



How can we effectively use technology in classrooms?

The classroom experience is rapidly changing through the integration of information and communication technology, internet connectivity and technology-based pedagogies. This chapter first explores how teachers can use technology to provide quality instruction, and provides a few insights on how teachers can better integrate technology and innovation to facilitate learning for all. The chapter then examines how teachers can engage with social media to support learning and help bolster students' ability to navigate through digital spaces. Lastly, the chapter focuses on using elements of games as a means of increasing student engagement, and identifies benefits and challenges of making games a part of the classroom experience.

Note regarding data on Israel

The statistical data for Israel are supplied by and are under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem, and Israeli settlements in the West Bank under the terms of international law.

“These new skills (21st century skills) need to be embedded, both across the curriculum and disciplines.”
Jan Peter aus dem Moore, McKinsey & Company, UAE

Introduction

Information and communication technology (ICT) is changing the way students are developing and learning. School systems are exploring effective ways to integrate ICT into the learning environment to enhance student achievement and advance the development of 21st century skills. Some systems have already invested heavily in introducing ICT into classrooms, while others have taken a more gradual approach. The availability of ICT in classrooms is only one aspect of this shift. Education systems need to re-evaluate their curricula, and teachers need to reassess their teaching styles, to ensure that ICT is used effectively to support learning and equip students with competencies that are important for the future. Connecting the way students interact with ICT inside of the school to the way they already connect with it outside of the school, could be the key to unlocking technology’s true potential for learning.

Topic 1: Technology in the classroom, today and tomorrow

Why is this topic important?

Digital devices and the internet are increasingly becoming a part of the environment in which young people grow and learn. But plans to expand access to technology in individual schools, entire districts or even whole countries will effectively improve student learning only if these tools are put to good use by both teachers and students. How can evidence about how students learn be used to make smarter use of technology in tomorrow’s classrooms? Can technology add meaningful new content and experiences to an already crowded curriculum? As we move into the future, how can technology help transform our use of learning strategies to engage students more effectively?

What is the evidence?

Frequently, evaluations of the implementation of ICT plans for schools show that investments in technology do result in greater use of computers, but that positive, quantifiable learning gains are more difficult to identify (Bulman and Fairlie, 2016). While both data from the OECD Programme for International Student Assessment (PISA) and research evidence concur that the positive effects of computer use are often limited to certain outcomes, such as computer skills, it’s important to keep in mind that student learning, whether online or offline, is mostly determined by student engagement and effective teaching techniques (OECD, 2015a). The value of technology in the classroom is therefore contingent on how and when computers are used, and not just on whether the technological tools are available to teachers and students.

Technology is most effective when it supports effective learning strategies

Hattie and Yates (2013) explain that the successful use of computer-assisted instruction shares several characteristics with successful non-technologically based learning interventions: it extends study time and practice; it allows students to assume control over the learning situation (e.g., by individualising the pace with which new material is introduced); and it supports collaborative learning. In other words, the science of learning is the same in a technology-rich world as it is in an analogue world. Learning still demands time, and is most effective when it responds to a personal need or goal, and when it can be socially enhanced.

Some digital classroom practices that are currently in the spotlight hold great promise. Teachers who “flip” their classrooms use class time for practice, group work, and individual feedback, while asking students to watch or listen to lesson content at home. In doing so, they extend study time and individualise instruction. In flipped classrooms, technology is used as a means to reinforce effective pedagogical practice, but is not at the centre of the classroom experience (Bergmann and Sams, 2012). Technology can also bridge space constraints. Virtual science labs enable hands-on experiences that students might otherwise never have. Similarly, technology use in second-language instruction can give students access to native speakers, which may not otherwise be available. And state-of-the-art, non-linear course-ware can provide a personalised experience for learners, enriched by frequent formative feedback loops.

Equity of access is not universal

While these and other trending practices hold great promise (Adams Becker et al., 2016), the data show that computer use in schools is still not as widespread as it could be in many countries, including some high-income countries, as well as those that top international education rankings. In 2015, 55% of students in Estonia, 52% of students in Korea, 48% of students in Japan, 46% of students in Poland, and 40% of students in Beijing-Shanghai-Jiangsu-Guangdong (the People’s Republic of China) reported that they used a desktop, laptop or tablet computer at school. And, in several countries, the prevalence of computer usage in schools actually decreased between 2012 and 2015.

Technology use is on the rise, but does not automatically translate into classroom innovation

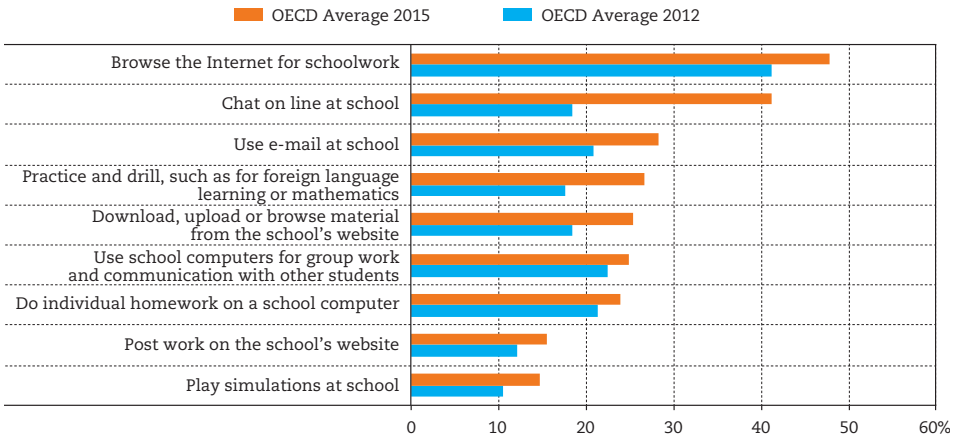
Another key challenge for the future is that, according to PISA data (see Figure 4.1), the most frequent uses of technology in the classroom today tend to emulate more traditional activities that could take place without digital devices. Browsing the internet for schoolwork (48% of students across OECD countries reported doing this at least once a week), and chatting online at school (the most rapidly growing activity, compared to 2012, with a 24 percentage point increase, on average, across OECD countries) are tasks that could otherwise be accomplished without access to technology, through more traditional research and discussion. Meanwhile, doing simulations on computers

Being told by administrators that it's ok to try new technologies, that you will be supported even if it doesn't go well... is invaluable. Paul Solarz, Teacher, USA

at school at least once a week, a technology-specific activity, was reported by an average of just 15% of students.

Figure 4.1 **Change in use of digital devices at school between 2012 and 2015, by type of activity**

Percentage of students who engage in each activity at least once a week, results based on students' self-reports





Source: OECD (2017), PISA 2015 Database, <http://www.oecd.org/pisa/data/2015database/>.

StatLink <http://dx.doi.org/10.1787/888933691078>

PISA data further show that teachers' use of digital devices is related to the demands of the curriculum, but also to their own attitudes. In mathematics, teachers who ask students to work on real-world problems use computers most. But pedagogical knowledge and diversification of instruction also matter a lot. Teachers who are most inclined towards, and better prepared for, student-oriented practices such as group work, individualised learning, and project work, are more likely to use digital resources (OECD, 2015a). Indeed, while educators' technology use does seem to be restricted, to some extent, by the pressures of demanding curricula and high-stakes examinations, technology use appears to be primarily driven by teachers' own pedagogical preferences and knowledge (Hennessy and London, 2013).

For technology to have an even more positive impact on learning strategies in classrooms of the future, we may need to look at the ways it can enhance student motivation. At the same time, teachers need to have a sense of ownership over technology which means technology should not only support teaching but also it should help teachers build on their pedagogical expertise. While simply using a computer or a smartphone to find the answer to a factual question is unlikely to make students smarter, technology does have the capacity to amplify great teaching.

 Mere use of technology is not innovation, more important is how teachers use it. 
Jan Peter aus dem Moore, McKinsey & Company, UAE

Lessons from the field: What are practitioners saying?

At the 2017 Qudwa Global Teachers' Forum, three panellists were invited to discuss the potential of technology to enhance teacher effectiveness and improve student learning. The panellists were Jan Peter aus dem Moore, an Associate Partner at McKinsey & Company and expert in digital education in the United Arab Emirates; Paul Solarz, a primary school teacher from the United States; and Mona Almarzooq, a mathematics teacher from the United Arab Emirates.

Lesson 1: Technology is changing what students should know and be able to do

The pervasiveness of technology is dramatically shifting the skills demanded by the labour market, from routine skills to performing tasks that require complex, higher-order competencies. This movement away from physical tasks towards those that require creative, strategic and analytical thinking is influencing what students need to master in school. As argued by the panellists, as robotics and artificial intelligence advance, there is also an increased likelihood that the future of work will be more about directing and managing machines so that they can carry out complex tasks, rather than performing those tasks ourselves. This means that education systems will need to adapt their curricula, pedagogies and assessment systems to ensure that students and teachers become more confident in the use of new technologies.

Lesson 2: Technology creates multiple opportunities for teachers

Technology can change the educational landscape in many ways. For instance, technology can be used to help teachers share their pedagogical knowledge and experiences with each other. It can also be used to better engage students in the learning process (see Box 4.1), to accelerate and adapt lessons to various learning styles and to widen the pedagogical options available to teachers.

Box 4.1 Genius Hour: Exploring technology in the classroom

Genius Hour, also known as *Passion Time*, is a way Paul Solarz encourages his students to go beyond the curriculum and explore research topics that may be of personal interest to them. Mr Solarz provides guidance throughout the process and organises mini-lessons that familiarise students with ways to research on the internet and document their learning. Students are also encouraged to reflect on and write about their research (both about the topic and the process itself). “Passion Time” is not a graded exercise, but students are held accountable for meeting deadlines.

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Box 4.1 **Genius Hour: Exploring technology in the classroom** (continued)

To identify the essential question and create an effective research plan, Mr Solarz's students follow the K-W-H-L-A-Q approach:

1. What do I **know**? Students list what they already know about the topic.
2. What do I **want** to know? Students identify what more they want to know about the topic and narrow it down to a single question.
3. **How** do I find out? Students think about what resources are available to help them find the answer.
4. What have I **learned**? Students explain what they have learned from their research.
5. What **action** will I take? This ensures that students are applying what they have learned and that inquiry leads to responsible action initiated by students as a result of the learning process.
6. What new **questions** do I have? At the end of a unit, students should be able to reflect on whether they were able to successfully address the essential question.

Using this approach, students work together with Mr Solarz to first identify the essential question and then begin researching, building and creating. Students are required to produce short videos showing the final product which they upload to YouTube and create an entry on the "Passion Project" blog page about it. Additionally, students view each other's videos and provide constructive feedback.

Lesson 3: **Proper training helps teachers use technology effectively**

Technology will make a positive difference in education only if teachers are ready and able to use it effectively, and if schools and school systems sustain an atmosphere that promotes innovation. All panellists agreed that, in addition to having access to the required hardware and software, teachers should be properly trained in the use of ICT— for instance, through communities of practice— and be encouraged to take risks.

Key action points

The panellists identified four key action points they feel could best support teachers in making the most of technology in their classrooms.

1. **Provide adequate training:** Technology will help transform education effectively only if teachers are ready, willing and able to use the ICT available at their school sites. It is important to understand that technology can support good teaching, but not replace it. Teachers should receive initial training, as well as continued professional development, such as seminars, workshops, and sessions with experts, to increase their ability and confidence in using ICT.

2. **Encourage teachers to take risks:** School principals and administrators play an important role in spurring innovation by teaching staff. School leaders who encourage teachers to embrace new technologies and pedagogies can make a big difference.
3. **Build a strong case for the use of ICT in schools:** Develop evidence showing the effective use of technology in the classroom and report it back to the school system and to the larger community. Establish networks with other schools and teachers to share best practices.
4. **Support the development of high-quality educational software, and ensure it reaches schools:** The potential of technology to transform the learning process by, for example, allowing for deeper and more flexible learning, largely depends on the quality of the educational software available to schools. Overloading teachers with new technologies or products may overwhelm them. Therefore, these should be introduced gradually and when appropriate.

Topic 2:

Social media as a platform for tomorrow's learning

Why is this topic important?

The internet has become a significant part of our daily lives, particularly as mobile handheld devices, such as smartphones and tablets, have made it more accessible than ever (OECD, 2016). Internet users are also developing increasingly sophisticated online behaviours, prompted by rapidly diversifying social media platforms¹ that now give users access to a whole host of services, in some cases through one application alone (Sharpley et al., 2016).

Given its widespread availability, social media has also begun to impact students, giving rise to new learning styles that allow young people to have more agency over their own learning (OECD, 2017). In 2015, PISA's investigation of the social media phenomenon's impact on students' lives found that across OECD countries, 88% of students agreed that "the internet is a great resource for obtaining information", while 84% affirmed that "it is very useful to have social networks on the internet" (OECD, 2017).

Student perceptions of the internet and social media as sources of information arise from the ease with which they allow information to be found and shared. Finding information no longer requires searching through books or magazines, or watching the nightly news. Although this can lead to a greater number of students being more informed about a wide range of topics (Bennett, Wells and Rank, 2009), the truth of the information found online is not always verifiable, and it can be difficult to sort fact from fiction (Krasodonski-Jones, 2016). In addition, researchers have found that the internet and social media have created spaces for intolerant groups to form and spread misinformation, and there is a tendency for social media users to create networks of like-minded individuals, leading to echo chambers that limit critical thinking and examination of evidence (Bennett, Wells, and Rank, 2009; Krasodonski-Jones, 2016).

🗨️ Students need to not only know how to consume knowledge on social media but also how to produce it. 🗨️

Derek Swanson, Teacher, UAE

Social media as a useful learning tool?

Undeniably, social media has become a key tool of the 21st century. Hence, although most students today will learn how to use it in informal settings, its place in the digital literacy curriculum cannot be denied. On the other hand, it is also important to consider whether social media can be inherently useful as a resource in schools, both in helping teachers teach more effectively and in enabling students to achieve formal educational goals. After all, education-based social networking can better position students to connect formal and informal learning and give them the opportunity to adapt social media to their lifelong learning kit. However, as Sharples et al. (2016) write about its use in the classroom, “Anyone can engage at any time, anyone can leave at any time, but skilled facilitators can keep people engaged and actively contributing.” Thus, when educators use social media as a learning tool, the methods used for doing so necessarily differ from those used in traditional teaching. Even so, what impact can social media use have on learning? How can we increase the positivity of that impact as we look to the future?

What is the evidence?

Despite a wealth of literature exploring the widespread use of social media by today’s students, there is a lack of evidence regarding its impact on learning. This is partially attributed to its ever-changing nature, as well as to differences in its usefulness depending on age group, gender, and other variables (Aydin, 2012). Yet, the belief that social media must be capitalised on continues to prevail, with supporters of education-based social networking citing its many compelling benefits. For example, social media can increase student engagement by integrating students’ favoured learning styles into instruction, thus enabling what is referred to as the “Knowledge Building” teaching approach (see Box 4.2) (van den Broek, 2012). Additionally, social media can help create a collaborative atmosphere that boosts interactions, and which allows teachers to quickly identify students’ learning needs and deliver immediate feedback (Blazer, 2012). Some studies indicate that use of smartphones and social media for educational purposes in school could increase students’ academic engagement (Brooks-Young, 2010; OECD, 2015a). However, studies have yet to find concrete proof of these trends.

On the other hand, there is abundant data confirming the growing prevalence of the internet – and by extension, social media – in students’ lives. From 2006 to 2015, student access to the internet at home became almost universal in PISA-participating countries and economies, with 95% of students reporting having internet connections at home in 2015 (OECD, 2017). In 2010, a survey conducted by Microsoft Corporation found that in the United States, on average, children have their first social media account by the age of 13, while a study by Fodeman and Monroe (2011) revealed increases across the board in the percentage of students in grades 4 through 8 using Facebook between 2008 and 2011 (Blazer, 2012).

“Previously, we used to prevent kids from using social media, but we have realised that now we need to embrace it ourselves and teach students how to use it effectively.”

Dr. Najla Al Naqbi, e-learning educator, UAE

Box 4.2 Social media for Knowledge Building

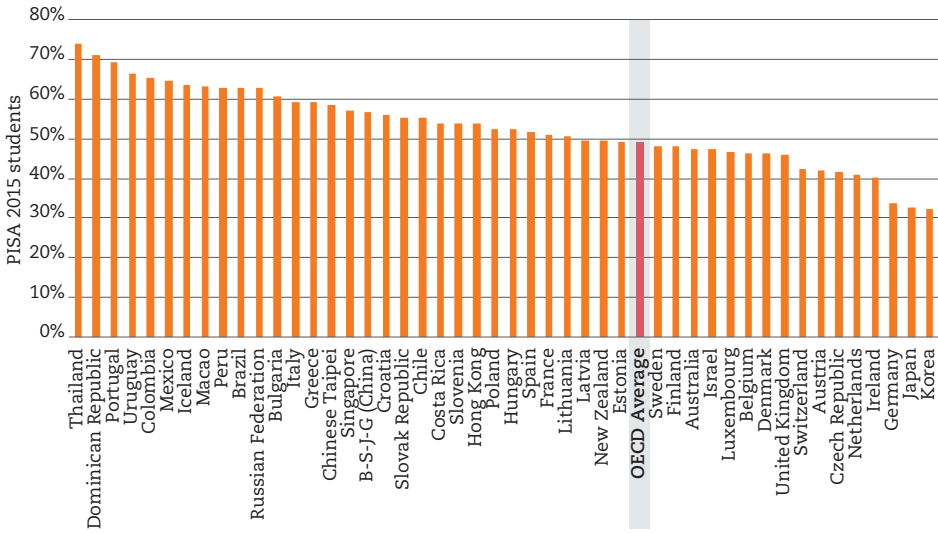
Knowledge Building refers to a constructivist teaching approach, in which education is restructured to meet the goals and processes of knowledge generation. While their specific achievements may vary, children and adults often follow similar processes for knowledge building, and learners of all ages are considered active contributors who share a collective responsibility for the expansion of knowledge (van den Broek, 2012). Students are not only learners and inquirers, but also members of a knowledge-building community that collaborates to expand the frontiers of knowledge and generate innovative ideas.

One example of Knowledge Building through social media can be found in a study by Palaigeorgiou and Grammatikopoulou (2016), which looked at innovative Greek educators who had incorporated extensive social media experience into their classrooms. The teachers employed a variety of social media tools, such as an online video blog that primary school students used to practice their English and communicate with peers within and outside of the country, and “wikis” for collaborative document writing. The study found that students were more academically engaged and confident in their creativity and self-expression, and felt empowered by their newly found role as knowledge producers, and by their ability to generate digital content (Palaigeorgiou and Grammatikopoulou, 2016). This example shows the power of social media to 1) enhance students’ digital literacy, and; 2) motivate learning and collective knowledge creation.

In the most recent version of the PISA ICT student questionnaire, indicators concerning social media were added to respond to the increasing interest about its place in educational spaces. Figure 4.2 shows the degree to which students enjoy exchanging information online with their friends to solve problems.

Across the countries that took part in this questionnaire, 49% of students stated that they used the internet to find solutions to problems. Aside from Portugal (69% of students), the systems that showed the highest levels of student use were all non-OECD countries: Thailand (74%), Dominican Republic (71%), and Uruguay (66%). These data show the broad potential of incorporating student interests (i.e. solving problems through digital devices) into the classroom.

Figure 4.2 Percentage of students who like to use digital devices to exchange solutions to problems with others on the internet



Note: These are average values for the countries/economies that implemented the PISA ICT questionnaire.

Source: OECD (2017), PISA 2015 Database, <http://www.oecd.org/pisa/data/2015database/>.



StatLink <http://dx.doi.org/10.1787/888933691097>

Possible drawbacks of using social media as a learning tool

Yet, despite its popularity and penetration, social networking has been met with resistance in some educational spheres, due to concerns that students may be exposed to inappropriate or dangerous content, and undesirable adult interactions (Blazer, 2012). There is also a consensus that social media may pose certain risks and potential harm to students' emotional and mental health (Frith, 2017). Research has connected excessive internet use with depression, and social media use in particular has been found to have wide-ranging potential negative side effects, such as hyperactivity, aggression, antisocial behaviour, or social isolation, not to mention that students can be subjected to psychologically scarring bullying online (known as cyber-bullying) (Frith, 2017). Extreme internet use (over six hours a day) has also been shown to have a negative relationship with students' life satisfaction (OECD, 2017).

The potential of social media in tomorrow's classrooms

Social networking for educational purposes clearly has the potential to yield widespread benefits, such as fostering cooperative learning, enabling formative real-time assessment, and facilitating knowledge building and digital literacy in 21st century students (OECD, 2015a). Furthermore, given the large amount of information spread through social media today, it is important for students to be equipped with

 **Social media may get teachers out of their comfort zone. A lot of the times, students can know more than teachers (on a certain issue) because of social media.** 

Koen Timmers, Teacher, Belgium

the skills to think critically about such material and to be able to sift between fact and fiction (Siddique, 2017). Although some social networking sites, like Facebook, are taking steps to limit the spread of false information, unverified information is still present in all parts of the internet, and students must be prepared for this unfortunate reality. As Bennett, Wells and Rank (2009) point out, the best course of action is to reform how we educate students, so that they are more prepared for citizenship in a digital world. Including social media and digital literacy in the curriculum is a crucial part of the needed reforms.



At this point, however, many of the real effects of social media on learning remain unknown, and there are considerable risks that must be managed before we can definitively determine how social media can be used for learning. In the meantime, it is useful for educators to begin scaffolding for future adaptations of social media to teaching practices (Aydin, 2012). From helping teachers develop strategies that make use of students' networking behaviours to improve their learning and development, to training them on how best to use the technology, there is a lot that can be done while both research and awareness continue to unfold.

Lessons from the field: What are practitioners saying?

At the 2017 Qudwa Global Teachers' Forum, three panellists discussed the ways they use social media to improve student learning. The panel included Derek Swanson, Director of Innovation and eLearning at American Community School of Abu Dhabi; Koen Timmers, a teacher from Belgium; and Dr Najla Al Naqbi, an educational technology expert and e-learning educator in the United Arab Emirates.

Lesson 1: Social media is an opportunity to connect formal and informal learning

All panellists agreed that for the first time, most students now have unlimited access to information. It is therefore important to ensure that students can differentiate between information that matters and is true, and information which is not true. A first step for teachers is to embrace the social media platforms that students use to access information and communicate with each other. Using social media in lessons can help teachers foster a sense of community by connecting what happens in the classroom to student's wider interests. In turn, bringing topics and discussion into the classroom which students are already engaged in helps them better connect with classroom learning. Derek Swanson explained (see Box 4.3) that gaining access to a wider audience can also become a source of motivation and creativity for students.

 **You have to go where the kids are (on social media).** 

Derek Swanson, Teacher, UAE

Box 4.3 Using social media to facilitate learning

Derek Swanson uses social media to support his teaching. He shares ideas and gives and receives feedback with his students, via Facebook and Twitter. His students actively use YouTube to create and share content. They create videos about issues and topics they are interested in, which are then uploaded and shared with the school community. Mr Swanson also livestreams student performances, sporting events, school board meetings and parent events, which greatly expands the audience for each.

Mr Swanson's driving motivation for using social media to facilitate learning is to empower students to become content generators, instead of merely consumers of social media. Creating content to share with a wide audience adds authenticity to the classroom experience, and increases engagement. It also allows students to take ownership of their learning.

Lesson 2: Connect social media with pedagogies

The panellists agreed that social media can be used not only as a source for accessing information, but that it can also be a way to introduce innovation and new teaching styles. Indeed, the conscious use of social media can itself be a pedagogical tool, allowing teachers to rethink the way they design the learning environment and re-examine how ICT is used in classrooms. Social media can also enhance the content of classroom teaching. It provides a tool for incorporating digital literacy practices into lessons, as well as a means to include the experiences and voices of students, thereby helping to put learners more at the centre of learning.

Lesson 3: Build appropriate skills for social media use

Introducing social media for learning carries with it a certain level of risk. In particular, there can be an 'echo chamber effect' and a blurring of the boundaries between the private and public spheres. This may discourage some teachers from using social media. To resolve this, the panellists agreed that teachers need to focus on core competencies and values, and to build on these to teach about the use – and abuse – of social media. At the same time, they offered valuable insights, such as the specific work of eSafe, a non-governmental organisation (NGO) working for safer internet access for children, and how to connect the use of social media with 21st century skills (see Box 4.4).

Key action points

The panellists identified three key action points that could better support teachers in their efforts to use social media to further student learning.

1. **Equip teachers with tools that support digital literacy:** Teachers need to incorporate pedagogies that help students identify true information on the internet and differentiate it from false information. Training is also essential to help teachers understand the variety of uses for ICT.

2. **Establish Personal Learning Networks:** Each student learns in a different way. Personal Learning Networks can help both teachers and students find communities that suit their specific needs. Learners choose whom to interact with and how much to participate.
3. **Create systems that help knowledge building:** Teachers and students need to constantly update their knowledge. Teacher training in social media use should focus on key competencies, including how to deal with fake news, how to authenticate content, and how to deal with any cyber-bullying situations students might experience. These challenges call for a proactive rather than reactive approach.

Box 4.4 Technology skills for the 21st century learner

The 2016 International Society for Technology in Education (ISTE) standards for students consist of seven main skills that learners should master in the 21st century. Students should be:

1. Empowered Learners
2. Digital Citizens
3. Knowledge Constructors
4. Innovative Designers
5. Computational Thinkers
6. Creative Communicators
7. Global Collaborators

These skills highlight the need for teachers to educate students about social media platforms and how to use them effectively. Teachers can use social media to connect students with experts, share knowledge, and foster discussions about global issues.

Topic 3: Gamifying teaching: What works?

Why is this topic important?

Teachers in many countries struggle to promote student engagement and motivation, which is particularly a challenge with teenagers (OECD, 2013). Boys, especially those who attend schools in socio-economically disadvantaged neighbourhoods where educational and career aspirations are low, tend to adopt a concept of masculinity that includes a disregard for authority, academic work and formal achievement. Indeed, as Salisbury, Rees and Gorard (1999) found, boys' motivation at school dissipates as they get older and by age 11, 40% of boys belong to one of three groups: the "disaffected", the "disappointed" or the "disappeared". Finding ways to promote and sustain student motivation and engagement in school, particularly with boys, is thus increasingly becoming a priority for teachers, parents and educators.

“It’s good to respect the skills students develop in games.”

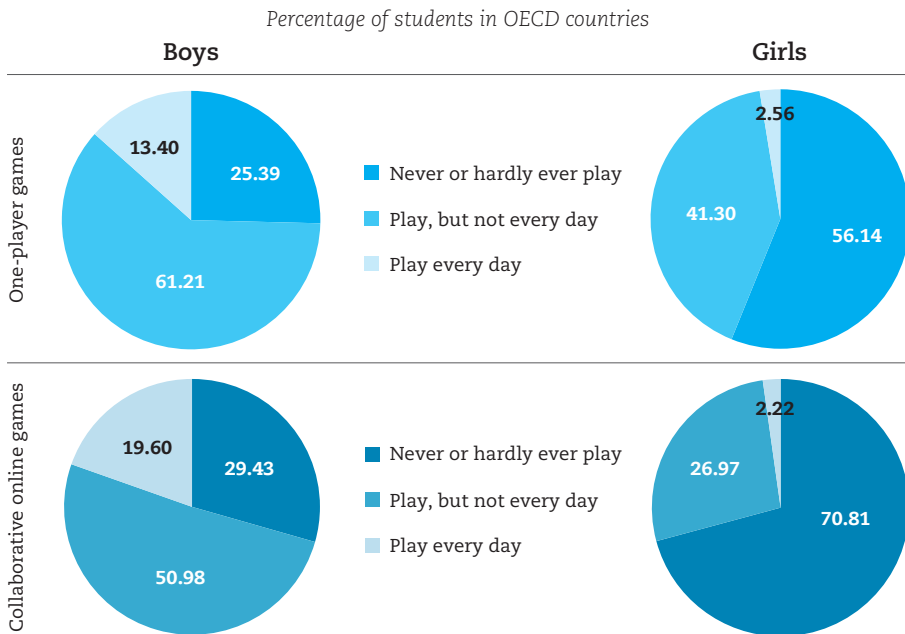
Jane McGonigal, Director of Game Research and Development, Institute for the Future

The fast-paced and highly engaging nature of teenagers’ leisure activities often sharply contrasts with traditional classroom dynamics and teaching practices. This further contributes to declining levels of engagement. At the same time, teachers are seeking new ways to ensure that students have the knowledge and skills they need to succeed in the 21st century. Introducing play and games into classrooms, and revising teaching so that it includes elements of both, has the potential to improve student engagement and motivation, while helping equip students with new skills. Under what conditions do game-based teaching and learning work? What are the desired outcomes of game-based learning? Can game-based learning prepare students for tomorrow’s challenges?



What is the evidence?

Evidence from PISA suggests that boys (who are consistently some of the students hardest to engage at age 15) are frequent video game players. Across OECD countries (see Figure 4.3), as many as 75% of boys play one-player games regularly and over 13% do so every day. Similarly, as many as 71% of boys in OECD countries play collaborative online games regularly, while 20% play every day. By contrast, 56% of girls report never or hardly ever playing one-player games and 71% never or hardly ever play collaborative online games (OECD, 2015b).

Figure 4.3 **How often do girls and boys play video games on the computer, outside of school?**



Source: OECD (2015b), *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence*, OECD Publishing, Paris.
 StatLink <http://dx.doi.org/10.1787/888933691154>

 **Gamifying is easy for the children to understand and adapt to because they play all the time. With teachers, transition is not so easy as they have specific ways of teaching that need to be disrupted.** 

Mithun Kamath, CEO, Arc Skills

The fact that video games are a favourite leisure-time activity among teenagers worldwide causes some concern among parents and educators. The addictive nature of leisure time gaming, coupled with the potentially negative consequences playing video games can have on academic performance (Borgonovi, 2016), add to this feeling. Students who excessively play video games may pay less attention in school, be less willing to allocate time and effort to home-study, and may become less motivated in school, especially without the constant external reward mechanisms that are artificially deployed in gaming (Swing et al., 2010).

Moderation is the key

Studies suggest that while excessive gaming may lead to negative outcomes, moderate gaming may yield positive effects. In fact, many games incorporate positive learning principles that can stimulate students' cognitive functioning, psychosocial adjustment, and promote problem-solving and spatial skills (Adachi and Willoughby, 2013; Connolly et al., 2012; Spence and Feng, 2010). Rather than demonising gaming, educators are increasingly exploring how to use play and games to engage students and promote learning.

Playing games in classroom settings:

- **Serious games**



Individuals play actual games that were specifically conceived and created for educational purposes. Engaging in such games occurs in non-recreational, educational environments (e.g., flight simulators for pilots). Game practice is, in these contexts, central to individuals' acquiring skills and competencies that otherwise would be difficult or impossible to acquire in real, learning-by-doing, practice settings.

- **Digital games or game-based learning**

Using video- or analogue games in the classroom for educational purposes (e.g., using Sim City to understand the complexities of how cities work) (de Sousa Borges et al., 2014). Playing games can help teachers convey knowledge and competencies that had been traditionally acquired in other ways, and promotes motivation and engagement.

Using games presents challenges

The direct use of both traditional and video games is a well-established practice in education. That said, and even though several meta-analyses have described the overall positive effects of using games to promote student learning (e.g., Clark, Tanner-Smith and Killingsworth, 2016), the literature also points to challenges in scaling the use of video games for regular classroom instruction. One specific concern is whether teachers are able to fully integrate games and gamified experiences into the instructional context (Lafuente, forthcoming).

 Parents and teachers, both, need to understand the positive benefits of games. 
Janet Hayward, Teacher, UK

Ways to add features or principles of gaming into teaching:

- **Playful design**

Adoption of basic features and principles and using game-based aesthetics and limited game-dynamics in non-game contexts (e.g., a normal maths programme that uses a well-designed, playful interface to log in, to show results, or to ask questions). Playful design is used to promote engagement and motivation.

- **Gamified teaching**



Using (some) gaming elements in educational contexts, with the aim of adapting pedagogical elements to incorporate some of the psychological, emotional and social power of games into teaching. Gamified teaching can promote engagement, motivation and competency acquisition. For example, adopting storytelling techniques, such as immersing the learner in a story with a plot, characters and challenges that make the story flourish, can mimic one of the main sources of motivation and engagement in video games.

According to literature reviews by Buckley and Doyle (2016), and Hamari, Koivisto and Sarsa (2014), gamified teaching is generally associated with better engagement and motivation. However, most studies cannot infer the direct effect of gamification per se, but instead suggest a positive correlation between the use of gamified teaching and motivation for the specific subjects and contexts in which gamified teaching was employed.

Pedagogical components to address

Gamifying teaching works best when it addresses several key pedagogical components that have been identified by the Institute of Play² including: rapid feedback, revolving around immediate and ongoing student progress information; participation, which lets everyone engage according to their skills and acknowledges failure as a part of the learning process; badges and goals, relating learning to specific skills and content; progressive challenges, which make learners feel neither too relaxed nor too anxious; and collaboration which involves a degree of competition, so that the learning environment fosters a level of co-operation and teamwork (Flatt, 2016).

Building on the work of Tulloch (2014), gamification should be understood as a way to implement innovative pedagogical approaches such as formative assessment, experiential learning, adaptive teaching, narrative pedagogies and collaborative learning, while focusing on the meaningful participation of all students. From this perspective, gamified teaching is not just an end in and of itself; but rather, it should be used to aid the implementation of active, student-centred, collaborative learning. As we move forward into tomorrow's classrooms, gamification can help increase student engagement and thus stimulate even better student outcomes.

 Games seem to be the most powerful way to build self-efficacy. 
Jane Mcgonigal, Director of Game Research and Development, Institute for the Future

Lessons from the field: What are practitioners saying?

At the 2017 Qudwa Global Teachers' Forum, three panellists were invited to discuss how using aspects of games in classroom instruction can improve student learning. The panel included Janet Hayward, a primary school teacher in the United Kingdom; Jane McGonigal, Director of Game Research and Development at the Institute for the Future, based in the United States; and Mithun Kamath, CEO of Arc Skills, an international skills training company.

Lesson 1: Gamification is more than just using games in the classroom

First and foremost, gamification fosters engagement, not learning. Through reflection and analysis, teachers can build on the engagement that gamification provides to bring out the learning. The use of games and gamification in classrooms needs to be balanced with traditional pedagogies. The added benefits of gamification come from the psychology and teaching methods that are already embedded in the games. They help channel the student's energy towards learning (see Box 4.5).

Box 4.5 Skills 21: A programme for gamifying teaching



Skills 21 is a programme designed to impart 21st century skills to students in grades 6 to 10. This programme combines gamification with immersion, reflection, and self-study. It is a blended programme, with both online and classroom elements, with the classroom instruction being delivered by teachers who are specially trained by the programme. Skills 21 is currently up and running in seven countries. Mithun Kamath explains that this kind of innovative programme does have specific challenges. But, there are ways to combat them.

Situations that Skills 21 teachers find challenging:

- Increased activity in the classroom, which they fear could lead to chaos
- Discussions in which teachers ask questions only, and do not share data or opinions
- Closely observing student behaviours
- Refraining from intervening or instructing
- Being passive in the class and letting students lead the learning

Ways to address these challenges:

- Only invite teachers who want to participate, regardless of their experience or the grade they teach.
- Train all teachers by first introducing what gamification is and explaining its benefits.
- Support classroom teachers through observations, demonstrations and feedback.
- Provide ongoing training and support, to share feedback and facilitate peer learning.
- Give teachers incentives to use gamification strategies by collecting evidence.

 The first positive impact of gamification is engagement, but that needs to be followed by discussions on the content in an engaging way. 

Mithun Kamath, CEO, Arc Skills

Lesson 2: Games help develop soft skills

Introducing games is an efficient way to build students' self-efficacy, increase curiosity and engagement, and expand learning through practical involvement. In addition, all games don't necessarily have to be educational. Teachers should feel confident in introducing games that support the development of soft- and meta-cognitive skills. For example, video games can provide students with opportunities to improve and succeed (see Box 4.6).

Box 4.6 Games for Change: Promoting videogames for learning

Games for Change is a non-profit organisation, founded in 2004, which creates and promotes video games that seek social change. Their idea is to put social-impact games into the hands of regular game players and create real-world impact through gaming.


Students are encouraged to explore social issues and learn 21st century STEM (science, technology, engineering and mathematics) skills through the various Games for Change Student Challenges.


Foldit, one of the games on the Games for Change platform, provide students with opportunities to crowdsource solutions to scientific problems, through gaming. For example, Foldit asks players to take on the role of a biochemist to map out how proteins might be folded in nature. In 2011, gamers playing Foldit helped unlock the structure of an AIDS-related enzyme that the scientific community had been unable to unlock for over a decade.

These kinds of games provide ways for students to address real-life issues while developing skills and competencies in an engaging way.

Lesson 3: Understanding why students play video games is crucial

For students who engage excessively in video games, it is important for teachers to understand what it is about the games they play that captures their imaginations so intensely. Instead of judging students because of the types of games they prefer, teachers should try to analyse the reasons for their engagement. This could provide insights into the types of pedagogies that may be more engaging and relevant to these students.

 It's not about gamification, but about what you want it to teach them.

You can include games in any subject, as long as it's built around what you want it to teach. 

Jane MCGonigal, Director of Game Research and Development, Institute for the Future

Key action points

The panellists identified three key action points that could help teachers include gamification in their teaching repertoire.

1. **Implement a three-step TEI plan (Train, Equip and Incentivise):** Teachers need extensive training on the various ways to add elements of games into instruction. These include gamification, immersion, reflection, role playing and case studies. Aside from equipping teachers with new skills, training gives teachers a sense of empowerment and can serve to renew and revitalise their interest in teaching. All teachers need to be equipped with updated devices and be connected to a larger community.
2. **Build the curriculum from the bottom-up:** National curricula are not changing at the same pace as technological progress. Teachers and schools should have more space to innovate and improve the curricula, to meet the fast-changing needs of the classroom.
3. **Modify views of gaming:** Teachers should familiarise themselves with the games their students are interested in, and think of ways to integrate their positive aspects into their lessons. It is also important to collaborate with parents, and to discuss the length of play and potential impact of games on students.

Notes

1. Social media platforms (sometimes also referred to as “Web 2.0”) refer to applications for blogging, podcasting, and collaborative content (e.g., Wikipedia and WordPress), social networking (e.g., Twitter, Facebook and Whatsapp), multimedia sharing (e.g., YouTube, Snapchat and Instagram), social tagging (e.g., Pinterest), and social gaming (e.g., World of Warcraft) (Redecker, Ala-Mutka and Punie, 2010).

2. The Institute of Play is a non-profit design studio that creates learning experiences and environments based on the principles of game design. It is currently one of the pioneers of innovation and implementation in transforming education through play.

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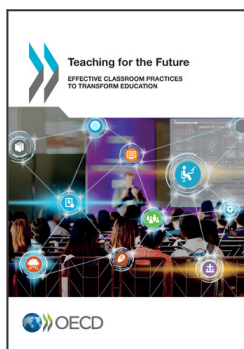
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