica*, National Information System for Professional and Technological Education). More tracer studies of graduates of EPTNM, by state and by the education system, would also help in assessing the quality and relevance of the programme in terms of the world of work.

Recent policies and programmes

Federal and state

The federal government is the undeniable leader of policy developments to support a wide and multi-level system of professional and technological education. State governments show varying degrees of interest and initiative; some states take decisive initiatives, making use of the room for manoeuvre offered by the federal legal framework, while others have different priorities.

Paraná and Ceará are considered good examples of states that took (and still take) measures to develop their professional and technological education, realising the importance of attractive EPTNM for their population and economies. In 2004, the Paraná State Secretariat of Education started an innovative movement to develop integrated EPTNM. This initiative sought to minimise the negative impact of legislative changes of 1997/1998; it also used *an integration* approach, as distinct from the more common "fifty-fifty" approach to juxtaposing curricula and workload (Governo do Paraná, 2008). Within the federal programme *E-Tec Brasil* (distance learning EPTNM), Paraná's winning proposals are numerous and cover a large number of municipalities in the state. Ceará also has innovative initiatives, and is an active participant of the federal investment programme in support of the state networks of EPTNM – *Brasil Profissionalizado*.

In the period 2003-2009, the federal government paid renewed attention to some key issues that had emerged in the period before; and substantially upgraded the capacity – quantitative and qualitative – of the overall system of professional and technological education in Brazil.

Main developments

Strategic

Multi-annual plan 2008-2011 (PPA). The PPA 2008-2011 defines challenging objectives regarding the purposes of EPTNM. Breaking with the preceding reforms of 1998, the PPA proposes an expansion of access to high-quality and free EPTNM, as the main sector policy objective for the period up to 2011. But the PPA faces two big challenges:

1. Only one-sixth of upper-secondary students reach higher education; moreover, 2 million youngsters (age 15-17) are out of school.

2. Only 8.4% of upper-secondary students are in EPTNM; therefore, most secondary school leavers enter the labour market without any professional preparation. This means that there is room to expand the federal and state EPTNM capacity, including through distance learning.

According to the PPA, the federal government will invest in the:

- Creation of new technical schools in core cities (150 new schools, 200 000 study places).

- Creation of distance-learning capacity for EPTNM in the state and municipal networks.

- Reorganisation and consolidation of IFETs offering initial and continuing training, technical education integrated with upper-secondary education, EJA, in-service training for teachers and *licenciaturas* in scientific areas.

- Organisation of integrated approaches combining professional education with secondary education.

- Closer and better articulation of EPT with the needs of local social and economic development, improvement of the responsiveness of EPT to labour market needs.

- Reform of the "*S System*", in particular ensuring that approximately 30% of study places is allocated to students from public schools.

Overarching legislation

Law No. 11.741 of 2008. This Law redefines the scope of EPT that now covers secondary and tertiary levels, as well as initial and continuing training (or professional qualification). This broader scope of EPT looks beyond the boundaries of formal education systems; educational institutions may offer the full length of EPT (three levels) and obtain efficiency gains, as

well as "permeability" in learning paths. A new paragraph is included in the LDB, stating that EPTNM institutions shall comply with the national curricular framework, with the complementary rules of the respective educational system, and with the requirements of each educational institution expressed in their own political-pedagogical project ("PPP", or policy framework).

It also promotes the integration of professional education with general upper-secondary education, and as such broadens students' opportunities to receive a professional qualification while studying in regular secondary schools (federal, state and private). This approach is likely to help resolve the problem faced by the large proportion of school leavers who cannot enter higher education, seek employment but do not have professional training. In addition, this approach favours the lifelong educational and professional development of citizens, by avoiding dead-end paths in the education continuum.

National curriculum framework (EPTNM)

Resolution CNE/CEB No. 1/2005. This Resolution updates the national curriculum framework for EPTNM, with special attention to integrated courses of professional education with general education in upper-secondary level, as well to the "parallel" approach within a unified curriculum (ascertained through an agreement of inter-complementarity between the concerned schools).

The revised workload is as follows: *(i)* 3 000 hours for the integrated courses that encompass a professional course that requires a minimum of 800 hours of study; *(ii)* 3 100 hours if the professional component of the integrated curriculum requires a minimum of 1 000 hours; *(iii)* 3 200 hours if the professional component requires 1 200 hours. This means that the integrated approach offers efficiency gains in the total workload. This framework applies countrywide.

Structuring measures

The two national Catalogues of qualifications[6] – *Catálogo Nacional de Cursos Técnicos* (Catalogue of EPTNM)[7] and the *Catálogo Nacional de Cursos Superiores de Tecnologia* (Catalogue of EPTNS)[8] – represent a far reaching tool to structure EPT at these two levels. An additional Catalogue – for courses of level below "technical" (EPTNM) – is currently under development and is expected to contribute to streamlining the immense variety of courses on offer.

These Catalogues of courses are relevant both for learners and for providers, and can likewise assist employers understanding the learning behind a qualification.

What is particularly important is the common structure of the two Catalogues of qualifications into big axes (technological groups), under which are organised the various courses. As said above, this structure was conceived in line with "logic of knowledge and technological innovation",[9] replacing the previous structure in line with sectors of economic activity, which were stipulated in the annexes of CNE/CEB Resolution N 4/99. For instance, two technological groups in the Catalogue of EPTNM concern directly the sector of *industry* (Box 7.2: groups 3 and 11), but one concerns control and processes, while the other is focused on production specifically. *Industry* is not the core of the categorisation behind the technological groups – the *technological* and *knowledge* elements are. However the learning areas foreseen for courses structured under technological group 11 do include elements of control and processes, which are obviously indispensable in the professional profile. However, this logic of the two Catalogues could be clarified for users, since it is less intuitive than a structuring logic based on sectors of economic/professional activity.

The new structural logic defines the "technological group" as the central line to build a learning course. It is defined by a technological matrix, which orients the pedagogical project of the course and is transversal throughout the curricular organisation of the course, providing both identity and structure. The technological curricular group guides the definition of the essential and complementary curricular components, expresses the trajectory of the educational path, guides the educational activity and establishes the pedagogic requirements.

Despite slight differences, namely number of technological groups,[10] the two Catalogues largely share a common structure. The advantages of this feature are clarified below.

This common structure of courses at two different levels (technical and technological at undergraduate and postgraduate levels) can be considered an excellent decision and premise to support lifelong professional development and upward progression and mobility. This policy is in line with worldwide discussions on transparency and permeability of learning paths. In the two Brazilian Catalogues, within the common technological groups, a substantial number of courses have common designation and purposes.

Box 7.2 **Common structure of the Catalogues**	
Technological groups of the Catalogue of EPTNM	**Technological groups of the Catalogue of EPTNS**
Group 1: Environment, health and safety	Group 1: Food production
Group 2: Educational support	Group 2: Natural resources
Group 3: Industrial control and processes	Group 3: Cultural production and design
Group 4: Management and business	Group 4: Management and business
Group 5: Hospitality and entertainment	Group 5: Infrastructure
Group 6: Information and communication	Group 6: Industrial control and processes
Group 7: Infrastructure	Group 7: Industrial production
Group 8: Military	Group 8: Hospitality and entertainment
Group 9: Food production	Group 9: Information and communication
Group 10: Cultural production and design	Group 10: Environment, health and safety
Group 11: Industrial production	
Group 12: Natural resources	

Box 7.3 **Application of the guidelines of the Catalogue of EPTNM**

The CEDUP of Chapecó visited by the review team offers a technical course for cooks, which is obviously in compliance with the guidelines of the Catalogue. However, comparing the curricular matrix of the course and the requirements defined in the Catalogue, a number of differences can be observed. First, the number of hours exceeds by 200 hours those stipulated in the Catalogue (800 hours). This is partly due to the inclusion in the curriculum of certain key competences, such as information technology, communication (Portuguese language), and psychology (interaction in society), but in particular by the inclusion of curricular practise (*estágio*), which amounts to 200 hours. The curricular matrix dedicates very limited time to competences linked with quality and safety of food, which is in contradiction with the requirements set in the Catalogue. This is certainly an issue to be addressed, as the course aims to deliver a qualification for public use (restaurants) and not for household application.

The inclusion of key competences of the areas communication, digital competences and teamwork is highly commendable and should be supported by state policy from and given a clear place in federal policies. Curriculum based on key competences is one of the priority areas in development in countries of European Union; therefore exchange of experience could be beneficial.

The two Catalogues define the minimal requirements in terms of contact hours for each course. In general, courses within the same technological group have similar amount of contact hours, but some variations occur (differences of approximately 200 hours between courses). As noted above, the number of hours for EPTNM courses (professional component) floats between 800 and 1 200 hours.

Expansion of system capacity

Expansion IFET (Federal Institutes of Education, Science and Technology)

President Lula signed a bill in July 2008 creating 38 Federal Institutes of Education, Science and Technology (IFETs, *Institutos Federais de Educação, Ciência e Tecnologia*). These will be located in every state, offering integrated courses in secondary general and vocational education, as well as Bachelor's degrees in engineering. Half of the places will be reserved for integrated secondary education. The IFETs will be separate from the existing network of vocational and technical education. Each state will have at least one main campus, with decentralised campuses in small towns, creating a network of 38 IFETs with 312 campuses.

IFETs will also offer extended courses at tertiary level, with emphasis on engineering courses and degrees in the natural sciences (physics, chemistry, mathematics and biology). They will also invest in research and in the training of teachers for public *fundamental* education.

"*Brasil Profissionalizado*" (Established by Decree No. 6.302 of 12 January 2007)[11]

For this, Santa Catarina has an envelope of approximately BRL 17 million. The planned allocation is as follows: BRL 10.4 million for construction, expansion and renovation of infrastructure and BRL 7.4 million for acquisition of equipment. Accordingly, 22 schools in 18 municipalities will benefit from this investment, through one new school, 10 projects of expansion and three projects of rehabilitation. By comparison, the State of Paraná has an envelope of BRL 126.2 million, planned as follows: BRL 77.8 million for construction and BRL 48.4 million for equipment. In Paraná, 252 schools in 170 municipalities will benefit from the programme, through 10 new schools, 9 projects of expansion and two of rehabilitation. *Of all states in Brazil, only eight receive less than Santa Catarina for this programme.*

E-Tec Brasil[12]

Starting in March 2008, the MEC launched a distance learning programme (*E-Tec Brasil*) offering a total of 147 courses in a wide range of subjects, including information technology, nursing, metallurgy, environmental science, agriculture and tourism. MEC's aim is to include 250 schools.

MEC's goal is to base E-Tec in 250 schools, especially in rural areas, in order to expand and democratise mid-level vocational education. Part of the Education Development Plan (PDE), the programme has a budget of more than BRL 75 million.

E-Tec's structure is similar to the *Open University-Brazil* system. Courses are completely free and offer a mix of distance- and face-to-face learning. The objectives are to encourage young people (especially in rural areas) to finish high school. The first E-Tec *vestibular* was held in August 2008, by the *Colégio Técnico Universitário (CTU)* of the Federal University of Juiz de Fora (UFJF). In total, 900 places were offered to eight mining communities: Alfenas, Almenara, Boa Esperança, Cataguases, Juiz de Fora, Porteirinha, Três Pontas and Timóteo.

Santa Catarina has few projects approved under this interesting new federal programme of distance learning for EPTNM. Only two municipalities and one CEDUP are involved, with two similar courses in both municipalities. Although the territory of Santa Catarina is smaller than other states, the review team questions why there is such low demand for this programme in Santa Catarina.

Dynamics

Brazil: Trends in EPTNM and EPTNS enrolments at various levels of the education systems

The figures of the School Census 2009 (INEP, 2009; see Tables 7.2 and 7.3) show a number of important developments in Brazil's system of basic and upper-secondary education, as well as in technical vocational secondary education:

1. Total enrolment in all levels declined slightly (by 1.2%) between 2008 and 2009. Of all levels and approaches, only vocational (technical secondary) education registered a significant growth in number of students between 2008 and 2009, by a total of 8.3% (public and private). The federal and the private networks were responsible for this noticeable increase.

2. The municipal network has the largest share (over 46% in 2008 and 2009) of students of all levels and approaches, followed by the state network (39.4% in 2009, 40.2% in 2008). The share of the private network increased to almost 14% in 2009.

3. Between 2008 and 2009 the public network lost almost 580 000 students in lower and upper-secondary education. The state network was the largest contributor to this decline (almost 428 000 fewer students in lower secondary education).[13]

4. Technical vocational education (upper-secondary level): the private network is the main provider, with a share of 55.5% of students in 2009; the state network serves 31% of students in this approach. With approximately 87 000 students in 2009, the growing federal network is still far from the targets set for the expansion programme in federal institutes.

5. The federal and private networks display the highest results in the quality index IDEB,[14] better than the state and municipal networks (Table 7.3). However, the federal network covers only a minor share of students in lower secondary education, while the two public networks that show lowest performance in IDEB are the predominant providers in this sub-sector. Beyond these variations, the 2007 target indicators for all levels were met. The current score in 2007 is 3.2 (on a scale of 1-10), and according to the Education Development Plan (PDE) it should reach 6.0 by 2022, the 200th anniversary of Brazil's independence.

Note: Many Brazilian youngsters are employed, therefore they attend evening courses (38% of upper-secondary students in 20080. This widespread phenomenon adversely affects students' performance at this level and in further studies alike. The national household sample survey (PNAD, 2008) estimated that the share of working children and adolescents (5-17 years old) declined very slightly, but it still represents 10.2% of the age group. In 2008, of the 4.5 million working children and adolescents, 993 000 were in the age group 5-13 years, employed in agriculture and informal activities (IBGE, 2009).

Table 7.2 **Students by levels and types of basic (*educação básica*) education, 2008**

Unit of the federal country	Number of students in basic (*educação básica*) education – 2008						
	Total students	Levels and approaches					
		ECEC	Primary and basic	Upper secondary	Special Education	EJA	EPTNM (parallel and subsequent)
Brazil	52 589 991	6 615 266	31 694 497	8 272 159	315 553	4 902 374	790 142
North	5 074 280	546 771	3 244 501	704 776	19 083	524 829	34 320
Rondônia	476 917	42 044	298 153	59 746	2 794	72 315	1 865
Acre	250 581	25 263	160 677	32 551	1 006	29 325	1 759
Amazonas	1 172 235	118 824	780 400	158 035	4 137	96 222	14 617
Roraima	135 097	17 479	84 477	17 055	96	14 952	1 038
Pará	2 399 135	280 893	1 508 594	331 524	7 375	262 708	8 041
Amapá	222 133	21 738	139 936	35 257	689	23 073	1 440
Tocantins	418 182	40 530	272 264	70 608	2 986	26 234	5 560
Northeast	16 280 149	2 028 293	9 883 096	2 488 341	54 650	1 749 418	76 351
Maranhão	2 234 125	329 508	1 370 906	319 028	7 662	202 799	4 222
Piauí	1 033 829	128 420	603 818	180 508	4 465	106 907	9 711
Ceará	2 582 393	356 425	1 573 261	403 859	9 238	227 678	11 932
R.G. do Norte	942 443	132 380	551 575	153 419	1 155	97 671	6 243
Paraíba	1 114 083	116 471	688 073	150 838	2 774	148 351	7 576
Pernambuco	2 548 920	293 662	1 522 819	430 509	12 293	274 171	15 466
Alagoas	974 806	90 708	648 243	126 888	1 857	103 998	3 112
Sergipe	604 976	74 873	374 353	85 593	2 029	65 569	2 559
Bahia	4 244 574	505 846	2 550 048	637 699	13 177	522 274	15 530
Southeast	20 761 039	2 867 943	12 097 078	3 352 136	141 273	1 811 668	490 941
Minas Gerais	5 102 342	554 489	3 177 652	829 717	46 253	390 239	103 992
Espírito Santo	925 771	141 698	548 253	138 652	9 227	67 459	20 482
Rio de Janeiro	4 005 473	464 204	2 357 700	639 613	22 525	445 922	75 509
São Paulo	10 727 453	1 707 552	6 013 473	1 744 154	63 268	908 048	290 958
South	6 819 599	782 008	4 182 317	1 137 652	75 528	488 393	153 701
Paraná	2 718 110	295 978	1 687 472	470 740	34 496	184 908	44 516
Santa Catarina	1 562 483	241 995	907 893	240 166	17 095	126 282	29 052
R.G. do Sul	2 539 006	244 035	1 586 952	426 746	23 937	177 203	80 133
Centre-West	3 654 924	390 251	2 287 505	589 254	25 019	328 066	34 829
M. Grosso do Sul	686 433	78 766	423 015	90 686	5 288	81 652	7 026
Mato Grosso	851 423	95 783	508 829	145 524	6 524	91 094	3 669
Goiás	1 443 259	144 117	932 738	262 100	6 955	84 332	13 017
Federal District	673 809	71 585	422 923	90 944	6 252	70 988	11 117

Source: INEP, *Resultado do Censo da Educação Básica 2009*; INEP, *Sinopse do Censo da Educação Básica 2009*. Available from: *www.inep.gov.br*.

Table 7.3 **Students by administrative dependency – level and type, change 2008 and 2009**

Level / approach	Federal			State		
	2008	**2009**	**Change %**	**2008**	**2009**	**Change %**
ECEC	2 238	2 454	9.7	112 546	76 971	-31.6
Primary & lower secondary	25 622	25 005	-2.4	11 000 916	10 572 496	-3.9
Upper secondary	82 033	90 353	10.1	7 177 377	7 163 020	-0.2
Professional	77 074	86 634	12.4	257 543	271 128	5.3
Special	820	804	-2.0	46 795	34 692	-25.9
EJA	9 745	12 488	28.1	2 838 264	2 619 356	-7.7
Total	**197 532**	**217 738**	**10.2**	**21 433 441**	**20 737 663**	**-3.2**

Level / approach	Municipal			Private		
	2008	**2009**	**Change %**	**2008**	**2009**	**Change %**
ECEC	4 878 475	4 909 091	0.6	1 726 002	1 774 115	2.8
Primary & lower secondary	17 442 158	17 329 638	-0.6	3 618 004	3 778 389	4.4
Upper secondary	136 167	110 780	-18.6	970 523	973 007	0.3
Professional	29 191	25 695	-12.0	431 651	477 657	10.7
Special	66 834	53 635	-19.7	205 475	163 556	-20.4
EJA	1 948 027	1 886 470	-3.2	149 388	143 018	-4.3
Total	**24 500 852**	**24 315 309**	**-0.8**	**7 101 043**	**7 309 742**	**2.9**

Level / approach	Total		
	2008	**2009**	**Change %**
ECEC	6 719 261	6 762 631	0.6
Primary & lower secondary	32 086 700	31 705 528	-1.2
Upper secondary	8 366 100	8 337 160	-0.3
Professional	795 459	861 114	**8.3**
Special	319 924	252 687	-21.0
EJA	4 945 424	4 661 332	-5.7
Total	**53 232 868**	**52 580 452**	**-1.2**

Source: INEP, *Resultado do Censo da Educação Básica 2009*; INEP, *Sinopse do Censo da Educação Básica 2009*. Available from: *www.inep.gov.br*.

Santa Catarina: enrolments in EPTNM

Overall in Brazil, the concomitant and subsequent approaches together largely predominate in total enrolment in EPTNM, as shows Figure 7.1. However the weight of the three forms varies widely in the three states that were selected for a comparison: São Paulo, Paraná and Santa Catarina.

In São Paulo the share of concomitant EPTNM students is approximately 70%, while integrated EPTNM – represents only a minor portion of enrolments. Paraná has the best developed integrated EPTNM, as result of a period of consistent efforts to revitalise an approach that is seen as offering equitable access to a comprehensive set of competences necessary for autonomous performance in working life.

In Santa Catarina it is the subsequent form of EPTNM that has an established majority of enrolments. This could be justified by social-demographic features of the target population, who engages in technical-professional courses upon completion of basic or of secondary education. Another justification could be the relatively low capacity of the public system (municipal and state) to absorb students in the concomitant and integrated approaches, which require co-ordinated provision (parallel approach) and substantial innovation in teaching methods and curriculum, as well as study places for full-day courses (integrated approach).

Figure 7.1 **The three approaches of EPTNM – enrolments[1]
in a comparative perspective, 2008**

	Brazil	São Paulo	Paraná	Santa Catarina
■ Integrated	132 519	14 784	22 442	4 199
▦ Subsequent	416 299	79 837	37 526	21 823
□ Parallel	379 160	212 877	7 196	7 246
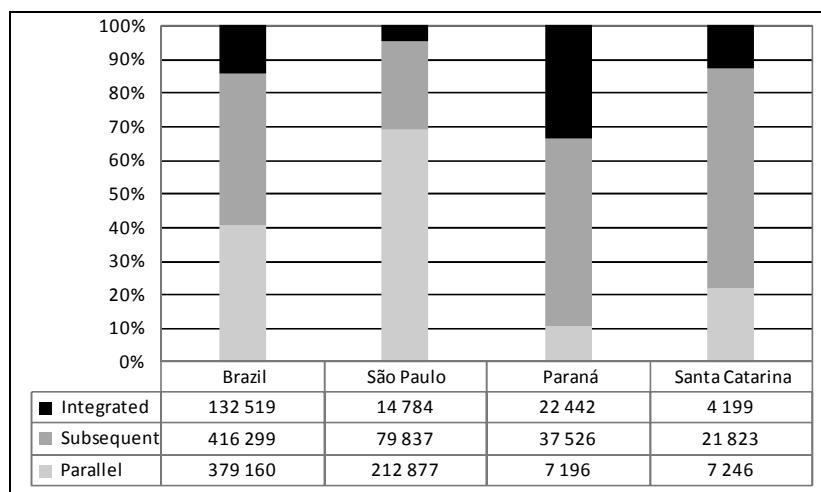
Note (1):   Refer to Table 7.1 for terminology.
*Source:* INEP (2009). Available from: *www.inep.gov.br/básica/censo/default.asp.*
Graph: Review team.

Santa Catarina – state network

According to the most recent information provided by SED, the total enrolment for EPTNM in the state network in Santa Catarina has been progressively increasing since 2001. This trend applies to the integrated and parallel approaches (data available only from 2007), but does not apply for the subsequent approach, which registered an enrolment decrease of almost 50% during the period between 2007 and 2009 (see Figure 7.2).

In the absence of data on funding of EPTNM, and on guidance activities, it is difficult to associate enrolments trend with budgets and demand. SED could analyse these relationships over time to conclude on the factors that hamper or foster changes in enrolments in EPTNM.

Figure 7.2 **Santa Catarina – evolution of EPTNM enrolments by approach, state network only**

	2001	2002	2003	2004	2005	2006	2007	2008	2009
□ Integrated							1 751	2 725	3 868
■ Parallel							2 382	3 266	5 612
■ Subsequent							7 154	5 915	3 930
■ Total	3 838	6 339	7 428	8 691	8 853	9 960	11 287	11 906	13 228
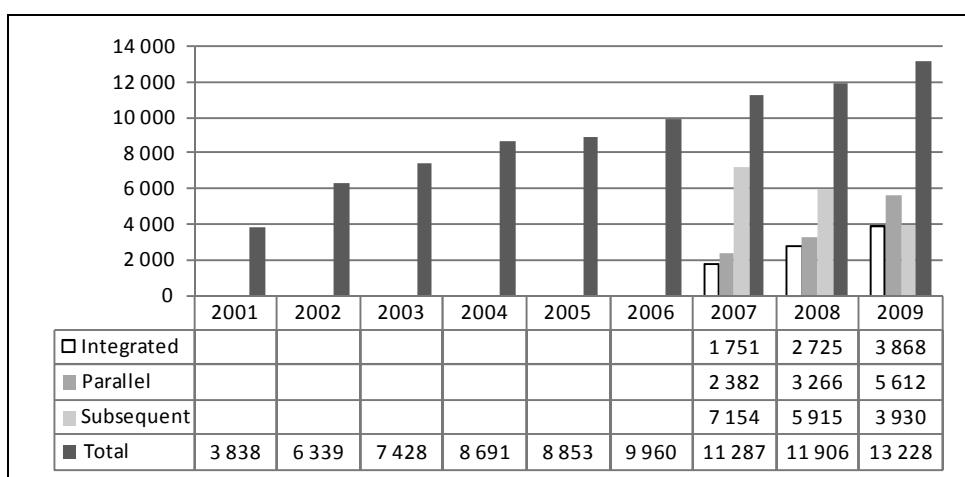
Source: www.inep.gov.br/basica/censo/Escolar/Sinopse/sinopse.asp. *Graph:* Review team.

EPTNM – integrated approach

As highlighted above Santa Catarina has a more developed subsequent approach of EPTNM, while SED has expressed intentions to develop the integrated approach as well. As Figure 7.3 demonstrates, this approach is provided by the state network (secondary schools), but also by the federal IFETs. According to INEP (2009) private providers are not interested in this approach. These figures raised some questions within the review team.

For Santa Catarina it will be important to assess the implications of this state of play of EPTNM approaches in relationship to the announced plans to significantly expand the offer of integrated EPTNM in secondary schools. The history of the bottom-up development of this approach in the neighbouring State of Paraná shows that this is not a process without challenges for the teaching community, as well as the organisation of schools and their partnerships with the local community and enterprises.

Figure 7.3 **Integrated EPTNM by type of administrative dependency, Santa Catarina in comparison with Brazil and other states**
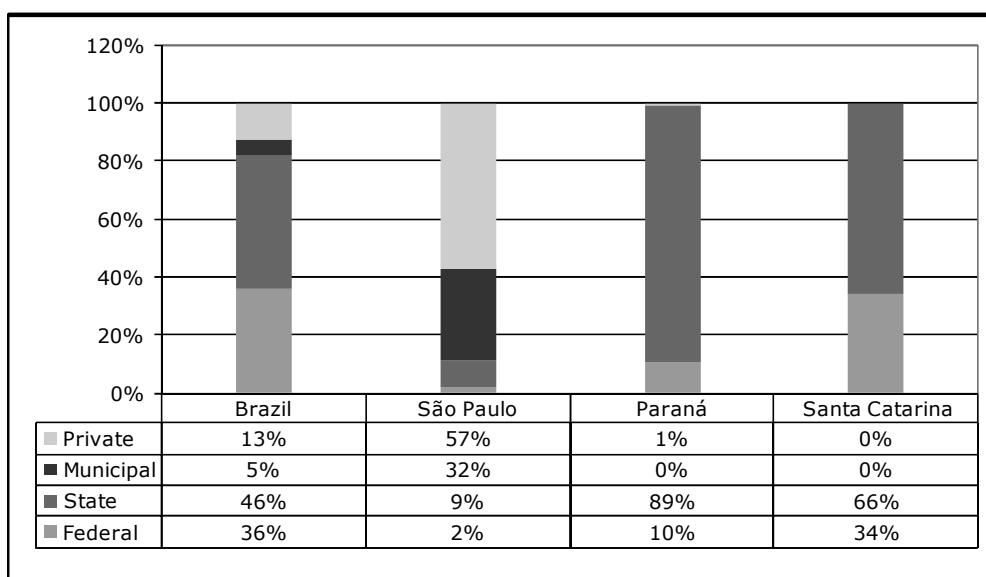
	Brazil	São Paulo	Paraná	Santa Catarina
Private	13%	57%	1%	0%
Municipal	5%	32%	0%	0%
State	46%	9%	89%	66%
Federal	36%	2%	10%	34%

Source: INEP (2009). Available from: *www.inep.gov.br/básica/censo/default.asp*.
Graph: Review team.

EPTNS: Brazil

Overall in Brazil, in 2008 total enrolments in professional technological education (post-secondary technological courses, c*ursos superiores de tecnologia*) grew by 12.3%, but the public and private network contributed differently to this change. Enrolment declined by 8.7% in the public network, and increased by 20% in the private network. The network of federal institutes had a leading position among public providers (57% of enrolments in this category), while the state and municipal networks registered very substantial declines in 2008. Private HEIs accounted for 80% of all new entrants in 2008 in technological courses.

Figure 7.4 **Enrolments in EPTNS within post-secondary education**

	2002	2003	2004	2005	2006	2007	2008
□ TOTAL Undergraduate	3 520 627	3 936 933	4 223 344	4 567 798	4 883 852	5 250 147	5 808 017
■ Post-secondary tech. education	81 348	114 770	153 307	214 271	278 727	347 150	412 032
▨ Bachelor/licenciatura	3 398 565	3 772 252	4 010 426	4 238 885	4 397 919	4 533 231	4 668 024
□ Distance learning	40 714	49 911	59 611	114 642	207 206	369 766	727 961
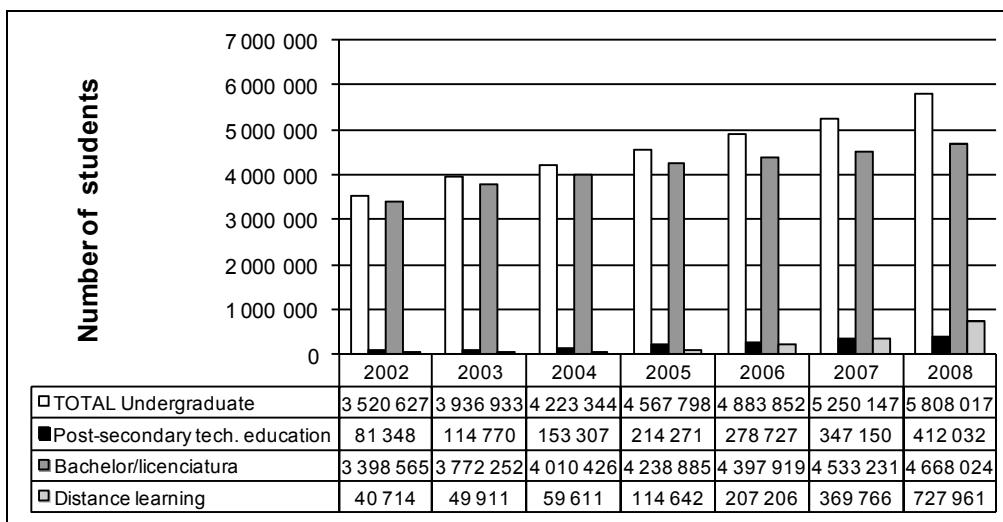
Source: INEP, *Sinopse da Educação Superior* (Synopsis of Higher Education), Census 2008.
Graph: Review team.

Private providers

SENAI (Serviço Nacional de Aprendizagem Industrial)

The national training service of the industrial sector has impressive training centres, in which a wide range of professional-technical education is provided, from initial qualification (below technical secondary) to post-secondary technological courses.

SENAI in Santa Catarina has a slightly different distribution of students compared with Brazil as a whole, as shown in the Table 7.4 and Figure 7.5 (enrolment in various levels, 2009). In Santa Catarina, the percentage of students in post-secondary technological courses is much higher than in Brazil overall: 7.2% and 1.2% respectively. Moreover, the number of post-secondary technological courses of SENAI Santa Catarina represents over 40% of total SENAI for Brazil – a figure that is self-explanatory.

According to the review team's observations during the field visit to SENAI Chapecó, a large number of these students in EPTNS are graduates of EPTNM SENAI, which shows a good transition rate between the two levels.

But the differences of relative importance of the various types of course between SENAI-overall Brazil and SENAI-Santa Catarina concern the remaining types as well (Figure 7.5):

a) EPTNM (technical secondary): in Santa Catarina the share of enrolment in these courses is twice the share registered in Brazil overall. These are mainly young students.

b) The share of learners in initial and continuing training of workers is much lower in Santa Catarina (31% against 71% in Brazil overall).

Table 7.4 **SENAI, enrolment by types of courses, quarter II 2009**

	Brazil		Santa Catarina	
	Students	**% of total**	**Students**	**% of total**
Professional initiation	173 925	17.14	29 623	41.46
Initial & continuing training of workers	721 317	71.09	22 318	31.23
EPTNM	106 909	10.54	14 352	20.9
EPTNS	12 441	1.23	5 161	7.22
Total	**1 014 592**		**71 454**	

Source: www.senai.br/br/institucional/snai_go.aspx.

Figure 7.5 **SENAI, enrolment Brazil and Santa Catarina, by types of courses**

	Professional initiation	Initial & continued training of workers	EPTNM	EPTNS
Brazil	173 925	721 317	106 909	12 441
Santa Catarina	29 623	22 318	14 352	5 161
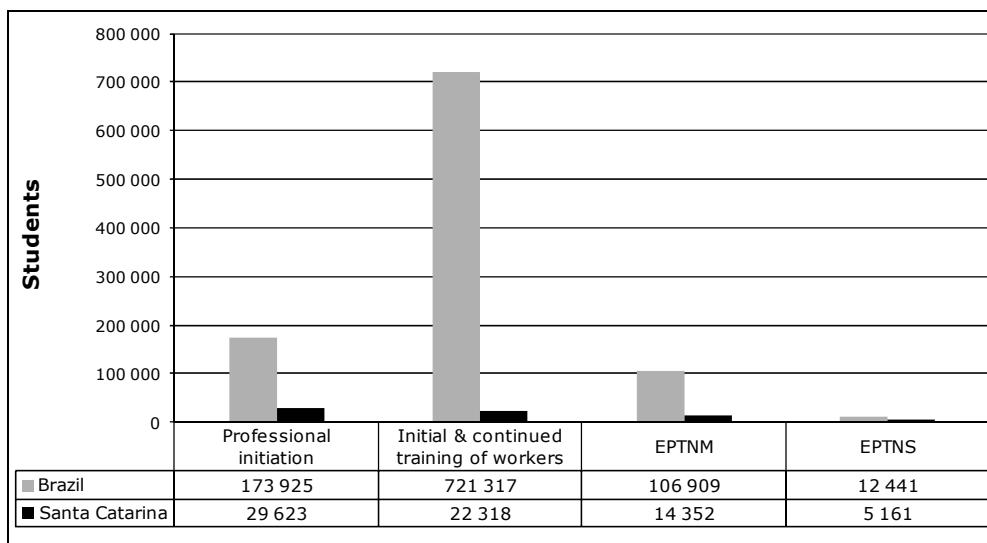
Source: www.senai.br/br/institucional/snai_go.aspx. Graph: Review team.

Figure 7.6 **SENAI, industrial basis and number of employees**

	Large	Medium	Small	Micro
Number of employees	399 765	138 234	177 861	181 517
Number of enterprises	478	955	4 783	40 141
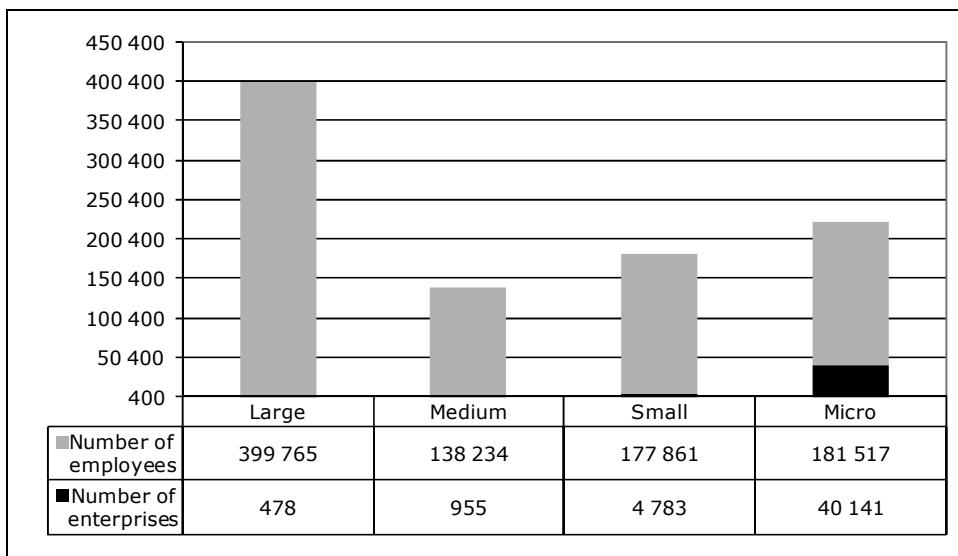
Source: www.senai.br/br/institucional/snai_go.aspx. Graph: OECD review team.

The industrial basis of SENAI in Santa Catarina has a slightly larger share of micro-enterprises (with a *lower* share of employees), while the slightly lower share of large enterprises has a *larger* share of employees. This shows that a larger share of the employed population in Santa Catarina work in larger enterprises; it probably also explains the greater number of higher-level technical and technological courses in SENAI Santa Catarina.

Enrolment in EPTNM by areas of study

The synopsis of Census data of *Educação Básica* for 2008 (INEP) provides data on the distribution of enrolments by area of study. Previous INEP censuses and special reports on EPTNM in *Educação Básica* offer interesting data series that show the distribution by areas of study in association with age groups and by approach.

General sustained features over the period 2003-2005 can be summarised in the following paragraphs.

Table 7.5 **EPTNM by areas of study, in parallel and subsequent approaches, 2005**

	Brazil	Southern region (2005)
Enrolment by areas of study with higher weight in enrolment, 2003-2005 – Total	Health: grows from 29% to 33%	Health: 25%
	Industry: 17-18%	Management: 21.7%
	Management: between 15% and 14%	Industry: 20.6%
	ICT: between 19% and 18%	ICT: 10.4%
	Agriculture and livestock: around 6-7%	Agriculture and livestock: around 8%
Graduates by areas of study with higher weight in enrolment, 2005	Health: 45%	Health: 36.4%
	Industry: 13.1%	Industry: 17.2%
	Management: 12.9%	Management: 12.9%
	ICT: 10.6%	ICT: 8.1%
	Agriculture and livestock: 4.5%	Agriculture and livestock: 9.42%

Source: MEC/INEP, *Educação Profissional Técnica de Nível Médio no Censo Escolar 2003-2005*, Brasília, 2006.

The INEP report (2003-2005) does not give disaggregated data by state, only by large region. In the southern region, EPTNM has fewer enrolments and graduates in the area of health compared with Brazil as a whole. Other differences are found in the enrolments and graduates in industry, management ad agriculture (these are higher in the southern region).

The figures for 2008 show a very substantial difference between Brazil as a whole and Santa Catarina, in terms of distribution of students. Santa Catarina has a substantial advantage in production-related areas, in particular the percentage of enrolments in industrial profiles (42% compared with 19% in Brazil). A similar advantage in Santa Catarina can be observed in agro-animal production (12% against 7%).

Brazil (as a whole) has a relative advantage over Santa Catarina in several services and areas, in particular in the percentage of enrolments in the area of management (16% compared with 10% in Santa Catarina); in IT, where overall Brazil has a share of 11% compared with 7% in Santa Catarina. Finally, health is represented much more in Brazil overall (29% of enrolments) than in Santa Catarina.

These differences reflect the strong industrial-agricultural basis of Santa Catarina, and the relatively stronger focus of EPTNM in Santa Catarina on production-related profiles, especially through the private system (SENAI being an important provider).

Figure 7.7 **Enrolments in EPTNM, by area of study in Santa Catarina**
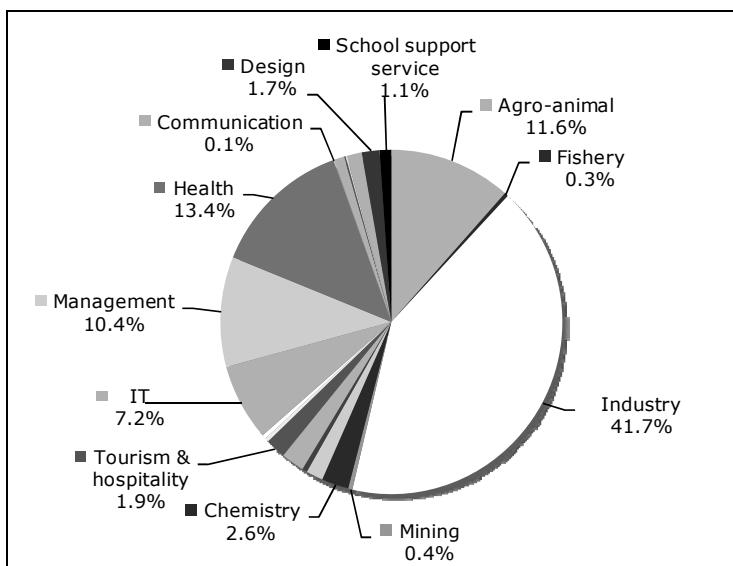
Source: INEP, *Sinopse da Educação Básica* (Synopsis of *Fundamental* Education), Census 2008.

Figure 7.8 **enrolments in EPTNM, by area of study in Brazil**
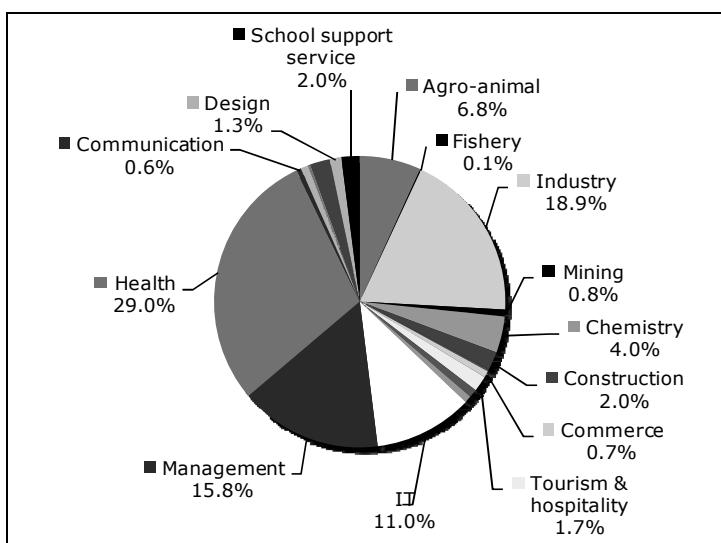
Source: INEP, *Sinopse da Educação Básica* (Synopsis of *Fundamental* Education), Census 2008.

Employability and further paths of graduates of EPTNM – federal schools

MEC/SETEC published in 2009 the only available study providing quantitative information on the situation of graduates of EPTNM after leaving school. The survey covered students of five consecutive years of graduation (from 2003 to 2007). This study covered all regions, and focused on graduates of the *federal network* of EPTNM. Since the report and tables present data aggregated for large regions, not by state, attention here is given to the results of the southern region, which includes Santa Catarina (together with Paraná and Rio Grande do Sul).

In general, the results of the study give a positive picture of the employment of graduates of the federal network (Figures 7.9 and 7.10). For example:

- Overall Brazil: on average 72% of graduates of EPTNM (federal network) are employed. Graduates of earlier years have the best employment figure, which is not surprising, as they have longer interaction with the world of work: 80% of graduates of 2003 are employed, against 63% of those who completed studies in 2007.

- Graduates of industrial profiles perform better than graduates of agricultural technical courses: 76% and 64% respectively are employed.

- It is important to underline that approximately half of those who are employed, are simultaneously studying. The average figures for Brazil are: 34% of all graduates only work, and 38% work and study simultaneously (total: 72%). As seen elsewhere in this review, the combination of employment and study is very common in Brazil, and not only amongst higher education students. This raises the question whether those who work and study are really "employed" in accordance with their EPTNM profiles.

- Moreover, the study concludes that 43% of graduates already worked before starting their EPTNM course. This figure is higher for the southern region (59%). This may raise a question on the real contribution of the EPTNM course for employability – would these graduates have been employed anyway, without the technical course? The study does not provide information regarding the potential added value or change in employment profile after the course (or linked with the new qualification given by the EPTNM course). This is a question that deserves closer analysis in a future tracer study.

Figure 7.9 **Situation after graduation by large regions**
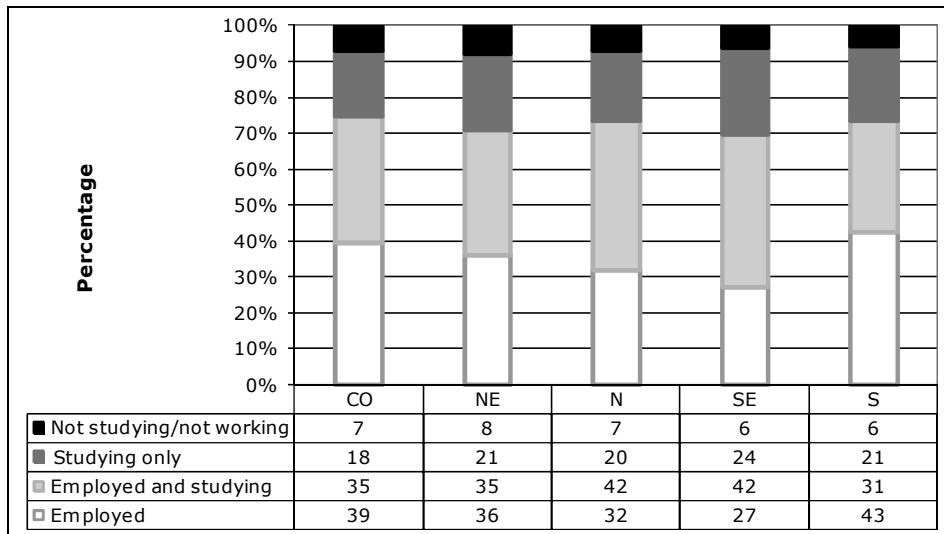
	CO	NE	N	SE	S
■ Not studying/not working	7	8	7	6	6
■ Studying only	18	21	20	24	21
▨ Employed and studying	35	35	42	42	31
□ Employed	39	36	32	27	43

Legend: CW: Centre-West; NE: Northeast; N: North; SE: Southeast; S: South.

Source: National Tracer Study of Graduates from EPTNM of Federal Network, Brasília, 2009.

Graph: OECD review team.

Figure 7.10 **Situation after graduation, by year of graduation**
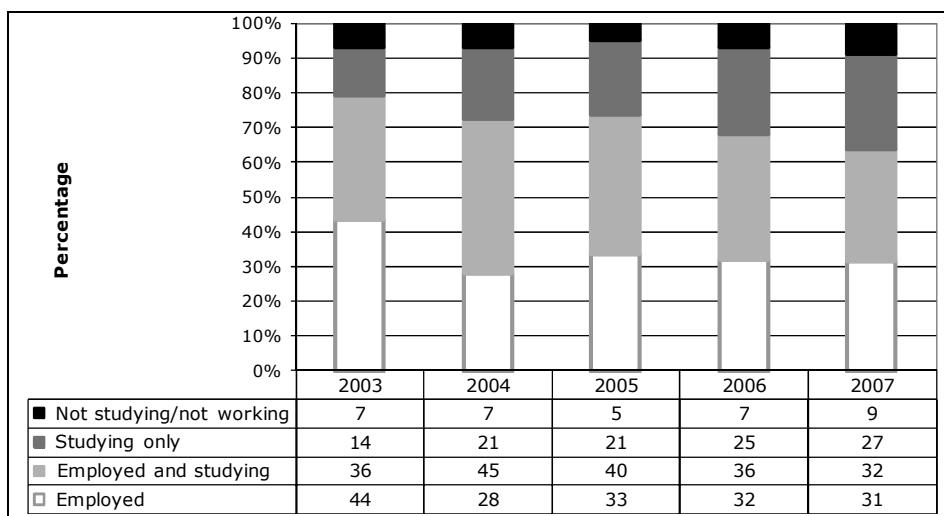
|	2003	2004	2005	2006	2007
■ Not studying/not working	7	7	5	7	9
■ Studying only	14	21	21	25	27
▨ Employed and studying	36	45	40	36	32
□ Employed	44	28	33	32	31

Legend: CW: Centre-West; NE: Northeast; N: North; SE: Southeast; S: South.

Source: National Tracer Study of Graduates from EPTNM of Federal Network, Brasília, 2009.

Graph: OECD review team.

The southern region displays higher employment shares than any other large region, with 43% of graduates working and 31% studying and working simultaneously, which in total is two percentage points higher than the total Brazil figure (72%, see above).

The study gathered data on the salary situation of graduates and showed that 59% of the employed graduates have "average remuneration", 11% are above average remuneration and 29% are below. In the southern region, the situation is again slightly better as a much lower share (20%) of the group are included in the category below average remuneration, and conversely more graduates have average (63%) and above average (15%) remuneration, compared with the national average.

> "I am a chef in a well-known Oriental cuisine restaurant in Leblon, and have a proper SENAC qualification (one year). I have an honest job and an official qualification, but my life is hard. I live in the *favela* (in Rio de Janeiro) because I cannot afford housing in a better neighbourhood. The large majority of the residents of the *favela* are employed people, they are not dependent persons, and even less – criminals". This young man (under 35) lives in Rio de Janeiro, and told a member of the team in January 2010 that wages are relatively low, and, although the professional qualification gives advantages in the labour market, it is not a guarantee of wage stability. This case is not unique to Rio de Janeiro, and similar ones can be found in Santa Catarina.

Notes and issues

Positive impressions

From the point of view of consistency of purpose, of democracy in the approach to combining science, technology and employable skills, of the recognition that EPT must be broad and multi-level, and of the vigour of federal government policy – EPT in Brazil compares favourably with systems in other countries. Elsewhere, the EPT sector often lacks public financing as a result of a lack of interest in public policy for EPTNM; or the role of public policy in EPTNM is poorly understood, seen only as a routine supplier of workers for narrowly defined jobs, without a strong commitment to lifelong professional development of the workforce.

In the view of the review team, Brazil's approach to professional education offers viable solutions for a range of issues that are the subject of much debate in other countries. These include:

- *Purpose of professional-technical education*: not only for specific jobs, but for creative participation in the *world of work*, based on informed participation in productive processes, and on autonomous thinking linked with good basic understanding of science and technology. This concept is wider, more integral and more democratic, since it does not allow a disconnect between general knowledge and technical-professional skills, and promotes the articulation of secondary professional education with secondary regular general schooling. But for those whose educational attainment is less than lower-secondary, or who are over-aged for regular schooling, the system offers various possibilities to learn and complete the basics of general education and combine it with professional education. In the opinion of the team, this consistent policy of integral EPTNM, built on knowledge and skills as well as culture, is a substantial strength.

- *The vision of EPT as being multi-level, across secondary to higher education* – as stipulated in recent legislative amendments – has the potential to improve the permeability of learning pathways across sub-systems (secondary and above), and to motivate upward professional development. EPT becomes a matter of common purpose, offering flexibility within the boundaries of formal education (secondary and above). Procedural regulation of institutional/course accreditation remains separated, but the architecture of areas of study (courses) is now similar in secondary technical and in (post-secondary) technological education, now that the two Catalogues of courses have been revised. Educational institutions of tertiary education offer technical and technological education, in parallel with other third-level degrees. This also allows sharing of resources, in particular teachers from graduate degree courses.

- The field visits in Santa Catarina led the team to conclude that the state has *two strong networks of EPTNM institutions: IFETs and SENAI*. IFETs are the successors of CEFETs, and have one century of development; they are now incorporated within a new network with an upgraded mission, resources and prestige. SENAI is private, and charges tuition fees for the majority of study places in technical and technological courses, while IFETs are public and free. SENAI has an organic interconnection with the industry, while IFETs have a mission

to provide good technical and technological education. Neither of these sub-systems is under the jurisdiction of SED, but both are subject to the same legal framework in respect to course accreditation, the curriculum framework and the Catalogue of courses.

- In Brazil and in Santa Catarina *the reputation of technical schools is very good*, as shown by the high ratio of candidates to study places. ENADE (Students' National Performance Evaluation, *Exame National de Desempenho de Estudantes*) results are positive in general for EPTNS courses. According to SETEC summary information at end 2009, EPTNS courses of the federal network have been performing well in ENADE.[15] In 2008, 100 EPTNS courses were assessed and 86 obtained a satisfactory rating, of which 18 reached the top rate (5), 28 courses rated (4), and 40 courses rated (3) (SETEC, 2009*b*). EPTNM students also tend to be above-average performers in ENEM, according to SETEC statements. Federal technical schools are sought after for their substantially higher quality compared with all other sub-systems of public secondary education. Finally, IDEB results of the federal network of upper-secondary education – and technical education is important in this network – are substantially higher in Brazil, and are on a par with the IDEB of private education (see Table 7.6).

Table 7.6 **IDEB (Index of development of basic and secondary education)**

| | Upper secondary | | | |
| | IDEB Observed | | Targets | |
	2005	2007	2007	2021
Total	3.4	3.5	3.4	5.2
Public	3.1	3.2	3.1	4.9
Federal[1]	**5.6**	**5.7**	5.6	7
State	3	3.2	3.1	4.9
Municipal	2.9	3.2	3	4.8
Private	**5.6**	**5.6**	5.6	7

Note (1): The federal network is one of the key providers of technical vocational education articulated with upper-secondary education, through the Federal Institutes of Education, Science and Technology created by Law of December 2008. Hence the high performance in IDEB in upper-secondary education by this network concern firstly technical-vocational education.

Source: INEP. Available from: *http://portalideb.inep.gov.br/* .

Issues

Federal and state policy

In the view of the review team, the main weakness of the system at state level is the absence of a comprehensive *state strategy for EPT, in particular EPTNM*, which would allow the states to benefit more effectively and efficiently from the strengths of the system. Despite many attempts to understand the role and place of EPTNM within the priorities of the State of Santa Catarina and of SED, or in defining common goals for all players – public and private, federal and state – the team was unable to discover how this is done. It may be that it relies on market mechanisms, which allocate resources to the economic sectors and the regions in the state that can make profitable use of them. It may also be that there is an implicit traditional distribution of roles among various sectors.

Available figures show clearly the concentration of all EPTNM resources/institutions in a very small number of municipalities; also, the number of municipalities with more than 1 000 students in EPTNM (all sub-systems) is very low. *Most of the state's territory has no local provision of technical education,* not even articulated with public regular secondary schools. Despite this limited territorial coverage, the State of Santa Catarina, as noted elsewhere in this Chapter, has expressed very little interest in the federal programme of distance learning for EPTNM (E-Tec): only one CEDUP covering two municipalities with two courses was selected in the first year of E-Tec (2008). Other states have benefited much more, with hundreds of projects serving hundreds of municipalities.

Relevance of EPTNM

Despite good absorption of graduates into employment, and good performance in ENEM and ENADE of respectively EPTNM and EPTNS students, the review team's analysis indicates that one aspect of the relevance of professional education in Brazil – *practical skills for employment* – is not considered as good as the *theoretical* knowledge that these courses provide.

The data of the survey on employment of graduates of federal EPTNM courses,[16] provide interesting evidence: while 87% of respondents rate the overall quality of courses "high or very high", and say the same about the quality of theoretical courses, a much lower proportion of respondents rate the quality of *practical* skill courses "high or very high" (only 66%, or more than 20% lower than for theoretical knowledge). In the southern region of Brazil, the share of respondents with a "high" appreciation for practical skills courses is higher (73%).

This information needs to be supplemented by other sources and by feedback from enterprises and organisations specialised in internships. Permanent improvement of EPTNM would benefit from structured feedback, and SED should take a more active role in monitoring and evaluating.

The school level – under SED jurisdiction

The review team's impressions are based on a limited number of visits to providers of EPTNM that operate under SED jurisdiction. These providers were CEDUPs only, as none of the visited EEB schools had EPTNM courses on offer. But based on these interviews with rural and urban CEDUPs in Santa Catarina, the team formed the following picture of the autonomy of these schools.

CEDUPs have the autonomy to plan the portfolio of their EPTNM courses, to prepare the required documentation for approval by the State Education Council, and to design the course curriculum. CEDUPs may submit applications to programmes of the federal government, following the institutional channels of state governance of education (for instance, in one CEDUP in Santa Catarina the SED approved one programme of distant learning in EPTNM – E-Tec).

However, this autonomy is limited by the governance regime of basic (*fundamental*) education in the state, including the funding system. In Santa Catarina, CEDUPs have substantial tasks and responsibilities, but relatively little autonomy to manage their financial resources. As other public schools, CEDUPs organise fund-raising events and initiatives (parties, exhibitions) to finance certain aspects of their work that are under-funded – for example, purchase of technical books and other learning materials.

The State Education Council (CEE) analyses, approves (or questions and rejects) the curricular proposals submitted by providers of EPTNM that are under state jurisdiction. Each technical course of secondary level that a CEDUP or an EEB wishes to open undergoes a process of approval at CEE. Submissions of curricular proposals for new courses and submissions for modifications of existing courses must follow specified requirements on the content of the proposal and its justification, as well on the recommended calendar for presentation of documents to CEE.

CEDUPs consider this process lengthy and complicated, as well as inflexible with regard to the different profiles of CEDUPs. Some CEDUPs have long-established courses in traditional sectors (such as agriculture) and train well defined user groups (for example: boys in small rural towns). Other CEDUPs are trying to grow and develop new courses in urban

contexts, where they serve a range of users (students and enterprises interested in the graduates), as well as facing competition from other providers. These CEDUPs, which have to experiment with new courses in new areas of study (for instance, real estate management, social services) in growing cities (such as Chapecó), need to be free to be creative, to experiment with new combinations of learning processes, and to improve their curricula based on the suggestions and recommendations they receive from enterprises and students.

Box 7.4 **CEDUP in Chapecó**

In Chapecó, the only existing CEDUP is managed by an enthusiastic and active team whose energy and work capacity greatly impressed the review team. They demonstrate not only strategic vision but also good management skills. They innovate, they recruit young motivated teachers, they discuss with students and motivate them to stay and complete their course, they interact with enterprises and seek their opinion on the learning outcomes of graduates, they organise fund-raising events to buy new technical books for the library, they decorate the school with large, well designed posters showing the course descriptions and information on professions, they permanently maintain a friendly teachers room providing drinks and cakes. They deserve more real support from SED than they presently receive.

This CEDUP has well-organised course documentation, and a secretariat with dynamic staff, so that it was easy for the review team to find answers to all technical questions about courses, teachers and students. The CEDUP management team, in turn, saw the OECD team's visit as a motivator for improvement, and a source of new ideas and suggestions.

Technological degrees/courses: progression issues and cases of non-recognition

An important issue for a future national qualifications framework would be the progression from one level to another, as well as the recognition of technological courses as "authentic" higher education degrees. Although enrolment and completion in EPTNS have been growing, there is evidence that some important public recruitment processes discriminate against holders of these degrees, at least in certain areas of study. In 2009 and 2010 the national oil company – Petrobras – rejected technological degree holders from early stages of the process, on the basis that Bachelor's degrees (in the same areas) would better suit the needs of the company.[17]

In addition, students and employers have unanswered questions about progression routes: for example from "technologue" to engineer; about the value of new technological courses within the framework of regulated professions; and about relationships with the job market.

Although the legal framework offers a number of possibilities for permeable pathways for career progression (such as the similar architecture of the Catalogues for technical and for post-secondary technological courses, and multi-level EPT within the same educational institution), and the LDB foresees that competences acquired in EPT and in employment contexts can be assessed, recognised and certified for purposes of continuation or conclusion of courses[18] – some mechanisms are yet to be developed and operationalised across the system and with EPT providers.[19]

The two Catalogues of qualifications (for EPTNM and for EPTNS) are good tools that offer a general overview of the professional profile and workload (contact hours). Their common logic and structure of technological groups represent an initial premise for permeability and upward learning and professional development for citizens. But a system based on learning outcomes and learning credits for recognition of prior learning/competences is yet to be developed. This is important to motivate continuing education and training, accumulation and transfer of credits, and for transparency and recognition of partial qualifications that many Brazilian citizens do possess.

Statistics and data

The statistical sources consulted by the review team for this chapter include federal, state, municipal and private ones, and although they have provided substantial information for this report, one can highlight some weaknesses, in particular inconsistencies between different types of sources.

For example: SISTEC[20] information on the nomenclature and types of EPTNM courses on offer differs from the information received from the SED of Santa Catarina. Similarly, issues of data consistency can be *implied* when matching: *(i)* data on enrolment in EPTNM by municipality provided by INEP (INEP, 2010) and *(ii)* information on EPTNM providers of the online MEC information system – SISTEC. The latter provides detailed information by municipality on the TVET providers (public and private) and the courses they are authorised to offer. Juxtaposing the two types of information, one can question both the reliability of SISTEC information on providers/courses and the enrolment figures in certain municipalities, which seem not to be feasible given the information on providers/courses as reported by SISTEC.

This observation confirms other remarks of this chapter: in general terms the systems and institutions are established and are equipped with resources. But there are problems linked with the effectiveness and quality in the use of these systems and resources. This typology of problem requires, from decision makers at all levels (state, municipal and certainly also federal, measures linked with capacity building, staff training, staff mentoring, monitoring and perhaps also better participation of the civil society (users, parents, enterprises) in some of the monitoring activities.

Recommendations

The set of recommendations proposed below are led by the following contextual factors:

- The analysis of strengths and weaknesses of the EPT/EPTNM system in Santa Catarina to respond to objectives of relevance for labour market needs, social inclusion challenges of the state and overall governance of a complex system that involves multiple actors and interests.

- The interest of the SED of Santa Catarina to lead and promote further expansion and quality development of EPTNM under SED jurisdiction.

- The need for co-operation and sharing of experience and knowledge by training providers of the various sub-systems and networks.

- Trends in VET policy internationally, in particular in the European Union, the recognition that VET should provide skills for employment but also for continuous personal development, for creative engagement in a greener and smarter economy and for active citizenship. These aims require from VET systems new objective setting and new methods, coupled with openness of all organisations involved to change and co-operation.

Strategic and policy related

1. Promote a common Santa Catarina policy and Santa Catarina goals (strategy) for development of EPT at all levels, co-ordinating and articulating all existing initiatives and programmes, irrespective of their origin or jurisdiction (federal, state, private).

Santa Catarina faces complex challenges to maintain its leading position in Brazil in terms of social and economic development, and to ensure the sustainability of its skills development agenda.

SED is well aware of the strategic importance of a more consistent policy to strengthen EPTNM within the state network of EBBs, as confirmed by the State Secretary of Education during the information meeting organised at the occasion of the launch of the OECD site visits in October 2009. According to this statement, over half of all EBBs of the state network should be ready to offer high quality and relevant EPTNM courses within the parameters of integration with general education stipulated by the Law.

Beyond the framework of EPTNM offered by EBBs, there is room to develop EPTNM for youth (as initial professional education and training) and for adults (as continuing training and further professional development). Strategically, the most important recommendations for SED are:

- Upgrade the relative importance of EPT, in particular EPTNM, in its overall state education programme. This means, firstly, renewed attention to the state system of EPT under direct jurisdiction of SED (in regular secondary schools, in state higher education institutions), through new initiatives, creative projects and proper funding.

- Engage more closely with the overall state government in relation to EPT as a whole. SED should take the lead in this, without coming into conflict with the legal education framework and division of responsibilities defined by law. Leadership will increase effectiveness through structured collaboration among all key players; for example through:

  − A "Santa Catarina EPT Forum" that calls for exchanges among federal, state, municipal and private EPT institutions, with a wider or narrower coverage, depending on the readiness of the participants to debate their common issues and objectives. The direct purpose of such an initiative is primarily for cross-fertilisation and sharing of good practice.

  − "Santa Catarina EPT Panorama": an interactive information platform that covers all levels, types and approaches of EPT; or covers only EPTNM if this is judged more relevant and also easier to organise.

  − Adoption of a (complementary) programme on development of EPT in Santa Catarina, which incorporates federal, state, municipal and private players and efforts around shared objectives.

  − Support for a public-private "Santa Catarina EPT Council" with a consultative role and with the function to monitor EPT performance for economic and social development.

2. Recommendations on strengthening the role and place of EPTNM in the SED Santa Catarina portfolio.

Compared with neighbouring Paraná and other states, SED Santa Catarina dedicates less attention to the development and renewal of the EPTNM system under its jurisdiction. This impression is confirmed by SED's limited number of relevant initiatives to address the needs of EPTNM – both in the knowledge basis of the system (for example: course diversification, new learning tools and materials, analytical papers and research), and in infrastructure. The effort of SED Santa Catarina appears to lack the energy that could be expected in such a dynamic state. The review team was surprised by the total lack of support in terms of statistical data and research that could have shed light on the panorama of state EPTNM; and indirectly on the leadership of SED to plan and act on the basis of well grounded evidence. The following recommendations are linked with Recommendation 1 above:

- Strengthen the institutional, human and technical capacity of the section dealing with EPTNM in the Directorate of Basic and Professional Education at SED.

- Improve the analysis and use of data and information collected through institutional census and surveys. SED should produce (commission) analytical reports on the situation and trends. The subjects for focused analysis can change, to meet new demands of the education and economic communities, of the municipalities and other players. Including the federal level.

- Introduce a system of indicators to measure the performance of the section that deals with EPTNM, measuring its contribution to effectiveness of EPTNM policies and programmes in the state.

- Ensure that the state benefits from federal EPTNM programmes, which are varied in profile and can contribute to qualitative development and expansion of state EPTNM. Santa Catarina's participation in certain federal EPTNM programmes is unsatisfactory: in the programme E-Tec, for example, Santa Catarina has only one CEDUP covering two municipalities, which compares poorly to the much more active participation of almost all other states.[21]

3. Recommendation on funding.

All discussion partners in meetings held during the review team's field visits were unanimous about one severe gap: the lack of a permanent budget line / programme to sustain state EPTNM.

There is a proposal on the establishment of a National Fund for Enhancing Professional and Technological Education (FUNDEP, *Fundo Nacional de Desenvolvimento da Educação Profissional e Tecnológica*) under discussion. These discussions began in 2009, but the MEC website offers only sporadic and limited information, and currently the team is not aware of significant progress.

It is expected that FUNDEP will be built on a small percentage (approximately 1%) of the revenues of two main taxes, and thus could gather a substantial amount to finance EPTNM.

- The State of Santa Catarina is eager to have an institutionalised and sustained solution for the funding of EPTNM. But a FUNDEP-type solution will benefit the state EPTNM *only if* the state itself has a clear vision of its objectives – short, medium and long term – for the system.

4. Recommendations on policy monitoring and evaluation.

- At state level, as proposed above, SED needs to initiate and lead a culture of proper monitoring of EPT policies, programmes and practice in the territory of the state. This requires a sector-wide overview, as well as negotiation and discussion. It is, however, a strategic matter. SED of Santa Catarina must be able to use sound evidence for decisions and choices, and this cannot be done without regular studies and data analysis.

- At local level, evaluation of course performance and relevance is important and should become a regular practise in IFETs and CEDUPs. Evaluation cannot rely only on self-evaluation that carries the risk of being defensive; hence the involvement in evaluation processes of successful graduates as well as of dropout students, of APLs and interested enterprises, needs to be promoted, and technical assistance provided to ensure comparability of results and reliability of methods.

5. Recommendations on qualifications system.

The legal basis of the qualifications system in Brazil has been modernised and a number of interesting elements can form the skeleton for future needed policy developments. While the inward (domestic) orientation of this policy area is essential, its future developments could benefit from a

sound exchange with the international debate from one side; and take into consideration the unavoidable globalisation of the economy, labour migration, and need for recognition of qualifications.

Tools and policies for transparency and recognition of qualifications has acquired high priority in the OECD area. Since the topic has high potential as a "reform-instigating" factor in the education and training systems of EU countries, it could be important to dedicate it a new effort. Sharing of experience and enhancement of policy dialogue with the European Union on this topic and on the new related policies in development in the European Union (learning outcomes, national and sector frameworks, quality assurance linked with common reference frameworks, recognition of prior learning, tools for portability and mobility) could be beneficial.

The transition from a technical course to a technological undergraduate course of similar designation could be managed in a more efficient manner if a system of recognition of learning credits were available. However, this recognition of prior learning seems far from viability, since the Brazilian qualifications are oriented to contact hours (not to total student workload and even less to learning outcomes) and the outcome levels are pegged to the concepts of secondary education (EPTNM) versus post-secondary education (ETPNS).

Although each technological group and each course (qualification) described in the Catalogues contain a definition of the outcome profile (functions, responsibilities), this element is rather laconic. The transition to a qualifications system with a sound grounding on learning outcomes needs to be put on the agenda of policy development in Brazilian EPT. The implementation of this recommendation will require substantial new attention and work on such essential items as:

a) Skills needs analysis and forecasting, in close co-operation with other policy institutions (employment, namely): flexible approaches that provide general – Santa Catarina-wide – information and data; but also more concretely at level of the key economic sectors.

b) Consistent interaction and co-operation of policy institutions responsible for EPT (SED Santa Catarina) and for employment and economic development, on skills needs analyses and forecasting. This co-operation is desirable to reach a sound transfer of the key messages from such a forecasting system into the education and training system at all levels, in particular, the EPT system.

Technical and conceptual recommendations

1. Recommendations on dissemination of user-friendly information on EPT in Santa Catarina.

This recommendation is linked with Recommendation 1 above:

- Update the relevant legislative-regulatory framework, and make it easily accessible to the public with links to the original texts/sources.

- Update the panorama of EPT in Santa Catarina, with detailed information on courses and providers, aimed at assisting students, parents, enterprises, communities and all EPT providers in the making informed choices.

- Update information on all available programmes and projects, of various initiatives and source of funding, with links to the source and promoter.

- Create an on-line forum for all players of EPT as a non-bureaucratic way to encourage exchanges (technical, good practice, learning and teaching practice, community development) among the various systems (public and private, various types of private providers).

2. Recommendations on career guidance and career planning.

To the surprise of the review team, the function of career guidance seems to be absent from the otherwise thoughtful and active national public EPTNM policy. References to *career guidance/planning* in the various policy and programme documents are difficult to find. During the field mission, the team did not receive a convincing explanation of this apparent lack of career/vocational guidance services/tools. Some initiatives are, however, worth mentioning: a number of IFETs organise *open door* days for new students, as does SENAI, during which they provide information about courses, laboratories and technology. But these initiatives cover only a small part of career guidance and planning services, and they are totally supply-driven.

The following steps should be taken:

- SED should organise a state-wide event/debate on career guidance and planning for the various players of the EPT system, taking into account the characteristics of the various user groups. This debate could include discussions of the latest developments worldwide in EPT. In the European

Union, for example, career guidance and planning is recognised as an indispensable corollary of life-long learning, and an effective and democratic way to link education of all levels with labour markets and local and regional governance structures. In Santa Catarina, SED could try to link such an initiative with the activity of local productive partnerships (APL).

- There are interesting tools of the type "World of Professions", organised in the form of games, videos, and web-format, already developed and being tested in Portuguese-speaking countries, which could be used under the leadership of SED as case-studies for critical analysis leading to various Santa Catarina's own alternative proposals. Such tools can be used/adapted in curricular and extra-curricular activities by lower and upper-secondary education schools; as well as – in more specific formats – in EPTNM and EPTNS providers.

- The existing National Catalogues of Technical Courses and Technological Courses at undergraduate and postgraduate levels offer a good basis for information, but they are more geared towards providers of training than to students. To better serve as guidance for future students and for those who intend to change their area of study, these Catalogues need to be reorganised, and installed in web platforms that allow search by various key words of interest for the student community. The current formats of the two Catalogues are not interactive at all, and are even hard to locate in the web site of MEC. While MEC/SETEC are responsible for the Catalogues and their improvement, SED of Santa Catarina can, at least, insert links to the Catalogues in its own website.

- The website of SED of Santa Catarina should open a user-friendly and visible space focused on EPTNM, or a separate space as suggested in Recommendation 1.b) above.

3. Recommendations on APL

Arranjos produtivos locais or "local productive partnerships" (APL) are an interesting approach to partnerships. In Europe and other parts of the world, the subject of "*social partnership in technical vocational education*" occupies debates, researches and policies; and is a pillar recognised throughout Europe. However, the review team was only informed of the existence of APLs *after* the field mission was completed. During the team's few visits to IFETs and CEDUPs, only one IFET mentioned – very briefly and in passing – some co-ordination with APLs in setting up new courses.

The team recommends the following:

- Given the variety of existing APLs in Santa Catarina it is important to assess their real effectiveness for creating better links between EPT and the local economies and enterprises. Good practice, interesting projects, innovative approaches, cases of public-private partnerships are certainly available, but in reality very little is known or published.

- More information on the activities and strategy of the APLs in relation to EPTNM is needed, for example through the public information resources of MEC and of SED.

4. Recommendations on more flexible and innovative EPTNM courses that are more responsive to technological changes and feed-back from enterprises.

More flexible approval procedures should be introduced by SED and CEE, for courses that have been tested and evaluated. This includes allowing room for adaptation of curricula and content of the various disciplines – to different demands/profiles of users – at the discretion of the CEDUPs, which in any case consult the local education authority.

5. Recommendations on sharing of learning resources.

This recommendation draws attention to enhancing co-operation between training institutions belonging to different networks, and assumes that these recognise the potential and mutual benefits of such exchanges and knowledge sharing. For this purpose the role of SED is one of facilitator of co-operation through a varied spectrum of incentives and initiatives that take into consideration the interests of all involved training institutions and networks.

- SENAI (and other players of the "*S System")* need to be encouraged to share learning resources (books, texts, case studies, videos) and methods with the less developed players, mainly the CEDUPs and the EEBs interested in improving their technical and pedagogic potential for EPTNM. SENAI has a rich experience and many years of exposure to international practice; therefore, SED of Santa Catarina should encourage this cross-fertilisation in a structured manner, through *(a)* mentoring of newer state EPTNM schools, *(b)* sharing of libraries and teaching resources, *(c)* teacher training in SENAI courses.

- Obviously, this mentoring role should also be played by the more experienced IFETs – even more so, as IFETs are public institutions.

- A *portal of the EPTNM Teacher* could be supported/initiated by SED of Santa Catarina, as a central E-library, forum and capacity building platform for all EPTNM teachers. This E-library should also welcome resources from other countries (Latin America, USA and Europe).

6. Recommendations on teachers' development.

These recommendations complement those already expressed in Chapter 8, on Teachers, in this review.

- SED of Santa Catarina must devote renewed attention to the training and development needs of teachers of specific professional/technical disciplines.

- One of the functions of the new reinforced network of IFETs is teacher training in *licenciatura* degree courses in all areas of science. This is essential. But nowhere did the review team find a clear policy dealing with training (pre-service and in-service) of teachers for specific professional areas/competences. IFETs need to be involved, but the "*S System*" could also provide this training. A SED of Santa Catarina policy is needed, ensuring the benefits of partnerships and sharing of experience and knowledge among the federal, "*S System*" and state systems.

- SED of Santa Catarina needs to study good practice in other states on this matter, and either join possibly existing networks of teacher training for professional areas, or organise its own network on the basis of partnership.

7. Exposure to international practice, in particular of European countries, and special attention to policy initiatives co-ordinated by the European Commission.

- A number of issues under discussion in Brazilian EPT could benefit from a structured exposure to practice and policies in Europe. Developments in such policy areas as: recognition and certification of prior learning; a credit system for EPT; and qualifications framework are of particular importance.

- SED of Santa Catarina needs to engage in bilateral exchanges with peers in other countries, and encourage its EPTNM institutions to become members of existing international EPTNM associations.

The European Commission, within its competences and building on the co-operation promoted by the Copenhagen process, adopted in June 2010 a Communication (European Commission, 2010) that encourages further modernisation of VET, through a new impetus for European co-operation on VET. The European Commission draws attention to the multiple roles of VET for individuals and societies, blending the contribution to economic competitiveness with social inclusion (inclusive VET for inclusive growth).

The plans adopted by the European Commission outline several possible ways to give vocational education and training a new impetus. They include:

- Ensuring access to training and qualifications is flexible and open at all stages of life.

- Promoting mobility facilitating gaining experience abroad, or in a different sector of the economy.

- Ensuring the highest possible quality of education and training.

- Providing more opportunities for disadvantaged groups such as school drop-outs, the low-skilled and unemployed, people with migrant backgrounds and the disabled.

- Nurturing creative, innovative and entrepreneurial thinking in students.

This new impetus for VET needs to be based on modern learning and qualification paths that allow and encourage lifelong educational development, proper integration of all key competences with the technical and professionally relevant skills in VET curricula and an improved image of VET as a sound learning choice for youth. VET shall become an attractive learning option with high relevance to labour market needs and pathways to higher education.

As highlighted in the Europe 2020 Strategy, partnerships between stakeholders in VET and in particularly the involvement of social partners in the design, organisation, delivery and financing of VET are a prerequisite to efficiency and relevance to labour market needs. In many countries these partnerships take the form of skills councils, which are involved in monitoring labour markets, development of skills profiles, curricula, certification, etc. The pilot European sector councils on jobs and skills should spread information and best practices on trends in this area.

General recommendation

The rich and interesting portal of MEC (*www.mec.gov.br*) needs to have a permanently visible and accessible space dedicated to SETEC and to all matters of EPT in Brazil.

Currently MEC has a visible space for "hot" subjects and programmes, and SETEC/EPTNM was amongst those in the last quarter 2009. Currently new users of the portal may not find the entry point to SETEC or to EPT, since other thematic priorities occupy the "Highlights" zone. Access to the Catalogues of Courses, to SETEC actions and to legislation is possible only through the "PDE" space under "State" and "Municipal". This is not a user-friendly solution, since it is unlikely that young people and students are interested in and aware of political and policy themes, or have the patience and time to search for practical information tools within a political programme. *EPTNM needs to be popularised, starting from its information and guidance tools and forms.*

Notes

1. Within the legal requirements for authorisation and evaluation of higher education courses.

2. EEBs and CEDUPs cannot offer EPTNS.

3. "S" system refers to a group of training systems including SENAI, SENAC, SESI, SESC and SENAR, *i.e.* public non-governmental organisations financed by payroll taxes.

4. Some data of the period confirm that many entrants in the top level São Paulo University were graduates from federal technical schools.

5. After legislative changes in 1994/1998, the federal government had downgraded its commitment to EPTNM, but in 2003-2009 it set up two large programmes to modernise and expand provision of public (free) quality technical-vocational education: *(i)* 2003-2010: BRL 1.1 billion for substantial expansion of the network of Federal Institutes of Education Science and Technology in all states; *(ii)* in 2008-2011: BRL 900 million to support the Units of the federal country upgrading their public networks of TVET providers.

6. In Brazil the term "qualification" is commonly used for lower level skills ("qualification courses"). In this section, it is used in line with the international definition.

7. http://catalogonct.mec.gov.br/introducao.php.

8. http://catalogo.mec.gov.br/.

9. *Parecer* CNE/CEB approved on November 2008, 12 June 2008, published by MEC, Annex to Law No. 11.892 of 29 December 2008 establishing the Federal Network of Professional Scientific and Technological Education.

10. The Catalogue of EPTNM has two additional technological groups: military and educational support.

11. www.planalto.gov.br/ccivil_03/_Ato2007-2010/2007/Decreto/D6302.htm.

12. http://etecbrasil.mec.gov.br/.

13. According to information received from the SED as this review was being finalised, it is important to note that this decrease in enrolment is the result of the SED initiative aiming to modify the state education system as established by articles 10 and 11 of the LDB No. 9.394/1996: *a)* states should ensure *fundamental* education and provide secondary education as a priority; and *b)* municipalities should provide *fundamental* education as a priority. This initiative resulted in a progressive process within the state education system characterised by both the decrease in enrolment for *fundamental* education (due to the municipalisation) and the increase in enrolment for secondary education.

14. IDEB: the Index of Development of Basic Education was created in 2007 and is a pioneer initiative that combines two equally important concepts for quality of education: student flows and student performance.

15. Students' National Performance Evaluation (ENADE, *Exame Nacional de Desempenho de Estudantes*) assesses curricular knowledge, skills and competences of entrants and graduates, in courses of technology, *bacharelado* and *licenciatura*. Different areas of study are assessed yearly, reports on the performance of the involved universities per area of study published by INEP. In November 2009 over 1.1 million students (60% were graduates) performed ENADE, which assessed 15 courses, including some of those with larger enrolment (management, accounting, law, economics, social communication, international relations).

16. *Source*: National Tracer Study of Graduates from EPTNM of Federal Network, Brasília, 2009.

17. www.concursos2010.com/2008/06/15/concursos-recusam-vagas-para-tecnologos/ (accessed 12 February 2010).

18. LDB amended by Law No. 11.741, Art. 41.

19. The existing *Rede Certic* has a different purpose, as it addresses low-skilled workers seeking recognition of their skills acquired throughout life. While this is a relevant and important objective, it differs from the issue of recognition of partial technical competences of higher level, through a system of learning credits or alternative system.

20. SISTEC (*Sistema Nacional de Informações da Educação Profissional e Tecnológica*, National Information System for Professional and Technological Education) is the online MEC information system on providers of EPTNM, with detailed information on all registered providers by municipality, and the respective registered technical EPTNM courses.

21. However, the review team did not have an opportunity to verify with SED the current status of E-Tec participation, since this information was obtained from MEC web resources.

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Chapter 8. The Teaching Career
and Teacher Education

In the drive of Santa Catarina authorities for improved quality in education, the teaching career needs to receive priority attention. The review team discusses the profile of the teaching profession in Santa Catarina, its career structure and salary framework, the conditions of employment (including classroom environments, work practices, teacher evaluation), and looks into the quality of school leadership, teacher pre- and in-service training and professional development. The chapter concludes with recommendations for reforms to enhance the teaching career and education, such as elaborating a position paper on the teaching profession, improving its image, introducing probation periods, and reducing the number of temporary teachers.

Teachers within the policy context

The aspirations for educational reform and development, and the policy initiatives to realise them by the federal government and the SED of Santa Catarina are admirable. However, it must be borne in mind that they emerge from a historical background of great inadequacy of educational provision. Thus, the education system is best viewed as in a process of transition. Major education reform in any country is a complex, time-consuming and costly undertaking. There are no "quick fixes", and it will take time and well-informed and sustained policy measures to achieve the aspirations. Within that reform programme a policy on the teaching career and teacher education needs special attention.

A key problem facing a rapid expansion of schooling is the availability of a quality teaching force to deliver the desired form of education within the classrooms, on a day-to-day basis. Teachers need to form a central dimension of any successful attempt at educational reform. They are the key activists, the crucial implementers of the planned curricular, pedagogic and assessment reforms. While it is an achievement to ensure that sufficient

personnel are available to fill the greatly expanded teaching positions being opened up, it is even more crucial that such teachers have the motivation, training, capacity and capability to make the pupils' time in school meaningful, beneficial and worthwhile. In Brazil generally, and in Santa Catarina in particular, there is significant disappointment that the inputs being made to the education system are not being reflected in the outputs, as measured by pupil assessment on examinations and tests. There is concern that the quality of schooling as measured by national, regional or international tests is very much less than is desired or expected. While there is more to educational achievement and values than are measured by such tests, nevertheless, the tests results are indicators of inadequacies in the quality of education. Unless addressed, this would leave Brazil very disadvantaged within a globalised economy.

In the drive for improved quality in education, the teaching career needs to get priority attention. It is not an "also ran" – or tangential piece of the educational policy process – it needs to be at its core. In the long run, quality cannot be achieved without a teaching force that is intelligent, caring, imaginative, well trained, well motivated and operating in working conditions that allow teachers reasonable opportunities to exercise their professional skills to good effect. Associated checks and balances are also needed, but there is no substitute for the good teacher if one wants pupils to demonstrate quality outcomes. In the course of its investigations the OECD review team came to the conclusion that there was a range of issues affecting the career of teaching which required attention if the teaching force is to be positioned to do the job that is required of it.

In Brazil, as in other countries, the role envisaged for the teacher has changed. Among the characteristics now required are those of the reflective, self-reliant and innovative practitioner. In 2005, the OECD published a major comparative study of the teaching career, titled *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (OECD, 2005*)*. Summarising the challenges which faced teachers, the report concluded:

> The demands on schools and teachers are becoming more complex. Society now expects schools to deal effectively with different languages and student backgrounds, to be sensitive to culture and gender issues, to promote tolerance and social cohesion, to respond effectively to disadvantaged students and students with learning or behavioural problems, to use new technologies, and to keep pace with rapidly developing fields of knowledge and approaches to student assessment. Teachers need to be capable of preparing students for a society and an economy in which they will be expected to be self-directed learners, able and motivated to keep learning over a lifetime. (OECD, 2005, p. 7).

There is a strong resonance between the objectives of schooling policy in Santa Catarina and such a listing of challenges. The OECD report also stresses, "as the most significant resource in schools, teachers are central to school improvement efforts" (OECD, 2005, p. 7).

To ensure that the resource represented by teachers is fully utilised in Santa Catarina there is a need for a comprehensive approach to policy on the teaching career. This involves elements such as the image of the teaching career, recruitment patterns, salaries, career structure, teacher deployment, conditions of work, teacher evaluation, patterns of initial teacher education, continuing professional development of teachers, appointment of school leaders, and modes of dealing with teachers experiencing serious, professional difficulties.

There is an interconnectedness between these features of the career. The amelioration of existing problems would benefit from a co-ordinated, rather than a piece-meal policy approach. It is also the case that teachers need to take responsibility for the satisfactory discharge of their professional responsibilities, in so far as it is in their power. Herein lie the well-springs of professional morale and self-esteem, laying the foundations for public trust. There is no magic wand which can address all the issues involved. What can be done, and what it is imperative to do if Santa Catarina is to achieve its educational policy goals, is that a framework on teaching policy is agreed, a commitment is made to the resources necessary for its implementation, and a sustained and consistent policy approach is maintained over the coming years. Such a policy road-map provides guidelines for the way ahead, and facilitates monitoring of progress along the way. The investment of time and effort will lead to valuable dividends for schooling into the future.

Current profile of the teaching career

Throughout its enquiries, in all regions of Santa Catarina, the review team encountered the view that the image of teaching as a career was poor, and in decline. Repeatedly, the team's interlocutors, whether teachers or others, testified that teaching was not well regarded as a career, that it was unattractive to bright young school leavers, that it was not valued by the public. Most teachers considered that they were poorly paid, that the career structure was unsatisfactory and that their work was under-estimated. Tellingly, when teachers were asked would they encourage their sons or daughters to apply for a career in teaching most replied in the negative. Indeed, one teacher remarked, "Not only would I not want my son or daughter to become a teacher, I would not want my son-in-law or daughter-in-law to become a teacher either!" In 2009, a major national study on attitudes to the teaching career was published, which included perceptions of

out-going secondary school students of teaching. The students expressed negative views of the career, associating the profession with "suffering", "working too much", "not being paid adequately", and "no social recognition". A good number of students stated explicitly that they were negatively influenced about choosing a teaching profession by their own teachers who, on a daily basis, transmit such negative perspectives about the profession in their interaction with students (*Fundação Victor Civita*, 2009 pp. 34-41). The team encountered experienced teachers who had strong personal commitment to the value and importance of the teacher's role in society and who were pained, in coming to such conclusions, about the lack of attractiveness of the job.

The report of the perceptions of teachers on their self-efficacy and job satisfaction carried out by the OECD Teaching and Learning International Survey (TALIS) study in Brazil (2008) also indicated that they were below the TALIS average (OECD, TALIS, 2008, Table 4.15, p. 112). While the TALIS study focused on teachers in the junior cycle of secondary schools, the findings can be indicative for other teachers. The lack of attractiveness is also borne out by the fact that many places on teacher education courses are left unfilled, and many of those who take up places have standards of entry at the lower end of the spectrum of general higher education entry standards. Many enter teacher education *faute de mieux*, as a consequence of not gaining entry to more prestigious courses.

The job of teachers becomes more demanding. In some schools, in certain districts, the work can be very stressful with changing social mores and a decline of parental control. Instances of violence, bullying and aggressive behaviour are reported as giving rise to teacher stress-related illnesses. Some teachers complain of the lack of parental supervision or appreciation for their efforts. Even in more normal teaching situations some teachers have formed the impression that they are underpaid, under-appreciated and over-worked. Even if it could be shown that this was not the objective situation, the fact that the teachers think in this way is itself a problem. As one teacher remarked, "There is a need to rescue the self-esteem of teachers." Sometimes, through practices such as unauthorised absenteeism, teachers themselves contribute to the lack of public regard. But the question arises as to whether the absenteeism is due to irresponsibility or to other causes? Normally, when teachers have a sense of job satisfaction and good morale in school systems, absenteeism does not present itself as a serious problem. Furthermore, teachers consider that reflections on their work and image in the public media do nothing to enhance their esteem among the public.

Whatever the causes, it is clear that teaching as a career currently suffers from an image problem. This needs to be addressed seriously. Informed efforts need to be made, through a variety of initiatives, to project the profile of the teaching career as one of great value and importance to the society. This will have a major influence on the formation and nurturing of Santa Catarina's most prized asset, its younger generations.

Career structure and salary framework

The teaching career

The fact that the four types of school system – federal, state, municipal and privately-owned-operate as differentiated and separate entities make it difficult to give a general account of the career structure for teachers. Variations exist between all, and, most notably, between the private schools and the others, which can be categorised as public schools. Perhaps the best way to establish an overview is to delineate the provisions within the state school system, and draw attention to some variations in the other schemes. A Teachers Statute dates from the 1986, and was devised for a very different educational context than now exists. Although this statute is currently viewed as having rigidities that impede the flexibilities required in a modern, mass-schooling system, the teacher union opposes its reform.

The current state teaching force comprises 41 369 personnel. These are categorised as 19 859 permanent class teachers, 16 549 temporary teachers and 4 962 in school administration positions. The great majority of the permanent teachers, 14 282, have a graduate specialisation, with a further 616 holding a Master's degree, and 32 having a Doctorate. A remarkable feature of the teaching force is the number of temporary teachers employed in the system, amounting to about 45% of the classroom teachers. The great majority of the teaching force is female. Interestingly, the length of teaching experience of the existing teaching force is short by international standards. The TALIS report indicates that only 19% of teachers in Brazil have been teaching for 20 years or more, whereas the average for the TALIS countries was 36% (OECD, TALIS, 2008, Table 2.3, p. 42).

Teachers are now appointed on the basis of a public "*concurso*" based on performance at a public competitive examination (*Country Background Report,* 2009, p. 45). Teachers undergo a three-year probationary period. Probation is adjudicated by an internal school council, which can include a parental representative. In theory, the probationary process can include classroom observation, but it was not clear to the review team how much this happened in practice. Probation can be refused, but no statistics on such refusals were available to the team. Once a teacher has got probation and a

teaching position it is very difficult to have the teacher removed from the service. If employed in a state school it is not possible to redeploy the teacher to another school in the context of such issues as a decline in pupil numbers in one school and an increase in enrolment in other state schools. This rigidity means that there are instances of teachers being surplus to requirements in a school, who continue to be paid even though they may have little meaningful teaching to do.

Salary framework

Teachers employed in municipal schools are subject to redeployment to other schools when this is the appropriate action. Teachers employed in private schools are subject to dismissal, according to the needs of the employer. Rates of pay are also variable in private schools, as negotiated by the employer and the teacher. At times, the salary may be lower than in a state school, but the working conditions may be more favourable.

The salary for teachers in state schools operates on both a horizontal and a vertical framework. The following table sets out the pattern.

Table 8.1 **Monthly salary framework for teachers in state schools (BRL)**

Public teaching profession (state) – Effective teachers – Base table								
Qualification	Level	References						
		A (01)	B (02)	C (03)	D (04)	E (05)	F (06)	G (07)
Magistério 2nd degree	1	534.46	549.16	564.26	579.78	595.72	612.10	628.94
	2	579.78	595.72	612.10	628.94	646.23	664.00	682.26
	3	628.94	646.23	664.00	682.26	701.03	720.30	740.11
Graduation 1st degree[1]	4	682.26	701.03	720.30	740.11	760.46	781.38	802.87
	5	740.11	760.46	781.38	802.87	824.94	847.63	870.94
	6	802.87	824.94	847.63	870.94	894.89	919.50	944.79
Graduation Full	7	870.94	894.89	919.50	944.79	970.77	997.46	1024.89
	8	944.79	970.77	997.46	1 024.89	1 053.08	1 082.04	1 111.79
	9	1 024.89	1 053.08	1 082.04	1 111.79	1 142.37	1 173.78	1 206.06
Post-Graduation, Master's PhD	10	1 111.79	1 142.37	1 173.78	1 206.06	1 239.23	1 273.31	1 308.32
	11	1 206.06	1 239.23	1 273.31	1 308.32	1 344.30	1 381.27	1 419.26
	12	1 308.32	1 344.30	1 381.27	1 419.26	1 458.29	1 498.39	1 539.60

Note (1): No more recruitment processes for teachers with 1st degree (short) graduation. The reference levels are indicated in the table since these are active teachers about to leave service (retirement) as well as teachers already retired.

Source: Wage Table = August 2009.

Plan of functions and wages – complementary Law 1139/92

The horizontal progression (A-G) is based on seniority, engagement with in-service education, exercise of responsibility, attendance etc. The vertical progression is based on academic qualifications. *Licenctiatura Plena* (full licence) is the key qualification and is held by the great majority of teachers. If a teacher obtains further qualifications such as a graduate specialism they achieve level 10, a Master's degree is level 11, while teachers with a Doctoral degree are allocated level 12. Level 1 to 9 relate to the majority of teachers. The scale for a grade A teacher goes from BRL 534.46, at first level to BRL 1 024.89 at level 9. If such a teacher is at Grade G, the range is from 628.94 to 1 206.89. Thus, the salary for a teacher, with a *licentiatura plena* at his/her maximum is about BRL 2 400, if the teacher works two shifts a day.

It is striking that the salary increases between grade A to G are very small, as are the steps on the incremental scale from year 1 to 9. Neither are the rewards for postgraduate qualifications generous. For instance, a teacher at his/her maximum with a doctoral degree only earns BRL 233 more than a teacher with a full licence, at his/her maximum. Yet, competition for entry to postgraduate courses can be highly competitive and the fees costly for a teacher.

Teachers may benefit from other small bonuses, but these can be discretionary and are not counted for pension purposes. An unusual bonus by international standards is one received by teachers who attend regularly and agree to stay with class room teaching, as there is a considerable desire to get away from the chalk-face into some form of administrative activity (*Country Background Report*, 2009, p. 46).

The salary is a structured one available for all eligible teachers. There is no scheme of performance incentives in Santa Catarina for special effort or achievement by particular teachers. There is a shortage of teachers in key subject areas such as English, chemistry, physics and mathematics, but no extra incentives are deployed to entice appropriately qualified graduates in these subject areas to engage in teaching. While precise, statistical data are not available, it is accepted by the educational authorities that a good deal of teaching takes place by teachers who do not have degrees in the subject areas in question.

Benefits

A significant professional provision for teachers in federal, state and municipal schools is that after five years of service teachers are allowed three months of sabbatical leave. There are some conditions regarding the

time of year at which this leave can be taken, and no more than 10% of teachers, in any one school, can avail of this provision simultaneously. This is a provision which, if used well, has great potential for the continuing professional development of teachers, and could pre-empt instances of teacher burn-out.

Teachers may retire on pension at early ages, compared with many other countries. If men have 30 years of service and women 25 years they can retire at age 50, with a majority retiring at age 55. The retirement age can be earlier if all the teachers' input was in classroom teaching. However, pension rates are not high and many teachers need to engage in further salary-earning activities. Some teachers who retire from state schools go on to teach on a part-time basis in private schools.

The Teachers' Union

While the review team found most teachers with whom they discussed teachers' salary and conditions were critical of these, the teachers did not look to the Teachers' Union to remedy the situation. At present, the team was informed, there are about 8 000 cases before the courts taken by teachers in relation to grievances. This does not reflect a healthy situation, but it appears that the Teachers' Union is not in a position to resolve problems. Fewer than half the teachers are members of the union. Both teachers and other stakeholders informed the team that the Teachers' Union had not progressed with the times, and adopted ideologically adversarial attitudes rather than a social partnership approach in its activities.

Despite efforts made by the team to meet and discuss issues with the Teachers' Union, only a limited interview was achieved. The team regrets this, as potentially, the Teachers' Union has an important role to play in the progress of educational reforms. Industrial relations are just one dimension of the role of teacher unions in many countries, but in Santa Catarina, at present, there seems to be a lack of confidence regarding the role and function of the Teachers' Union. It would be very much in the interest of the Teachers' Union to adopt a progressively professional dimension to its activities, as well as the industrial relations aspect, in addressing the issues that face the teaching career in Santa Catarina.

Teacher data bank

The fragmented nature of the schooling system in Santa Catarina and the varied patterns of teacher employment conditions are major factors impeding a coherent planning policy for the teaching career. Constructive, forward looking policy needs to be informed by a comprehensive data bank

of all relevant features of the existing teaching force. This would include comprehensive data on teacher numbers, training, qualifications, age, experience, probation patterns, engagement with continuing professional development, evaluation of teacher performance, patterns of retirement, and so on. It would be highly desirable if a mechanism could be devised where such data on teachers could be brought together for all educational sectors in the State of Santa Catarina. Such readily accessible data would be of major value for routine, as well as for macro planning.

Conditions of employment

Workload and teacher autonomy

For most schools in Santa Catarina the school day is divided into three shifts – an early morning shift, an afternoon period and a night shift. Each of these is intended to be of four (clock) hours' duration. The school year must have a minimum of 200 days, and with individual pupils allocated four hours of tuition per day the expectation is that pupils will have at least 800 hours tuition per annum. But, as is shown in Chapter 5, the reality tends to fall short of that. Most teachers teach two shifts per day, involving a tuition load of 40 hours per week. Some teachers teach a third shift which brings their engagement towards 60 hours per week. Teachers often take their second or third shift in a different school from their first shift, which involves extra travel and stress. Thus, teachers have heavy teaching loads, and some teachers told the review team that they felt "very, very, very tired."

The heavy teaching loads and the circumstances of the work arrangements impinge significantly on the time for planning, preparation, evaluation and pupil feedback. Class sizes tend to be high with averages of about 25 per class in the first year of *fundamental* education; 30 per class for years 2 to 5; 35 per class for years 6 to 9, and up to 40 per class for secondary school.

There is a long established tradition of parental and community involvement in the schools of Santa Catarina. All schools are required to have School Deliberative Councils (CDE, *Conselho Deliberativo Escolar*) involving teachers, educational administrators, parents and community representatives. The team was impressed by the level of engagement in the school community by parents in a number of schools visited. As well as helping to provide facilities for the schools, parents also took an involved interest in academic affairs. However, as in most countries, this was not a universal pattern, and parental involvement with schools in disadvantaged

areas is very unsatisfactory. The State Secretariat for Education is very keen that schools should interact with their local communities and encourages such partnerships. There are a number of types of school where this is given a special categorisation. For example, there are some Open Schools, whereby the facilities of the school are made available to various community groups on Saturdays and occasions when the school is not in normal operation. Then there are schools designed for, and devoted to the needs of particular local communities such as schools for people with occupations in fishing, farming, or particular enterprises. Some of these have boarding facilities and their curricula and methodologies may differ from mainstream schools. The team was impressed by the work in this type of school, for example, the *Casa Familiar do Mar* (boarding school for fishermen's children) in São Franciso do Sul, which was visited by the review team. These boys come from fishing families. They stay one week in the *Casa Familiar* and then return home for two weeks to help their families on the boats. During their school week they follow the integrated secondary school curriculum, but their daily lessons are more intense with 8-10 class periods per day.

Teachers enjoy a reasonable degree of autonomy in their schools. A key dimension of this is that all schools are expected to devise what is known as a Political-Pedagogical Project (PPP). This corresponds largely to a school plan, whereby each school community sets out educational priorities and emphases linked to socio-economic and cultural traditions of their local community or district. Ideally, this provides an opportunity for team collaboration and planning, honed to particular aspects of that school community. However, the absence of sufficient planning time and the lack of professional expertise in this process sometimes impedes the full realisation of the potential involved. As was discussed in chapter 5, the federal authorities decide on the curriculum to be implemented, but provision is made for schools to contribute 25% of the curriculum content. In theory, this is a progressive provision, but, in practice, as the curriculum is already very crowded and content-laden, this opportunity is seldom used by school staffs. Teachers are free to select their textbooks from the range supplied free by the federal government. They may also choose additional (non-textbook) teaching materials, supplied by the State of Santa Catarina.

Work practices

The review team had only limited opportunity to engage in the direct observation of classroom teaching, but from this and from indirect evidence they formed the view that much of teaching was of the traditional, teacher-centred model, rather than of a child-centred, problem-solving and active-learning type. The team's view is collaborated by evidence from a study by

Carnoy, Gove and Marshall (2003) comparing teaching styles in Brazilian, Cuban and Chilean primary schools. The results indicated that Brazilian students spend much more time copying instructions and lessons from the chalkboard than do students in the other countries. Brazilian teachers rely more heavily on recitations by the whole class than on individual questions and answers. Brazilian students are noticeably (and significantly) less engaged during the lessons. Brazilian teachers also make much less use of direct questions to students. In Brazilian classrooms, teachers infrequently check every student's work, and usually only some of any student's work (Rodríguez *et al.*, 2008, Annex IV, p. 18). Reporting specifically on mathematics teaching at grade 3 level in Brazil, Carnoy *et al.* state:

> The lessons were focussed on producing correct answers rather than developing understanding. For the most part, Brazilian lessons consisted of a teacher writing on the board, students copying, and little interaction. In most cases, almost no effort to link concepts to the procedure was made. Explanations, when they were made, focussed solely on describing the procedure that was used. (Rodríguez *et al.*, 2008, Annex IV, p. 20)

The TALIS report recorded that the use of professional collaboration in teaching style by teachers in Brazil was low compared with other countries (OECD, TALIS, 2008, figure 4.7, p. 102).

The findings quoted relate to Brazilian schools as a whole, and while the team is not in a position to state how such aspects are reflected in the Santa Catarina's schools, *per se*, it is unlikely that they would not feature there, to some degree. In so far as such characteristics are in evidence, it would be a cause of great concern. The very poor performance of pupils on national and international tests such as SAEB and PISA signal that the teaching methodology employed is off target. Chapter 5 points out the problems that exist regarding curricular content and the inadequate time available to cope with it, but it may also be the case that the pedagogy used in the classroom further compounds the general problem of inadequate pupil achievement. If the current unsatisfactory outcomes of the educational process are to be satisfactorily addressed the issues of curriculum content, class time available, and the teaching methodologies employed need to be core issues in reform efforts.

Classroom environments

There is also evidence that the classroom environment of some schools in Brazil is not conducive to high quality output. For example, the PISA study (2003) reported that "Brazilian classrooms are less ordered than in other countries". The Brazilian students report the most frequent occurrences

of "students don't listen", "'noisy/disorder", "teacher has to wait for quiet", "students don't work well" and "work begins long after lesson begins." The PISA study also referred to high levels of class disruptions, lack of respect for teacher, and bullying (Rodríguez *et al*., 2008, Annex IV, pp. 16-17).

On their visits throughout Santa Catarina, the review team was informed of the difficulties faced by some schools due to vandalism, violence and drugs misuse. Some schools visited employed full-time security personnel. Overall, in the state there are 300 such personnel allocated to schools facing such difficulties, and increasing use is being made of CCTV cameras, as a counter-acting measure to misbehaviour.

The team learned that maintenance of good discipline is a serious problem for some schools. Regarding Brazilian schools, the TALIS study shows that classroom disciplinary climate is viewed rather negatively by teachers in Brazil compared to the other 23 countries, and the percentage of lesson time lost to disruptive student behaviour or administrative issues is the highest among participating countries (OECD, TALIS, 2008, figures 4.9 and 4.11, pp. 104,106). Such circumstances have a wearing effect on teacher morale and have a draining effect on teacher energy. In fact, it was reported to the team that a significant number of teachers suffer from stress-related illnesses. This is likely to be a contributory factor to the high level of teacher absenteeism affecting schools in Santa Catarina.

The TALIS report indicates that teacher absenteeism is a relatively serious problem in Brazil, as a whole: 32% of teachers are in schools where the principal reports this as "hindering a lot, or to some extent" (OECD, TALIS, 2008, Table 2.8, p. 45). Something of a debilitating culture has set in, whereby some teachers do not consider punctual attendance as of particular importance. Traditionally, a high degree of tolerance of absenteeism has existed. Up to now, no real sanctions have been invoked against casual absenteeism. Such absenteeism, as well as denying pupils teaching time, creates many problems for school administrators, and also diminishes the status of the teacher in the eyes of parents. This tradition of teacher absenteeism may be symptomatic of a range of problems within the school system. If schools are well administered, if the working conditions are reasonably satisfactory, if there is a good collegial spirit among staff, and if reasonable progress is being recorded, then teacher absenteeism tends not to be a serious problem. Building a professional ethic of responsibility is very important in a teaching force. The TALIS report noted that in Brazil teacher self-efficacy and job satisfaction are below the TALIS average (OECD, TALIS, Table 4.15, p. 12). This points to the desirability of taking a comprehensive approach to policy on the teaching career, with a view to securing for it a greater sense of its professional self image.

"Temporary" teachers

Another feature of the teaching career in Santa Catarina, which has a bearing on educational quality, is the tradition of employing such a huge cohort of "temporary" teachers. Apart from problems which may arise due to the level of their qualifications and their pedagogic expertise, they are not part of the established staff in a school. Accordingly, while some individuals may give great service, it is not realistic to expect such teachers to give their whole-hearted commitment to a school in terms of planning and its mission if they have no security of tenure. A supply of temporary or substitute teachers can be of great benefit to a system, but not when it comprises almost half of the teaching force. It is gratifying that the SED has put in process a scheme whereby from 2010 all temporary teachers will have to pass a formal entry examination. This examination is being organised for the whole state by the ACAFE university framework.

Teacher evaluation

There is no school inspectorate in Santa Catarina. There was an older system of school supervisors but this was discontinued about fifteen years ago. There are 36 regional education management offices (GEREDs, *Gerências Regionais de Educação*) whose staff, among other duties, liaise with and relate to schools in their regions. The staff are expected to support the work of schools and to check on schools' performance. However, this latter, is very much of the light regulatory model and does not involve detailed qualitative dimensions. A new training scheme has been initiated for administrative staff in the regional offices. This is being conducted through eight hubs for the delivery of courses throughout the state. The course includes group interactive work, conducted in hotels, over a week's duration. This continuing professional development work should be of value to GERED staff in fulfilling their responsibilities.

According to the TALIS report, around one fifth of teachers in Brazil had not received feedback or appraisal in their school (5th highest of 23 countries) and almost 20% of teachers are in schools that had no evaluation from any source (external or self-evaluation) in the last five years (6th highest of the 23 countries) (OECD, TALIS, 2008, Figure 5.3, p. 150). The report also stated that only about 15% of teachers reported that they would receive some reward (monetary or non-monetary) for improving the quality of their work or being innovative in their teaching, below the average of the 23 participating countries. The team cannot say whether the situation in Santa Catarina follows the overall Brazilian pattern precisely, but the experience there is unlikely to diverge greatly from the national situation.

Since 2006, some pilot work has been done in Santa Catarina of a whole school evaluation process. In April 2009, the SED issued Instruction No. 1 of 23 April 2009, with regard to a new assessment process of organisation and management of schools. This involves an elaborate process of whole school appraisal. Article 4 of the Instruction conveys the emphasis of the approach:

> The rating actions take place through site visits in public schools state-wide, consisting of full research, through observation, interview and application of an instrument to collect data, to evaluate the actual processes of organisation and management of each school and their relationship with the learning outcomes of students. (SED, 2009)

It is stated that both the quantitative and qualitative evaluation instruments should respect the history and culture of individual schools, the characteristics of the surroundings and the classes of workers in the community, its identity and complexity. Three working groups of three members each are being designated to undertake the work. While the guidelines for the evaluation groups are very detailed regarding aspects of the schools' operations and administration, they do not specify direct classroom observation of teacher practice. The emphasis is more on effective and efficient management of state schools. The aim is to give feedback to the school management and staff with a view to improving the organisation and management of this category of schools. This initiative could be a very useful one, but its implementation may not be without problems, and it remains to be seen how successful it will be.

Principal teachers (school leaders)

It is now well recognised internationally that the quality of school leadership has a major bearing on the success of schools achieving their educational objectives. A major comparative study on school leadership by the OECD (2008) concluded:

> School leadership has become a priority in education policy agendas internationally. It plays a key role in improving school outcomes by influencing the motivations and capacities of teachers, as well as the school climate and environment. Effective school leadership is essential to improve the efficiency and equity of schooling. (OECD, 2008, Vol. 1, p. 9)

In Santa Catarina principal teachers are appointed in two ways. On occasion, it is done by election by the school community. In the majority of cases it is through political appointment. Both systems have their weaknesses. Election by the school community may yield a popular

outcome but, not necessarily, one with the leadership qualities which the situation requires. The qualities required of educational leadership may not coincide with being popular. Qualifications, experience, track record and achievement, and independent judgement are not always best assessed by a constituency of non-peers, and principalship appointments can be open to many vagaries of popularity stakes. On the other hand, appointment by political patronage is also subject to the vagaries of party politics. Being successful in local politics is not a guarantee of having the qualities required of school leaders, and often involves a too high influence of non-professional factors in appointment. Santa Catarina is a stranger to the mode of principal appointment in most developed countries. This involves an open competition on set, transparent criteria, and adjudication by an independent review panel selected on the basis of their expertise, experience and qualifications. This form of selection is much more likely to consistently lead to the selection of the best candidate for the job. Recently, the SED proposed moving in this direction for the appointment of principals, but was met with strong political opposition. One would hope that this matter could be re-visited, as there is a lot at stake for the future well-being of the state's schools.

Training courses exist for school leadership and management, but being successful in them is not mandatory for appointment. The municipal authorities have arranged with a university for an open and distance learning course for their principals. There is also a national programme for principals – the "*Progestão*"– which seems to promise much. Good quality training for principal teachers is of great importance and, generally, success in such a course should be a condition for appointment. However, it is important that proper quality assurance procedures apply to such courses. The fact that since 2005, almost all the higher education institutions (HEIs) are empowered to offer such courses raises questions as to consistency of standards, and of the capacity of all these institutions to provide high quality leadership courses.

A further problem relating to the post of principal in Santa Catarina schools is the limited discretion which principals enjoy. Principals have no say in the selection of staff for their own schools. As the key personnel who are in the best position to know the needs of their school community, it is highly desirable that the principal should have a voice in staff selection. Neither does the principal have the power to sanction teachers for non-professional behaviour, such as teacher casual absenteeism. Another limitation on the principal's role is that he/she has no financial discretion in the allocation of resources. There is no budgetary allocation to allow the principal to support particular professional initiatives within the school.

Furthermore, the salary differential for principals is not such that in itself it would make the job highly attractive for prospective school leaders. Interestingly, the TALIS report suggests that school principals in Brazil tend towards an instructional style of leadership rather than a more administrative style of leadership. It is striking that instructional leadership, (supervision of instruction, supporting teachers' professional development, setting the schools goals) is strongest in Brazil compared with all other TALIS countries (OECD, TALIS, 2008, Table 6.3, p. 207). This is a very positive dimension, and emphasises all the more the desirability of additional buttressing for the position of principalship in the interests of the quality improvement of schooling. Unlike many countries, there is no state association of school principals. Such a grouping in other countries has been shown to be of significant benefit for the exchange of best practice, co-ordination of policies and strengthening group morale among leaders in the school system.

Teacher education

Initial teacher education (ITE)

The review team encountered strong criticism from all stakeholders consulted of many aspects of the initial teacher education which has traditionally been provided for student teachers. However, as teacher education is provided by the vast majority of higher education institutions – federal, state and private – variation exists regarding quality, and generalised comment may not do justice to all providers. Nevertheless, sufficient indicators exist to suggest that the overall position regarding ITE is seriously unsatisfactory and is in need of fundamental reform. In the national study on attitudes on the teaching career (2009) out-going students from secondary school were asked which academic programme they applied for in the *Vestibular* and only 2% selected the teaching career as a first option. The vast majority of this small proportion of respondents were attending the less prestigious public schools, and belong to the C and D socio-economic strata. According to the School Census of 2007, the study reported a reduction of 9.3% in the number of students enrolled for teaching careers. (*Fundação Victor Civita*, 2009, pp. 28-64). Entry standards to many teacher education courses tend to be very low, in some cases even the minimal entry standards are not obtained. While courses in the more prestigious HEIs are well subscribed to, in many other courses there are vacant, unfilled places. In some courses, the team was informed that the drop-out rate was as high as 30%. Despite the generally low standard of student teacher entry, it is noteworthy that the level of student failure at

course completion is very low. In some HEIs, the teacher education courses are provided at night, with attending students having worked during the day. There is also a heavy reliance on distance learning for ITE. While distance learning can have a beneficial role to play in teacher education, particularly in in-service teacher education, an over-reliance on it for initial teacher education can have many disadvantages in terms of quality. Inadequate direct personal contact with the expertise of staff involved in teacher education can be a major impediment to student teachers reaching their full potential.

In general, education departments do not enjoy high status within HEIs. Even in prestigious universities the team learned that the quality assurance grade for the education department tended to be in the 1-2 grade, out of a 5 point grade rating. Such a rating tended to lower the overall quality assurance rating of the HEIs. Probably, the most universal criticism of ITE encountered by the team was the mismatch which it was alleged existed between the theoretical components of courses and the practical needs of beginning teachers. It was constantly maintained that the courses were not practical enough and that they did not equip student teachers with the skills required for the challenges of contemporary classrooms. In the traditional course, of four years duration, the team noted that teaching practice only came towards the end of the course, in the fifth and eight semesters. The teaching practice itself was regarded as having many deficiencies including inadequate preparation, inadequate support and inadequate supervision. Some schools reported that no supervision took place by university staff. Relationships between, at least, some HEIs and the practising schools were seen as very poor, or non-existent. There was very little close collaborative work which would foster a partnership between the training institution and mentor teachers in the schools.

During the four year course of training the students choose specialisms from the sixth semester *e.g.* IT, Special Education. They only study one academic subject during the four years, which for secondary teaching limits teachers' deployability. As well as giving rise to rigidities in the deployment of teachers within a school, this also tends to the situation where many teachers find themselves teaching subjects in which they have no subject mastery. A further frequently voiced criticism of existing course is that they have not kept in touch with the changing policy and curricular trends and the consequent needs of schools. This is particularly voiced in the area of inclusive education. It is state policy that schooling provision should be inclusive, but teachers complain that they have not been adequately trained to cope with the challenges involved.

The State Education Council (CEE, *Conselho Estadual de Educação*) is responsible for the quality assurance of all courses in state institutions, including teacher education courses. This is a task of major importance for the quality of education in Santa Catarina. To do the job adequately it would need extensive resources, appropriately qualified personnel, a transparent independence of action, and an appropriate administrative back-up service. The review team was not confident that all these requirements are in existence. The fact that so many HEIs, particularly in the private sector, are allowed to offer teacher education courses was a cause of worry to the team. As Table 9.7 of Chapter 9 on Higher Education in this review shows, of the 18 010 students enrolled in HEIs, just 2 097 are in the federal and state universities, while 3 513 are in small, private, for profit HEIs. The team was not convinced that the capacity of some of these private institutions in terms of academic and professional expertise, resources, critical mass, research capability, equipment or facilities were such as to ensure a quality teacher education experience for students.

The type of fees available in private institutions from teacher education students are much smaller than for other departments. For instance, fees of BRL 340 per month for teacher training contrast with BRL 800 for engineering, BRL 1 800 for dentistry and BRL 2 000 for medicine. One surmises that the differences in income from various courses has a bearing on the resources invested in the courses, to the detriment of education. In general, the review team would consider that fewer teacher education programmes, but of a genuinely assured quality, would better serve the needs of Santa Catarina than the current very diversified and uneven quality of course provision.

The review team was very gratified to learn that both the federal and state authorities have been taking progressive steps towards reforming initial teacher education. This is a major breakthrough in teacher education policy with much promise for reform efforts. In 2006, the federal government took the initiative of instituting a reform process for initial teacher education. The State Secretariat for Education of Santa Catarina has participated whole-heartedly in this endeavour. It adopted a highly consultative approach with key stakeholders. Between 2006 and 2008 it conducted eight seminars, as well as visits to institutions and held discussions with students, unions, municipalities, and so on. The first aim was to diagnose weaknesses and strengths which existed in the traditional programmes. Among the key weaknesses identified were: lack of links between theory and practice; inadequacies in the type of teaching practice; poor relationships between HEIs and schools; course content not focussing on pupils and their needs; lack of sensitisation of course content with the culture of the schools; disorganised growth in the number of institutions awarding teacher licences.

Among the goals decided on to combat the identified weaknesses were:

Teaching practice to be experienced from the beginning of the teacher education programme; study of the academic subject to be related to the curriculum subject; better articulation between the needs of schools and course content; the course content to be based more on educational research; perceiving the school as the location for much research and interventions towards improving the quality of basic education; the promotion of reflective practice among student teachers. These goals were generally incorporated in a set of guiding principles for the new approach (SED, *Formação Inicial,* 2008).

The legal basis was set out in Decree No. 6.755 of 29 January 2009 for the "National Policy of Professional Training of Teachers of Basic Education," termed PARFOR (*Plano Nacional de Formação de Professores da Educação Básica*).

The programme is being offered in the Federal University, the State University and the ACAFE (Community) Universities. It is opened to three categories of entrants and it is hoped that, by 2010, about 20 000 students will have been qualified. The first courses began in ACAFE universities in September 2009. The courses are fully funded by the Federal Ministry of Education. A key concern throughout is the emphasis on quality rather than quantity, with the slogan "less means more" in operation. As might be expected, not all established, experienced staff welcomed such a significant change of emphasis on ITE programmes. Opposition has been expressed from such staff, but it does appear that the new programmes will proceed as planned.

Significantly, attention has been paid to implementation issues. Santa Catarina has established a *Licentiatura Forum* of 23 members to oversee and monitor the progress of the innovation. One expectation is that the thrust and quality of the programme offered will, in time, lead to the marginalising of the weaker HEIs as regards the provision of initial teacher education courses. The document, *Planejamento Estratégico – Formação Inicial* sets out a range of responsibilities for each of the involved parties regarding implementation. They emphasise heavily the links between HEIs and schools, the emphasis on quality practice in real school situations and the incorporation of a research dimension in initial teacher formation. Specific attention is paid to quality supervision and formative feedback to students.

Supervision has to be in the form of a partnership between a university supervisor and a classroom teacher. Interestingly, also, a special post is being created in the GEREDs of a person with responsibility to ensure that these practice and supervision guidelines are, in fact, implemented at school

level. The review team analysed the course content for the new programme of one of the universities and in terms of its coverage, it seemed to fulfil the desired new emphases. The review team considers that there is good scope in the under-utilised capacity of the ACAFE universities for the delivery of these reformed courses.

The new programme is only at the initial stages and it will take time before its effects can be evaluated. Nevertheless, the signs are that the national and state government have taken a strong action in coming to grips with weaknesses in ITE, in going about this in a laudatory, consultative way, and in steering the new programme towards successful initiation, despite opposition from certain academic interests.

In-service teacher education (INSET)

In Brazil, as in most countries, it is generally accepted that following initial teacher education, the challenges of modern teaching require teachers to engage periodically, throughout their careers, in continuing professional development courses, or INSET. Traditionally, these have taken two forms, one relates to specific refresher-type, short courses in relation to changes in curricula, use of educational technology, and so on. The other form is through postgraduate programmes provided by the universities leading to certification, such as Master's degrees. From the point of view of policy-makers most emphasis is placed on the shorter courses, targeted more directly to the needs of schools. Traditionally, courses in mathematics and Portuguese have been given a great deal of emphasis, but this is now changing as part of a new policy approach. There are a great many providers of INSET programmes, including most HEIs, as well as GEREDs and other agencies. What is problematic is the quality of some of the courses provided and the capacity of some providers to engage with teachers at the appropriate level. Teachers complained to the review team about the quality of some of the courses. They also criticised arrangements whereby courses were scheduled during school days, but no substitution was provided for teachers attending the courses, thereby causing problems for schools to cover for absentees.

The TALIS study (2008) reports some interesting aspects of INSET in Brazil. It stated that 83% of teachers had participated in professional development activities during the survey period, as against a TALIS average of 89% (OECD, TALIS, 2008, Table 3.1, p. 80). About 55% of teachers in Brazil paid nothing for the courses, and about 56% received scheduled time allocation for undertaking the programmes, compared to a TALIS average of 65% and 63%, respectively (OECD, TALIS, 2008, Table 3.5, p. 85). A striking feature was the high level of unsatisfied demand for more INSET by

Brazilian teachers; 84% of Brazilian teachers wanted more professional development than they received, while the TALIS average was only 55%, seeking more (OECD, TALIS, 2008, Table 3.3, p. 83). The areas which were most sought by the Brazilian teachers were teaching pupils with special needs; ICT teaching skills; teaching in a multi-cultural setting and coping with student discipline and behaviour problems (OECD, TALIS, 2008, Table 3.4, p. 84). It is likely that the teaching force in Santa Catarina reflects the general Brazilian pattern in relation to INSET issues.

As was the case with initial teacher education, the review team was pleased to note that both the federal government and the state authorities have launched a new initiative to invigorate and re-structure INSET. From 2009, a new national INSET programme is underway. It incorporates a suite of 30 disciplines or themes. These include subject areas such as, media education, special needs education, inclusive multi-cultural education, and so on. The courses are free for teachers. Very significantly, the methodology of the courses has received particular attention. Much use is to be made of workshop, interactive methods. The topics to be dealt with are to be close to the needs of classrooms. There is provision for evaluative feedback loops. They are to be delivered through face-to-face and distance education methods. Attention is also being paid to the training of trainers, and expert teachers will be selected to work with their teacher peers.

An interesting INSET programme in operation is the "Leap into the Future" (*Salto para o Futuro*) course which involves 80 hours of interactive, innovative work on teaching, and leads to a certificate for successful participants. This course can be requested by school staffs and delivered within the school. The review team also encountered innovative programmes of INSET, initiated not by state agencies, but by civic groups. An example of these was the course in the city of Brusque. Here the local Chamber of Commerce and employer bodies got together and organised an INSET programme which brought the teachers from state, municipal and private schools together. Sessions are designed on the basis of teachers' needs and involve workshop approaches facilitated by external lecturers and skilled peers. The scheme has been operating successfully for three years. Other interesting staff development initiatives planned by SED are the establishment of teacher study groups between schools. This can be a very valuable process, but difficult to get underway, and it will be interesting to see how it develops. A somewhat similar initiative, which operates in some countries, is the establishment among teachers, on a voluntary basis, of subject associations *e.g.* mathematics teachers, science teachers. Such groups hold seminars and courses exchanging ideas and best practice methods in relation

to their subjects and help promote professional *esprit de corps* among the involved teachers. It would be worthwhile to encourage such associations of teachers in Santa Catarina.

Educational research

Policy on teachers, teacher education and schooling affairs generally benefit from good quality research in these areas. The Santa Catarina State Development Plan (PCD, *Plano Catarinense de Desenvolvimento*) incorporates strategies for government action in education to 2015. The following is listed among the actions outlined therein, "Implement network of researchers in education, promoting the creation and organisation of faculty researchers in the public school system" (SED, State Development Plan, Sect. 3). The review team formed the view that, in the past, there has been insufficient research on the education system, that the dissemination of what was there was poor, and that the linkage between policy makers and educational researchers was tenuous. As is indicated by the data in the Chapter 10 on RDI in this review, research into the education system has not been a strategic policy interest and there is not capacity in many of the HEIs to conduct serious educational research. Educational research should form the lifeblood of both initial and in-service teacher education. There is a need for much more school-focused research. The team welcomes the emphasis in the new initial teacher education plan of introducing student teachers to the practice of educational research and encouraging students to be reflective on their practice. If the aspirations in the PCD are to be realised, budgetary and organisational issues need to be pursued with the relevant stakeholders, particularly the education departments in HEIs which have the capacity and are well positioned to deliver high quality educational research. Attention also needs to be paid to the better dissemination and profiling of good educational research. It would be desirable if a special branch of the SED was designated to take responsibility for the promotion and utilisation of educational research.

Recommendations

In setting out its recommendations for action to improve aspects of the teaching career and of teacher education, the review team is conscious that for many issues there may be divided responsibilities between the federal and the state authorities. Yet, the team is encouraged by the joint efforts of both authorities in moving to address a number of identified problem areas such as the evaluation of school management, initial, and in-service teacher education. In making its recommendations, the team considers that its efforts

are working with the current of educational reform in Santa Catarina. Education has been, and continues to be on a trajectory of expansion. The great challenge for now and the future is the qualitative development of the system. Central to the effort to improve the quality of education will be the efforts of the teaching force. Santa Catarina has a relatively young teaching force, and there are a number of pointers to suggest that, over the years ahead, its maximum potential can be realised. At present, there are a number of issues which restrict the achievement of this potential. It behooves the state to address these and put in place a series of inter-connected reforms which can build a teaching profession of which Santa Catarina can be proud, and which is empowered to deliver the high quality education to which society aspires. In shaping a quality teaching force the state is making an investment in a key sector of its human resources, which, in turn, yields dividends towards the long-term future. The following are the recommendations the review team makes to enhance the teaching career and teacher education.

- The team considers that the time is ripe for the state to draw up a comprehensive position paper, or green paper, which would set out an overview of its views and policy options on the teaching career. In doing so, the state would be setting out from a position of strength, due to recent actions. The recent initiatives on initial and in-service teacher education, on revitalising the regional education staffs, on whole school management evaluations already reflect creditably on the pro-active stance being taken by the federal and state authorities. What the team proposes is to build on these initiatives, to group and co-ordinate them as a policy drive, and to add a range of other appropriate target areas. The position paper would indicate to the public and stakeholders that a coherent and cohesive push was underway to establish the teaching profession as a core concern of state policy in its general drive for modernisation, and economic and social progress. At the discretion of the authorities, the position paper could incorporate specific issues from the precise list of recommendations set out hereunder. Proposals in the position paper would be open for consultation and comment leading to their refinement towards concrete policy measures. Not all features of the plan need be implemented simultaneously, as certain priorities could be established. However, the realisation that a holistic approach was being envisaged could have a major impact on the morale of the teaching force and help to build its attractiveness to aspiring teachers. Individual policy intents can be maximised and give rise to greater synergies when devised in a cohesive way rather than when treated as discrete interventions.

- There is a need to improve the image of the teaching career in Santa Catarina. As has been highlighted in this chapter, it now suffers from many deficiencies. It is neither attractive to high quality potential candidates, nor is it giving what the OECD TALIS report calls "self-efficacy and job satisfaction", to many in-career teachers. Appropriate occasions should be used by officialdom to stress the significance and value of teachers' roles in society. The affirmation of the achievements of teachers and a public recognition of the very difficult circumstances they encounter in some schools can be of major value in sustaining teacher morale. Discrimination is, of course, necessary, as superficial commendation can ring hollow. Worthwhile contributions of teachers to society should be highlighted, and the qualities inherent in this most humane of professions brought to people's notice. Teachers consider that their portrayal in the media is often disparaging. In re-shaping the image of teaching in Santa Catarina a more benign media approach would be helpful, and could be grounded on the demonstrably valuable work going on in some schools.

- A probation period of three years for entry into teaching is unduly long by international standards. The review team suggests that this should be reduced to two years, with the first year involving an induction dimension under the guidance of a specified mentor teacher. The probation process should involve the direct observation of teaching and classroom performance, conducted by the principal teacher or his/her nominee.

- The proportion of temporary teachers should be significantly reduced and, as well as tightening entry standards, which is now underway, their incorporation into the mainstream teaching force should be facilitated.

- The team considers that, despite political difficulties, efforts should be made to revise and modernise the Teachers Statute so that it is more in keeping with contemporary schooling needs and circumstances.

- While, at present, it seems difficult to avoid the three shift day, due to deficiencies in school infrastructure, it is desirable to put planning in place so that, at a future time, a more normal provision of school day attendance can be available for both pupils and staff.

- At present, the great majority of teachers are required to teach two shifts or 40 hours of instruction. This is a very heavy load and greatly impedes the time available for integral professional work such as preparation for teaching, feedback to pupils, planning with peers, and so on. The aim should be, over time, to reduce such teaching loads to a pattern which is more feasible for good professional practice.

- Such a move would be linked to improvements in teacher salaries, as teachers' income is linked to the hours they teach. The bonuses which are currently available for teachers should be re-considered with a view to absorbing them within the salary structure, and including them for pension purposes.

- Note should be taken of the progress of salary incentive schemes for teachers recently introduced in a number of Brazilian states, to monitor their appropriateness for introduction in Santa Catarina.

- Regulations need to be introduced, or tightened on aspects of teacher employment conditions. For instance, re-deployment schemes should be introduced for teachers in state schools, and rigorous sanctions introduced for culpable absenteeism.

- The review team welcomes the introduction of the school management assessment scheme, and hopes that, as it evolves, it can incorporate a teacher evaluation dimension.

- The review team also welcomes the SED's efforts to reinvigorate the regional management education offices. Every effort should be made to strengthen their roles in school support and evaluation.

- The review team recommends that the mode of appointment of principal teachers be reformed, and their role in schools re-appraised towards giving them a voice in staff appointments, and some budgetary discretion. The emphasis which exists regarding their instructional leadership role should be further supported.

- The review team welcomes the SED's initiative on initial teacher education. The review team commends the emphases of the *Planejanento Estratégico – Formação Inicial*, and considers the reforms as having much merit. Every effort should be made to raise the standard of entry to initial teacher education.

- Rigorous quality assurance should be applied to all agencies permitted to offer teacher education courses. Fewer teacher education courses, but of a demonstrably higher standard, would best serve the state's needs.

- It would be desirable if more than one academic subject, even if at a minor level, could be incorporated in the teacher education courses for secondary teachers to assist in the efficient deployment of teachers.

- The review team was gratified with the evidence which exists for the demand of more in-service training, and of the types of such training being required, both in content and format. This appetite for quality

in-service training is an asset within the system, and should be satisfied. Significant support should be given to a 'Training of Trainers' policy, so that skilled teachers can be nurtured to work on INSET with their peers.

- The review team commends the federal and state initiative on in-service teacher education both as regards the extended range of courses and the nature of their methodology.

- Good quality education departments within HEIs, with appropriately qualified staff, should be supported in their efforts to provide postgraduate courses for in-career teachers, which are focussed on the real needs of contemporary schools.

- The SED should establish a unit with a specified responsibility to promote educational research. A budget sub-head should be established which would provide a fund for competitive bedding by HEIs, on research topics deemed of central importance for state policy. Closer liaison should be nurtured between policy makers and educational researchers.

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Chapter 9. Higher Education

This chapter provides an overview of federal and state provision for higher education institutions in Santa Catarina, their academic programmes, staffing and governance. It covers issues of access and quality to higher education as well as the financing of the system and provisions for student support by the federal and state levels. In addition it contains sections on the labour market relevance of the system and policies for internationalisation for higher education to be able to compete in a global economy. It ends with a section on challenges facing the sector and offers recommendations.

Introduction and background

Santa Catarina has a well-developed system of higher education with a large number of public higher education institutions (HEIs) and an even larger number of community and private HEIs spread throughout the state. In 2009, the participation rate in higher education in Santa Catarina was 26% of the 18-26 year old age group, slightly above the average for the rest of Brazil (25%), but below the South American average of 30.3%. Growth in participation has come from fee-paying community universities and from private institutions which together accounted for 81.5% of gross total enrolments in higher education in 2009. This chapter will argue that, if the state is to reach its goal of developing human capital to a more advanced level as part of the creation of a knowledge based society, it is essential to improve accessibility and to increase student enrolments in public HEIs. It is equally necessary to take measures to increase the efficiency and utilisation of the community universities and to improve the quality of all HEIs, especially those operating in the private sector. This chapter explores these issues. Second, it provides a description and analysis of the higher education system in the state. And third, it discusses the challenges confronting the system and concludes by offering some policy options to assist the state government in achieving its goal.

The higher education system in Santa Catarina

The number of HEIs in Brazil began to grow steadily after the passage, in 1996, of the National Education Guidelines and Framework Law (LDB, *Lei de Diretrizes e Bases da Educação*) which introduced, *inter alia*, new regulatory procedures, new curriculum guidelines for undergraduate courses, greater autonomy for HEIs, and provision for institutional differentiation in higher education.[1] By 2008, there were 5.08 million undergraduate and distance students enrolled, a growth of almost 22% from 2004 to 2008 (Table 9.1). Recent growth has been particularly rapid (10.6% between 2007 and 2008) (INEP, 2009).

Table 9.1 **Growth in HEIs and enrolment in Brazil, 1996-2008**

Number of tertiary institutions					
	Total	**Public**	**Private**	**% Public**	**% Private**
1996	922	211	711	22.9	77.1
2000	1 180	176	1 004	14.9	85.1
2004	2 013	224	1 789	11.1	88.9
2008	2 252	236	2 016	10.5	89.5
Number of students (thousands)					
	Total	**Public**	**Private**	**% Public**	**% Private**
1996	1 869	735	1 133	39.4	60.6
2000	2 694	887	1 807	32.9	67.1
2004	4 164	1 178	2 985	28.3	71.7
2008	5 080	1 274	3 806	25.1	74.9
Average number of students per institution					
	Total	**Public**	**Private non-profit**	**Private for profit**	
2008	2 256	5 398	1 888	2 393	

Source: INEP (2006 and 2009).

Until the 1960s, Santa Catarina had one university established and maintained by the federal government, the Federal University of Santa Catarina (UFSC, *Universidade Federal de Santa Catarina*) which is located in Florianópolis and gained full University status in 1960. The State University (UDESC, *Universidade do Estado de Santa Catarina*) was set up in 1965. In the late 1960s, ACAFE was formed in order to provide more diverse higher educational opportunities across the whole state for those students who could not gain places in the elite public institutions or who could not easily afford to move in order to pursue their studies.

Box 9.1 **Santa Catarina Association of Educational Foundations (ACAFE)**

The 13 Community Universities in Santa Catarina provide a model of higher education that is unique in Brazil with strong roots in the local communities which they serve. They began as municipal level foundations whose purpose was to provide education to those who were unable to attend a federal or state level institute. They evolved into the ACAFE network (*Associação Catarinense das Fundações Educacionais*) which is a not-for-profit system of fee-paying institutions with good facilities and committed management with a distinct focus on regional development. ACAFE institutions account for 54% of enrolments in third level education in Santa Catarina and contribute to a major programme of teacher training financed by the state government. A very large proportion of students enrolled in the system study short postgraduate evening courses. Potentially, these institutions could help to achieve the major goal of improving participation and broadening access. However, as currently operated, the campuses are underutilised by day and there are comparatively few postgraduate programmes.

After 1996, in both Brazil and Santa Catarina, the proportion of institutions classified as "public" fell sharply. In Santa Catarina, this resulted from a reclassification of the ACAFE "community universities" as "private non-profit". Compared with Brazil as a whole, the proportion of students attending a public institution is distinctly lower in Santa Catarina and has fallen sharply since 2004. The decline is not only in percentage terms, reflecting growth in both the community and for-profit HEI enrolment, but also in absolute numbers. More than half of all students attend ACAFE HEIs in Santa Catarina and, by 2009, the average size of the ACAFE institutions was larger than the public universities. In contrast, the average size of private for-profit HEIs was less than 600 students.

By 2009, Santa Catarina had, in addition to the federal, state and community HEIs mentioned above, two municipal institutions and 102 private HEIs, making a total of 121 HEIs, a significant number for a population of almost six million. Compared to the Brazilian average, the relatively large number of small private institutions is striking.

All federal and state institutions are free of charge. The ACAFE network relies almost entirely on tuition fees, as, of course, do private for profit institutions. The mixture of governance and funding models in the public institutions as well as the proliferation of small private institutions makes for a complex system of tertiary education that potentially fosters social

inequality of access, distorts student preferences and is inefficient in its use of resources. The most successful students apply to the federal and state HEIs where they receive a free education, but more than half (54%) of all students attend ACAFE colleges. The team was informed that, in the federal UFSC there are 20 applicants for every place while, during visits, it was observed that many places in the community ACAFE system remain unfilled, especially during the day. On the other hand, the large number of autonomous institutions offers the possibility of responding flexibly to changes in student preferences and/or labour market demands. The issues of access, funding and governance are discussed later in this chapter.

Table 9.2 **Growth in HEIs and enrolment in Santa Catarina, 1996-2009**

	Total	Public	Private non-profit	Private for profit	% Public	% Private non-profit	% Private for profit
HEIs							
1996	21	10		11	47.6		52.4
2000	41	4	18	19	9.8	43.9	46.3
2004	94	6	16	72	6.4	17.0	76.6
2009	121	6	13	102	5.0	10.7	84.3
Students (thousands)							
	Total	Public	Private non-profit	Private for profit	% Public	% Private non-profit	% Private for profit
1996	70	64		5	92.2		7.8
2000	118	35	71	12	29.3	60.1	10.5
2004	178	64	78	36	35.7	43.9	20.4
2009	216	40	117	59	18.3	54.0	27.5
Average number of students per institution							
	All HEIs	Public		Private non-profit		Private for profit	
2009	1 785	6 589		8 973		582	

Source: INEP (2006) and Background Report (2009).

As one would expect, the majority of students at the federal and state universities in Santa Catarina are classified as daytime students, although the number of evening students is also important in these institutions. By 2008, the biggest increase in enrolments in evening courses in both absolute and relative terms has been in the private for-profit institutions. There has also been substantial growth in the evening courses of the ACAFE institutions.

Table 9.3 **HEIs in Santa Catarina: sources of funding, selectivity and enrolments, 2009**

Institution	Number	Tuition	Sources of funding		Enrolments	%
Federal (UFSC)	1	Free	99% federal (can obtain state and municipal and private funds for specific projects).	Very High	27 124	12.6
Federal Institute of Santa Catarina	1	Free	Idem.	Idem	1 452	0.7
Federal Institute of Education, Science and Technology of Santa Catarina	1	Free	Idem.	Idem	17	0.0
State (UDESC – ten campuses)	1	Free	State (99%) (can obtain federal, local municipal and private projects).	High	10 475	4.8
Municipal	2	Free	99 % municipality can receive federal state and private funds.	Low	971	0.4
Community Universities (ACAFE)	13	Not for profit	More flexible. *(i)* ProUni scholarships; *(ii)* student fees. Can receive funds from federal, state and private sources and can sell services.	Low	116 649	54.0
Private (includes universities and several other types of institutions)	102	Variable tuition fees (by institution and by course)	ProUni scholarships and student fees.	Low	59 374	27.5
Total	121				216 062	100.0

Source: Background Report; INEP (2006 and 2009) and review team discussions.

Table 9.4 **Enrolment[1] day and evening students, 2004 and 2008, thousands**

	Total	Federal	State	Municipal	Non-profit	For profit
2004						
Day	68	14	5	14	28	7
Evening	111	4	2	25	50	30
Total	178	18	6	39	78	36
2008						
Day	69	14	6	16	26	7
Evening	136	4	3	27	58	44
Total	205	19	9	42	84	51
Percentage growth						
Day	2.1	2.8	25.3	8.7	-8.7	5.0
Evening	18.6	10.0	28.9	6.9	14.3	31.8
Total	13.0	4.5	26.3	7.6	7.2	28.1

Note (1): Numbers may not add to totals because of rounding.　　　*Source*: INEP (2006 and 2009)**.**

Academic programmes

In common with the rest of Brazil, there is a very wide range of academic programmes available in the HEIs in Santa Catarina and, in the period following the passing of the LCB law, the numbers of these programmes had, in 2004, grown by 11.7 % over 1996 (INEP, 2006). In 2008, this trend continued in Brazil as a whole with, for example, INEP reporting an increase of 5.2% new graduate courses over the previous year (INEP, 2009).

Table 9.5 sets out some details of the main programmes together with the standard duration and approximate levels of enrolment in 2009. The *Licenciatura* is uniquely geared towards the needs of the teaching profession. The Bachelor's, Master's and PhD are more immediately comparable with international models. Some short courses, such as the Sequential Courses (*Cursos Sequenciais*, CS) and the Specialisation Courses (*Cursos de Especialização*) grant certificates or diplomas that are not registered in the Ministry of Education and hence these cannot cover any of the dozen or so legally regulated or recognised professions. Programme and curriculum guidelines are the responsibility of the Federal Ministry of Education and the minimum number of hours per academic programme is defined by the *Conselho Nacional de Educação* (CNE, the National Education Council).

Table 9.5 **Third level programmes, 2009**

Type of Programme	Duration	Hours	Enrolment by programme	Comments
Curso Sequencial (CS) (Sequential Course)	Up to 2 years	800-1 600	3% (not increasing)	Does not provide any professional degree.
Curso Superior de Tecnologia (CST) Upper-level Technology Course	2-3 years (usually 3)	1 600-2 400	10%	Oriented to individual technical specialisations with diploma.
Licenciatura[1]	4 years	2 400 hours + (3 200 average)	20%	Teacher Pre-service Programme.
Bacharelado	4 years	2 400 hours + (3 200 average)	60-62% approx.	Equivalent to Bachelor's Degree.
Especialização[2] (Specialisation)	Usually 1 year	360-500 hours	N/A	Certificate. Labour market oriented.
Master's	2-3 years		2.5%	
Doctorate	4-5 years		2.5%	

Notes:

(1): For elementary schools in all academic areas. Basic requirement for teachers.
(2): For professions (*e.g.* psychology, law and medicine) this can take from one to three extra years.
Source: Review team discussions, 2009.

Table 9.6 demonstrates a notable imbalance in programme provision among HEIs in Santa Catarina: of the 885 short specialisation courses delivered in the state, 830 of them are in ACAFE or private HEIs. Undergraduate programmes are also mostly clustered in these institutions (though the data do not distinguish their CS, CST, *Licenciatura* and Bachelor's programmes). Conversely, most Master's and Doctorate programmes are in the federal and state institutions with only 33 Master's and 2 Doctorate programmes in the ACAFE institutions.

Table 9.6 **Distribution of academic programmes
by Santa Catarina institutions, 2008**

	Undergraduate programmes	Specialisation courses	Master's programmes	Doctorate programmes
Federal University	58	40	62	41
Federal Institutes	12	7	1	
UDESC	39	8	12	6
Municipal HEIs	6			
Community	947	415	33	6
Private	369	415	2	
Total	**1 431**	**885**	**110**	**53**

Source: SINAES, http://sinaes.inep.gov.br/sinaes.

Table 9.7 provides micro data on student enrolment by programme in Santa Catarina in 2007. In the ACAFE and private institutions the largest category of courses are those oriented towards business, especially if legal courses, which are particularly important in ACAFE colleges, are included in this category. Interestingly, this data shows that the strong tradition of engineering continues in Santa Catarina with 11.91% of students enrolled in engineering, manufacturing and construction, the majority of whom are in the ACAFE and municipal institutions. Engineering in Santa Catarina is traditionally strongly linked with local industry, the engineering school of UFSC being historically considered the best in Brazil.[2] This enrolment rate is more than twice that for Brazil as a whole which has a relatively low overall rate (5%) of enrolments in engineering, manufacturing and construction at ISCED level 5A/6[3] in 2007 compared with 38% enrolment in social sciences, business and law (OECD, 2009*a*, EAG Indicator A3). As well as engineering (broadly defined), teacher training and health courses are also particularly important in ACAFE institutions. One rather worrying issue is the low enrolment rate in science and mathematics (2.73%) which has potentially serious implications for the capacity of the state to engage in research and development, especially for the state's science and technology programmes (see also Chapter 10, on RDI).

Table 9.7 **Student enrolment by field of study and type of institution, 2007**

	Numbers enrolled					
	Federal	State	Municipal	Non profit	Private	Total
Agriculture and Veterinary	718	1 657	595	1 899	431	5 300
Business Management, Commerce, Marketing, etc.	808	1 249	5 498	18 550	17 395	43 500
Accounting and Taxation	777	88	1 746	4 558	3 404	10 573
Law	824	0	6 135	11 903	7 079	25 941
Journalism	602	138	1 205	1 916	2 155	6 016
Social and Behavioural Science	1 561	19	2 619	3 346	1 533	9 078
Science and Mathematics	1 440	141	1 093	2 407	245	5 326
Computing	867	935	2 131	3 218	3 143	10 294
Education	1 185	912	3 539	8 861	3 513	18 010
Engineering, Manufacturing and Construction	4 663	1 964	5 726	8 526	2 371	23 250
Arts and Humanities	2 357	751	2 380	2 894	1 117	9 499
Health	2 257	1 001	7 851	8 150	3 172	22 431
Social Services	578	0	344	495	142	1 559
Services	0	0	342	2 848	1 303	4 493
Total	**18 637**	**8 855**	**41 204**	**79 571**	**47 003**	**195 270**
	Percentage of total enrolment					
Agriculture and Veterinary	0.37	0.85	0.30	0.97	0.22	2.71
Business Management, Commerce, Marketing, etc.	0.41	0.64	2.82	9.50	8.91	22.28
Accounting and Taxation	0.40	0.05	0.89	2.33	1.74	5.41
Law	0.42	0.00	3.14	6.10	3.63	13.28
Journalism	0.31	0.07	0.62	0.98	1.10	3.08
Social and Behavioural Science	0.80	0.01	1.34	1.71	0.79	4.65
Science and Mathematics	0.74	0.07	0.56	1.23	0.13	2.73
Computing	0.44	0.48	1.09	1.65	1.61	5.27
Education	0.61	0.47	1.81	4.54	1.80	9.22
Engineering, Manufacturing and Construction	2.39	1.01	2.93	4.37	1.21	11.91
Arts and Humanities	1.21	0.38	1.22	1.48	0.57	4.86
Health	1.16	0.51	4.02	4.17	1.62	11.49
Social Services	0.30	0.00	0.18	0.25	0.07	0.80
Services	0.00	0.00	0.18	1.46	0.67	2.30
Total	**9.54**	**4.53**	**21.10**	**40.75**	**24.07**	**100.00**

Source: Ministry of Education, Higher Education Census 2007, data compiled by Simon Schwartzman.

Staff in higher education institutions

As would be expected, the number of staff in higher education in Santa Catarina grew rapidly between 1996 and 2008 with the greatest increase in the ACAFE institutions. And, as measured by the highest degree received, staff qualifications improved at all types of institution. By 2008, staff in federal and state institutions had the largest proportion of PhDs (56.4% and 35.2% respectively) while staff with Master's degrees predominated in the private institutions.

Table 9.8 **Degree qualification of teaching staff in Santa Catarina by type of institution**

	Professional qualification	Total	Federal	State	Municipal	Private non-profit	Private for profit
1996	Number	5 272	1 527	431	2 875		439
	% less than Master's	37.8	33.3	51.3	74.6		86.8
	% Master's	28.6	44.6	39.7	21.3		10.7
	% Doctorate	33.5	22.1	9.0	4.1		2.5
2000	Number	8 771	1 880	592	867	4 533	899
	% less than Master's	49.8	17.6	35.1	52.6	62.9	58.5
	% Master's	34.0	34.4	42.2	37.9	31.8	34.8
	% Doctorate	16.2	48.0	22.6	9.5	5.3	6.7
2004	Number	14 526	1 866	1 073	2 832	5 474	3 281
	% less than Master's	45.3	15.2	50.2	49.9	48.9	50.9
	% Master's	38.7	24.5	33.7	35.6	42.7	44.2
	% Doctorate	16.0	60.3	16.0	14.5	8.4	4.9
2008	Number	15 362	2 430	887	2 714	5 638	3 693
	% less than Master's	39.4	19.2	23.3	41.7	41.5	51.4
	% Master's	40.9	24.4	41.5	41.9	46.4	42.3
	% Doctorate	19.8	56.4	35.2	16.3	12.1	6.3

Source: INEP (2006 and 2009).

In federal and state HEIs, all academic staff have tenure and their conditions of employment are the same as civil servants. In ACAFE and private HEIs, staff frequently have part-time contracts, which is hardly surprising given that so much of the enrolment in these institutions is for evening courses. In private HEIs, staff are frequently paid by the hour. Inevitably, the predominance of part time and evening staff can be expected to affect adversely the quality of the student experience and collegial life in the private institutions.

Governance and management

In common with the rest of Brazil, higher education in Santa Catarina is governed through the Secretariat for Higher Education (SESU) in the Federal Ministry of Education (MEC) which is responsible for higher education policy development in all states. As already discussed, curriculum guidelines are developed by the MEC and are followed throughout the whole Brazilian system, public and private, because university diplomas can be recognised only by the federal government or its delegated authority. A number of key semi-autonomous agencies assist the SESU in aspects of higher education policy formation and implementation: INEP (*Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira*, National Institute for Educational Studies and Research Teixeira); CAPES (*Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*, Co-ordination for the Improvement of Higher Education Personnel); and CNPq (*Conselho Nacional de Desenvolvimento Científico e Tecnológico*, National Council for Scientific and Technological Development) (Salmi and Fèvre, 2007, p. 59). INEP has an overall role in the collection, analysis and dissemination of data and information about higher education in Brazil and has an impressive website featuring, *inter alia*, the work of SINAES (*Sistema Nacional de Avaliação da Educação Superior*, National Higher Education Assessment System) as well as detailed research and reports on various aspects of the system. CAPES is responsible for the financing and evaluation of postgraduate studies but it also provides scholarships for people to study advance degrees and also evaluates and provides accreditation to graduate programmes. CNPq oversees national issues relating to technology and scientific development. A more detailed discussion of CAPES and CNPq is included in Chapter 10 on Research, Development and Innovation.

In Santa Catarina, the policy leadership and strategic thinking for the sector are provided by the State Secretariat for Education (SED). This work is supported, by the Santa Catarina Policy Forum on Higher Education (*Fórum Catarinense de Políticas de Educação Superior*), set up in 2004 to evaluate the organisation and functions of higher education, analyse the relevance of the teaching, research, and public service activities conducted by higher education institutions; and identify possible areas for improvement in higher education in matters related to regional engagement and funding strategies (Decree No. 1350, 2004). Its overall objective is to improve the responsiveness of higher education to economic and social needs and thus contribute to the development of a knowledge economy in Santa Catarina. Its development is also closely linked to the regional development policy of the state government in which the ACAFE institutions, especially, have a major role. Additionally, an important role is

played by the State Education Council (CEE, *Conselho Estadual de Educação*) which is composed of representatives from the different institutions, government entities and unions. CEE approves the licensing of new institutions and the renewal of authorisation for public as well as private not-for-profit institutions under state or municipal law (with the exception of those that are federally controlled). In Brazil, because the federal government has no direct jurisdiction over state and municipal HEIs, institutional management such as budgeting, human resource policies and student intake for those institutions are the function of the institution, following CEE-SC guidelines.

All HEIs are classified as universities, university centres, institutes and faculties, centres or colleges. Universities provide graduate degree programmes and are required to have a substantial number of full-time, academically qualified staff. University centres are required to have a percentage of academically qualified staff with full-time contracts but are not required to offer graduate education. In principle, the federal government oversees the federal and the private institutions and the state governments oversee the state institutions. The ownership, governance and institutional management arrangements for the various types of HEIs in Santa Catarina are set out in Table 9.9 where the separate legal and governance arrangements for the Santa Catarina community universities (ACAFE) are also clarified.

Table 9.9 **Governance of higher education in Santa Catarina**

	Federal	State	Municipal	Community	Private
	(UFSC) + 2 federal institutes	(UDESC) 10 campuses	2 HEIs	(ACAFE) 13 HEIs	102 HEIs (includes universities and other types of institutions)
Ownership	Federal control	State control	Municipality under state supervision	Private legal not for profit owned by the community state oversight	Private legal for profit (owner can be individual or group). Federal control
Governance and Management	Governing Council (elected) Academic Council	Similar to federal (elected)	Similar to federal and state (elected)	Similar to federal and state but with greater representation from the community (elected) (ii) Academic Council	Governing council (or management) appointed by owners rather than elected Academic Council in some cases but not always

Source: CAPES, Institutional Statutes and review team interviews, October 2009.

Institutional level governance and autonomy

All HEIs are governed by Councils which vary in size and composition with beneath them, various academic and administrative councils and boards of trustees. However, not all private institutions have academic councils and, if they do exist, they have no power. Most private institutions are controlled by a "maintaining institution", which can be a private company, or the Church for religious institutions. These institutions designate the rector and other officers.

In the *federal institutions* the highest authority is the University Council (*Conselho Universitário*) which is largely composed of internal appointments from within the university but which also includes, at least in the case of UFSC, six external representatives designated as follows: three by the Chambers of Industry, Commerce and Agriculture; two by the Union of Workers of the State of Santa Catarina, and one by the Union of Educational Workers of the State of Santa Catarina (Article 16, *UFSC Governing Statute*). Appointments to the University Council are for a period of two years.

At *state level*, in UDESC, the University Council (CONSUNI) includes the rector, vice-rector and elected directors of campuses. Academic and administrative staff are heavily represented, together with at least one undergraduate and one postgraduate student; two external representatives appointed by the Community Council; one retired member of staff and one former student; and one representative of the state government (Article 13 of UDESC Statute). Membership of CONSUNI is made up of 70 individuals and, while all representative members are democratically elected, it is notable that there seems to be a bias towards academic and institutional membership with little or no representation from the wider business community. The independent Board of Curators in UDESC has ultimate responsibility for the financial affairs of the university and its constituent campuses. This Board is composed of one representative from the state government, three from the university, and three from civil society.

In *ACAFE institutions*, half of the approximately 30 members of the Governing Council (GC) are internal appointees (30% academic staff and 20% students) and half are nominated by local trade associations and employers groups, reflecting the community focus of these institutions.

In the matter of institutional autonomy there are important differences between the federal and state HEI model and all other types of HEIs. In Santa Catarina, in spite of the reforms of the 1996 Law (LDB) referenced above, public HEIs are more handicapped than, for instance the ACAFE institutions, and distinctly less autonomous than similar institutions in many OECD countries (Table 9.10). For key human resource management policies

in respect of hiring new academic staff, of terminating contracts and of setting staff salaries, public HEIs are quite inflexible as they are linked to civil service pay and conditions where promotion is linked to years of service and where the recruitment of part-time practitioners from industry is very difficult (Salmi and Fèvre, 2007, p. 61).

Both university and university centres are free to create new courses and to establish the number of student places. Individual institutions depend on the authorisation of the Ministry of Education for these functions. In theory, universities need to be reassessed periodically and could lose their status; however, in practice this has never happened. There is a strong pressure from the private sector to bring isolated, small schools into university centres in order to free them from external oversight.

Table 9.10 **Extent of university autonomy in selected OECD countries and in Santa Catarina**

	Netherlands	Austria	Ireland	UK	Denmark	Sweden	Finland	Brazil (federal & state)	Santa Catarina ACAFE	Santa Catarina Private
Own buildings and equipment	X	X	X	X					X	X
Borrow funds	X			X	X				X	X
Spend budgets to achieve objectives	X	X	X	X	X	X	X	X	X	X
Set academic structure and courses		X	X	X		X	X	X	X	under federal oversight
Employ and dismiss staff									X	X
Set salaries	X	X		X		X	X		X	X
Decide size of student enrolment	X		X		X			X	X	under federal oversight

Note: X means that the university has the power to perform this function autonomously.

Source: These responses come from a survey undertaken in 2003 by members of the OECD's Institutional Management in Higher Education Programme (IMHE), reported in OECD (2003) Education Policy Analysis. The information for Brazil is based on 2007 World Bank interviews (Salmi and Fèvre, 2007, p. 6) and on further discussion during the OECD visits in October 2009.

Both the state and community institutions exhibit greater autonomy and flexibility than the federal HEIs. Even though the MEC has oversight of curriculum content, the UDESC Constitution is very explicit about its autonomy to determine teaching and research policy; to begin and end courses and programmes and to decide on course curricula; decide on places; hire academics; establish international relationships; reform its constitution (*Estatuto da UDESC, Art. 5*).

All types of institutions enjoy considerable autonomy in the appointment of the rector who, with the exception of the private universities, is elected democratically with significant institutional input. In federal HEIs, the rector is appointed by the President of Brazil for a four year term from a list of three candidates who are chosen by their peers in the academic, administrative and student communities. In UDESC, candidates for rector and vice-rector, who must have been with the institution for at least five years, are elected "by direct and secret vote of the university community and appointed by an act of the State Governor" (Article 26). ACAFE HEIs are also responsible for the appointment of the rector who is chosen from among staff who have worked continuously for the institution for at least five years. The usual term of appointment is four years.

Access to higher education in Santa Catarina

In Santa Catarina, as in many other jurisdictions, key determinants of equity of access to higher education lie in the quality of primary and secondary education systems and how well prepared children are to take admission examinations which tend to be biased in favour of students from private high schools who have a considerable advantage when it comes to highly competitive university entrance tests.

Federal and state universities, offering as they do free tuition courses, have the highest demand and, consequently, are highly selective. Admission decisions are made on the results of the entrance examination and due to that reason, a proportionally higher number of accepted students come from private high schools. A detailed discussion of the *Vestibular* and ENEM admission examinations can be found in Chapter 5. Only 14% of high school students in Santa Catarina are enrolled in private high schools, while, for instance, according to a study of the admission cohorts of 2004-06 at UDESC, 55.2% of those students who were admitted came from private schools (Makowiecky, 2007). Moreover, the drop-out rates of accepted students is higher for those who come from public schools.

In 2008, only 5% of all students came from the poorest 40% of all households, and virtually all of these went to private institutions. In contrast, 57.6% of students came from the richest quintile. Over 90% of the students in public universities came from the richest 40% of households, and nearly three-quarters came from the richest 20% of households.

Table 9.11 **Percentage distribution of students by income quintile in public and private higher education, 2008**

	Quintile	Public	Private	Total
Lowest	1	0	1.5	1.3
	2	0	4.3	3.7
	3	8	11.7	11.2
	4	18	27.4	26.1
Highest	5	74	55.1	57.6
	Total	100	100	100

Source: National Household Sample Survey (PNAD, 2008).

Federal initiatives to improve access include *(i)* ProUni Scholarship Programme; *(ii)* Affirmative Action through Quotas and *(iii)* Student loans.

Programa Universidade para Todos (ProUni)

ProUni (University for All Program) is in operation since 2005 and is aimed at placing academically qualified low-income students in third level education in private higher education institutions. Eligibility for ProUni financing is predicated on a passing grade in the ENEM examination and on family income. Full tuition fee scholarships are granted to students whose families have an income equal or less than one-and-a half minimum wages, while a partial tuition fee finances scholarships for students from families with an income no larger than three times the minimum wage. Full time students who receive the full scholarship are also eligible for a monthly maintenance grant. In Santa Catarina, in the first semester of 2009, a total of 6 371 ProUni scholarships were offered to students, of which 4 381 were equivalent to full tuition and 1 990 to partial tuition.[4]

While ProUni works as a variation of a voucher scheme, it is important to note that ProUni scholarships do not transfer actual funds to the participating HEIs or to eligible students. The scholarship scheme is operated by granting tax exemptions to participating institutions upfront based on the number of scholarship students enrolled. In Santa Catarina,

students can attend the ACAFE institutions and private HEIs and be supported by ProUni, which has become a significant source of indirect funding. However, the review team was informed during visits to some ACAFE institutions that because of issues arising with the taxation authorities, the HEI in question was not eligible for ProUni financing, and consequently was facing significant financial difficulties.

Affirmative action initiatives

Because investment in improving the quality of primary and secondary education will take time, affirmative action policies have been developed in Brazil in order to increase participation in higher education by afro-descendents, indigenous people and handicapped individuals, as well as by students from lower income families. Affirmative action policies are enforced by federal law[5] although institutions have some degree of flexibility in their implementation. Special attention has been paid to the ethnic background of students with a quota system which, in general, allocates 10% of places for new students from racial minorities and 20% to students from public schools. This approach was controversial when it was introduced in UFSC in 2007 on the grounds that those students who had done well in the *Vestibular* were crowded out by others from the target groups who had done less well. UDESC also established its own Affirmative Action Programme in September 2009 to ensure that a minimum of 20% of first year places will be assigned to applicants from public high schools. In November 2009, the quota system was the subject of legal challenges in Rio de Janeiro following public discussions about whether the issue of lower participation is one related to poverty or to discrimination. One prominent researcher in the Institute of Studies of Work and Society in Rio de Janeiro expressed the following opinion: "the main issue has to do with poverty and the bad quality of basic education. People who are poor don't have access to good education; they have more difficulty in having access, in particular to the more prestigious courses. It is a question of poverty not of race" (Simon Schwartzman, quoted by BBC on 1 November 2009).

Academic leaders in Santa Catarina share this view. One of them has stated that "the central problem is located in reducing poverty and improving the overall quality of basic and secondary education" (Makowiecky, 2007).

Research on international experience of affirmative action programmes indicates that they do not always work very well in practice as they can have unintended outcomes such as an increase in racial tension and resentment as well as inherent difficulties in targeting participants (Salmi and Fèvre, 2007, pp. 17-20).

Student loans – federal and state financed

The main scholarship financing programme (for higher education) in Brazil is the Student Financing Programme (FIES, *Programa de Financiamento Estudantil*), initiated in 1999 to replace a previous loan scheme, the Educational Credit Programme. There have been significant improvements in the scholarship loan in Brazil after the FIES was introduced. FIES is administered by the Federal Savings Bank (*Caixa Econômica Federal*) and provides loans (paid directly to the higher education institutions) to needy students who are not beneficiaries of ProUni to cover up to 50% of their tuition costs (students who are beneficiaries of ProUni can receive a loan of up to 25% of their tuition costs). Priority is given to students who scored well on the ENEM. The fixed interest rate is set by the *Conselho Monetário Nacional* (National Monetary Council) and, for contracts signed in 2006 was 6.5% (3.5% for students studying to be teachers). While attending a HEI, the borrower must make interest payments every three months up to a fixed maximum. Repayment of the principal begins after graduation. For the first 12 months (phase I) following graduation, the student must pay monthly instalments that equal 50% of the tuition fee charged in his/her last semester. In phase II the debt balance is divided into equal instalments and paid over a period of six years. In 2004 the system was reformed to remove guarantor requirements and to introduce weighting in the allocation of loans to minority ethnic groups (*Source*: Buffalo University).

The State of Santa Catarina also has a number of scholarship and research funds which are specifically targeted at increasing access for lower income students. These programmes provided total or partial remission of fees in ACAFE or private HEIs to about 13 000 students in 2008 and to an estimated 20 240 in 2009. These are further discussed below.

Funding

Resource mobilisation

In 2006, Brazil's public spending on all levels of education was 4.9% of GDP of which 0.8% was expended on tertiary education.

Table 9.12 **Education expenditure as a percentage of GDP 2006**

	All levels	**Tertiary education**
OECD Average	5.7	1.4
Chile	5.7	1.7
Mexico	5.7	1.1
Brazil	**4.9**	**0.8**

Source: *Education at a Glance: 2009*, page 218.

As a percentage of the overall education budget, spending on higher education in Brazil is less than the OECD average. However, the ratio of expenditure per student in tertiary to primary exceeds by more than 100% that of all other OECD countries (OECD, 2009*b*, Table 11, p. 108). These numbers include public institutions only since information on private spending on education is not available in Brazil. Given the high percentage of students in the public higher education system that come from the top income quintile, this investment is regressive. However, these numbers may not take into account state investments in primary and secondary education.

Figure 9.1 **Ratio of expenditure per student in tertiary to primary education**
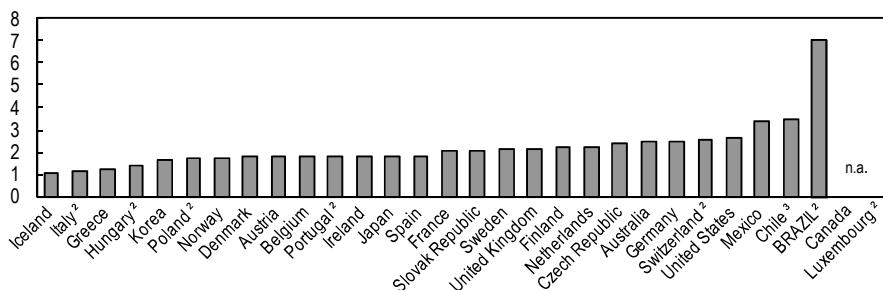
Notes:

(1): The year of reference is 2004.

(2): Includes public institutions only.

(3): The year of reference is 2006.

Source: OECD, Education at a Glance, in OCDE, 2009*b*.

The federal government directly finances the operation and maintenance of federal higher education institutions. In addition, financial resources for higher education are transferred to institutions through a variety of different programmes. As shown in Table 9.3 the funding of higher education in Santa Catarina comes from multiple sources depending on the ownership and governance of the institution. As explained, federal, state and municipal level institutions are almost wholly financed by public funds, although state and municipal HEIs can access local and private funds. The state education budget allocates 2.05% to UDESC.

For postgraduate study and research the main source of such funding is CAPES[6] which provides fellowships for graduate programmes. In 2008, CAPES financed postgraduate bursaries for 995 Master's and 388 Doctorate students in Santa Catarina. CAPES also granted scholarships for 40 short postgraduate courses in the state (*Concessão de Bolsas de Pós-graduação da Capes no Brasil, Filtro Ano: 2008*). The institutional destination of these bursaries and scholarships in Santa Catarina was as follows: federal HEIs: 177, UDESC: 36; municipal institutions: 20 and private HEIs: 31. The science and technology institutions – CNPq, FINEP (National Agency for Financing Studies and Research, *Financiadora de Estudos e Projetos*) also transfer money to institutions on a project-by project basis.

As noted above, the not-for-profit ACAFE institutions charge tuition fees. Both ACAFE and private HEIs are eligible for state support for payment of scholarships to economically disadvantaged students (Articles 170 and 171 of the State Constitution). ACAFE institutions are also eligible to receive federal and state scholarships for research funded by CAPES and CNPq. All HEIs are allowed to undertake industry funded research and other private services.

There is anecdotal evidence that some HEIs struggle with default in payment of fees which, in the case of the private institutions are, in practice, almost their entire revenue. Sample monthly fees quoted to the review team from private HEIs ranged from BRL 340 for teacher training; BRL 450 for business studies; BRL 500/600 for law; BRL 800 for engineering; BRL 1 800 for dentistry; and BRL 2 000 for medicine. Thus, some students in Santa Catarina are paying the equivalent of USD 1 155 per month for medical training.

Resource allocation

Targeted state programmes to support higher education

Under Articles 170 and 171 of the State Constitution, Santa Catarina finances the following:

- *Scholarship and research fellowships*: The aim of the programme is to increase access for lower income students by offering total or partial remission of tuition fees. The number of undergraduate beneficiaries is relatively small, amounting in 2008 to 11 355 out of a total enrolment of 216 062. The number of undergraduate beneficiaries has, however, risen sharply in 2009 to about 18 000. Research grants have recently risen sharply from 923 graduate students in 2008 to about 2 000 in 2009.

- The cost of this programme was BRL 34.7 million in 2008, and BRL 37.8 million in 2009, a considerably smaller rate increase, especially in real terms, than in the number of beneficiaries.

There are two much smaller Santa Catarina programmes of student support:

- *Programme of Higher Education for Regional Development*. (*Programa de Educação Superior para o Desenvolvimento Regional*, PROESDE): supports academic research and extension activities relating to regional development through joint projects between the State Secretariat for Regional Development (SDR) and those existing undergraduate courses in the ACAFE HEIs that are considered strategically important. In 2008, BRL 2 million, financed 718 students; in 2009 this is expected to fall: an expenditure of BRL 715 000 will benefit 240 students.

- *Fund to support the operation and development of higher education in the State of Santa Catarina* (*Fundo de Apoio à Manutenção e ao Desenvolvimento da Educação Superior*, FUMDES) provides grants directly to students who have been resident for at least two years in the State of Santa Catarina and who attended public high school or a private institution on full scholarship. FUMDES is financed by earmarking 2% of certain taxes of private corporations and 1% of state-financed research projects. In 2009, this was expected to amount to about BRL 4.3 million and to benefit 2 900 students. The grants are not tied institutionally or confined to the State of Santa Catarina, but they are not for use abroad.

The team was also informed that on 15 October 2009 a new financing instrument had been approved by the state, the *Fundo de Desenvolvimento Social* (FUNDOSOCIAL, Social Development Fund) which will disburse 0.3% to finance full scholarships, through the acquisition by the state, of the empty places in the HEIs. It is planned to allocate 90% of these funds to ACAFE and 10% to private HEIs, but only to those that are accredited. This initiative is further discussed below in this chapter.

Inefficiency

It is a source of concern that, in 2004 of the 80 366 places on offer in Santa Catarina, 25 930 in ACAFE and private HEIs remained unfilled. A further distortion is that the review team was informed that some students manage to register for more than one public HEI in Santa Catarina thus unfairly occupying scarce free places in the public system. The team was also informed that private non university institutions often inflate their places so that they do not have to request authorisation from the federal government every time demand grows. Student-staff ratios are very low overall in Brazil, especially in the federal universities where "*generous pension schemes and a disproportionate number of administrative staff*" contribute to inefficiencies (Salmi and Fèvre, 2007, p. 2). The same pattern appears also to be true in Santa Catarina where, in 2008, the proportion of technical and administrative staff was 45% of the total staff numbers in the federal HEIs (INEP, 2009). Student-staff ratios appear to be very low even in private HEIs (Table 9.13). However, this data, while broadly accurate for public HEIs, does not represent student: teacher equivalents. And because most teachers in the private sector teach only a few hours a week in the evening, the students to teacher equivalent in the private sector is probably at least five times greater than the INEP figures, thus greatly contributing to the efficiency (and profitability!) of the private HEIs.

Table 9.13 **Student: teaching staff ratio in Santa Catarina, 1996-2008**

	Total	Public	Private non-profit	Private for profit
1996	13.2	13.3		12.4
2000	14.6	12.2	16.3	14.4
2004	12.3	11.0	14.3	11.1
2008	13.4	11.6	15.0	13.7

Source: INEP (2009).

Quality

In recent years, efforts aimed at improving the overall quality of higher education in Santa Catarina have been primarily driven by regulations and policies established at the national level.

The quality assurance framework prevalent in Brazil – and consequently in Santa Catarina – has unique complexities as result of the complicated nature of the higher education system in which complementary, interlinked and some times conflicting roles are assumed by a variety of federal and state agencies. As seen in Table 9.14, key quality assurance activities as applied to academic offerings are undertaken by various agencies depending on the type of institution in question and on the level of the degree or programme being offered.

At the **institutional level**, the National Institute for Educational Studies and Research Teixeira (INEP) takes the leading role in implementing an overall institutional evaluation with the objective of fostering an improvement in the quality of higher education, according to the 2004 law which established the National Higher Education Assessment System (*Sistema Nacional de Avaliação da Educação Superior*, SINAES). The Institutional Evaluation has two components: a self-evaluation which is co-ordinated by an *ad hoc* Internal Evaluation Commission (*Comissão de Avaliação Interna*, CPA) established at each institution based on a series of guidelines developed by the National Committee for Evaluating Higher Education (CONAES, *Comitê Nacional de Avaliação da Educação Superior*), and an External Evaluation which is conducted by specific peer review committees assembled by INEP which use a questionnaire composed of 41 indicators covering 10 dimensions of analysis: mission and institutional development plan; policies for teaching, research and public service; institutional social responsibility; communication with the community; human resources policies; organisation and institutional management; physical infrastructure; planning and evaluation; student policies; and financial sustainability.

In order to initiate the process of offering **new academic programmes**, institutions are subject to a variety of oversight processes conducted by various agencies, including *credenciamento* (government overall institutional approval), *autorização* (initial government authorisation granted to the institution permitting it to offer one specific academic programme), *reconhecimento* (government final authorisation to grant degrees once an academic programme which already received its initial authorisation has opened and has students who have almost completed their academic workloads), and *acreditação* (periodic external review of academic programmes).

Table 9.14 **Distribution of some roles in quality assurance in higher education in Santa Catarina**

Type of institution	Overall steering authority to assure quality	Authorisation and further evaluation of undergraduate academic programmes	Authorisation and further evaluation of graduate programmes
UFSC	MEC and CNE	CNE	CAPES
Federal Institute of Santa Catarina	MEC and CNE	CNE	CAPES
Federal Institute of Education, Science and Technology of Santa Catarina	MEC and CNE	CNE	CAPES
UDESC 10 campuses	CEE	CEE	CAPES
Municipal	CEE	CEE	CAPES
Community Universities (ACAFE)	CEE	CEE	CAPES
Private	MEC and CNE	CNE	CAPES
University Centres	Private: MEC/CNE Public: CEE	Private: CNE Public: CEE	CAPES
Other	MEC/CNE Public: CEE	Private: CNE Public: CEE	CAPES

Source: Review team interviews, October 2009.

When starting a new undergraduate programme, an institution must obtain initial authorisation from the appropriate government authority verifying that a series of requirements has been fulfilled in terms of the programme's didactical/pedagogical organisation, academic staff and physical infrastructure. Three years after authorisation has been granted and the programme has been in operation, a three-person peer review committee, appointed by either CNE or CEE as is appropriate (refer to Table 9.14), verifies the quality of the new programme. Over the course of a two day visit, the team verifies that all required elements of the programme are in place. This process includes consultation and dialogue with students and faculty members. Based on this review, the team produces a report with a recommendation which serves as the basis for the final authorisation of CNE/CEE (known as *reconhecimento*). After this three year review, a similar review is supposed to be carried out every five years. In theory, under this mechanism, those institutions being reviewed could lose their status, or could be forced to close academic programmes if their quality is low. However, in practice, there is no recollection of any single institution

being placed in such situation, or loosing its accreditation (Salmi and Fèvre, 2007). Such a situation implies either that all institutions together with their respective academic offerings are of comparable quality, or that there is no capacity in the system or willingness of the involved agencies to rigorously enforce the quality standards. The team considers that, most probably, the latter case applies and that there is little or no appetite to implement the existing quality assurance mechanisms. Obviously, when a quality assurance system lacks the capacity to differentiate levels of quality, and it lacks the ability to differentiate institutions or academic programmes that are not up to the previously defined quality criteria, it becomes somewhat irrelevant, and it is seen more as a bureaucratic requisite than as a serious effort at systemic improvement.

In contrast, the initiation of new graduate programmes follows a much stricter and more selective authorisation, recognition and renewal process handled solely by CAPES. The process includes the following steps: the scientific committee of CAPES appoints a team to conduct the initial visit, at the invitation of the HEI; the team makes a decision about the authorisation and recognition regarding all graduate programmes; and every three years a similar CAPES committee conducts a programme by programme review for the renewal of authorisation and recognition.

To provide an idea of the rigour with which authorisation of academic programmes is performed by level, it is relevant to note that 30%-40% of proposed graduate programmes are rejected, while in the case of undergraduate programmes, the team was informed that there has never been a recommendation to withhold recognition of a programme in an accredited HEI.

Taking into consideration that the two aforementioned mechanisms for quality assurance (the institutional effectiveness process and academic programmes review) are in place, and given the central role of the government in enforcing both, it could be argued that there is no need for further improvement to the quality assurance framework in Santa Catarina, or moreover, that measures aimed at improving it could be very difficult if not impossible to implement because they would require changes to federal laws. However, the review team considers that the quality framework in Brazil in its current form and, by extension, that of Santa Catarina, requires significant improvement in order to support an internationally competitive higher education system.

The Brazilian quality assurance higher education framework as it is applied to Santa Catarina is still a Type I Traditional one (see Table 9.15) in which emphasis is placed on quality control, mostly at the initial stages of the offering of academic programmes. The quality control system is

implemented by a central government agency. During the OECD review visit, many and varied stakeholders raised the overemphasis on procedures already mentioned above. Issues raised were that the current system is highly bureaucratic and complicated and has been "pre-defined" through a series of administrative guidelines mandated by the Ministry of Education in such a way that it ultimately becomes more of a system of compliance with bureaucratic requirements to be fulfilled than an integrated process aimed at fostering a culture change at higher education institutions. The team considers that a quality assurance system should however be viewed as in constant evolution. It is recommended for Santa Catarina to explore ways to develop and follow a roadmap which will guide the transition of the quality assurance system to a Type III Mature one. The dilemma for Santa Catarina is if it should wait for changes to happen at the national level, or if it should move ahead towards a Type III quality framework for its higher education system.

As has happened in other countries, the development of the quality assurance system is key to helping higher education institutions in Santa Catarina substantially improve their teaching, research and public service functions. If government and society in the State of Santa Catarina are serious in their desire to become a leading Brazilian state in the knowledge-based economy, significant effort must be exerted with the goal of improving the quality of higher education institutions and their academic offerings using as a reference not only the highest national benchmarks, but more importantly, relevant international ones. In other words, the higher education system in Santa Catarina must move beyond nationally defined quality benchmarks. How it can make a difference in Santa Catarina is in not only by fulfilling national quality criteria, but at the same time defining international targets and working to achieve them. In pursuing this goal, it is important to emphasise the need for flexibility and diversity. Pursuing quality by utilising international benchmarks does not mean that characteristics of one single type of institution from abroad should be utilised as a reference, or that accreditation offered by accrediting agencies from abroad should be chosen as the sole proxy of quality based on international standards. Also, this does not mean that all institutions should aspire to become top level international research oriented universities, but that in each of the subsectors, the institutions should establish ambitious but achievable goals not only meeting with national benchmarks and requirements but, more importantly, also defining them in light of international standards and practices, while highly valuing the diversity of institutions and institutional missions.

Table 9.15 **Typology of tertiary education quality frameworks**

Variable / type	Type I: Traditional	Type II: Transitional	Type III: Mature	Brazil and Santa Catarina
Approach for quality	Quality Control (QC).	Quality Assurance (QA).	Quality Enhancement (QE).	Initial work in QA, and still challenges in QC.
National efforts	Focus on procedures to control/impose quality measures.	Procedures accompanied by incentives, training and monitoring.	Accreditation based on adoption of QA practices.	Still a strong emphasis on procedures and check-lists.
Level of institutional intervention	Institution-wide.	At the level of academic offerings.	Institutional and academic offerings.	Major emphasis on institution-wide intervention with initial work on accreditation of academic offerings, especially at the level of graduate programmes.
Timing of intervention	*Ex ante facto.*	*Ex post facto.*	Both.	Mostly *ex ante facto* with emphasis in the initial stage of offering of academic programmes.
Dominant evaluation approach	Educational inputs. Emphasis on institutional indicators.	Educational outcomes and processes. Emphasis on learning outcomes and institutional effectiveness.	Both.	Major emphasis in educational inputs, and some attention to outcomes through checklists defined by a central agency.
Participatory approach	Mandatory participation.	Voluntary participation.	Both.	Mandatory participation.
Applicability by institution type	Either private OR public educational institutions. Differential treatment.	Private AND public educational institutions. Trends towards equal treatment.	Educational institutions and specialised accrediting agencies. Equal treatment.	Applicable to both although with differential enforcement and regulations.
Applicability by institutional level	Universities.	Universities and some non-university institutions.	All levels of the tertiary education system.	All levels of the tertiary education system.
Level of government participation	Central. Government Agency.	Semi-autonomous.	Independent. Non-governmental entity.	Central.
Level of student participation	QA system application.	QA system design.	Both	QA system application.

Source: Adapted from Marmolejo (2005).

In pursuing a goal to become an internationally competitive higher education system, Santa Catarina can explore the feasibility of establishing a statewide independent quality assurance organisation or agency to which all higher education institutions in the state could be invited to participate on a voluntary basis. Such an independent agency could establish accreditation criteria competitive at the international level. At the initial stage, voluntary involvement could be supported with incentives offered to those institutions willing to participate.

This effort requires the establishment of a series of strategies and concrete incentive-linked plans with the overall goal of improving the quality assurance system. These efforts may include: *(a)* greater awareness, understanding and training among the professionals within the higher education community (academic staff, students and authorities) about the importance of quality; *(b)* "educating" external stakeholders (employers, parents of potential and current students, alumni) about the importance of a sound quality assurance system in higher education and ways in which they can become more active participants; and *(c)* defining quality thresholds with relevant peer institutions and systems on the international scene. In the Latin American context, similar programmes established in Mexican states and in Chile show the effectiveness of such an approach. Other countries, including the United States and Canada have established like initiatives at the regional and provincial levels respectively, with significant positive outcomes. Ultimately, only by incorporating additional interested parties in the process and by linking efforts more concretely with outcomes, incentives and institutional change, will higher education institutions take more "ownership" of their own institutional quality assurance systems as a crucial tool for improving their institutional effectiveness rather than a mere requisite imposed by government agencies.

In addition, the focus of the current quality initiatives in Santa Catarina's higher education institutions – based on the regulations and guidelines, as defined by central agencies – place excessive emphasis on proxies and indicators based on inputs (number of students per teacher, books per discipline, students per computer, publications per faculty member, etc.) and on internal analysis. This institution-centric and input-based approach gives less importance to the analysis of educational outcomes and institutional impact. A good example is the fact that according to the guidelines issued by the Ministry of Education for the *reconhecimento* and further periodic evaluation, consultation with graduates of the academic programme under review is given only a marginal importance equivalent to 5% of the overall score. The analysis of a graduate's profile, according to the aforementioned guidelines, should be based on "coherence in comparison with the goals that were defined when the programme was

designed". As can be seen, such subjective analysis – which usually is based on interviews with a few graduates – does not include consistent analysis of the real performance of graduates, their employability and the relevance of the academic contents being taught in the classroom and the corresponding skills being acquired. It is evident that a sound quality assurance system must place greater importance to the performance of graduates, and on the information provided by the employers sector. By doing this, institutions not only will have more relevant input for their academic programmes, but also it will provide them with opportunities to strengthen on a more systematic way ties with graduates, employers, and the community at large.

Labour market linkages and relevance

As has been discussed already in Chapters 5 and 7, career counselling and sources of information to help students to choose a career are not generally available at school level in Santa Catarina. There is, however, a variety of easily accessible sources of information about the availability of courses in HEIs. For example, the National Higher Education Assessment System (SINAES) operates an informative website that covers all HEI courses throughout Brazil. However, there does not appear to be a source of information about the possible labour market implications of career choice, such as the Chilean *Futurolaboral* (www.futurolaboral.cl).

Educational administrators and institutional managers made references to possible mismatches of the qualifications of university graduates and demands in the labour market. The team was not furnished with data about graduate employment and unemployment in Santa Catarina, but even if it had this data, it is not clear that it would be useful in the allocation of state resources to education. In a state that is such a small part of the total Brazilian economy, it is to be expected that a proportion of tertiary level graduates will find employment elsewhere in Brazil, and that part of the demand for specialised graduates will be met by those trained in other states. No attempt was therefore made to carry out a market analysis for high-level skills.

Most institutions visited have rather *ad hoc* information about how their graduates are performing in the labour market. No institution reported conducting a systematic Graduate Tracking Survey, although UDESC has implemented a system that is partially aimed at establishing the relevance of its courses. A feasibility study to establish the potential employability of graduates is conducted by HEIs as one of the prerequisites for first-time institutional or government course approval; however, once the course has been approved, systematic evaluations of its relevance are no longer conducted.

Because ACAFE and private HEIs are in competition with each other for students and more dependent than the public system on student enrolment for their own financial viability, they informed the team that they are aware of demographic trends and that they regularly collect statistics to understand the characteristics of local labour market demand. Institutions also rely on informal feedback from employers and from graduates through various initiatives such as meetings with local Chambers of Commerce and business associations. These institutions demonstrate quite a degree of flexibility in their willingness to monitor the relevance of their programmes and to introduce new courses and modify or drop existing courses as required by student demand or possible overlap or duplication with competitors. Because academic staff is hired often on a part time or hourly basis, the only constraint on private HEIs in this process of continuous reassessment of their course is their ability to get an accurate picture of likely student demand and their ability to devise courses of an adequate level of quality.

Nonetheless, in some meetings the team was informed of the apparent mismatch between courses offered and what the labour market requires and that many students do not work in their area of specialisation.

The ACAFE HEIs are active in orienting their thinking towards future economic needs of the communities which they serve. Several ACAFE HEIs visited by the team reported that they had regular meetings with municipalities and branches of local government to discuss the improvement of education for entrepreneurship and plans to develop innovation and business incubators on their campuses.

Curricula

As noted above, curriculum and standards are the responsibility of the federal level and all HEIs are required to adhere to them in relation to 80% of course content. Accredited HEIs add regional elements to respond to the economic and social requirements of their catchment area. Many academics agree that the curriculum is too narrow and lacking in innovation. One of the main reasons for that is attributed to the professional associations which have little incentive to change. The curriculum workload is very heavy, considering that a typical number of hours in class is 3 400 in core subjects plus 240 hours in optional subjects and 300-400 hours in practical training. Such a heavy workload does not allow time for students to develop independent study or research habits. Many institutions are initiating reforms of what they perceive to be narrow and inflexible curricula by attempting to introduce core modules that encourage more flexibility and

choice for students. That is the case of UDESC at the state level. Here also the ACAFE institutions have a particular strength as 20% of the course content relates to community social or research needs.

Credit system

All HEI courses carry credits which are valid in all federal and state universities in Brazil. As a general rule, courses and syllabi are comparable and students can expect about 70% of the content of a similar programme in another institution to cover the same subject matter so that, for example, Bachelor's and Master's students do not have difficulty in transferring between and among HEIs in Brazil. Progression from a BA in one HEI to an MA in another geographically removed HEI is equally possible within the Brazilian system.

However, the review team was informed that in practice there is some rigidity in the transferability of academic credits, especially between the public and private system. Moreover, because the curriculum grid (academic workload) is very rigid and oriented towards a particular rather narrow specialisation, it is not usually possible to take credits in other subjects to count towards a degree with the exception of the 10% of optional subjects that a student can choose from other courses. And there is no clearly defined pathway between short courses and between vocational education institutions and HEIs.

Distance and open education

Distance Education Courses in Brazil are accredited by the Federal Ministry of Education. In 2008, 115 institutions offered 647 distance courses nationwide and enrolment in distance education increased by 96.9% over the previous year and now represents 14.3% of total national enrolment in higher education. Moreover, the number of graduates in distance education grew by 135% in 2008 compared to 2007. In contrast to Brazil as a whole, however, in 2008 there are very few distance students enrolled in Santa Catarina and the INEP 2009 Census could only find 102 in total (INEP, 2009).

Many institutions in rural areas have identified the potential of increasing student numbers and gaining market share by attracting students employed in agriculture or from remote areas. These institutions are beginning to establish distance learning offices on campus and are making

teaching materials available on their websites. One institution visited has established an accredited Distance Education Centre (one of only two in the state so far). Fees charged are about 30% less than regular fees. Content is being purchased from a private institution in Paraná State.

Box 9.2 **UNISUL**

The University of Southern Santa Catarina, a municipal education foundation in Tubarão, claims to be the largest provider of distance education for undergraduates in Brazil. In 2008, almost 50% of the 41 000 students enrolled were in distance education. *UnisulVirtual* uses digital communication resources to allow students to have permanent contact with their tutors, with their class colleagues, with the institutional administrative departments and remote access to course content and learning activities. These students come from all parts of Brazil and beyond.

Whereas face-to-face students are mostly young and have recently finished high school and still live with their parents, in distance education, the students are adults and have jobs and are financially independent. The average age in face-to-face programmes is 21.7 years, and the average age of the distance students is 34.8 years.

UnisulVirtual created the Virtual Learning Space tool as the main resource for pedagogical mediation between teachers and students. The students also receive printed teaching material, CD-ROMs and DVDs to do their reading and simulation activities which are compulsory to the programmes. The tests requiring their presence are held in military organisations of the Army, Air Force and the Navy, and at partner universities throughout Brazil. The UnisulVirtual students can choose the city where they will sit for the examination, and this allows cost reductions on transport and adds flexibility and mobility to the model.

Within Unisul, *UnisulVirtual* also does the planning for the setting up and implementation of new distance programmes; co-ordinates the training of teachers and technicians in pedagogic methodologies in distance education; develops web technologies for distance education; and, in partnership with conventional education campuses of the university, promotes the offering of distance courses so that the face-to-face students can do up to 20% of their contact hours enrolled using the distance education resources, with flexible education.

http://portal2.unisul.br/content/site/auniversidade/campusdaunisulvirtual/englishovervi ew.cfm

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Life long learning

The team was not made aware of a life long learning strategy for Santa Catarina. The state does, however, have distinct strengths that will assist policy makers in the development of such a strategy.

- First, there is currently a strong awareness of the importance of tertiary and vocational education for the social and economic development of the state especially among state level policy makers, the academic community and local authorities.

- Secondly, there already exists a strong network of institutions spread throughout the state which has the capacity to deliver courses to learners of all ages in either face to face or in distance mode.

- Finally, there already exist a proliferation of evening courses and short duration professional and technological courses and a strong tradition of attending these courses has developed.

However, the quality of some of the short courses and the accreditation of the institutes that sponsor them remain a worry. And the current practice of charging fees in the not-for- profit sector is an obstacle to those who might most benefit from additional learning opportunities and will be an obstacle to the development of an equitable LLL system. These issues are addressed below.

Internationalisation

Internationalisation of higher education is, in today's world, an important component of national and regional education policies. A well-designed internationalisation policy will improve the quality and relevance of educational offerings in light of the demands imposed by a globalised and knowledge-based society (Gacel-Avila, 2005). In this regard, a more comprehensive definition of higher education internationalisation is not confined to what institutions do, but to their contribution to an overall regional or national strategy. This comprehensive approach leads higher education institutions to recognise that internationalisation is not just about the exchange of students, signing of agreements with peer institutions, or participation of the institutional leadership in international organisations. On the contrary, a comprehensive internationalisation policy requires, in addition to the aforementioned components, a global, international and intercultural dimension in the teaching, research and public service activities on campus.

Considering the important role that Brazil plays and will continue to play in the global scene, and recognising its leading presence in the MERCOSUL (Southern Common Market, *Mercado Comum do Sul*) region, it is very evident that the country will need internationally-minded and capable human capital resources. In this regard, higher education will be required to become strongly aligned with the Santa Catarina government's aspiration to improve the international competitiveness of the state. This aspiration is not only present in government and business circles and in the leadership of higher education institutions, but more importantly, it is considered as a key priority by students and faculty members consulted during the OECD review visit. In other words, a clear consensus exists in Santa Catarina about the need to internationalise effectively its higher education system.

However, few of these aspirations have yet been fulfilled and in general, internationalisation in higher education in Santa Catarina is very marginal, if not insignificant. As would be expected, the largest institutions in the state, UFSC and UDESC, have accomplished the most significant work in this area, although the scope and type of their international activities are also limited. In a similar fashion to what happens in other parts of Brazil, internationalisation is confined to traditional activities such as the signing of international agreements with peer institutions, participation in international networks or associations, and the participation of a very small number of students and faculty members in international mobility programmes. One area in which more international efforts are conducted is in the work done by researchers from graduate programmes with peers from other countries. Moreover, limited attention is given in higher education institutions in Santa Catarina to efforts aimed at internationalising the curriculum of academic programmes, further scaling-up the international mobility of students and faculty members, and fostering in students an internationally-competitive command of at least a second language.

It should be noted that this limited attention to internationalisation of higher education in Santa Catarina mirrors what happens at the national level. Brazilian universities have still not given strategic importance to the process of internationalisation (Laus and Morosini, 2005). During the review visit, a variety of reasons for such limited internationalisation of higher education in Santa Catarina were consistently mentioned by institutional representatives: government centralisation of the system limited efforts to internationalise the curriculum; the absence of second language teaching because of assumptions that students acquire this competence earlier in their education; faculty members who are not adequately prepared to teach international subjects, institutional policies towards internationalisation that are mostly symbolic, and limited resources to support student and faculty mobility.

Table 9.16 **A comparative analysis of internationalisation of higher education in Santa Catarina**

Internationalisation elements	Level of development and implementation in leading countries and institutions	Situation in Santa Catarina
International dimension in the institutional mission.	• The international dimension is clearly defined as part of the institutional mission.	• An indirect mention to the international dimension is included in some institutional missions.
Internationalisation policy.	• Clearly defined and publicised.	• Exists in large institutions. • Non-existent in medium and small institutions
Office of International Programmes (OIP).	• Formal unit fully dedicated to support internationalisation. • Adequately trained professional staff. • Formal budget.	• OIP exists in large institutions. • OIP's leadership in charge of a political appointee (usually a faculty member), subject to change when a new university administration takes over. • OIP non-existent (or in charge of a part-time employee) in medium and small institutions. • Formal budget for OIP in large institutions, and no specific budget in medium and small institutions.
Internationalisation of the curriculum.	• Present in most of the academic programmes. • Mechanism in place to include the international dimension when relevant in courses.	• Only present in a few academic programmes. • No formal mechanism established to include the international dimension in the review of the curriculum.
Outbound student mobility.	• 5-10 % of all domestic students participate in a study abroad programme.	• Less than 0.5% of domestic students participate in a study abroad programme.
Inbound student mobility.	• 5-10 % of total enrolment composed of international students (including degree-seeking and exchange students).	• Less that 0.5% of total enrolment composed of international students in higher education institutions in Santa Catarina.
Full command of a second language.	• All students must demonstrate full command of a second language.	• Policies in place in some institutions, although not enforced. • Optional remedial, fee-based courses offered to interested students.
International academic staff mobility.	• In-bound and out-bound mobility of academic staff. • Sabbatical programmes aimed at international experiences. • Policies to attract foreign teaching academic staff.	• Limited number of academic staff being supported for out-bound mobility, mostly at large institutions. • Insignificant number of foreign academic staff in regular teaching activities.

Table 9.16 **A comparative analysis of internationalisation of higher education in Santa Catarina** (continued)

Internationalisation elements	Level of development and implementation in leading countries and institutions	Situation in Santa Catarina
Subjects being taught in a foreign language.	• Availability of some regular subjects being taught in a foreign language.	• In general, no regular courses being taught in a foreign language.
International partnerships for the development and offering of dual/joint/sandwich degrees	• Offering of degrees in conjunction with selected international partners. • Strict internal quality assurance policies and regulations aimed at guaranteeing similar quality to regular domestic offerings.	• Some programmes offered in conjunction with international partners. • No formal quality assurance policy.

Source: OECD review team.

Table 9.16 provides a succinct review of the different components that an internationalisation strategy at the institutional level should ideally have, as well as a review of the gap existing between these components and the current situation of Santa Catarina's higher education institutions. It is recommended that higher education institutions base their roadmap for bridging this gap on the difference between the stages as identified in the table. By fostering higher education institutions at the state level to develop and implement internationalisation plans, and by better aligning current government incentives, policies and financial support mechanisms, the state could be of great help in assisting the higher education system to become more internationalised.

The policies related to second language acquisition – or lack thereof – deserve special mention. Considering the unique ethno-linguistic heritage of Santa Catarina in which knowledge of a second language is common among older generations, the lack of attention to language training in the higher education institutions seems paradoxical. Today, people in Santa Catarina regret not keeping the language of their ancestors. The state government has made initial efforts in offering optional language courses after school in elementary education, but those actions are insufficient and too dispersed. Members of the review team learnt during the review visit that the acquisition of a second language is not considered a worthwhile activity in higher education, and that the lower levels of the educational system are often "blamed" for deficiencies in language training. At the same time, students and academic staff in elementary and middle school tend to "blame" higher education for not adequately preparing teachers specialised in second language acquisition. Out of this "blame game" emerges the

reality that command of a second language is not present in most students in the educational system in Santa Catarina and that, rather than passing the responsibility from one educational level to another, a serious concerted action should be taken in order to address this important deficiency in the educational system.

R&D and Innovation

The analysis in this chapter shows that Santa Catarina is fortunate in having a structurally diverse system of higher education which is well spread throughout the state. However, institutions that are rated excellent by international standards would typically include both undergraduate and graduate education, and, as is shown in Table 9.6, opportunities to progress to postgraduate studies in Santa Catarina are mostly available only in public universities which are, for the most part, located in Florianópolis. In this context, the team was informed of plans to open two new federal institutions in Chapecó and in Joinville.

Research-led teaching is a distinguishing mark of the best universities worldwide. In Santa Catarina research is confined mostly to UFSC and UDESC. According to the national ranking known as General Index of Courses (IGC, *Índice Geral dos Cursos*) published in 2008 by INEP and which includes the 175 most important HEIs in the country, UFSC was situated as 15th at the national level in quality of graduate courses while UDESC was positioned in 23rd (INEP, 2008). Chapter 10 takes up these challenges for Santa Catarina and discusses, *inter alia*, the role of universities as a seat of research and scholarship and as major contributors to national and state innovation policy.

Challenges and recommendations

This report recognises that some policy interventions which would improve the higher education system lie outside the direct control of the state government. Nonetheless, there is a range of policy options available to the state education policy-makers that would encourage the development of a more flexible, accessible and responsive system of higher education.

Strategic focus and system steering

Multiple players are engaged in the development and implementation of higher education policy in Santa Catarina, with strong inputs from the federal level because of its role in financing and quality assurance.

Currently strategy is focused on developing higher education to enable the citizens of Santa Catarina to fulfil their potential in an increasingly knowledge intensive and competitive world. The leadership of Santa Catarina is also aware of the necessity to encourage high quality research intensive universities while maximising the valuable contribution of the ACAFE institutions to higher education in Santa Catarina and to focus on improving teacher education. There is no evident strategy in place to develop a life long learning policy.

While the MEC and INEP provide very useful comparative data on the Brazilian system, it is not clear how much ownership of this information there is at state level and whether it is used for evidence-based policy making in Santa Catarina.

A more strategic approach to the development of the system would assist in the development of the state as a learning society for the 21st century. This report recommends that, working closely with the Santa Catarina Policy Forum on Higher Education (*Fórum Catarinense de Políticas de Educação Superior*), the State Education Council, with all key players in the state and relevant players at federal level, the State Secretariat for Education should take the lead in setting clear goals and objectives for the higher education system in Santa Catarina. Measures should include:

- The establishment of clear goals and agreement on the delivery roles of the different HEIs.

- As a priority, the creation of new policies to address the existing quality assurance and accountability challenges.

- The utilisation of INEP data to develop international and national benchmarks and targets for the Santa Catarina system.

- The development of a life long learning policy and a strategy for its implementation.

A more detailed discussion of these and other recommendations follows.

Participation and inequities of access

Policy makers in Santa Catarina are clear that a major goal for the state is to increase enrolments in higher education. Santa Catarina is unique in Brazil in that, at the time of writing, it has only one federal university which considering its overall level of development could be perceived as a relative disadvantage (See Annex 3 of Salmi and Fèvre, 2007, p. 19). But, as has been seen, the state does not have a shortage of HEIs with the ten UDESC

campuses, the 13 ACAFE institutions and the growth of private HEIs. In fact, with 121 institutions for a population of fewer than six million, the total number of HEIs is very large.

However, in spite of the existence of numerous HEIs, access is an issue for many intellectually competent students who may not have attained one of the relatively scarce free places in the public system or who are financed by ProUni or other scholarships in a private institution where the academic level is often lower than in the public system. The geographically restricted location of the public HEIs is an added disadvantage for many students who do not live near Florianópolis or one of the ten UDESC campuses. This issue is especially difficult in the western and southern part of the state.

Other sources of inequity occur for students who may have been disadvantaged because of a background of poverty or inadequate schooling. These issues together with the admissions system to higher education are the subject of recommendations in Chapter 5. However, disadvantage arises for those students who may be able to attend either an ACAFE or a private institution only in the evenings because they are working to pay their fees and who, consequently, may not receive their first choice of full degree course. Enabling these institutions to attract day as well as evening students would enhance access, increase participation and greatly decrease the inefficiencies which arise from empty classrooms and laboratories**.** The current distortion in the way ACAFE HEIs are financed is further discussed below.

The review team was impressed with the overall flexibility of the higher education system in Santa Catarina and considers that institutional conditions are ripe to take advantage of the potential of developing technologies for distance and open education. The team saw evidence of that in ACAFE and private HEIs where, as already discussed, most students work and attend third level courses in the evenings. However, the absence of a fully developed high quality distance education system is a disadvantage for those students who are unable to attend any institution because of their geographical location. And the needs of adult learners are not yet fully met because of the absence of a life long learning strategy and a fully organised qualifications framework. Moreover, there is concern about the quality and relevance of a large number of the fee-paying courses offered, especially those in private HEIs.

The state has plans to address some of these inequities by facilitating the attendance of scholarship students at both ACAFE and at some private HEIs. This is an excellent initiative as it will also ensure greater utilisation of the excellent existing facilities in the ACAFE system. Moreover, in order to address concerns about coverage of the public system, there are plans to

establish two new federal universities, one in Chapecó, in the western half of the state, and the other in Joinville, north of Florianópolis. Together both these initiatives can be expected to increase participation and improve access.

Easing financial pressures on needy students and improving the availability of support to ensure the participation of disadvantaged students would evidently improve access. In this context, this report draws attention to the discussion in Salmi and Fèvre of possible modifications to the Federal Student Loan Scheme including the review of the eligibility criteria to enable only students from low and middle income families to benefit from subsidised loans. The review team is not able to make recommendations about the Federal Student Loan programme within a state level report other than to urge the Santa Catarina authorities to review the state level student aid programmes with the view to easing the financial burden of attending third level education and developing of guarantees to ensure that all needy students can access financial aid.

In brief, specific recommendations to increase access are:

- Continue to develop measures to enable the ACAFE institutions to attract day as well as evening students in order to enhance access, increase participation and greatly decrease the inefficiencies which arise from empty classrooms and laboratories. These initiatives will facilitate the attendance of scholarship students at both ACAFE and some private HEIs.

- Take advantage of the existing flexibilities in the higher education system to develop the potential for distance and open education.

- Broaden the initiatives to improve access beyond a focus on admission policies and incentives only. Seek to increase retention rates, especially among students from lower income families, a consequence of which will be an increase in graduation rates.

- Review state level student aid programmes with a view to easing the financial burden of attending third level education by making loans more easily available to students.

Governance

As discussed above, there are complicated governance arrangements in Brazilian higher education where multiple actors at federal, state, municipal and institutional level interact in the steering and management of the system. This is especially the case in public HEIs whose flexibility and autonomy are hampered by requirements such as civil service recruitment procedures

and conditions of employment. In this regard, the ACAFE and private institutions have more flexible governance arrangements. By international best practice standards, the very large size of some university governance bodies would be seen as dysfunctional. Moreover, the composition of institutional governing bodies is often representational and the involvement of employers on federal and state university councils is not automatic and very marginal.

While it may not be possible to change the existing regulations for governance of federal HEIs, Santa Catarina could take the lead in working with the federal level towards a better system of autonomy and accountability for federal institutions while also exploring ways to introduce complementary policies in UDESC and in ACAFE HEIs:

- One goal should be greater autonomy combined with greater transparency of roles and responsibilities to assist institutions to deliver on their objectives. Some useful areas to focus on would be:

  − Improve the effectiveness of governing authorities by ensuring that members with experience and expertise relevant to the specific mission of individual institutions are appointed.

  − Strengthen the leadership of Higher Education Institutions by rationalising the election of rectors (allowing at least part of the selection process to be achieved through an external independent board), and extending their appointment term to ensure continuity of strategic management and planning.

  − Encourage the mobility of institutional administrators between institutions.

- Another major goal should be to strengthen institutional accountability in all public and private HEIs, not only through measures to improve the quality of teaching and learning but also through the introduction of transparent budgetary allocation mechanisms to reward desired performances (both discussed in the next paragraphs).

Finance

The development of a funding model that is suitable for an expanding higher education system is a key challenge for governments, especially as societies place ever more complex demands on universities. This report suggests an approach to funding that would allow the Santa Catarina government to set targets by linking resources to the achievement of specific targets while ultimately encouraging diversity and autonomy by allowing universities scope to contract for different mixes of provision according to

their individual strategies. The report also recognises that, because the financing of the federal institutions as well as the allocation of several student support instruments are outside the direct control of state authorities, the ability of Santa Catarina to change or to modify many aspects of higher education funding may be limited to state allocations to UDESC and to the ACAFE institutions. However, it explores ways in which it may be possible for the Santa Catarina authorities to work with the federal government to develop initiatives that would make other elements of the funding of higher education more efficient, transparent and fair.

One area that is already receiving attention is the under-utilisation of the existing facilities in the ACAFE institutions that has been highlighted in this Chapter as a key efficiency challenge for Santa Catarina administrators. In its quest to increase participation and provide more and better educational opportunities for its citizens, Santa Catarina government has already begun to address this issue through the FUNDOSOCIAL (Social Development Fund, *Fundo de Desenvolvimento Social*), introduced in October 2009 whereby 0.3% of the state education budget is to be disbursed to finance full scholarships, through the acquisition of the empty places in the HEIs. It has been noted in this report that, at the date of the team visits, it was planned to allocate 90% of these funds to ACAFE and 10% to private HEIs, but only to those that are accredited. The review team endorses this initiative and considers that the state should continue to explore ways in which this approach could be evaluated and then expanded so that federal as well as state funding could be used to finance students to study, especially by day and especially in the ACAFE HEIs. Furthermore, it is the team's view that private HEIs should be allowed to participate in these initiatives only when state authorities are satisfied that robust accreditation procedures are in place to assure that the quality and relevance of their courses matches those of the public and the ACAFE institutions.

The team considers that a performance based allocation model would be especially useful for Santa Catarina. International experience indicates that the introduction of a mix of performance based allocation instruments linked both to policy objectives and to institutional performance are a useful policy lever to increase efficiency and improve accountability. Performance based funding also encourages greater transparency in how core resources are utilised by directly relating inputs to outputs. For example, output-based funding provides government with the means to ensure that the required institutional behaviour is encouraged: *e.g.* the introduction of socially or economically desirable courses or the education of an appropriate number of graduates in a particular discipline. The success of such a system requires

more detailed and transparent data on the cost of university operations and this will further enhance the accountability of the institutions. These mechanisms also encourage a greater degree of institutional innovation.

As part of a range of performance based funding, many countries have successfully introduced competitive funding models for programmes that are needed by society or by the economy. Competitive funds fulfil many objectives, including the improvement of quality, relevance and efficiency among the competing institutions. In the case of competitive funds, especially for research, the team would recommend that peer reviewed competitive processes modelled on internationally established best practice should be introduced.[7]

Turning to demand side funding allocations to higher education in Santa Catarina, the largest part of the public funds allocated to student and their families through scholarships and loans, are not within the sphere of influence of Santa Catarina. However, the existing system, whereby it seems that ProUNI grants are made to private HEIs without stringent quality checks, could usefully be reformed through the application of stricter accreditation rules. In this area, it would be necessary for Santa Catarina to work with the federal level to influence the way the ProUni grants are currently utilised. Political considerations may not permit the development of this policy but it is the view of the team that such a measure would act as a powerful lever to enhance quality.

In brief, priority recommendations to improve funding and efficiency are:

- The review team endorses the FUNDOSOCIAL (Social Development Fund, *Fundo de Desenvolvimento Social*) initiative and considers that the state should continue to explore ways in which this approach could be evaluated and then expanded so that federal as well as state funding could be used to finance students to study, especially by day and especially in the ACAFE HEIs. Furthermore, it is the team's view that private HEIs should be allowed to participate in these initiatives only when state authorities are satisfied that robust accreditation procedures are in place to assure that the quality and relevance of their courses matches those of the public and the ACAFE institutions.

- The introduction of performance-based funding, whereby HEIs would contract with the state to deliver specific outputs at an agreed level of cost with funding being allocated accordingly, could be a major step towards improving higher education outcomes.

- Peer reviewed competitive funds modelled on internationally established best practice should be introduced, especially for the funding of research.

- Santa Catarina administrators should work with the federal level to tighten the criteria for the award of ProUni grants which currently seem to be allocated even for those private HEIs where quality may be a concern. Political considerations may not permit the development of this policy but it is the view of the team that such a measure would act as a powerful lever to enhance quality.

Quality

The review team considers that the improvement of the existing system of quality assurance is a key priority issue for Santa Catarina.

The report finds that procedures for recognising and accrediting institutions and courses are excessively bureaucratic and seem to rely on procedural and administrative guidelines rather than on an evaluation of the quality of educational outcomes. Given the rapid growth of small private HEIs in the state, the review team finds it astonishing that there appears to be no case in which an institution has ever lost its accreditation. This situation leads inevitably to questions about the willingness or capacity of the agencies involved to enforce quality assurance standards rigorously. Obviously, when a quality assurance system lacks the capacity to differentiate levels of quality, and it lacks the ability to differentiate institutions or academic programmes that are not up to the previously defined quality criteria, it becomes somewhat irrelevant, and it is seen more as a bureaucratic requisite.

The review team is also concerned about potential distortions of quality assurance in both under graduate and postgraduate education. For instance, in the case of undergraduate programmes, there has never been a recommendation to withhold recognition of a programme in an HEI that had previously been authorised while, in the case of graduate programmes between 30%-40% were rejected by CAPEs, evidence of a more rigorous approach.

The report sets out a recommended roadmap whereby Santa Catarina could move its quality assurance system from a system of compliance with bureaucratic requirements towards an integrated process aimed at fostering a culture change at higher education institutions.

Specific recommendations to assist in this process are:

- Santa Catarina should explore the feasibility of establishing a statewide independent quality assurance organisation or agency in which all higher education institutions in the state could be invited to participate on a voluntary basis. Such an independent agency could establish

internationally accepted relevant accreditation criteria. At the initial stage, voluntary involvement could be supported with incentives offered to those institutions willing to participate.

- Linked to this, is the development of a series of strategies and concrete incentive-linked plans with the overall goal of improving the quality assurance system. These efforts could include: *(a)* greater awareness, understanding and training among the professionals within the higher education community (academic staff, students and authorities) about the importance of quality; *(b)* "educating" external stakeholders (employers, parents of potential and current students, alumni) about the importance of a sound quality assurance system in higher education and ways in which they can become more active participants; and *(c)* defining quality thresholds with relevant peer institutions and systems on the international scene. In the Latin American context, similar programmes established in Mexican states and in Chile show the effectiveness of such an approach. Other countries, including the United States and Canada have established similar initiatives at the regional and provincial levels respectively, with significant positive outcomes. Ultimately, only by incorporating additional interested parties in the process and by linking efforts more concretely with outcomes, incentives and institutional change, will higher education institutions take more "ownership" of their own institutional quality assurance systems as a crucial tool for improving their institutional effectiveness rather than a mere requisite imposed by government agencies.

- In assuring quality, greater importance should be placed on the performance of graduates, and on the information provided by employers. By including this focus on the labour market, institutions will not only have more relevant input for their academic programmes, but also will have better opportunities for systemically stronger ties with graduates, employers, and the community at large.

Relevance

The absence of career orientation programmes in Santa Catarina secondary schools leaves a major gap for individuals who need information about whether they wish to proceed to higher education and, if so, which programmes and institutions to choose that would be appropriate for their private economic and personal interest needs. This dearth of useful information is also a feature of the third level system with little evidence

available about the value of the qualifications or credentials provided by institutions in Santa Catarina. Few HEIs have functions whereby students can be assisted to make an informed career choice. Neither is labour market information available to government (whether federal or state) which needs to be informed about outputs and outcomes of the system nor to employers who need to understand the value of degrees and diplomas when making recruitment decisions.

As an example of good information on the earning potential and labour market experience of graduates is *FuturoLaboral* in Chile (www.futurolaboral.cl). However, for the reasons discussed above, the development of this kind of instrument would only be possible at federal level and is not useful at state level because Santa Catarina forms such a small part of the federal labour market. However, measures to link state institutions into sources of national labour market information would be a practical first step. This could be done by developing a process whereby national information about careers is made widely available in all third level institutions in the state together with advice about possible qualifications requirements and appropriate steps to attain them.

While in theory, academic qualifications contribute to student mobility throughout Brazil, the team had the impression that, in practice, the concept of a qualifications framework is not totally developed at federal, state or institutional level in Brazil, nor are the needs of individual learners who may wish to re-enter education and/or training at different stages of their lives being addressed.

This chapter has already remarked on the number and range of disciplines covered in full time and part time programmes as a source of flexibility. However, so many programmes also risk confusing students by increasing the complexity of the system while not necessarily leading to greater diversity among HEIs. Moreover, the educational and labour market value of the many very short duration courses is not clear. The team was informed that efforts have been made in recent years to narrow down this long list of programmes; mention was made in one HEI of narrowing the list from 1 000 short course programme titles in technology to 112 – although that is still a very large number.

There was also much discussion of having to follow the guidelines of the Federal Ministry of Education for curriculum content and a real tension between wanting more autonomy in course design to suit local needs while satisfying the needs of the Ministry of Education for standardisation and quality assurance.

It is recommended that the following policy options to improve relevance should be considered:

- A range of measures to improve labour market linkages should be developed and put in place, including the establishment of careers offices and tracking surveys.

- A methodology should be designed to develop pathways from one level and section of the state education and training system to another. One possible approach is to define the value of all programmes and qualifications within a transparent state level framework with the co-operation of institutions and employers. Such an approach would improve linkages between and among all providers, contribute to the needs of life long learners and eventually eliminate dead end courses. (See also recommendations in Chapter 7).

- Employers should be encouraged to contribute to the development of more flexible curricula.

Internationalisation

While there is an awareness in Santa Catarina (and in Brazil as a whole) that internationalisation is an important national strategy for higher education, in reality, activities to promote internationalisation are confined to those traditional areas such as the signature of international agreements with peer institutions, participation in international networks or associations, and the encouragement of a very small number of students and faculty members to participate in international mobility programmes. The team found that, in general, limited efforts are made in HEIs in Santa Catarina to internationalise the curriculum of academic programmes, to scale up further the international mobility of students and faculty members, and to encourage students to acquire an internationally-competitive command of at least a second language.

A variety of reasons for such limited internationalisation of higher education in Santa Catarina were consistently mentioned to the review team by institutional representatives: government centralisation of the system limits efforts to internationalise the curriculum; the absence of second language teaching because of assumptions that that students acquire this competence earlier in their education; faculty members who are not adequately prepared to teach international subjects; institutional policies towards internationalisation that are mostly symbolic; and limited resources to support student and faculty mobility.

Some recommendations to improve the international dimension of education in Santa Catarina are:

- In order to encourage the development of globally minded, locally responsible, and internationally competitive graduates, the curriculum in HEIs should include modules with an international dimension.

- The absence of second language proficiency should be comprehensively addressed through a strategy involving all levels of education in the state. This effort should encompass the further training of teachers and curriculum review from elementary school to higher education.

- Greater efforts to encourage the international mobility of students and academic staff to and from Santa Catarina should be undertaken.

- The internationalisation component of HEI strategic plans should be strengthened and should include the establishment of international support units within each institution. Resources to staff these units with trained personnel and appropriate programmes to support internationalisation goals and strategies should also be provided.

Notes

1. The INEP Report on Higher Education in Santa Catarina analyses data from two periods: *(a)* prior to LDB (1991-1996); and *(b)* post-LDB (1996-2004) from 1991 to 2004 to determine the impact of the law. The study focuses on the themes of expansion, privatisation (public/private relationships) and diversification of higher education, with a view to understanding higher education reform in Brazil during the last decade as well as defining broad policy options for the country as a whole as well as for each of its states.

2. See the further discussion on Engineering Programmes in Chapter 10 on Research, Development and Innovation.

3. ISCED level 5: First stage of tertiary education (not leading directly to an advanced research qualification); and ISCED level 6: Second stage of tertiary education (leading to an advanced research qualification).

4. http://prouniportal.mec.gov.br/index.php?option=com_content&
    view=article&id=137:quadros-informativos&catid=26:dados-e-
    estaticas&Itemid=147
    and
    http://prouniportal.mec.gov.br/images/arquivos/pdf/Quadros_informativos/
    quadro_bolsas_ofertadas_por_municipio_1_semestre_2009.pdf

5. In 2009, the bill was pending in the Senate.

6. Besides its role in the financing and evaluation of postgraduate studies, CAPES provides scholarships for students pursuing advanced degrees and also evaluates and provides some forms of accreditation to graduate programmes.

7. For a full discussion of performance based funding and competitive grants together with an indicative list of countries with interesting examples, refer to Salmi & Fèvre, 2007, p. 85 *et seq*.

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Chapter 10. Research, Development and Innovation

This chapter describes the research, development and innovation activities of Santa Catarina in relation to its industrial base and capacities of its university sector. It also covers the numerous federal and state initiatives for RDI and offers recommendations on making these more focussed and sustainable.

It is now well recognised that scientific research, development and innovation (RDI) contribute significantly to economic growth of countries and regions, and to the social welfare of society. Nations which develop, and effectively manage their knowledge assets perform better economically; knowledge-based enterprises systematically outperform those with less knowledge focus; and individuals with more knowledge get better paid jobs. Investments in research and development, education and training, and other intangible assets are the cornerstones of a modern economy.

Over the past decade research, development and innovation policies have emerged as an amalgam of science, technology, and economic development policies, signalling a growing recognition that knowledge in all its forms and innovation are at the heart of the "knowledge-based economy". It also signals that innovation is a more complex and systemic phenomenon requiring an emphasis on the interplay between institutions, and the interactive processes involved in the creation of knowledge, and in its diffusion and application to societal problems. The reform of the RDI system in Santa Catarina is, therefore, an essential element in the reform of higher education and its knowledge institutions.

The key economic sectors in Santa Catarina

Santa Catarina ranks fourth among all 27 Brazilian states in terms of the level of economic development and per capita GDP. In 2007, the per capita GDP in Santa Catarina was close to BRL 16 000 compared to an average

across Brazil of BRL 12 700, and ranged from a maximum of BRL 37 500 in the Federal District around the capital Brasília, to the State of Piauí in the northeast region at BRL 4 000.[1]

In 2008, the industrial sector in Santa Catarina was the largest sector contributing 51% of the GDP of the state followed by the service sector at 32.5%, and the agriculture at 14.5%. In the northeast of the state, the electro-mechanical, textile and furniture industries are the main contributors to economic development; in the west, cattle, poultry and related agribusiness predominate, while in the south the economy is primarily driven on coal mining, ceramics and fishing. The northern corridor that includes Joinville, Jaraguá do Sul and Blumenau is heavily industrialised – more than 50% of the state's industrial output is concentrated in this small, but highly developed area. The major cities of Santa Catarina and their respective economic sectors are: Joinville (metal-mechanic, tourism, software and commerce); Florianópolis (tourism, government, technology, education), Blumenau (software, textile and beer), Criciúma (ceramics and building materials); Chapecó (cattle and poultry breeding), Jaraguá do Sul (electric machinery and textile), Tubarão (coal mining and processing), Brusque (textile); and São Bento do Sul (furniture).

- *Industry and manufacturing*: Industrial companies are grouped in specialised regional centres, including ceramics and building materials industry, textiles and garments, electronics and electrical machinery, metallurgy and extractive heavy machinery, agricultural products and food processing industries, and pulp and paper. There are approximately 45 000 industrial companies, 455 are medium sized, and 108 are classified as large enterprises. They employ a total of 400 000 workers. The industrial production in the State of Santa Catarina has registered steady increases that has made the State a regional leader in a number of sectors: food processing, auto-parts manufacturing and automotive vehicles assembly, textiles, rubber and plastic, electric machines, electronic devices and materials processing.

- *Agriculture, fishing and agribusiness:* Agriculture contributes approximately 14.5% of the GDP of the state. However, if all agribusiness productive chains are considered, including the agro-industrial input chain, the sector represents 38% of the GDP of the state, which was estimated at USD 41 billion in 2008. Agribusiness represents 60% of Santa Catarina State exports, and the main product shipped is chicken. The state produced 1.8 million tons of the frozen product, and its exports of frozen chicken, estimated at USD 1.89 billion in 2008, were shipped to 120 countries.[2] Santa Catarina is among the six principal state producers of foods and has one of the highest rates of

productivity per cultivated area, thanks to the labour capacity and innovation of its farmers, the use of modern technology and to the family nature of more than 90% of the agricultural enterprises. The 3 000 agricultural industrial establishments and agricultural-food processors employ nearly 35 000 people.

- *Mining:* The coal industry is very important to the economic development of Santa Catarina. However, initiatives to develop the industry have taken their toll in biophysical and human costs, and coal mining in the southern part of the state has created problems leading to the degradation of environmental quality. The water system has been degraded in many areas as a result of heavy loads of pollutants discharged daily into the rivers, together with the waste particles discharged into groundwater drainage system. The state government is determined to ensure that the biophysical environment be restored in coal-dependent areas. Traditional attitudes need to change, and an integrated solution for Santa Catarina's coal mining region requires decision makers to confront and address complex environmental, social, political, economic and cultural problems.

- *Tourism:* The importance of tourism to Santa Catarina's economy is indisputable, generating an estimated BRL 6.4 billion – equivalent to 12.5% of the state's GDP – and nearly 510 000 jobs (11.9% of total employment) in 2008. However, much of the potential of the state remains largely untapped, as indicated in an economic impact study conducted by the *Fundação de Apoio à Pesquisa Científica e Tecnológica do Estado de Santa Catarina* (FAPESC, Santa Catarina Foundation for the Support of Scientific and Technological Research), the state foundation that funds and supports RDI initiatives. FAPESC believes that the rich diversity of landscapes and cultures, which is the state's main tourism asset, provides huge opportunities for growth. The government and its public and private sector partners are working hard to ensure that tourism development is sustainable – that it achieves a healthy balance between business imperatives, the protection of natural resources, and the well-being of the citizens of Santa Catarina.

Recent historical perspective on RDI in Brazil and Santa Catarina

The Brazilian science and technology sector was subject to an extensive review in the mid 1990s that laid the foundation of modern science and technology development in Brazil. According to the main conclusions and recommendations of a study published in 1994 by the Getúlio Vargas Foundation (*Fundação Getúlio Vargas*), rapid development of science and

technology was seen as the key to raising living standards, consolidating Brazil's comparative advantage as a key player in Latin America, and a significant partner in an increasingly integrated globalised economy. The study concluded that the economy must modernise and adjust to an internationally competitive environment, and education should be expanded and improved at all levels. The study also pointed out that as the economy grows and new technologies are introduced, new challenges will emerge in the production and use of energy, environmental control, public health, the management of large cities, and in the composition of the labour force.

According to the study, Brazil's new science and technology policy should aim to: *(a)* stimulate researchers' initiative and creativity, and establish strong links between the researcher's work and the requirements of the economy, the educational system, and society as a whole; and *(b)* make Brazilian science and technology truly international; and *(c)* strengthen the country's educational and science and technological capabilities. To fulfil these goals, the report pointed out that Brazil's technology policies needed to be redirected in line with new economic realities, and be geared to the reorganisation and technological modernisation of the industrial sector. Furthermore, permanent policies needed to be established to support the more dynamic sectors of the productive system to enter a continuous process of innovation and incorporation of new technologies to keep in step with technical progress in the world economy.

The study also concluded that RDI groups in universities and government institutes should be strongly encouraged to establish links to the productive sectors and to engage in applied RDI projects, while maintaining a high level of academic and basic research activities. The report also recommended that resources for applied RDI work should not come from the budget for basic programmes but from specific funding envelopes from government agencies for special programmes, as well as, RDI incentives to private firms and independent foundations. The report emphasised the need to evaluate applied RDI projects in terms of their academic quality, as well as their financial viability and social and economic significance.

The report emphasised that globalisation requires a profound rethinking of the old debate between scientific self-sufficiency and internationalisation, which it saw as not necessarily contradictory emphasising that Brazil has much to gain as it increases its ability to participate fully as a respected partner in the international scientific and technological community. To meet this objective, fellowship programmes for studies abroad supported by CAPES (Co-ordination for the Improvement of Higher Education Personnel, *Coordenação de Aperfeiçoamentos de Pessoal de Nível Superior*) and the National Council for Scientific and Technological Development, *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (*CNPq*), the report

emphasised, need to be revised and substantially expanded because Brazil would benefit substantially from studies-abroad programmes, as well as, from programmes to bring top-quality scholars from other countries for extended periods, or even permanent appointments in Brazilian universities and research institutions.

Today, Brazil is ranked 15th in global scientific publications and 25th in scientific citations. Publications are mostly in the areas of biomedical, engineering and space science. Brazil produces around 10 000 doctorates per year. There are 270 business incubators and start-up companies, half of which focus on research and technology, and over 6 000 firms that have RDI investments valued at BRL 1.9 billion in 2008. Brazil has a booming oil and gas market, is a world leader in agribusiness, and has strong aeronautics and aerospace industries. Brazil also has the largest banking and financial sector in Latin America, with recognised expertise and sophisticated software development tools and information management.

Funding of research, development and innovation

The key Brazilian organisations, which were created mostly in the 1950s, specifically for directly promoting and funding RDI include:

- *National Council for Scientific and Technological Development (Conselho Nacional de Desenvolvimento Científico e Tecnológico, CNPq)*. Formerly known as the National Research Council, is an agency of the Ministry of Science and Technology (MCT) for the promotion of scientific and technological research and training of human resources for research in the country. The functional structure of a CNPq includes the executive director responsible for managing the institution, an Advisory Board responsible for institutional policy formulation and development. Its members include the president and vice president of the institution, the chairmen of FINEP and CAPES, MCT executive secretary and representatives of communities of S&T enterprises and key units of CNPq. Besides participating in these bodies, the scientific and technological community of the country also participates in management and policy development through the advisory committees.

- *The National Agency for Financing Studies and Research (Financiadora de Estudos e Projetos, FINEP)* is a public institution also linked to the MCT. It was created in 1967, to institutionalise a trust fund for research projects and programmes, created in 1965. Subsequently, FINEP replaced and expanded the role hitherto played by the Brazilian Development Bank (BNDES, *Banco Nacional do Desenvolvimento*) and its fund for technical and scientific development.

FINEP's mandate is to support the economic and social development of Brazil through the promotion of research, development and innovation in enterprises, universities, technological institutions, and public and private research centres. Examples of FINEP's support includes the development of the Tucano aircraft by the *Empresa Brasileira de Aeronáutica S.A.* (EMBRAER), which paved the way for the airline manufacturer to become a major exporter of short haul aircraft in the world, as well as, funding of numerous projects sponsored by the Brazilian Enterprise for Agricultural and Livestock Research (EMBRAPA, *Empresa Brasileira de Pesquisa Agropecuária*), and universities which are essential to the technological development of the Brazilian agricultural system, making it one of the most competitive in the world.

- *Co-ordination for the Improvement of Higher Education Personnel (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, CAPES)* plays a key role in the expansion and consolidation of postgraduate studies in all states of Brazil. CAPES' activities can be grouped into four main areas: *(a)* evaluation of postgraduate programmes; *(b)* access to and dissemination of scientific research; *(c)* investment in training of high level RDI personnel in the country and abroad; and *(d)* promotion of international scientific co-operation. CAPES has been the key source of support to in the development of qualified RDI workers at the Master's and PhD levels in Brazilian universities and RDI institutions. The CAPES evaluation system of university graduate programmes is a key instrument for the university community in search of a standard of academic excellence for national Master's and Doctoral degrees. The evaluation results are used by the institutions as the basis for the formulation of policies aimed at promoting scholarship, graduate studies and co-operative RDI programmes.

- *The Brazilian Development Bank (Banco Nacional do Desenvolvimento, BNDES):* BNDES is a federal public company, linked to the Ministry of Development, Industry and Foreign Trade (MDICE, *Ministério do Desenvolvimento, Indústria e Comércio Exterior*). Its goal is to provide long-term financing aimed at enhancing Brazil's development and improving the competitiveness of the Brazilian economy. Support to innovation is a strategic priority of the Brazilian Development Bank (BNDES). From 2008 to 2010, the bank plans to invest BRL 6 billion in technological innovation, providing support to all economic sectors. The BNDES has provided resources to finance two innovation programmes; a technology fund FUNTEC (*Fundo Tecnológico*), and a fund for small- and medium-sized

enterprises CRIATEC (*Fundo de Capital Semente*, Investment Fund for Seed Capital). FUNTEC has as a key objective to support RDI initiatives in universities and technological institutions. CRIATEC, on the other hand, is a BRL 100 million fund focused on the capitalisation of seed money for innovative micro- and small-sized companies to provide financial support to projects to foster technological development and strategic innovations in Brazil.

Brazilian funding for research, development and innovation comes from six main sources: *(i)* government (federal, state and municipal) sources such as CNPq and FINEP, both a part of the Ministry of Science and Technology (MCT) at the federal level, and the São Paulo Research Foundation (FAPESP, *Fundação de Amparo à Pesquisa do Estado de São Paulo*) in São Paulo, and the Santa Catarina Foundation for the Support of Scientific and Technological Research (FAPESC, *Fundação de Apoio à Pesquisa Científica e Tecnológica do Estado de Santa Catarina*) at the state level, *(ii)* indirect RDI funding through the budgets allocated to public and private universities, institutes and RDI centres, *(iii)* direct funding of public RDI institutions, such as the Brazilian Enterprise for Agricultural and Livestock Research (EMBRAPA, *Empresa Brasileira de Pesquisa Agropecuária*), whose source of revenue is via budgetary allocations by ministries and state secretaries, as well as, investment of part of the products and services sold, *(iv)* tax incentives for industrial, commercial and private enterprises, usually for their own RDI centres, or via some fiscal benefit (tax exemption laws), such as the Informatics Law, *(v)* statutory funding of national private and non-for-profit associations and foundations such as the *Banco do Brasil* Foundation, typically provided via statutory mechanisms or donations by private individuals or companies; and *(vi)* funding by international organisations and multilateral and bilateral funding bodies, such as the World Bank, the Inter-American Development Bank, and UNESCO.

The RDI capacity of Brazilian universities

The *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)* is the main Brazilian agency responsible for financing and evaluating postgraduate studies, disseminating the results of scientific research, and promoting international scientific co-operation. CAPES has played a vital role in supporting the rapid expansion of postgraduate programmes in Brazilian universities over the past fifteen years. Salmi and Fèvre report that the number of Master's students grew by about 70%, from 44 000 in 1996 to 74 412 in 2006, and that during the same period, the number of doctoral students more than doubled from 20 000 to 44 466, and that "with these increases came also a better geographical distribution of

postgraduate courses, resulting in a significant decrease in regional disparities in terms of opportunities for advanced human capital training" (Salmi and Fèvre, 2007). The report also outlines two interesting characteristics of this growth. First, despite this expansion of postgraduate enrolment, its level still remains relatively low, compared to other countries in the region; at only 2.6% in 2006, the proportion of postgraduate students in Brazil was half as high as that of Mexico and Colombia. Second, the distribution of graduate programmes among key academic disciplines at the Master's and PhD. levels is much more balanced than for undergraduate studies; at the Master's level, humanities and social sciences account for no more than 28% of the total, and at the PhD. level, they represent 11% of all Doctoral programmes, compared to 62% for undergraduate studies in public universities.

The regional distribution of the elite federal universities, that undertake the bulk of RDI in Brazil, is uneven across the country. While the large majority of states, including Santa Catarina, have only one federal university, Pará and Paraíba have two each (although a second one is being created in Santa Catarina), São Paulo and Pernambuco have three, Rio Grande do Sul and Rio de Janeiro have four and Minas Geraís has the largest concentration with eleven federal universities. This pattern does not follow the spatial distribution of population, and is very unfavourable to a state like Santa Catarina with only one federal research university, and one of the lowest ratios of the number of federal universities per 10 million inhabitants, at 1.67 compared to a Brazilian average of 3.13.

The Federal University of Santa Catarina (*Universidade Federal de Santa Catarina*, UFSC) is a public university located at Florianópolis, the capital city. It is the third largest university in Brazil, and the fifth in Latin America. The university, the only federal university in the state up to 2009, has a reputation for the excellence of its engineering school, and is internationally known by the quality of its programmes in mechanical engineering, control engineering and electrical engineering. UFSC is ranked as the seventh best university in Latin America by the Webometrics[3] ranking of world universities. The history of Federal University of Santa Catarina has its roots in the Polytechnic Institute of Florianópolis founded on 13 March 1917. Organised as a free institute, it was the first degree granting institution in Santa Catarina.

The degree granting status triggered a movement to make it the first state university and, on 18 December 1960, it became the University of Santa Catarina, offering programmes in law, medicine, pharmacy, philosophy, economics, social services and industrial engineering. On 15 July 1968, in an effort to improve university education in Brazil, the federal government introduced reforms where the major universities in Brazil were

reorganised and recognised as federal universities, adopting the Anglo Saxon university model. The University of Santa Catarina became the Federal University of Santa Catarina (*Universidade Federal de Santa Catarina*). Until recently the undergraduate admission process was almost similar to all others in Brazil using the written *Vestibular* tests. In later years this process of admission has been altered, the *Vestibular* has been replaced by another more contemporary examination, the *Exame Nacional do Ensino Médio (ENEM),* and in 2007 the institution approved a quota system proposed by the Ministry of Education, which allocates 10% of places for new students to racial minorities and 20% for students coming from public schools.

An important indicator of the capacity for RDI, is the number and place of employment of RDI workers per million persons in the population. In Brazil and Santa Catarina, contrary to the pattern found in industrialised countries and transition economies, most researchers are employed in the university sector, where 68.8% of all PhD holders in the country can be found, compared to only 8.3%, 5.9% respectively in research centres and enterprises (Salmi and Fèvre, 2007). The proportion of RDI workers employed in private enterprises has decreased in recent years; in 2000, 26% of the all RDI workers were employed in private enterprises, and 70% in universities, as opposed to less than 20% in private enterprises and over 75% in universities by 2007. By contrast, in OECD countries, almost 70% of RDI workers are either directly employed or actively collaborating with counterparts in enterprises, and less than 25% are employed in the university sector.

A useful proxy indicator for the calibre of RDI output from Brazilian universities is the rating given to their graduate programmes by CAPES. According to this rating only few universities have a critical mass of postgraduate programmes (more than ten programmes) with a rating of 6 or higher. RDI production is concentrated in a small number of universities; the 3 universities in the State of São Paulo – USP, UNICAMP and UNESP – account for half of the total scientific production of the country. From the perspective of RDI output, the Brazilian university sector can basically be divided into the four groups as indicated in Table 10.1. First, there is a small group of 6 top research universities that are very productive and whose research quality is leading edge by international standards. Second, there is a group of 11 universities, which includes the Federal University of Santa Catarina (UFSC) that are reasonably productive and have RDI output in specific fields and disciplines. A third group consists of 24 universities that have limited RDI capacity, even though some of its members aspire to be recognised as research universities. Finally, the vast majority (over 2 230

out of an estimated 2 275 institutions) including all the universities in Santa Catarina – other than UFSC – have virtually no capacity for RDI.

Table 10.1 **The RDI capacity of Brazilian universities**

Category	Number of postgraduate programmes highly rated by CAPES	Number of universities in category	Top three universities in category (Number of highly rated programmes)
Category 1: Top RDI productive universities with broad and diverse RDI capacity	Ten or more	6	Universidade de São Paulo, USP (64) Universidade Federal do Rio de Janeiro, UFRJ (27) Universidade Estadual de Campinas, UNICAMP (23)
Category 2: Universities with some RDI targeted capacity	Three to nine	11	Universidade Federal de Viçosa, UFV (7) Universidade de Brasília, UNB (6) **Universidade Federal de Santa Catarina, UFSC (5)**
Category 3: Universities with limited RDI capacity	One or two	24	Universidade Estadual de Maringá, UEM (2) Universidade Federal do Ceará, UFC (2) Universidade Federal Fluminense, UFF (2)
Category 4: Universities with virtually no RDI capacity	None	Over 2 230	

Source: Adapted from Salmi and Fèvre (2007).

Reform of applied science and engineering education in Santa Catarina

With rare exceptions, the programmes in the Brazilian engineering schools do not prepare students in contemporary methods of applied science and engineering education. To meet the demand of a growing and more sophisticated economy, considerable restructuring in engineering education was needed that included changes in programmes' objectives, the structure and organisation of programmes and curricula, and the integration of educational and IT technology in all programmes.

With this general goal in mind, the Federal University of Santa Catarina established a network of engineering schools and a programme for the reform of applied science and engineering education in the state; the re-engineering of engineering education in Santa Catarina or *Reengenharia do Ensino de Engenharia em Santa Catarina (REESC)*. The network involves

six engineering schools in the state; *Universidade Federal de Santa Catarina* **(**UFSC) in Florianópolis, *Universidade Regional de Blumenau* (FURB) in Blumenau, *Universidade do Estado de Santa Catarina* (UDESC) in Joinville, *Universidade do Sul de Santa Catarina* (UNISUL) in Tubarão, *Universidade do Extremo-Sul Catarinense* (UNESC) in Criciúma, and *Universidade do Oeste de Santa Catarina* (UNOESC) in Joaçaba.

Prior to the introduction of the reforms, the approach to engineering education, prevalent in most universities, was a traditional old-fashioned, science-based approach. The adopted reforms are based on the realisation that the education of a contemporary skilled engineer, well prepared for an active role in the process of technological innovation and development, requires a paradigm shift in their education. The key elements of such a shift include the adoption of: *(a)* problem and/or situational-based open-ended approach to learning, *(b)* interactive student-centred learning, *(c)* use of contemporary technology in experiments and projects, *(d)* the use of diverse evaluation methods for assessing students performance, and *(e)* the integration of information technology (IT) in all relevant courses.

At the programme level, which involves about 18 different engineering programmes, the objective was the development of methodologies to better teach the technological or applied aspects of the engineering curricula through the structured introduction of contemporary technology in all courses, and through an understanding of the underlying methodologies of technological development. The student is introduced to methods of learning to learn, and the production of supporting technical materials is encouraged to stimulate a culture of interactive learning outside the classroom, through independent research. IT is used intensively to produce relevant educational software to facilitate the access to didactic material in every programme. The project also supports the retraining of engineering faculty members, especially in the use of modern teaching tools and educational software. For the whole technical spectrum of the curriculum, REESC stresses the complementarity of theory and practice in all engineering programmes. Undergraduate students were introduced to new methods and modalities of learning; many students were also exposed to real engineering projects through their participation in prototype engineering firms (*empresas junior de protótipos*), supported by the programme.

Relevant RDI issues in Brazilian research universities

- *The link between academia and enterprises:* According to CAPES, the divide between the worlds of academia and business has taken its toll on Brazil. At a time of consistent growth in the country's output in basic

sciences, which reached a 2.02% share of internationally published articles in 2007; an output of scientific literature on a par with European countries such as Switzerland (1.89%), Sweden (1.81%), and The Netherlands (2.55%), Brazil's share of the world's registered patents was only 0.06%, comparing poorly with countries such as South Korea (0.79%), Italy (1.31%), France (2.96%), and Japan (22.67%). This imbalance is also made clear in a study published in 2008 by the World Bank "Knowledge and Innovation for Competitiveness" (Rodríguez *et al.*, 2008), which shows that Brazil remains behind other developing countries when it comes to converting scientific knowledge into practical results. One reason is the country's low level of investment in RDI. While Brazil dedicates only 0.98% of its Gross Domestic Product (GDP) to RDI, China invests 1.22%. As a result, Brazil remains behind its main global competitors: South Korea, China, India and Russia.

- *RDI in industry and business:* Looking at the number of RDI workers in the private and public productive sectors also makes it clear that the sector plays a limited role in technology development and innovation. While, more than 75% of RDI workers are employed in universities; only 10% are in the productive sectors, and 15% in the government. By contrast, in many OECD countries, 70% are in the public or private productive sectors; 18% are in universities; and 12% are in government. This indicates that Brazilian corporations, which should be most responsible for creating patents, are investing little in their own research. Brazilian enterprises, many observers believe, are timid about their role in the production of knowledge and technology, especially the SMEs (small and medium enterprises). About 10% of the public investments in RDI in Brazil are made by a small group of state-owned corporations and holdings in the fields of telecommunications, oil, electric energy, mining, metallurgy, and aeronautics. Several of these corporations have created their own research and development centres; the best known are known are Petrobrás's Research and Development Centre (CENPES, C*entro de Pesquisas e Desenvolvimento da Petrobras*), Telebrás' Research and Development Centre (CPqD, *Centro de Pesquisa e Desenvolvimento da Telebrás*), Eletrobrás's Electric Power Research Centre (CEPEL, *Centro de Pesquisas de Energia Elétrica*), the Technology Centre of the Rio Doce Valley Company (CTVRD, *Centro de Tecnologia Companhia Vale do Rio Doce*), and the Aerospace Technical Centre associated with the Brazilian Aeronautics Company (EMBRAER, *Empresa Brasileira de Aeronáutica S.A.*), a state-owned aircraft manufacturer.

- *Intellectual property and patent ownership:* Another factor that separates Brazil from other countries is patent-ownership policies.

Whereas companies own most patents in virtually all developed countries and many transition economies, the principal owners of patents in Brazil are universities. In developed economies, the universities do not produce more than 3% of all registered patents. In Brazil, they produce 27% of registered patents. According to the latest study of the National Institute for Industrial Property or *Instituto Nacional de Propriedade Industrial* (INPI), universities assume the leadership in patent registration. When it comes to registered patents, UNICAMP (the University of Campinas, in the State of São Paulo), ranks third overall in Brazil, outpacing even companies with great technological power such as oil producer Petrobras, appliance maker Multibrás, and EMBRAER, the aircraft maker. The biggest patent owners in Brazil include a long list of universities, headed by UFMG (the Federal University of Minas Gerais); USP (the University of São Paulo), and UFRJ (the Federal University of Rio de Janeiro).

- *The Law of Innovation:* Although Brazil's situation is far from ideal, there has been some progress made in strengthening the relationships between universities and enterprises. The first steps in that direction began in 2004 with the creation of the *Law of Innovation*; an initiative that provided a framework both to enterprises and universities, especially public ones, regarding the country's scientific and technological output. The law also helped to promote the relationship between academia and business, and enhanced Brazil's scientific and economic development. Before 2004, collaborative initiatives were few and far between. But the obstacles to the synergy between them has slowly been eroded, thanks largely to the growing awareness and stimulus that the law has provided to both sectors. The Brazilian law is very similar in spirit to the American law adopted in the United States in 1984. Brazilian enterprises and universities have come closer together in four different ways: by creating co-operative laboratories; by developing joint projects; by incubating start-ups; and by training skilled RDI workers.

RDI programmes in Santa Catarina

The RDI initiatives in Santa Catarina are funded and co-ordinated by the Foundation for the Support of Scientific and Technological Research (*Fundação de Apoio à Pesquisa Científica e Tecnológica do Estado de Santa Catarina*, FAPESC). FAPESC is an agency of the State of Santa Catarina established in 2006 with the following mandate: *(a)* allocate scientific and technological resources to ensure regional equilibrium in the distribution of these resources that can result in sustainable development for

all stakeholders; *(b)* planning, execution and evaluation of RDI programmes in the Sate following the priorities and guiding principles established by the State Council for Science, Technology and Innovation (CONCITI, *Conselho Estadual de Ciência, Tecnologia e Inovação*); *(c)* support the planning and implementation of individual and institutional RDI projects in the state; *(d)* support the capacity building of human resources involved in scientific RDI work; and *(e)* promote and support the regional, national and international co-operation in RDI involving universities and RDI institutions of Santa Catarina.

The Brazilian government has recently announced that it expects to invest approximately 1.5% of its Gross Domestic Product (GDP) in advancing science, technology and innovation in 2010. Based on Brazil's 2008 GDP figures, that would correspond to BRL 43.3 billion. One example of the growing importance of innovation in Brazil is that the State of Santa Catarina established processes for the implementation of its *Innovation Law* on 10 June 2009. This new law allows for a series of incentives for scientific and technological research and innovation, including incentives that are part of a programme for support to in-company research (*Pappe-Subvention*).

The Innovation Law was created as a result of meetings with entrepreneurs, universities, research centres as well as the state government, and was co-ordinated by FAPESC. A major achievement of this initiative is the designation of 1% of the state net revenue to FAPESC, and the same percentage to the Santa Catarina State Enterprise for Agricultural and Livestock Research and Rural Outreach, *Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina* (EPAGRI). Eight other Brazilian states have similar legal instruments in place to promote investments, including Minas Gerais, Mato Grosso, São Paulo, Amazonas, Ceará, Bahia, Rio de Janeiro and Pernambuco.

Science and technology networks

The science and technology wide-band network of Santa Catarina, Rede Catarinense de Ciência e Tecnologia (RCCT): The science and technology network is a programme of the state government managed by FAPESC to establish a wide band network connecting over 1 800 institutions in all 36 regions of the state. The network includes universities, schools, government and private laboratories, research centres, incubators, libraries, museums, health education centres, and hospitals.

The network of technology incubators, Incubadoras e parques tecnológicos: FAPESC in co-operation with the Brazilian National Service for Support to micro- and small-sized Enterprises; *Serviço Brasileiro de Apoio às Micro e Pequenas Empresas* (SEBRAE), the Brazilian National

Service for Industrial Apprenticeship (SENAI, *Serviço Nacional de Aprendizagem Industrial*); and other agencies has established 75 business and technology incubators spread strategically over the state, since 2002. Examples of these incubators include incubators for agribusiness, entertainment and media, and biopharmaceuticals in Florianópolis, agribusiness in São Miguel, software development, coal and biogas technology in Tubarão, and building materials in Rio do Sul to just name a few. Table 10.2 provides a summary of these incubators.

Proteomics network of Santa Catarina, Rede de Proteoma do Estado de Santa Catarina (RPSC): The RPSC was established in 2005 as part member of the national Proteomic network. It is formed by research groups distributed in five education institutions and state research centres, in collaboration with the Proteomic networks in the States of Rio Grande do Sul and Paraná and the Programme of Genome Research of the southern universities. The main objectives of the RPSC is to study the proteome of *Mycoplasma Hyopneumoniae* in order to help reduce the huge resources lost due to death of pigs and chickens by infection, and decreasing consumption of nitrogen-based fertilizers in animal feed. In 2006, the RPSC signed an agreement, to support the implementation of the research programmes in biotechnology, and the purchase of equipment for three-dimensional analysis of proteomics chains, for shared use by researchers in UFSC (*Universidade Federal de Santa Catarina*), UNISUL (*Universidade do Sul de Santa Catarina*), FURB (*Universidade Regional de Blumenau*), UNIVALI (*Universidade do Vale do Itajaí*), UNIVILLE (*Universidade da Região de Joinville*), EMBRAPA/CNPSA (*Empresa Brasileira de Pesquisa Agropecuária / Centro Nacional de Pesquisa em Suínos e Aves*), UNOESC (*Universidade do Oeste de Santa Catarina*) and UNESC (*Universidade do Extremo-Sul de Santa Catarina*).

The innovation and forecasting network for agribusiness; Rede de Inovação e Prospecção Tecnológica para o Agronegócio (RIPA): RIPA was developed using funding for the agribusiness sector from MCT and FINEP. The primary purpose of the funding is to maintain, and increase the competitiveness of Brazilian agribusiness, through the generation and transfer of knowledge for technological innovation. To achieve this overall objective, RIPA has embarked on the following initiatives: *(i)* supporting advanced studies and building a network of innovation and technology for agribusiness; *(ii)* creating a collaborative environment that maximises the channelling of tacit and explicit knowledge of the participating organisations; *(iii)* integrating the initiatives of government institutions, and productive sector enterprises, *(iv)* Establishing a steering committee of the Fund for Agribusiness Sector, to set priorities and promote initiatives to support innovation and technological forecasting. The strategy of RIPA

provides for equal participation of communities and scientific users, customers, supporters, the productive sector, financial sector, developers, and development agencies.

Table 10.2 **Summary of technology and business incubators in Santa Catarina in 2008**

New incubators		Consolidated older incubators	
Incubator	**Major partner (s)**	**Incubator**	**Major partner (s)**
Entertainment Incubator **Florianópolis**	**FAPEU** – *Fundação de Amparo à Pesquisa e Extensão Universitária* (Foundation for the Support of University Research and Outreach), Florianópolis.	Regional Innovation and Entrepreneurship Centre **Tubarão**	**CRIE** – *Centro Regional de Inovação e Empreendedorismo* – specialising in the development of micro and small enterprises through access to infrastructure of and support services.
Information Technology Incubator **São Bento do Sul**	**FETEP** – *Fundação de Ensino, Tecnologia e Pesquisa de São Bento do Sul* – Advisory services in management development and installation of technology to support the formation of successful companies and creating entrepreneurial cultures.	Innovation and Technology Centre **Biguaçu**	**CITEB** – *Centro de Inovação e Tecnologia de Biguaçu* – Facilitate the professional development through training of manpower, as well as increasing productivity and quality of products and services offered by participating companies.
Regional Industrial and Commercial Development **Itapema**	**ACITA** – *Associação Comercial e Industrial de Itapema*.	Regional Business Incubator **São José**	**IESJ** – *Incubadora de Empresas de São José* – The incubator is located in a building donated by the University of Vale do Itajaí (Univali).
Launch of enterprises in **Curitibanos**	**CETEC –** *Centro Tecnológico de Curitibanos e Região* – A business incubator in Universidade do Contestado (UNc) – Campus Curitibanos in co-operation with SEBRAE.		

Source: Adapted from FAPESC Annual Report, 2008.

Sapiens Park: FAPESC supports Sapiens Park, a business and technology incubator established in an area of 4.5 million square meters in the northern part of the Island of Santa Catarina. The Sapiens Park has also the support of UFSC, Sapientia Institute of FAPESC and Fundação CERTI (Foundation of Reference Centres for Technological Innovation, *Fundação Centros de Referências em Tecnologias Inovadoras*). The complex was designed to attract businesses and innovative projects in the sectors of tourism services, technology and environment. The Park's strategic plan for regional development aligns the contributions and funding from federal, state and municipal governments. The plan aims to create a new urban centre for Florianópolis, focused on science, technology and dissemination of

knowledge. The Park's headquarters, a renovated former penal colony, houses an auditorium for meetings with the community and partners, and an incubator for sustainable projects with business, social and environmental foci.

The centres of excellence in science, technology and innovation, Programa de Apoio aos Núcleos de Excelência (PRONEX): FAPESC and CNPq are providing funding for 13 centres of excellence projects selected for the PRONEX. Through it, researchers will receive funding to support scientific research projects and technological innovation for a total BRL 6 141 000 over three years. The selected projects go through a very rigorous selection process. First, a team of FAPESC selects proposals that meet all funding requirements and forward them to two independent consultants. Armed with advice from an *ad hoc* advisory committee, a new analysis of the merits and relevance of each study is forwarded to the final project selection committee. Examples of selected projects in the most recent round include; *(a)* conservation of native flora of the Atlantic, *(b)* native fish farming in the Uruguay River basin, and *(c)* development of the Santa Catarina digital library.

Scientific research and development programmes

Basic scientific research, and science, technology and innovation programme (STI): The STI programme was launched in 2006 and is targeted to support scientific, technological and innovation projects in various areas of knowledge, relevant to the socio-economic development of Santa Catarina. The objective of the programme is the advancement of basic scientific research through capacity building and updating of the technological infrastructure for research in participating institutions through the provision of financial support to projects of basic scientific research, in two lines: *(i)* **Line I:** supports the purchase of scientific instruments and / or equipment, usually not covered by other public funding sources. Such instruments and / or equipment are usually shared both by institutions and research groups on proposals for up to BRL 500 000, and *(ii)* **Line II:** provides support for projects that qualify as research frontier of basic scientific knowledge and connected to relevant development challenges in Santa Catarina.

Research programme for the health care system, Sistema Único de Saúde (SUS):[4] This programme is targeted to support research activities aimed at promoting the development of science, technology and innovation in the health field in Santa Catarina, based on priority health problems defined in the State Department of Health and National Health Agenda. Funding

involves researchers with links to health care providers and/or universities, institutes, centres, foundations, research and development centres and other government departments. In the period 2006 to 2008, FAPESC received 102 proposals, of which 30 were selected. The majority of selected research projects were in the following areas: *(i)* management of health education, *(ii)* support for the establishment of an integrated health care system, *(iii)* establishment of a Health Information System (HIS), *(iv)* health services policies, *(v)* sanitation, *(vi)* pharmaceutical research *(vii)* technology assessment and health economics, and *(viii)* communicable and non-communicable diseases.

Universities of Santa Catarina merit award, Prêmio Mérito Universitário (PMUC): Established in 1994, the PMUC has as a goal to improve the quality of life in the State of Santa Catarina through the development and appropriation of scientific knowledge by students, and through participation in scientific research projects that contribute to the reduction of regional disparities. The public call for participation is directed to students enrolled between the second and last semester of their programmes, in all disciplines and knowledge areas in universities and institutions of higher education in Santa Catarina. The PMUC meets the federal and state legislation goals for strengthening training and introducing students to the methods of scientific research, and enhancing their participation, with adequate guidance and support. In the last round of funding in 2007, 398 students were awarded scientific initiation grants of BRL 2 500 in three major areas: *(a)* humanities and social sciences, *(b)* applied engineering sciences, and *(c)* earth and life sciences.

The "Southern" postgraduate plan: In 2007, FAPESC in co-operation with CAPES initiated a postgraduate studies support programme for university teachers and researchers in the southern states; 50 scholarships for studies towards the Master's and 20 towards Doctorate degrees. The two entities signed an agreement to share BRL 9 million cost of the programme. All areas of knowledge were also addressed in the selection process, in accordance with CAPES guidelines for such scholarships. Master's students receive monthly fees from BRL 940, and doctoral students BRL 1 394. The transfer of the grant payments is made directly to institutions for two consecutive years for Master's degrees and four years for Doctorates. Universities supported by the Southern Plan are: UDESC, UNESC, FURB, UNISUL, UNIVALI, UFSC, UNIVILLE, UNOCHAPECÓ and UNOESC. Each one receives from one to thirteen scholarships. The FAPESC contribution covers academic fees in the amount of BRL 230 000. The

programme also provides institutional funding for activities related to graduate studies at Master's level (MINTER, *Mestrado Interinstitucional*) and Doctoral level (DINTER, *Doutorado Interinstitucional*) in different regions of the for travel and related expenses. CAPES grants totalled BRL 1 053 005, and FAPESC BRL 1 556 838 for 2008.

Young researchers and scientific initiation for junior scholars programmes: In May 2007, the Young Researchers programme, supported by CNPq in co-operation with FAPESC provided funding for 63 young researchers to complete their Doctorates. Each will receive between BRL 14 000 and BRL 50 000 in 2008. The overall cost of the programme BRL 2 300 000, of which BRL 1 530 000 is provided by CNPq. Among the sector studies conducted under this component are:

- *Health care***:** focused on the development of therapies for patients with acute leukemia and Alzheimer's, and the establishment of oral pathology research in Santa Catarina.

- *Transportation***:** The design of the transportation infrastructure in the state, to support several campaigns to reduce traffic accidents.

- *Social cohesion***:** development methodologies for social inclusion, and that it will investigate the cultural diversity in the public schools of Santa Catarina.

- *Industrial development***:** development and implementation of projects to: *(a)* evaluate the recovery of areas degraded by coal mining, *(b)* develop methods to reduce water use in the textile industry of the Vale do Itajai, and *(c)* minimise the sludge production in the sewage treatment of the effluents of that industry.

The programme for scientific initiation for junior scholars encourages the training of high school students in the methods of scientific research, covering all areas of knowledge of interest to the federal funding agency CNPq. The programme involves the selection of high school students who attended public schools of the State of Santa Catarina, provided they meet the requirements outlined by FAPESC. In 2007, 210 monthly grants in the amount of BRL 100, with a duration of 12 months were fully paid. And 10 scholarships were awarded to selected students in the Gymkhana, a programme established through partnership between the Secretariat of State for Education, FAPESC, UFSC and the Fundação CERTI, an independent private technology research and development organisation that maintains partnerships with universities and research centres in Brazil and abroad.

Sectoral and regional RDI programmes

Agriculture and horticultural programmes

- *Agriculture*: This FAPESC programme supports research projects in crops such as rice, beans, cassava, seeds and seedlings, as well as livestock, and environmental protection in Santa Catarina. This includes also research in bioactive plants, biotechnology, temperate and tropical fruits and vegetables, beekeeping, aquaculture, fisheries and fish farming, livestock and farm management, agro-ecology, agro-meteorology, environmental information, soil management, forest resources and water resources. The programme supports researchers with doctorates and experience in scientific and technological research of at least two years in the disciplines outlined. The researchers should have functional link or employment with institutions of research, which in turn must have infrastructure compatible with the research work, supporting physical infrastructure and staff support consistent with the magnitude of the work.

- *Floricultural programmes*: The growing and harvesting of flowers is a growing business in Santa Catarina. Domestic consumption of flowers in Brazil is expected to increase by 14% in 2010, and the south region stands to have the highest per capita consumption. Brazilian exports are also growing; floristic exports grew more than 40% in recent years. To generate technologies enabling the state to supply the domestic and foreign markets, the FAPESC is funding research to study the commercial viability of flowers and native cultivated ornamental plants in Santa Catarina. The botanical gardens of Florianópolis is a recent initiative of FAPESC that will provide recreation and environmental education, as well as, contribute to the implementation of the national biodiversity, and support research on biology, ecology and other related themes.

- *The viticultural centre at São Joaquim*: The FAPESC with support from other agencies including the Brazilian Wine Institute (*Instituto Brasileiro do Vinho*, IBRAVIN) is also providing support for the establishment of a Viticulture and Fruit Production Research Centre at São Joaquim. Over recent years, the grape growing and wine making industry have made heavy investments in research and technology by developing advanced crop and production techniques, acquisition of state-of-the-art equipment, renewal and expansion of vineyards, control of production, and training of personnel. The result is impressive, and the recognition has been forthcoming. Over the past decade. Brazil has obtained over 1 800 distinctions in international contests with its wines,

and Santa Catarina is becoming a key producer of wine in the country. Another important product that is gaining attention is the pineapple guava, or "*feijoa*", a native of the Brazilian southern plateau with secondary dispersion in Uruguay. Due to the uniqueness of its flavour, the economic importance of the pineapple guava is steadily increasing on the world market, and it is an attractive commercial alternative for farmers in southern Brazil.

- **Shrimp aquaculture:** The cultivation of shrimp in Santa Catarina increased four fold from 1998 to 2004. However, in recent years viral diseases have caused great damage to the producers and the industry of the state. In Santa Catarina, a total of BRL 75 million will be invested in establishing units of cultivation and breeding laboratories. Before the crisis, the state programme for the development of cultured shrimps included a partnership between UFSC and the Santa Catarina Enterprise for Agricultural (and Livestock) Research and Rural Outreach; *Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina* (EPAGRI). The design of UFSC-EPAGRI project involves the study and monitoring of the behaviour of the virus, development of bioactive substances, and genetically improved probiotic strains, and strengthening the immunology of shrimp production.

Environmental sustainability programmes

- **Studies for the preservation of aquifer systems:** This project will provide investment for infrastructure development, training and interventions to protect and enable the sustainable use of waters of the Guarani Aquifer System, Serra Geral. The project will map the areas of greatest vulnerability to contamination, monitoring water quality, and will support the following actions: *(i)* installation of a local centre for water distribution supported by infrastructure of laboratories for water analysis, and GIS database; *(ii)* training of technical staff of state and local officials, teachers, extension workers and NGO participants, *(iii)* dissemination of technical standards for the sustainable use of surface and groundwater; *(iv)* introduction to the use of digesters and bio compositors, aimed at improving the marketing of carbon credits; and *(v)* supporting the introduction of measures to mitigate the impact of agricultural practices and ensure the economic sustainability of agricultural properties.

- **Environmental "greenhouse" research:** FAPESC has targeted public financial support for research projects aimed at reducing greenhouse gas emissions by encouraging the development of scientific and

technological co-operation, and the improvement of environmental quality. FAPESC will fund fourteen research projects targeted at minimising the impact of human activities on climate change in the 2008/2010 funding cycle with an envelope of BRL 1 000 000. Notable among the projects selected are: *(a)* a project to enhance the peat-material of partially decomposed plants in the Serra State Park, *(b)* a project that investigates the use of forest residues and industrial waste to slow down global warming, and generate thermal and electrical energy in the region of Lages, and *(c)* a project that explores methods of methane reduction and generation of clean energy through the treatment of manure generated from organic waste.

- ***The special fund for the protection of the environment; Fundo Especial de Proteção ao Meio Ambiente de Santa Catarina (FEPEMA)***: The State Secretariat for Economic Development in partnership with FAPESC approved the establishment of this fund as part of the National Fund for the Environment (*Fundo Nacional do Meio Ambiente*, FNMA). The new fund will support the training of representatives and managers of environmental protection projects. As a result of this process, the Fund for the Protection of the Environment, *Fundo Especial de Proteção ao Meio Ambiente de Santa Catarina* (FEPEMA) marked environmental history in Santa Catarina, in 2006 by signing the decree that gives new rules for the protection of the environment, and established a new executive board as a more effective, transparent and participatory body. With the new rules, the resources from environmental fines, traditionally transferred to the Brazilian Institute of Environment and Renewable Natural Resources, *Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* (IBAMA), will now go to FEPEMA supervised by the State Secretariat for Economic Development.

Industrial development programmes

Applied RDI programmes for local industries

- ***The ceramics industry:*** The strategies adopted for this project were informed by the recognition that policies encouraging small and medium enterprises are more effective when directed to groups of companies rather than individual companies, through enhancing co-operation, collective learning, tacit knowledge and innovative capacity of enterprises and institutions. This initiative supports increasing the competitiveness of manufacturers of ceramics products in Santa

Catarina, through knowledge transfer and infrastructure development to increase technological capabilities in the industry. The arrangement allows companies to work in a co-operative environment, achieving economies of scale. Some threats to the sector were identified during project development, including: low level of process technology, small-scale production, low value added, and the entry of strong international competitors.

- *The textile industry:* In Santa Catarina, the textile and garment industry was traditionally a growing and vibrant manufacturing sector, and one of the largest manufacturing industries of the state. However, faced with foreign competition, local companies were forced to restructure, seeking to modernise and expand their productive capacity. To that end, the FAPESC project's main goal is to develop technologies to optimise the pre-bleaching, bleaching, dyeing and surface treatment of textile substrates, and facilitate the use of natural dyes in the printing of fabrics, fiber removal in textile processing, using hydro-cyclone with media. The project involves the establishment of a textile and clothing technology platform essential to the growth of the sector. The platform should result in further closer co-operation between industry, universities and institutions in the textile sector.

- *Information and communication technology (ICT):* Santa Catarina has emerged as one of the main Brazilian states in the number and quality of companies that develop ICT products particularly software. However, their level of participation in the global market for ICT is well below their potential. The root causes for low participation level, include among other factors, the small number of companies that have been evaluated by external evaluators and are certified to international standards such ISO 9001, CMM, and others. FAPESC therefore supports initiatives to improve the competitiveness of Santa Catarina's ICT enterprises, by developing the tools to standardise product development processes used in the development, testing and marketing of ICT products, and particularly applications software.

Innovation centres and programmes

- *Centres of technological innovation and intellectual property (TIIP):* This FAPESC initiative supports the establishment and consolidation of TIIPs which are mandated to manage the intellectual property rights (IPRs) of research institutions and the dissemination of its results through Santa Catarina and Brazil. The selection process for funded initiatives is based on the criteria that were evaluated by Brazilian experts in the area of Technological Innovation and Intellectual

Property, taking into consideration the capacity of the bidding institution or consortia of institutions and the regional distribution of resources being invested by FAPESC.

- *Programme "Inova SC":* This programme is sponsored by the government of Santa Catarina through FAPESC to provide strategic data and promote structural innovation in enterprises and business establishments in Santa Catarina, and strengthen their links to the universities and the institutions of science, technology and innovation of the state. With the implementation of the Programme Inova SC, the FAPESC, along with 13 other technological institutions, interacted with hundreds of enterprises of all sizes in the 8 regions of Santa Catarina, and analysed their strategies for adopting technological innovation. The programme identified the following strategies for strengthening innovation: *(i)* developing relevant professional development and training programmes related to innovation for enterprise personnel, *(ii)* restructuring the TIIPs in the underdeveloped regions of the state, *(iii)* fostering the development of products or processes in SMEs (small and medium enterprises), *(iv)* upgrading the qualifications and skills and training of managers of the innovation process in enterprises, *(v)* supporting the implementation of innovative pre-incubators and business incubators, and *(vi)* assigning graduate students capable of generating innovative solutions to spend part of their studies working in enterprises.

- *RDI in small enterprises, Programa de Apoio à Pesquisa em Empresas (PAPPE):* The PAPPE programme promotes research and development in the enterprises of Santa Catarina, by supporting the development of closer ties with research institutions to generate and deploy innovations in all industrial and business processes of the enterprises. The programme provides research to support RDI initiatives in small and medium enterprises (SMEs), individually or in the form of consortia. In 2007 an agreement was signed to formalise the investment of BRL 9 million to promote technological innovation in Santa Catarina. By signing the agreement, the state government has established a partnership with FINEP, which provided funding of BRL 2.5 million, in addition to BRL 1.5 million from SEBRAE/SC and the FAPESC contribution of BRL 1.5 million.

- *The Bio-Lages technology pole:* The *Polo de Biotecnologia em Lages (Bio-Lages)* was designed as a network of institutions and basic bio-technological laboratories. The Pole offer specialised services in research, diagnostics, consulting and audits, creating opportunity for

businesses and development in the area of bio-technology in the *Serra Catarinense*. Other partners include the Department of Regional Development, the Centre of Agricultural and Veterinary Sciences (*Centro de Ciências Agro-veterinárias*) of the State University of Santa Catarina (UDESC, *Universidade do Estado de Santa Catarina*), and the University of the Plateau of Santa Catarina (UNIPLAC, *Universidade do Planalto Catarinense*). Funding for the project is secured from several sources, the FAPESC, the Development Agency of the State of Santa Catarina (BADESC, *Agência de Fomento do Estado do Santa Catarina S.A.*), the Regional Bank for the Development of the Far South (BRDE, *Banco Regional de Desenvolvimento do Extremo-Sul*), and the Santa Catarina Partnership Fund.

Analysis of the constraints and proposed reforms of the RDI system in Santa Catarina

Strengthening the policy framework and governance of the RDI system

Policy and governance constraints

While the policy framework and governance of the RDI system at the federal level in Brazil is relatively well established, and the capacity of institutions such as CNPq, FINEP and CAPES is substantial, the institutions supporting the governance of RDI at the state level are newer and weaker than their federal counterparts. The policy and governance constraints in Santa Catarina include:

- The fragmented institutional nature of the RDI system, with its narrow discipline orientation does not respond well to the cross-disciplinary nature of knowledge generation in a modern economy.

- The weak links for the development, implementation and monitoring of joint RDI initiatives between the state and federal funding bodies.

- Research institutions work within different organisational and administrative settings, are funded under different rules and lack standards and criteria for performance assessment and evaluation.

- Absence of a common framework for planning, funding and accountability results in the lack of purposeful co-ordination of RDI initiatives.

Opportunities and options for reform

The government of Santa Catarina may consider the development of a comprehensive policy and governance framework that builds on the capacity of some RDI institutions, but addresses the major weaknesses and limitations of the existing system including the development of *a framework for the monitoring and evaluation of the outcome of RDI initiatives* through the use of internationally recognised indicators and metrics.

Energising and balancing the RDI agenda

The RDI agenda constraints in the present system

Energising the RDI agenda involves the assessment of key assumptions about relevant issues of priority setting and funding.

- *Basic vs. applied research:* The debate about the balance between basic and applied research has been at the core of the debate about RDI policy in many countries and local jurisdictions including Santa Catarina. The blurring of the boundaries between the two and its impact on priority setting and funding decisions in the public and private sectors poses fundamental difficulties for policy makers. While this debate still continues, there is an emerging understanding that any relevant research should include both components; a pure, curiosity-driven (basic) component without particular end use in mind, and the use-inspired (applied) component.

- *Securing sufficient funding for the RDI infrastructure:* The funding for centres of excellence programmes in many countries focuses on funding the infrastructure of the participating institutions in a network of centres of excellence. The funding of the programme *Programa de Apoio aos Núcleos de Excelência* (PRONEX) is not an infrastructure funding programme but rather a project oriented programme which represents a major constraint. By contrast, the Canada Foundation for Innovation (CFI), an independent agency created in 1997 with an initial endowment of CAD 800 million, and later expanded to a total of CAD 3.2 billion funds research infrastructure in centres of excellence involving universities, hospitals, colleges, and non-profit research institutes.

Opportunities and options for reforms

The government of Santa Catarina may consider some of the following options for reforms:

- *Create a more balanced RDI agenda:* The key challenge for policy makers in FAPESC is not to find a new conceptual definition of basic research, but to identify a broad definition of its scope to cover the whole range of research types needed to establish a sound body of knowledge to achieve socio-economic advances. This implies that policies for public sector research need to complement private sector research, and define research priorities, agendas and funding instruments accordingly. An overall trend observed in OECD countries is that institutions dedicated to basic research are increasingly looking for partnerships with the private sector, and are more committed to the rapid transfer of research results to viable commercialised applications.

- *Redefining the organisation and mandate of PRONEX:* Change the terms of reference for funding PRONEX-based initiatives from its project orientation to a fund that provides infrastructure financing to the network of centres of excellence in the universities, hospitals and research institutions to ensure their long term sustainability.

- *Evaluation and assessment of funded RDI initiatives:* The call for increased funding for RDI is naturally linked to the introduction of more rigorous processes of evaluation and assessment of the outcome of these initiatives and the accountability of the use of publicly allocated resources. Traditional evaluation procedures such as peer reviews for grants and projects, which are common in many developed countries, have not been widely used in Brazil and Santa Catarina and their introduction should be included in the government agenda for reforms.

- *Balanced assessment of RDI outcomes:* The most commonly used RDI indicators involve the traditional indicators of scientific excellence such as the number of publications in internationally refereed journals, citations, patents and awards. There are many initiatives underway to develop a more balanced approach for the assessment of the outcome of RDI that includes criteria and measures of quality and relevance to the socioeconomic needs of society such as: *(a)* continued relevance of the RDI programme to its original stated objectives, *(b)* programme results and the achievement of objectives, *(c)* impacts of the programme on its stakeholders, and *(d)* cost-effectiveness of the programme.

Ensuring the diversification and sustainability of RDI funding

Funding constraints

The funding constraints in Santa Catarina include:

- ***The existing low level of gross expenditures on research and development:*** The present levels of public expenditures on RDI in Brazil and in Santa Catarina expressed in terms of the Gross Expenditure on Research and Development (GERD), as a percentage of the GDP, are low in comparison with other countries at the same level of economic development, especially in Latin America.

- University research activities are underfunded – both in terms of infrastructure and facilities, as well as, project funding – thus hindering the full utilisation of universities' research capacities.

- The funding contribution of the private sector to RDI initiatives in Brazil and in Santa Catarina is low by international standards. Most of the projects funded by FAPESC are in the area of technology transfer, development of a proof of concept, and technology prototyping.

Opportunities and options for reforms

The government of Santa Catarina may consider some of the following options for reforms:

- ***Increasing the gross expenditure on research and development (GERD):*** Increasing GERD as a percentage of the GDP has to be a major priority for the government. The recently announced target by the federal government of 1.5% of the GDP from its present level within five years is a step in the right direction, and will bring funding in Brazil and in Santa Catarina in line with other leading Latin American states/provinces in the region and in other parts of the world.

- ***Restructuring the funding mechanisms:*** The restructuring of the RDI funding mechanisms in Brazil and Santa Catarina is essential to the long term sustainability and effectiveness of the RDI system. Reform to the existing institutional funding framework, and the enhancement of project-based competitive mechanisms are essential aspects of the proposed reforms.

    - ***New institutional funding paradigms:*** Institutional funding for universities and other public RDI institutions refers to the block grants that governments or funding agencies allocate to RDI institutions annually. In the absence of serious evaluation of the

outcome of RDI initiatives in these institutions, they were traditionally free to use these funds in any way they saw fit. While this situation, until recently, prevailed in many countries including in the OECD area, there have been recent attempts to introduce measures of accountability in the use of institutional funding, that are worthy of consideration for funding RDI in Brazil and Santa Catarina. First, the funding should be linked to the development of an overall science and technology policy, with priority attached to identified sectors or disciplines. Second, the funding levels should be tied to overall RDI development goals. Finally, performance-based criteria for institutional funding should be introduced as an integral component of the funding mechanism.

− *Funding of new centres of excellence (CoEs)***:** This approach to institutional funding provides funds to networks of centres of excellence in targeted strategic clusters through existing funding agencies and/or through new independent foundations with clearly defined mandates. These new mechanisms often emphasise the participation of the private sector as a key criterion for the funding. The *Programa de Apoio aos Núcleos de Excelência* (PRONEX) funded by FAPESC and CNPq is step in right direction and should be strengthened and expanded.

− *Project-based competitive funding:* Public funds are allocated to targeted projects in institutions, or often involving more than one institution on the basis of applications that are submitted in response to a call for tender or request for proposal. The criteria for eligibility are outlined in some details by the funding agencies, and the applications are reviewed by a panel of peers. Project-based funding which was prevalent originally in Anglo-Saxon countries, has been now widely adopted in other parts of the world.

− *Enhancing the private funding of public sector RDI initiatives:* Over the past decade there has been a trend first observed in OECD countries, but recently in upper and lower middle income countries, of the increasing share of private funding for public RDI initiatives, especially in universities. The government should consider the introduction of legislation to provide tax incentives for businesses and enterprises to increase their contributions to the RDI agenda in Brazil and in Santa Catarina. The government should consider the development of RDI-related tax incentives for private sector enterprises in Santa Catarina to increase their contribution to RDI initiatives.

Enhancing the RDI capacity of universities and higher education institutions (HEIs) in Santa Catarina

Capacity constraints

The RDI capacity constraints of universities and higher education institutions in Santa Catarina include:

- The relatively weak RDI capacity of the majority of universities in the state. With the exception of the Federal and State Universities of Santa Catarina (UFSC and UDESC), most of the other universities have less than 20% of their teaching staff qualified at the PhD level; the majority of the university staff hold either a Master's or Bachelor's degree. Other issues include:

  - The overall lack of second language capacity, and especially English, among RDI workers in universities and research institutes hinders their ability to co-operate with international partners and participate in RDI consortia.

  - The overall research production (articles published in international journals and patents) is low in comparative terms, although it has been increasing during the last ten years.

  - The lack of well defined research priorities tends to produce research results that are only weakly aligned with state and national objectives.

  - The lack of common evaluative procedures and performance indicators for research tends to result in low productivity and inefficient use of resources.

Opportunities and options for reform

The government of Santa Catarina may consider some of the following options for reforms:

- ***Co-ordinated RDI resource allocation:*** Allocating more resources and mounting co-ordinated efforts between FAPESC and CAPES to increase the number of scholarships available to the teaching staff of universities and HEIs to obtain their PhD, with an overall target of 30% of all teaching staff in the universities across the state by 2016.

- ***Co-ordinated effort to improve English as a second language capacity of all RDI workers*** by funding targeted second language programmes, and providing adequate incentives for faculty to learn a second language in all universities and HEIs.

- *Adoption of contemporary RDI performance assessment tools:* introduction of new performance assessment tools linking incentives to performance will inevitably meet resistance from many stakeholders, especially university researchers who have never been subjected to such a situation. The government of Santa Catarina should pursue an effective change management system to ensure the success of the new approach it has recently put in place.

Box 10.1 Public-private collaboration in innovation: the case of American industries and national laboratories

For decades, Proctor and Gamble (P&G) has been creating petroleum-derived materials that are engineering marvels. Tide bottles that don't explode if dropped from high shelf on the floor of a super market, and shampoo emulsions that don't separate, whether they are shipped by plane at 30 000 ft or warehoused at temperatures exceeding 40 degrees, are some of the products that P&G is famous for. Now as P&G joins the "go green" movement, it has realised that natural materials may not be as pure, as strong or as stable over time as petro plastics, and developing green replacements for them requires deep science that is beyond the capacity of most companies like P&G. Enter national laboratories such as Los Alamos National Laboratory, and Scandia National Laboratory, the fabled weapons research centres in New Mexico that pioneered the development of America's nuclear arsenal. In a partnership that started in 1995, P&G has tapped the labs for the knowledge of world class chemists, physicists, biologists, production engineers and computational scientists, as well as the labs supercomputers. Some of the key spin-off areas are:

- *High performance computing:* National labs use super computers and advanced software to simulate nuclear explosions. Goodyear, P&G and other enterprises have adapted these tools to design better tires, and green detergent bottles and other household goods.

- *Bioterrorism protection:* Sandia and Los Alamos developed technology to detect and neutralise anthrax and other biological and chemical agents. Scotts's *Liquid Gold* turned such breakthrough into *Mold Control 500 w*hich fights toxic mold in homes.

- *Micro systems:* Sandia builds tiny electronic devices that can survive radioactive blasts. Scandia has opened its microelectronic labs to private companies developing bio sensors and chips used in medical diagnostic gear.

- *Nano materials:* Los Alamos develops ways to spin carbon nanotubes into fibers that strengthen weapons, aircraft and armor. CNT Technologies used the Los Alamos knowledge and methods to create "super threads" for sporting goods and artificial limbs.

Public-private collaboration in innovation such as P&G's is earning praise in many quarters, and is what the US Congress had in mind two decades ago when it began pushing the nation's hundreds of national laboratories to transfer more of their know how to US companies. Many of the national labs, eager to earn contract research fees from corporations jumped at the opportunity.

Source: Adapted from Business Week, 22 September 2008.

Box 10.2 **The reform of higher education and scientific research in France**

Over the past three years, several changes have occurred in the French system of scientific research and higher education as the country struggled to find ways of modernising a structure that has been forged over two centuries. Change was needed because the French system was mired in numerous idiosyncrasies, including a dichotomy between public universities and specialised public institutions of higher education – the *grandes écoles* which are selective but mainly undergraduate institutions. The other is a research workforce fragmented between universities and government agencies such as the *Centre National de la Recherche Scientifique* (CNRS, National Centre for Scientific Research) for basic sciences and the *Institut National de la Santé et de la Recherche Médicale* (INSERM, French National Institute for Health and Medical Research); a system that inhibits the flow of professional talent between these institutions. The CNRS, a multidisciplinary centre, created in 1939, is France's biggest research organisation, with 32 000 employees of whom 26 000 are tenured including 11 600 researchers. It has extensive international partnerships, including exchange agreements with 60 countries and 5 000 visiting scientists from abroad. Its budget for 2008 was EUR 3.3 billion (USD 5 billion).

In August 2007, the French government proposed giving universities more autonomy and a stronger role in defining the research agenda. It is too early to judge whether universities will use their increased, but still limited, freedom effectively. However, several drawbacks remain. Universities are still not to be allowed to select students on the basis of their abilities but remain obligated to accept all applicants who have passed the *Baccalauréat*. In fields such as mathematics, physics and chemistry, universities suffer from competition with the *grandes écoles* for attracting the best students, and this will not change. Yet, despite the selectivity of the *grandes écoles*, their students are rarely exposed to research and have little incentive to complete graduate education. In 2007, only 6% of the 42 000 students of the science and engineering *grandes écoles* advanced into PhD. programmes.

Although the successes of French research have largely relied on partnerships between the universities and government agencies, some political forces want to abolish permanent nonteaching research positions. The *Agence Nationale de la Recherche* (ANR, National Research Agency), established in 2005, provides research grants on a competitive basis and provides career-development opportunities to young researchers. However, more than 70% goes to programmes with targeted objectives defined *a priori* by the government. The 30% devoted to broader, excellence-based programmes, critics argue, is too small. In addition, the ANR grants support very limited overhead costs. It is shortsighted not to acknowledge the important role of the infrastructure in which individual researchers operate.

The teaching load of newly recruited professors has increased by 50% since 1983, severely impairing their research capacities. The CNRS has proposed creating five-year chair positions that have no teaching duties for assistant professors, giving them a chance to remain active in research. This is potentially a good idea whose generalisation would be welcome, but only if the hiring procedures at universities improve. However, most scientists believe that the badly needed reinvigoration of the universities cannot be achieved simply by jeopardising comparatively more efficient organisations such as the CNRS. The future of France's research and education system ultimately depends on its ability to attract the best young minds to science and give them the appropriate means to develop their ideas.

Source: Adapted from *Science*, 7 June 2008, Vol. 320, by Edouard Brézin, a former president of the French Academy of Sciences**.**

Improving the relevance, quality and impact of RDI initiatives and programmes

The constraints in priority setting in RDI

The challenge of priority setting in the RDI system involves the following issues:

- *The balance among RDI priorities:* The development of balanced RDI priorities is one the most important challenges facing the RDI community in any country or local jurisdiction. The dimensions of such balance include the balance between basic versus applied research, core infrastructure funding versus project-based funding and academic freedom of university-based research versus industry-driven and controlled funding.

- *The limited autonomy and flexibility:* The effectiveness of RDI institutions and relevance of their work depends on their autonomy and ability to be responsive to the needs of the end user of their RDI products. Rigid bureaucratic control of RDI institutions hinders their autonomy and flexibility.

- *The lack of sufficient multidisciplinary approaches to RDI:* Successful RDI initiatives in the knowledge economy require a multidisciplinary outlook to the RDI projects and initiatives. The narrow disciplinary orientation that seems to still prevail in the RDI initiatives of the universities of Santa Catarina is a constraint that needs to be addressed.

Opportunities and options for reforms

The government of Santa Catarina may consider the adoption of some of the following options for reforms:

- *Priority setting processes and approaches:* Countries and local jurisdictions vary considerably in their strategies for priority setting. In jurisdictions where the top-down approach is predominant, the government adopts explicit strategies, and sets up priorities for RDI through the use of advisory bodies or inter ministerial committees. The mandate of these bodies can vary from providing advice or recommendations to actually making formal decisions supported by a legal mandate. At the other extreme is the decentralised bottom-up approach favoured by countries with strong local governments such as Australia, Canada and the United States, where the advisory bodies are decentralised and serve different government agencies. Many countries, including Brazil fit between the two extremes.

- ***Funding multidisciplinary thematic initiative and adopting technology forecasting and road mapping methodologies:*** Define the RDI agenda by using key development themes and adopting technology forecasting as a powerful tool to stimulate dialogue amongst the RDI stakeholders to help the process of priority setting, and Technology Road Mapping (TRM) as a planning process driven by the projected needs of the state's markets. This would help the FAPESC and partner enterprises to identify, select and develop processes and technology alternatives to satisfy forecasted market needs. TRM requires the establishment of public-private partnerships discussed earlier.

- ***Contemporary processes of knowledge production, diffusion and exploitation:*** The growth of the knowledge economy has resulted in general shift away from the narrow disciplinary research, usually referred to as Mode 1 research, which hinders fruitful synergies across relevant scientific disciplines, and is carried out in specialised RDI institutions, towards more multidisciplinary research (Mode 2) that is more directly responsive to societal needs and is carried out by multidisciplinary teams of researchers. The demand-driven shift towards multidisciplinary research is evidenced in areas such as ICT, biotechnology, nanotechnology, alternative energy and environmental technology.

Notes

1. Brazilian Institute of Geography and Statistics (IBGE, *Instituto Brasileiro de Geografia e Estatística*), 2007.

2. Santa Catarina State Enterprise for Agricultural and Livestock Research and Rural Outreach, (EPAGRI, *Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina*, 2008).

3. www.webometrics.info/

4. The Health Care System in Brazil is in general structured along the same lines as in the United States, with a relatively large private sector. The system is also fragmented in many smaller hospitals, clinics, laboratories and other medical centres; a structure which means that many doctors and medical centres are specialised in specific diseases in which they have a high level of competence.

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Chapter 11. Towards Strategic Reform Measures

> *This chapter provides a brief reminder of the issues facing the Santa Catarina education system and recapitulates the main recommendations of the substantive chapters to promote a viable reform strategy for the State Secretariat for Education.*

Purpose and context of the review

The review is the outcome of a request from the state government of Santa Catarina, Brazil, to the OECD Directorate for Education Programme for Co-operation with Non Member Economies to conduct a general review of the education system in that state. The aim was to examine all main aspects of the education system with a view to advising the state authorities on how best the system could assist in the realisation of the aspirations for economic, social and cultural development of Santa Catarina.

Brazil is a federal country, with the federal government located in Brasília. It is a vast country with great regional and climatic variation. Its population of 192 million people is made up of many ethnic groups. In recent times it has been benefiting from a steady level of economic growth at an average rate of 2.5% annually over the last decade. Inflation rates have also been reduced greatly. As a country, it has many natural advantages. It has the world's largest freshwater supplies and the largest tropical forests. It has huge mineral and hydrocarbon wealth. It is self-sufficient in oil, and following new offshore discoveries in 2007, it is likely to be a significant exporter of oil in the future. Tracts of its land are agriculturally very fertile. It has a well-developed tourist industry. Brazil is also benefiting from increasing inflows of foreign direct investment (FDI). Interestingly, Brazil has not been as badly hit by the current international economic recession as many other countries.

Santa Catarina is one of the 27 states which make up the Federation, and it has its capital in Florianópolis. Both the federal government and the authorities in the State of Santa Catarina have invested some of their financial resources in expanding education provision at all levels. They have identified the education of citizens as of crucial importance to the economic, social and cultural advancement of the state, in the context of globalisation and the knowledge society. An extensive raft of legislation and educational policy initiatives has been introduced as evidence of this concern. A striking feature of educational policy-making has been its consultative character, whereby stakeholders have been involved in the development of policy, nurturing a sense of ownership with it. Education in all public education institutions is free, and schemes exist for the provision of free textbooks, school transport, school uniforms and school meals.

Despite such praiseworthy efforts in the provision of schooling, the quantitative expansion of provision is not matched by the quality of the education provided, as measured by national and international tests. The performance of pupils on such tests has been very disappointing and highlights the fact that the key target for the future is to raise the standards of student achievement at all levels of the education system. The system is not equipping students with the capacities and capabilities which they require as individuals and citizens to participate in, and contribute to the society which is evolving.

Santa Catarina, with a population of about 6.2 million, is a relatively wealthy and economically progressive state. It ranks fourth among the 27 Brazilian states of the Federation, in terms of economic development, and GDP per capita. It has a rich diversity of social, cultural and ethnic groups who enjoy one of the highest standards of living in Brazil. Santa Catarina has a slower population growth and a lower birth rate than Brazil generally. This positions it favourably from a demographic perspective to focus more on qualitative provision of education than quantitative. Santa Catarina has a complex pattern of schooling provision. There are three types of public school – federal, state and municipal – and a fourth category of private, fee-paying schools. Each of these types of school operates independently of each other, and has different management and regulatory arrangements. The Federal Ministry of Education (MEC), located in Brasília, has significant overall responsibility for areas such as the curriculum framework, standardised learning assessments, the provision of textbooks, transportation and meals for public schools. It also has major responsibilities for aspects of higher education. The Secretariat for Education in Santa Catarina, working in association with the federal authorities, has responsibilities for many aspects of education specific to the state. Currently, national policy is that the municipalities should become

responsible for all public pre-schools and primary schools, but this policy has not yet been fully implemented in Santa Catarina. There are 36 regional administrative divisions in Santa Catarina, and each has an education office which supports the work of schools in its administrative area. To accommodate the greatly expanded pupil population, reliance is placed on the use of a shift system in the schools. The majority of schools have to accommodate three shifts per day, from early morning to late in the evening. The shift system impacts unfavourably on the amount of school time available to individual pupils, on the optimal times for some pupils' engagement with their studies, and on other qualitative aspects of schooling, including the quality of teacher input.

Among the challenges which face the greater economic development of the state are inadequacies in the physical infrastructure, weaknesses in human capital skills in relation to market needs and innovative endeavours, and a traditional inadequate investment in research, development and innovation (RDI). By examining the whole spectrum of education and research provision from early childhood to higher education and lifelong learning, the review seeks, through its analysis and recommendations, to assist the authorities in Santa Catarina to devise and implement educational policies to meet the human capital challenge, and the research and innovation needs. In doing so, the review team is encouraged that it is working in harmony with policy concerns and trends already in evidence in Santa Catarina. Some of the recommendations coincide with the perspectives of Santa Catarina authorities and, thus, give an affirmative consolidation to such viewpoints. Other proposals may be more novel, reflective of international experience. In this context, the reviewers were struck by the outward-looking attitudes of their Santa Catarina hosts, who were anxious to benefit from the best of international practice.

The reviewers were invited to examine a range of sub-sets of the overall education system. It is hoped that analyses and recommendations relating to each sector will be useful to those with policy and administrative responsibilities for the sectors. Cumulatively, the recommendations are extensive. While some have resource implications, other suggestions do not, or require little additional funding. It is, of course, a matter for the authorities in Santa Catarina to exercise discretion as to which recommendations to accept, and to decide on priorities for action. The successful implementation of major educational change is a long-haul process, but it is important to have a clear view of the highway to reach one's destination. The shared concern of the Santa Catarina authorities and the reviewers is that participants in the education system acquire the knowledge, attitudes and skills to be flexible, adaptable, self-reflective and self-learning. The hope is that they develop transferable skills and

competencies to reach their potential as individuals and to contribute productively to the development of their society, at an exciting era of change.

The financing of public schooling

In Brazil the three levels of government are jointly responsible for running and financing basic education. The federal government holds overall responsibility for the administration of the national education system. The municipal governments are in charge of pre-school and, increasingly, the *fundamental* cycle of education. The 26 state governments and the Federal District are responsible for secondary education and, in some cases, overlap with the municipalities in the provision of *fundamental* schooling. The system of educational financing reflects the various responsibilities of the different levels of government for ensuring a functioning system. To strengthen the administrative political and financial autonomy of governmental levels, the Brazilian Constitution defines a system of unconditional transfers between the Union, the states and the municipalities, from higher to lower levels of government. Of the total disposable tax revenue for education in 2007, the federal government had 58.4%, the states had 25.9% and the municipalities had 15.7%. The current national goal is to increase expenditure in education from 4.7% of GDP at present to 6% of GDP by 2012, which comparatively viewed, is a high target.

The valuation of education as a priority area in Santa Catarina is reflected in the pattern of the expenditure allocated to it. Of its total fiscal budget and social security revenue, in 2009, Santa Catarina allocated 19.3% to education services, which was, by a margin, the highest proportion for any category, including health and social security. This is also seen in the fact that while the Constitution decrees that a minimum of each state's own tax revenue of 25% be allocated to education, in Santa Catarina the percentage, for 2009, was 29.5% of the state's budget. Of the proportions allocated, *fundamental* education receives the largest share, at 62.6%, and secondary education benefits from 18.2%. However, pre-school education and youth education are only allocated small percentages, at 2.3%, and 3.2% respectively.

Recommendations

While public spending on schooling is high in Santa Catarina in relation to the Gross Regional Domestic Product (GRDP), outcome indicators are not commensurate with the level of government investment, suggesting that service delivery is inefficient, rather than under-funded. Improved quality of

schooling outcomes is of central importance to the state's policy on economic growth based on improvements in human capital. The federal and state governments could strengthen incentives for efficiency enhancement by adding conditionality to some budget transfers and by introducing rewards for performance. Budget rigidities should be removed, especially those related to revenue earmarking. Policy action to make budgeting more flexible should focus on a gradual elimination of revenue earmarking and aggregate spending floors. This would allow budget-making and planning to be guided more by efficiency considerations and policy priorities, rather than by historical costing and short-term revenue trends.

More strategic co-ordination through state-municipality fiscal relations is urgently needed for the smooth and beneficial municipalisation of *fundamental* education, drawing from good practice in some other states. Better change management towards municipalisation is necessary.

- School-based accountability pressures are important for efficient use of education resources, but three-levels funding (federal-state-municipality) is too complicated and fragmented. It should be re-introduced toward school-level outcome enhancement, such as learning achievement and school improvement.

- Successful innovatory practices in schools should be more widely publicised and debated throughout the state, with a view to their adoption, or adaptation, on a more widespread basis.

- The most critical issue for the State of Santa Catarina is the strengthening of the quality transformation process. Funding should be geared for schematic change towards performance enhancement so as to lead to student learning outcome reform.

Governance: system and quality management

While the State Secretariat for Education is well equipped to exercise a mandate of policy leadership, strategic thinking and education quality management for the education system as a whole, because of the fragmentation of governance structure its remit is limited. For instance, it is only responsible for about half of the children in the schools of Santa Catarina. This remit is to be further reduced by the national policy of "municipalisation", whereby responsibility for all pre-schools and primary schools is being transferred to the municipalities. While advantages can accrue to the decentralisation involved, there are also potential dangers to the quality of the education provided. Greater attention needs to be paid to the change management involved, with support for municipal leaders and school staffs in implementing the policy.

The proper functioning of effective interfaces between the control and local levels of governance, and between state and private providers is paramount for enabling informed policies for the schooling system as a whole, and for monitoring its quality. The fragmentation of the system also affects the availability of quality-related evidence at the disposal of decision-makers. This is a serious impediment to the reliable monitoring of the system, and the timely identification of its needs. There also tends to be a narrow focus in the quality management which tends to look primarily into immediate learning acquisition and test performance, leaving out other quality related sources of information.

Recommendations

The review team considers that the major institutional management issues confronting education in the Santa Catarina education system stem from fragmentation of existing institutional arrangements for the regulatory and management functions. To remedy this situation the review team recommends the following measures:

- Harmonise the management of education by establishing state-based regulatory mechanisms for co-ordination and operational oversight, and by strengthening the co-ordination of education policies at local level.

- Enhance the monitoring and oversight function at state level by scheduled audits for quality assurance and continuous improvement of all schools within Santa Catarina.

- Enlarge the mandate of the Directorate for Organisation, Control and Asssessment (DIOC, *Diretoria de Organização, Controle e Avaliação*), and expand the coverage of existing institutional audit to 100% within state schools, while encouraging municipalities to participate also.

  To help improve evidence-based policy, the team recommends:

- SED to distribute its aggregated findings and analyses more widely and actively as a means to improve feedback signals within the system concerning state level educational policies and school level practices.

- SED to formalise its data analysis and reporting as a reference for policy-making on all governance levels, perhaps through the establishment of an independent body for educational policy research and analysis.

- To improve accountability a performance-based reward system that gives more weight to *results* rather than to process only should be set up. Performance results should be transparent by setting up measurable objectives and targets at different aggregate levels, and by assigning accountability through performance contracts.

Access and equity including special education provision

Santa Catarina, as Brazil itself, has a creditable record in honouring its commitments towards equality of educational provision, under a range of international agreements, signed in the recent past. In general terms, there is no gender imbalance in the participation of boys and girls within the school system. Santa Catarina is proud of its mix of people with diverse ethnic backgrounds and of its efforts in ensuring "education for all", yet some ethnic groups are still educationally disadvantaged. The state has also made great progress in reducing the number of people living in poverty. But still, about 20% of families with children between 0 and 6 years old have incomes below one-half of the minimum wage. The "demographic" dividend being experienced by Santa Catarina provides the opportunity to ensure that no child should be deprived, because of poverty, of its right to a nine-year education of acceptable quality.

The central, rights-based concept that unifies the laws and regulations in Brazil is that of "inclusive education". The right to education is seen as *a universal right.* Special education in Santa Catarina is run by the SED, with the support of the Santa Catarina Foundation for Special Education (FCEE, *Fundação Catarinense de Educação Especial*), assisted by local Associations of Parents and Friends of Exceptionals (APAEs, *Associações de Pais e Amigos dos Excepcionais*). In the absence of an obligation for co-ordination, the links between governance levels and service providers in many municipalities seem to work on *ad hoc* basics. This is likely to have an impact on the reliability of diagnostic procedures, the rate of identification of children with SEN/CWD, and ultimately, their access to education. In most regions, the concentration of expertise and the availability of infrastructure render the APAEs the main and often only resource for schools, parents and education authorities in dealing with children with Special Education Needs and children with disabilities (SEN/CWD). In 2009, Santa Catarina devoted only 3.4% of its education budget to SEN/CWD, and many APAEs need to raise income from other sources.

Santa Catarina has set itself the commendable aim to provide all SEN/CWD children with an education in regular schools. Two main challenges exist – the provision of this type of education, and the

identification of all children with SEN/CWD. Many difficulties lie in the way of accommodating such children in regular education institutions, despite commendable efforts of personnel in the schools. It would seem that less than one-third of all registered children with SEN/CWD are in mainstream schooling. The review team is concerned that a substantial number of such children remain unreached by and "invisible" to the education system, or simply drop out before time.

International experience in relation to children with SEN/CWD is that early identification and intervention are crucial for success. These are weaknesses in the Santa Catarina system. Other problem aspects relate to weaknesses in statistical data, lack of special needs education in general teacher education courses, aspects of school organisation and infrastructure, and academic access beyond basic education for SEN/CWD pupils.

Recommendations

- Step up the active involvement of the SED in ensuring that *every* child of compulsory school age is adequately served, including children with SEN/CWD.

- Improve accurate data gathering and data sharing among various levels of government and among ministries most likely to be aware of families with children at risk.

- Encourage all APAEs to strengthen links with health and social welfare agencies, and to publicise their services more widely.

- Identify and remove obstacles for SEN/CWD children in regular schools, so that national policy on inclusive education can be more satisfactorily achieved.

Curriculum and textbooks in pre-school, basic and secondary education

The Ministry of Education (MEC) in Brasília sets the curriculum policy, operates standardised learning assessments and provides textbooks for students in public schools. The SED in Santa Catarina is responsible for implementing national policy, and for shaping the educational experiences of the citizens in the state. There are eight compulsory subjects in *fundamental* (basic) education and twelve for secondary school. There are no elective or optional subjects; each student studies all subjects. As most schools work on a 3-shift basis, at maximum there are 20 "clock" hours instruction available per week for individual pupils. There is a mismatch

between the *intended curriculum* and the *time available* for teaching and learning in the classroom. The subjects are treated as compartmentalised entities, rather than in cross-curricular fashion. The rigidities of curricular prescription inhibit the flexibility needed for inclusive education of SEN/CWD children in regular schools.

The textbooks are supplied free by the MEC to public schools, on a three-year renewal cycle. Private enterprise is responsible for the production and distribution of texts, with the National School Textbook Programme (PNLD, *Programa Nacional do Livro Didático*) as the purchasing agency. It has a specialist committee for the systematic assessment of school texts. Through its assessment and selection process, the Ministry of Education exercises a considerable steering role on curricular content and on pedagogic methods. Teachers have the right to choose between the textbooks available. Teachers expressed satisfaction to the review team on the general quality of the textbooks available, but expressed reservations that vocabulary was pitched too high for many pupils. Disquiet was also expressed that textbooks were not always delivered in time for the start of the new school year.

Recommendations

- The tension between the number of compulsory subjects and the learning time available *must* be resolved. Rushed teaching and shallow learning lead to poor student achievement. To foster the skills needed by pupils in contemporary society, a new approach to classroom teaching and learning is required, with much more scope for teacher-pupil interaction. If for infrastructural/logistical reasons, at the moment, learning time for individual pupils cannot be extended, then the curriculum content should be reduced – "less is more".

- There should be more individual choice of subjects by students. In addition, the policy on inclusive education must be accompanied by a more individualised approach to teaching and learning, so that *all* students receive an education that is meaningful and relevant to their individual abilities and life goals.

- The MEC/PNLD should consider a four-year instead of a three-year renewal cycle for textbooks.

- There should be more investment in school libraries and their development as 'resource centres', including the provision of story books for primary school children.

- There is also a need to provide textbooks for children who have reading difficulties or who experience mild learning problems.

Student assessment

Perhaps the most central concern of the Santa Catarina authorities regarding education is the poor level of performance of students as measured on national and international tests. Despite substantial investments in education *inputs* (policy, finance, infrastructure, books and materials) and *processes* (teacher training, timetable), student outcomes remain well below what might be expected. Significant new targets are being set for improved performance by 2022, and the challenge is how to bring them about.

The Index of Basic Education Development (IDEB, *Índice de Desenvolvimento da Educação Básica*) was established in INEP in 2007. It monitors student achievement and transition flows in *fundamental* education and assigns an overall score between zero and 10. On the basis of results, the MEC is expected to provide special support to poorest-performing states and municipals. IDEB incorporates data from two main testing processes – the National Basic Education Assessment (SAEB, *Sistema Nacional de Avaliação da Educação Básica*) and *Prova Brasil*. The *Prova Brazil* test is taken at the end of grade 4 and grade 8. The SAEB is taken at the same stages and consists of standardised tests and socio-economical questionnaires. The tests cover Portuguese language, with a focus on reading, and mathematics, with a focus on problem solving. The SAEB is used primarily as a sampling mechanism to follow performance trends over time. SAEB also assesses performance in the last year of upper secondary school and SAEB includes private schools whereas *Prova Brasil* relates to public schools. The results of SAEB are reported only for each state, while *Prova Brasil* results are reported to individual schools.

There is also an examination process at the end of secondary education as a test for entry to university. Traditionally, each university holds what is known as a *Vestibular*, which is based on a declared field intended study. In 1998, INEP introduced a national examination for this purpose, termed ENEM. It is a voluntary multiple-choice objective test for secondary school leavers. Unlike the *Vestibular*, ENEM is not specifically curriculum-based, but is geared towards higher-level thinking skills, on the lines of PISA tests. In 2009, the government stated its objective to transform the ENEM into a national *Vestibular*. However, some universities are loath to abandon their traditional *Vestibular*. It remains to be seen what progress will be made in this regard.

Since 2000, Brazil has participated in the OECD PISA tests, taken by a sample of fifteen year old students. PISA assesses the extent to which students near the end of compulsory education have acquired some of the knowledge, skills or competencies that are essential for full participation in society, focussing on the key domains of reading, mathematics and science.

However, the performance of Brazilian students on the tests continues to be very disappointing, in the bottom category of countries. While the performance of Santa Catarina students has been better than that of other states, it also is disappointing, and a cause of serious concern. The authorities are determined to improve this performance and plan to participate as an adjudicated region in PISA 2012.

Recommendations

- It is essential that the SED and the CEE shift their attention from inputs and processes to effective ways to improve student *learning*, which is the key goal.

- The SED should take steps to ensure that national statistics are analysed and reported in ways that are useful to schools and classroom teachers.

- The SED, should develop clear guidelines, including mark descriptors, so that teachers can make valid decisions in evaluating students' learning and their eligibility for promotion.

- More attention should be paid to methods of assessment of learning in initial and in-service teacher education.

- The MEC should prepare the ground carefully, with the support of key stakeholders, toward a new-style national university entrance examination, combining the best features of the *Vestibular* and ENEM, and ensuring fairness and transparency in the examination process.

Professional and technological education

Brazil's technical schools, particularly those in the federal network, enjoy a high reputation, and technical education has deep roots in Brazilian culture. In Brazil, professional-technical education at secondary level is termed EPTNM (*Educação Profissional Técnica de Nível Médio*), while that at undergraduate and postgraduate levels is referred to as EPTNS (*Educação Profissional e Tecnológica de Nível Superior*). EPT (*Educação Profissional e Tecnológica*) is the overall term for the multi-level professional and technological sector. There has been considerable public debate on the appropriate content framework of technical education. What is now favoured is the integration of professional-technical education with general academic education, somewhat on a comprehensive curricular approach. However, during this transitionary phase, it is not always achieved in practice, and will require more co-ordinated actions among the various departments of the MEC. The federal government is leading the policy changes and states are responding in different ways. Santa Catarina is not in

the forefront of the change movement. Neither has Santa Catarina taken an active role in the MEC's distance learning programme (E-Tec) for EPTNM. Significant differences in student participation in different types of courses are also observable between the practice in Brazil as a whole and Santa Catarina, reflecting the strong industrial-agricultural basis of the state and the take up on production-related profiles.

The review team considers that the integrated approach to EPT is praiseworthy, going beyond training for specific jobs towards a more creative participation in the world of work, based on informed participation in productive processes, and on autonomous thinking linked to a good basic understanding of science and technology. It promotes the articulation of secondary professional education with secondary, regular general schooling. Furthermore, the vision of EPT, as being multi-level, has the potential to improve the permeability of learning pathways across secondary to higher education, and to motivate upward professional development. The revision of course Catalogues has further facilitated this process. The reputation of technical schools and the performance of their students are high. Interestingly, graduate evaluations reveal that the practical element of the programmes which transmit skills for employment, is considered to be not as good as the theoretical knowledge they offer. The review team noted that the CEDUP (Centre for Professional Education, *Centro de Educação Profissional*) schools which were visited expressed frustration at the restrictions on their autonomy in their course provision to respond more flexibly to the changing employment context.

Recommendations

Chapter 7 of this review sets out many detailed proposals and guidelines for EPT, in the light of its analysis of the professional and technological education scenario. Among the key recommendations are the following.

- Santa Catarina should set out a coherent strategy and policy for the development of EPT at all levels, integrating and articulating all existing initiatives and programmes, irrespective of their origin or jurisdiction, whether federal, state or private.

- Strengthen the institutional, human and technical capacity of the section dealing with EPT in the *Diretoria de Educação Básica* in the SED.

- Introduce a system of indicators to measure the performance of EPTNM and improve the analysis of data and information collected through surveys and institutional census.

- The transition to a qualifications system with a sound grounding in learning outcomes should be pursued and should involve a sharing of experience and policy dialogue with the European Union.

- Create an on-line Forum for all stakeholders of EPT to exchange ideas and experiences.

- Update and disseminate information on all available programmes and projects, on all initiatives and sources of funding, with links to sources and promoters.

- The SED should support the establishment of a career guidance service recognising that career guidance and planning are indispensible features of lifelong learning, and a crucial link to the labour markets.

- Private providers of EPT, such as SENAI (*Serviço Nacional de Aprendizado Industrial* / National Service for Industrial Apprenticeship), should be encouraged to share learning resources and methods with other less well resourced players such as CEDUPs, interested in improving their EPTNM activity.

- SED should devote renewed attention to the training and development needs of teachers of specific professional/technical subjects.

The teaching career and teacher education

Teachers need to form a central dimension of any policy focussed on the improvement of the quality of education. They are the key activists, the crucial implementers of planned curriculum, pedagogic and assessment reforms. To ensure that the resource represented by teachers is fully utilised in Santa Catarina, there is a need for a comprehensive policy on the teaching career. The review team found that the image of teaching as a career was poor, and in decline, and it formed the view that there is a necessity to re-build the status of teaching and to project it as a career of value and importance to the well-being of society.

The shift system and large classes impinge significantly on teachers' time for planning, evaluation, and a pupil feedback. From some observation and research evidence it would seem that much of the teaching is of a traditional, teacher-centred model, rather than of a child-centred, problem-solving and active-learning type. There is also evidence that the classroom environment of some schools is inimical to high quality teaching and learning. Quality teaching input is also affected by high rates of teacher absenteeism. Furthermore, the practice of relying on a very large cohort of "temporary" teachers is not conducive to sustained, progressive teaching in

schools. There is no school inspectorate in Santa Catarina, and the evaluation of teachers' work hitherto has not been well structured. The review team welcomes a new initiative by the SED on whole school evaluation, but it may need to incorporate a more focused approach to evaluation in the classroom. The majority of school principals are political appointees. Training for school leadership is not mandatory for appointment and, when appointed, principals have no say in the appointment of their school staff, and have no budgetary discretion in the allocation of resources.

The review team formed the view that the quality of initial teacher education is seriously unsatisfactory, and is in need of fundamental reform. There is great unevenness in the quality of the teacher education which is provided by the different higher education institutions. The review team was very grateful to learn that both the federal and state authorities have been taking progressive steps, in recent times, in reforming initial teacher education. Steps have also been taken by these authorities to improve in-service teacher education and, from 2009, a new national in-service programme has been underway.

Recommendations

- The SED should draw up a comprehensive policy paper, following consultation with stakeholders, which would set out an overview of its policies on the teaching career. The paper would indicate that a coherent, cohesive push was underway to establish the teaching profession as a core concern of state policy, in the general drive for modernisation, and economic and social progress.

- The proportion of "temporary" teachers should be reduced and, as well as tightening entry standards, their incorporation into mainstream schooling should be facilitated.

- Teachers' very heavy teaching loads impede many qualitative aspects of teachers' input, and the aim should be to reduce such loads to a pattern compatible with quality teaching.

- Such a move should be linked to improvements in teacher salaries, as teachers' income is linked to the hours they teach. Note should be taken of the salary incentive schemes, recently introduced in a number of Brazilian states, to monitor their appropriateness for introduction into Santa Catarina.

- The review team welcomes the introduction of the school management assessment scheme, and hopes that, as it evolves, it can incorporate a teacher evaluation dimension.

- Reforms in the mode of appointment of principal teachers should be introduced, and their role re-appraised.

- While the review team welcomes the SED's initiative on initial teacher education, it considers that rigorous quality assurances should be applied to all providers.

- Good quality education departments within HEIs should be supported to provide postgraduate courses for in-career teachers, which are focussed on the real needs of schools.

- The SED should establish a unit with a specified responsibility to promote educational research, and closer liaison should be nurtured between policy makers and educational researchers.

Higher education

Santa Catarina has a total of 121 Higher Education Institutions (HEIs), of which 102 are private. The student participation rate was 26% of the 18 to 26 age group, slightly above the average for the rest of Brazil (25%), but below the South American average of 30.3%. To achieve its economic and social goals, Santa Catarina faces two main challenges regarding higher education – to increase the participation and graduation rates, and to improve the quality and efficiency of the education provided. All federal and state institutions are free of charge, with the other HEIs being fee-charging. The most successful students apply to the federal and state HEIs, but they only cater for 18.3% of enrolled HEI students. About 66% of all enrolled students are evening students. The mixture of governance and funding models in the public, as well as the proliferation of small private institutions makes for a complex system that potentially fosters inequality of access, distorts student preferences, and is inefficient in the use of resources. Most of the Doctorate and Master's programmes are located in the federal and state universities, which also had the highest proportions of Master's and Doctorate among their staffs.

Curriculum guidelines for all HEIs in Brazil are developed by the MEC and university qualifications are recognised officially by the federal government. In Santa Catarina, policy leadership and strategic thinking on higher education are provided by the SED, which is advised by the Policy Forum on Higher Education. An important role is also played by the State Education Council (CEE), which is a stakeholder representative body.

All HEIs are governed by Councils which vary in size and composition, with beneath them, various academic and administrative councils and boards of trustees. The public HEIs are distinctly less autonomous than would be

the norm in most OECD countries. Federal and state universities, which are free, have the highest demand for entry and, consequently, are highly selective. Admission decisions are made on the results of the entrance examination, the *Vestibular,* and due to that a proportionately higher number of accepted students come from private schools, and from homes able to pay the fees for such schools. A number of affirmative initiatives are in place in support of equality of opportunity for poorer students. About a quarter of the student places available in the non-public universities remain unfilled.

The review team considers that the existing quality assurance mechanisms are too institution-centred and input-based, and need to give more importance to the analysis of educational outcomes and institutional impact. All HEIs are required to teach the curriculum and observe the standards laid down by the federal authorities in relation to 80% of course content. That tends to give a rigidity to curricula. For students the curriculum workload is very heavy and limits time for students to develop independent study or research habits. Career guidance is not a strong feature of the system, and mismatches exist between courses provided and market-place needs. In contrast to Brazil, as a whole, higher education by distance education has very limited take-up in Santa Catarina.

There is a realisation in Santa Catarina that greater internationalisation of higher education in highly desirable but to date, it is very marginal in the state. If it is to have real impact, it will require special efforts by the HEIs, supported by the state.

Recommendations

Chapter 9 incorporates a detailed range of recommendations and guidelines to address issues identified by the analysis of the higher education system. Among key recommendations are the following.

- The State Secretariat of Education and the State Education Council should take the lead, in association with the main stakeholders, in formulating a strategic approach to the development of the higher education system, incorporating clear goals and objectives.

- Continue to develop measures to enable the ACAFE (*Associação Catarinense das Fundações Educacionais*, Santa Catarina Association of Educational Foundations) institutions to attract day as well as evening students, in order to enhance access, increase participation rates, and decrease the inefficiencies which arise from empty classrooms and laboratories.
- Review state level student aid with a view to easing the financial burden of attending tertiary education by making loans more easily available to students.

- Develop the potential for distance and open higher education.

- Improve the effectiveness of governing authorities by ensuring that members with experience and expertise relevant to the specification of individual institutions are appointed, and reform the election and role of rectors.

- The review team endorses the FUNDOSOCIAL (Social Development Fund, *Fundo de Desenvolvimento Social*) initiative and considers that the state should continue to explore ways in which this approach could be evaluated and then expanded so that federal as well as state funding could be used to finance students to study, especially by day, and especially in ACAFE institutions.

- Introduce performance-based funding, whereby HEIs would contract with the state to deliver specific outputs, at an agreed level of costs, with funding allocated accordingly.

- Peer reviewed competitive funds, modelled on internationally established best practice, should be introduced for the funding of research.

- Santa Catarina should explore the feasibility of establishing a state-wide independent quality assurance agency to establish internationally accepted, relevant accreditation criteria. All higher education institutions should be invited to participate, on a voluntary basis.

- Linked to this should be the development of a series of strategies and concrete incentives with the goal of improving the quality assurance system.

- In assuring quality, greater importance should be placed on the performance of graduates, and in the information provided by employers.

- To improve internationalisation, a strategy should be devised to promote second language proficiency at all levels of the education system, and modules with an international dimension should be included in HEI courses.

- The internationalisation component of HEI strategic plans should be strengthened, and international support units, with resources, should be set up within all major HEIs.

Research, development and innovation

Because of its significance for economic and social development in contemporary society, the reform of the RDI system in Santa Catarina is an essential element in the reform of higher education and its knowledge institutions. In 2008, the industrial sector was the largest sector in Santa Catarina contributing 51% of the GDP of the state, followed by the service sector, at 32.5, and agriculture, at 14.5%.

CAPES (Co-ordination for the Improvement of Higher Education Personnel, *Coordenação de Aperfeiçoamentos de Pessoal de Nível Superior*) is the Brazilian agency responsible for financing and evaluating postgraduate studies, disseminating the results of scientific research, and promoting international scientific co-operation. In Santa Catarina, as in Brazil generally, most researchers are employed in the university sector, unlike many industrialised countries. In 2007, over 75% of researchers were located in Brazilian universities, with 20% in private enterprises. By contrast, in OECD countries, almost 70% of RDI workers were either directly employed, or actively collaborating with counterparts in enterprises, and less than 25% were in the university sector. In Santa Catarina, the Federal University (UFSC, *Universidade Federal de Santa Catarina*) is the only university in the state which is regarded as a leading RDI institution, by international standards.

At a time of consistent growth in Brazil's output in basic sciences, which reached a 2.02% share of international published articles in 2007, Brazil's share of the world's registered patents was only 0.06%. One reason for Brazil's poor record in converting scientific knowledge into practical results is the country's low level of investment in RDI. While Brazil dedicates only 0.98% of its GDP to RDI, China invests 1.22%. In this aspect, Brazil remains behind its main global competitors: South Korea, China, India and Russia. Brazilian corporations, which should be most responsible for creating patents, are investing little in their own research.

The RDI initiatives in Santa Catarina are funded by the Foundation for the Support of Scientific and Technological Research (FAPESC, *Fundação de Apoio à Pesquisa Científica e Tecnológica*). On 10 June 2009, Santa Catarina implemented its Innovation Law, which allows for a series of incentives for RDI. Under this law 1% of the state net revenue is to be devoted to FAPESC and 1% to the Santa Catarina Enterprise for Agricultural and Livestock Research and Rural Outreach (EPAGRI, *Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina*). Currently, there are a range of networks, incubators, and innovation centres supported, in part, by such funding, engaged in RDI activities in Santa Catarina.

Recommendations

Chapter 10 contains detailed guidelines and options for action. The following are a summary of these.

• The government of Santa Catarina should consider the development of a comprehensive policy and governance framework that builds on the capacity of some RDI institutions, but addresses the major weaknesses and limitations of the existing system, including the development of a framework for the monitoring and evaluation of the outcome of RDI initiatives through the use of internationally recognised indicators and metrics.

• There is a need to energise and balance the RDI agenda involving the creation of a more balanced RDI policy, the evaluation and assessment of funded RDI initiatives, and the balanced assessment of RDI outcomes.

• To ensure the diversification and sustainability of RDI funding attention should be paid to increasing the gross expenditure in RDI and restructuring the funding mechanisms, along recommended lines.

• To enhance the capacity of HEIs for RDI there needs to be a co-ordination of RDI resource allocation, a co-ordinated effort to promote English as a second language for RDI workers, and the adoption of contemporary RDI performance assessment tools.

• There is a need to improve the relevance, quality and impact of RDI initiatives and programmes. To achieve this, more attention needs to be paid to priority setting processes and approaches, to funding multi-disciplinary thematic initiatives and adopting forecasting and road mapping methodologies, and to paying attention to contemporary processes of knowledge production, diffusion and exploitation.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

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Reviews of National Policies for Education

SANTA CATARINA STATE, BRAZIL

Education is a central priority for the State of Santa Catarina. Its policy makers are firmly committed to providing a relevant and efficient education system that responds to the requirements of the global economy and allows the state to be competitive, both nationally and internationally.

This OECD review gives a brief overview of education in Santa Catarina and its development. It presents an analysis of the system from pre-school to tertiary education and lifelong learning, and identifies key directions for policy reform in light of the challenges encountered by officials, communities, enterprises, educators, parents and students. It concludes with a set of key recommendations concerning the structure of the system and its labour market relevance; access and equity; governance and management; research, development and innovation; internationalisation; and financing. This report will be useful for professionals in Santa Catarina as well as their Brazilian and international counterparts.