

Perspective

From research to policy action

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The issues aim to:



Summarize research evidence from key studies on innovation in education.



Translate this evidence into concrete ideas for policy action.



Conclude with the implications of the evidence for using technology in teaching and learning.

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Playful learning in the age of datafication and digitalisation

i Introduction

Although play is often associated with simply having fun and escapism, it has a central role in the young of many animal species including humans, for cognitive and social development (Sharpe, 2019; Yogman et al., 2009), as well as self-regulation (Barker et al., 2021). However, as learners finish early childhood education and progress through the years of formal education, their curriculum moves further away from playful activities. Yet, playful learning is important not only for early childhood education and care (ECEC), but also in older learners, and interest is growing in higher education as well (Jørgensen, Schrøder, & Skovbjerg, 2023; Whitton & Mosely, 2019).

Educators in Denmark and Finland are two important proponents of playful learning in Europe, recognizing the importance of play in early childhood education and beyond.

Denmark has been an early adopter of digitalisation in schools¹. Since 2013 it has been mandatory for the Danish municipalities to use learning management systems (LMSs), linked to the 2012 school reform that put emphasis on schools to establish measurable learning goals for each student. There has been a decrease in mental wellbeing in young men and women according to surveys in Denmark (Rosendahl et al., 2022), a decline that has been attributed to demands of performance and achievement in Denmark and elsewhere (Görlich, Katznelson & Pless, 2024). There has also been a decreasing trend in the reading ability of students in Denmark between 2006 and 2021 (IEA, 2023) and in mathematics from 2018 to 2022 (OECD,

2024). Although this decreasing trend cannot be clearly linked to digitalisation, it likely encourages further emphasis on alternative approaches in education. Playful learning in Denmark is a trend that is perhaps one reaction to the increasing performativity in the education systems (Ball, 2012, 2015) brought about by digitalisation and datafication. There is a connection between playfulness and wellbeing (e.g., Proyer & Ruch, 2011), making playful learning an appealing way to promote school belonging and wellbeing.

Finland has a long tradition of pre-primary education combining play



and outdoor learning. Instead of focusing on developing the "school readiness" of pupils, the ECEC system in Finland has a socio-emotional approach built around playful learning (Kangas & Ukkonen-Mikkola, 2021). The Finnish core national curriculum defines play in detail and as a crucial component of learning in early childhood education and care (ECEC). It states that children learn by playing, exploring, moving around, taking care of the learning environment and through self-expression and creativity (OPH, 2016).

¹ Public schools in Denmark are governed and financed by the municipalities.

Play in ECEC promotes scientific inquiry skills (Vartiainen & Kumpulainen, 2019) and mathematics skills (Ginsberg, 2006) and in Finland, schools implement it as a way to promote learning ecology and sustainability from an early age.

PlayLabs in Denmark

 PlayLabs are open-ended spaces used by students and for teacher professional development. PlayLabs are part of the [Playful Learning Programme](#), a collaboration between six university colleges and the Lego Foundation. There is one PlayLab set up in every university college for initial teacher education in Denmark. PlayLabs have many tools, but the tools are not for a specific purpose. Instead of fixed desks and chairs, there are movable furniture, and the furniture are not in a single style. According to the University College Copenhagen, it is a "living space" where there is always someone, and where students can visit any time they want to work on their tasks and experiment. PlayLabs are also research centers, where experts investigate the role of playfulness in learning, cultural change, inclusive education, and in understanding the role of socialization and objects in education.

The components of playful learning

What is playful learning? Playful learning is a process of creative experimentation without constraints or expectations set for the outcome, in which learners often use objects and spaces that are unconventional for education to create and build in collaboration with other learners and can engage in make-believe or other forms of play with them.

Material is at the centre of playful learning activities. Learners can be asked to create a new religion and express it with handmade

objects and sculptures or can be asked to create a boardgame or tabletop role playing game to teach about democracy. Free choice and exploration, physical movement, social interaction and outdoor learning seem central to playful learning.

Playful learning has five components (Parker & Thomsen, 2019; Zosh et al., 2017, 2018). These five elements are not unique to playful learning but are harnessed the most by it.

Active

Children learn better when they actively manipulate both the information and the flow of information (e.g., Zosh et al., 2013). In play, learners engage with hands-on activities, move their bodies, which reduces distraction and promotes "minds-on thinking". Furthermore, make-believe and role playing seem to improve self-regulation (Berk & Meyers, 2013).

Meaningful

The open-endedness of play enables learners to choose the objects and themes that are personally interesting to them, which helps them place the information they learn in context and make meaning out it. Guided play is important because the teacher can ask the questions that can help learners make the connection between the information and what they already know.

Socially interactive

Most play is collaborative. And when learners share information, it helps them construct new knowledge. When learners collaborate, they persist more and create more complex outputs.

Iterative


Children are naturally curious and make predictions about what objects around them do or don't, expectations that they often put to the test. They also want to test unexpected events further and

revise their rules when necessary. Such exploration and testing are encouraged in playful learning. Make-believe play also promotes reasoning, because learners have to keep a set of imaginary conditions in mind, and when a condition changes, they need to act according to what they expect would happen under those conditions.

Joyful

There are often moments of surprise during play, which increases joy and curiosity. Joy can be defined as positive emotions. Negative emotions and frustration are also part of play, because they lead to joy after something has been achieved or a problem solved.

Playful learning environments and outdoor learning in Finland

 Finnish education established outdoor technology-enhanced playful learning environments (PLEs) in school playgrounds, aimed at facilitating and encouraging playing and the use of body in learning activities (Hyvonen, 2011). PLE activities involve games on the playground combined with indoor activities enhanced by technology (Kangas & Ruokamo, 2012). For instance, students can wear radio frequency identification devices (RFID), which can be used by computers to identify which student have reached a location as a requirement of a game or which student is answering questions at certain locations around the playground. Students can also design their own games using the technology.

The Finnish curriculum also encourages the use of outdoors and natural settings for learning. There are nature school programmes that are supplementary to formal schools and aim to promote awareness about sustainability and ecology. Outdoor activities in a nature school can consist of, for example, students catching and examining species collected from a small lake and playing games related to food

chains and common species found in springtime (Sjöblom & Svens, 2018). Research shows that playful learning in natural settings support environmental education (Ardoin & Bowers, 2020). When pupils are outdoors instead of the classroom, they gain access to new modes of learning: there is more space to play and move and there are fewer noise restrictions, and the material is loose and abundant, such as sand, twigs, earth and water, enabling additional ways of building (Molina et al., 2023).

The benefits of playful learning

Studies suggest that playful learning can have a positive impact on learning (Parker & Thomsen, 2019). It is related to creativity (Proyer & Ruch, 2011), and playful young adults are more likely to have higher academic achievement (Proyer, 2011). Learning outcomes are improved when there is guided play in place of free play or directed instruction, which emphasizes the important role of teachers as the scaffolders of the learning context (Alfieri et al., 2011). Playfulness is also associated with mental wellbeing and slightly linked to physical fitness (Proyer, 2013).

Positive framing of failure, the spirit of play, and intrinsic motivation

Whitton (2018) links the benefits of playful learning to three pedagogical characteristics: the positive framing of failure, the spirit of play, and developing intrinsic motivation.

Playful learning might appear to be at odds with assessment. However, experimenting and observing results are at the heart of it. Playfulness is thought to emphasise the importance of failure and to frame it positively (Whitton, 2018). At surface level, creating a safe environment for failure might seem to hinder building resilience and persistence in learning. However, for advocates of playful learning it

is actually the accountability culture in schools that causes learners to become risk-averse, curbing their curiosity and motivation to experiment (Nørgård, Toft-Nielsen, & Whitton, 2017).

Research indicates that managing and addressing errors positively plays an important role in creating an environment where students can be comfortable making mistakes and learn better (Ingram, Pitt, & Baldry, 2015; Steuer, Rosentritt-Brunn, & Dresel, 2013; Zhao, Seifried, & Sieweke, 2018). Playful learning aims to encourage learners to take risks and learn to manage disappointment in the face of failure, to ultimately help them maintain creativity and resilience in the world beyond school.

Playful learning activities avoid being too easy, an approach that is in line with desirable difficulties (Bjork & Bjork, 2011) and flow theory (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005). Tasks with moderate difficulty also promote collaborative learning, encouraging students to collaborate more and communicate with each other (Diezmann & Watters, 2001; Moore et al., 2019; Samuelsson & Frykedal, 2011). More students participate in activities during playful learning and students feel more part of the class, making it a more inclusive approach.



Playful learning changes the perception of time. Students get out of the “getting the job done” mindset and are more in the flow (Skojvberg, 2024). Educators should not only use one type of play, but a diverse set of playful activities. This ensures that more learners participate in the process. Playfulness creates an environment where there is no right and wrong; learners become the “master of the outcome”.

Playful learning supports learners to immerse themselves in the spirit of play. Playfulness creates a make-believe context, where learners accept alternative rules and realities. In this context, learners can set their imagination free, hence becoming more creative by working around the boundaries set by the playful situation.

People who perceive themselves as playful are also more likely to believe they are creative, which can further help with their actual creative output (Bateson & Nettle, 2014). Since the playful setting is a safe environment to experiment and make mistakes, creativity is further encouraged.

As learner performance is not being evaluated, playful learning can develop intrinsic motivation. Learners participate in playful activities by their own choice and shape the process continuously. Intrinsic motivation promotes the sense of agency and creates more room for free exploration and experimentation.

Digital play and digital skills

Initial teacher education providers in Denmark view playful approaches as an effective way to develop critical digital literacy both for teachers and learners. In playful learning activities with digital tools, students are encouraged to explore and test the features of software and digital resources that are available in the school and evaluate their usability for their tasks (Zhou, 2017).

Findings from a survey conducted in the UK and South Africa led to some important recommendations concerning digital games as a playful learning medium (Marsh et al., 2020). First, digital games have synergy with aspects of playful learning, especially when the games have an open-ended, sandbox-like design that also enable cooperation (e.g., Minecraft, Roblox). Such games can also help develop digital and social and emotional skills according to the survey report. The report also recommended a broader policy approach for digital wellbeing that goes beyond online safety and includes digital play. Furthermore, the RITEC project (UNICEF Innocenti, 2024) indicates that digital play through games can improve the wellbeing of students who are able to build social relationships and improve their sense of belonging and autonomy, which are important for student achievement according to the European Commission (Cefai et al., 2021). This is especially the case for digital games that have elements such as open-ended problem solving, socialization and control over the design, pacing and strategy of the game.

Playful learning and data literacy

Owing to the extensive use of learning management systems in Danish schools, University College Copenhagen are investigating activities to promote the technology comprehension and data literacy of teachers and students. Since there is evidence that students experience a lack of confidence due to frequent individual assessments in school (Grumløse, Kaas & Berg, 2020), they propose adopting playful approaches and collective evaluation.

As a partner in the [Agile EDU](#) project, University College Copenhagen are experimenting with playful learning activities intended to develop students' data literacy (see their [interview](#)). Instead of focusing on learning analytics, their activities focus on small data collected by the learners in open-ended activities intended to promote creativity and

collaboration. For instance, students are asked to develop a method to assess enjoyment or collect data to improve enjoyment in class. They can either use a circuit board with buttons to collect responses from people (e.g., evaluate the lesson on a scale of 1 to 5) or use sensors to measure other indicators in the physical environment. To help them operationalize what they will measure playfully, they can use material to describe it, e.g., building a scene that defines a happy classroom using Lego.

Challenges in playful learning

Despite numerous benefits, playful learning is not always easy to handle for teachers owing to its unpredictability and the fact that it comes with its own challenges.

Open-endedness is key in play, but some reluctant students can perceive this freedom as transgressive and demanding. This can be even more the case for adolescents who are more self-aware and concerned about how they appear to others (Lund et al., 2023) and for adults, for whom it is important to be intrinsically playful to engage in play (Nørgård, Toft-Nielsen, & Whitton, 2017). While some playful learning lessons ask students to explore freely, students can also feel overwhelmed by the number of choices they can make. However, research shows students also appreciate being involved more in decision-making in class, which suggests that teachers can try to find balance between teacher scaffolding and student freedom.

Open-endedness also aims to enable a non-stressful space for experimentation. Nevertheless, students might still be looking to understand how they are expected to perform. They can be nervous trying to role play or build a robot using unconventional materials. To provide comfort, it is important to promote the sense of community

in the class and emphasize that it is all a game. Observations from teacher education suggest that similar tensions are also felt by teachers (Skovbjerg et al., 2024). They can resist the notion of play and associate it with not working. Some can believe that play trivializes their profession and the seriousness of education. The resistance can be even stronger in cultures outside of Nordic countries. Many teachers finish their teacher education without learning about playfulness, while it could help them adopt playful approaches in their career if they engaged in such activities in their own initial education.

Prior skill differences when engaging in a playful learning activity can demotivate some learners, for example, when not everybody knows the rules of a game (Boysen et al., 2023, 2024), or when some learners are more skilled at drawing. Those who are less skilled will be less able to participate in the activity. Non-domain specific objects can help students be on the same level. This is the principle of "low floor, high ceiling" (e.g., Maiorana, 2019).

Co-creation can compromise the sense of ownership of a product. To tackle this challenge, one group can develop an "add-on" to another group's product, rather than modifying and "improving" the product (Boysen et al. 2022).

The principles of playfulness are often at odds with formal school education settings. Learners can lose the sense of time during playful learning activities, while "schools are governed by timetables" (Mardell et al., 2019, p. 234). Therefore, it is suggested that teachers and learners can experiment with time, e.g., by sometimes increasing or decreasing the time management imposed on specific tasks and discuss the outcome with learners (Skovbjerg et al., 2024).

Since playful learning aims to put performativity aside, and the concept of play is still difficult to define and understood differently by different educators, it is difficult to measure the impact of playful

learning interventions on learner achievement. To facilitate its evaluation, Zosh et al. (2018) proposed a multidimensional working definition of play based on the five elements above that defines play on a spectrum from free play to guided play and on to direct instruction.

Policy actions

- Introduce some playful learning activities in schools to understand their role in student competences, physical/mental health and learning, and monitor them before possibly extending them.
- Give priority to playful activities and methods (e.g., open-ended, iterative) that can be easily integrated into core subjects in the curriculum.
- Make weekly time for “off-screen” projects and lessons that are not graded, can be implemented outdoors and in a playful manner.
- Encourage schools to define multiple locations inside and outside the school building that can be used as alternative teaching and learning spaces that enable playful learning.
- Make funding available for schools to set up makerspaces and combine it with playfulness, enabling students to tinker, build and play, developing their creativity and experimentation skills.

Conclusion

With the widespread use of digital platforms in schools, education stakeholders see a potential for analysing and identifying patterns in education data that can help improving education practices. However, the impact of this widespread use is debated, and educators are looking for a relationship between digitalisation and the increasing mental wellbeing issues observed in schools. Furthermore,



the benefits of digital personalized learning platforms are not yet well established, and higher-order competences such as collaboration, creativity and critical thinking seem to be out of these platforms' reach for the time being. In this context, playful learning can be an important way to develop such skills. Despite an initial investment in materials and time constraints for schools, there is enough evidence to recommend it as a weekly activity for students, to have a time out from the pressure to perform.

Research warrants the benefits of playful learning for encouraging its adoption both in higher education with young adults, as well as with pupils at younger ages to make it a stronger disposition that persists throughout life. Despite the supporting evidence for the benefits of play, education systems seem to move away from the playful learning model towards a school readiness model, for example, [in Sweden](#). Therefore, it is more important than ever to compare the evidence on playful learning with school readiness approaches in pre-primary and primary education.

The components of playful learning (except for joyfulness) overlap with other student-centered methods such as inquiry-based learning and the makerspaces. It is therefore important to define how playful learning differs from other methods. Playful learning is an umbrella approach that envelops inquiry-based learning, or similar approaches, provided they incorporate the common elements of play (Boysen et al., 2022).

Furthermore, it is important to distinguish playful learning from gamification and game-based learning, which often adopt mechanisms such as extrinsic rewards granted to measurable performance (Whitton, 2018). Gamification elements and digital educational games are often considered as play and are adopted for their benefits on student motivation. However, it is important for these games to be open-ended and not too constraining to allow for collaborative play seen in guided play. Guided play provides the ideal degree of free movement inside a mechanism, like an airplane wing that has a certain freedom of movement.

More research is needed to identify the individual characteristics that help learners engage in play and benefit from playful learning. For an effective use of play with students with different needs, teacher professional development is crucial. Playful learning skills were identified as an important training need for teachers in [a case study](#) of multiple European countries, conducted by the [21st Century Teachers project](#) (Samoilă et al., 2024).

Although playful approaches emphasise open-endedness and creativity, this does not mean that learners must be given complete freedom and no guidance. The research literature clearly shows more benefits for guided play, emphasizing the important role of both parents and teachers in scaffolding play and asking guiding questions that will help students get the most out of the playful activity.

Policy actions

- Experiment with playful methods in national Future Classroom Labs where available.
- Introduce play as a method in initial teacher education programmes.
- Implement playful learning methods in initial teacher education to help teachers be ready to link playfulness to curriculum goals after they start their teaching career.
- Like the project "[21st Century European Teachers](#)", support teacher education and training providers to co-create playful learning programmes for teacher professional development.

References

You can see the cited papers in the full [reference list](#).



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