

VIDEO GAMES

in European Schools

Results from the Games in Schools 2023-2024 Research Project



GAMES

in schools

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About

Games in Schools



Led by European Schoolnet on behalf of Video Games Europe, *Games in Schools* is an initiative designed to train teachers and educators across Europe on how to use video games as pedagogical support in the classroom.¹

Following the success of *Games in Schools* in previous years, Video Games Europe and European Schoolnet continued their collaboration in 2023-2024 to examine in more depth the opportunities but also challenges offered by integrating games into teaching and learning in formal education. This work builds on the previous *How are digital games used in schools?* research report, published in 2009, where more than 500 teachers, decision-makers and experts in eight European countries were surveyed to understand two main questions: What can digital games bring to classroom teaching? What kind of cooperation can be envisaged in this precise context between education systems and the games industry?² As such, the **new *Video Games in European Schools* research report provides up-to-date insights and evidence on the topic of game-based learning for researchers, policymakers and education professionals and practitioners with an interest to bring video games to the classroom.**

More specifically, the 2023-2024 iteration of the *Games in Schools* project was composed of:

☆ A redesigned ***Games in Schools 2023 MOOC*** exploring new elements related to social and emotional aspects of games, including how to ensure diversity inclusion and gender equality, providing practical examples of gameplay tools and activities that can be used in daily teaching practice.³ This is the fully updated 5th edition of the successful *Games in Schools* course launched for the first time in 2014.

☆ An updated ***Games in Schools 2023 handbook for teachers*** interested in using video games at school, titled ***Using educational games in the classroom: guidelines for successful learning outcomes***.⁴ In addition to English, this resource is currently available in Croatian, Dutch, French, Polish, Portuguese, Romanian and Spanish.

☆ The ***Games in Schools 2023-2024 research*** investigating how video games are used for teaching and learning across Europe. This study aimed at identifying enablers, obstacles, and opportunities of video games in education and consisted of a survey of European teachers, focus groups with educators, game experts and policymakers, and case study analyses illustrating good practices across Europe. The results of this research are presented in this report.

1 <https://www.videogameseurope.eu/games-in-society/education/about-games-in-schools/>.

2 [How are digital games used in schools?](#)

3 [Games in Schools 2023 | European Schoolnet Academy.](#)

4 [Using educational games in the classroom: guidelines for successful learning outcomes.](#)

European Schoolnet



The mission of European Schoolnet⁵ is to inspire and support its network of ministries of education, as well as schools, teachers and relevant education stakeholders in Europe, in the transformation of education processes for 21st century digitalised societies.

We do this by identifying and testing promising innovative practices, sharing evidence about their impact, and supporting the mainstreaming of teaching and learning practices aligned with 21st century standards for inclusive education.

Since its founding in 1997, European Schoolnet has used its links with education ministries to help schools become effective in the pedagogical use of technology, equipping both teachers and pupils with the necessary skills to achieve in the digital society.

Video Games Europe

Since 1998, Video Games Europe⁶ has ensured that the voice of a responsible games ecosystem is heard and understood. Its mission is to support and celebrate the sector's creative and economic potential and to ensure that players around the world enjoy the benefits of great video game playing experiences. Video Games Europe represents European and international video game companies and national trade associations across the continent. Europe's video games sector is worth €25.7bn, and 53% of Europeans are video game players.⁷



⁵ <http://www.eun.org/>.

⁶ <https://www.videogameseurope.eu/>.

⁷ Video Games Europe Key Facts 2023 <https://www.videogameseurope.eu/publication/2023-video-games-european-key-facts/>.

Foreword

This important *Games in Schools* research, on use of video games as an educational resource in the classroom, surveyed a total of 1,474 teachers in 26 different countries in Europe. The findings confirm that appropriate use of games enhances student motivation, supports varied learning styles, and helps explain complex subjects, including for students with special needs.

15 years on from the first *Games in Schools* research report, perceptions have evolved and there is a much greater appreciation of the value of using video games as an innovative educational tool. However, the new research also identifies the pressing need to upskill teachers so that they can access these effective teaching tools and help educate the next generation of digital citizens. 63% of teachers surveyed expressed the desire for more training on how to use video games in the classroom to support pupils' learning objectives.

The report is a useful resource for both policymakers and educators, showcasing best practice examples and making recommendations to help harness the benefits of using video games – to enhance the learning experience for pupils and to provide innovative, effective teaching tools for teachers across Europe. Leveraging digital tools for educational growth, bridging the digital skills gap, and fostering innovative teaching strategies are necessary for Europe's digital future.

The report includes European best practices to develop game-based learning. We hope these diverse examples will inspire teachers, educational institutions and governments to reimagine education through a digital lens when considering the potential for using video games as a complement to traditional teaching methods.

We would like to thank the European Schoolnet, the authors, the teachers and various experts who contributed to the survey and to the report.

Simon Little

CEO, Video Games Europe

List of European case studies:

- ★ **Belgium:** In 2023, the annual "Education meet Games" event brought together more than 400 educators, game developers, and experts to discuss game-based learning.
- ★ **France:** Supported by the French Ministry of Education, the "Learning by Making Games" project, supported by Fusin Jeunesse, including ScienceXGame, a chair created by École polytechnique and Ubisoft.
- ★ **Italy:** Since 2018, the "Maker Camp Contest" project has used Minecraft to bridge history, culture, and civic education in Italian Schools. The annual IVPRO DAYS event further explores how video games can serve as educational resources and cultural tools.
- ★ **Luxembourg:** In 2022, the Ministry of Education introduced a comprehensive "Digital Sciences curriculum" including "Games" as one of the topics.
- ★ **Poland:** In 2022, the Ministry of National Education included in the national high school curricula the video game "This War of Mine" by 11bit studios, along with supporting material for teachers on how to use the game.
- ★ **Romania:** From 2022-2023, the Romanian Game Developers Association, implemented the *Games in Schools* project in Romania, involving 8,000 students in grades 5 to 8 in enriched lessons across subjects such as history, maths, and English through video games.
- ★ **Sweden:** In 2020, the Region of Gothenburg used Minecraft in a project to engage young people in civic decision-making processes.
- ★ **UK:** Since 2014, the Digital Schoolhouse initiative, run by the UK video game trade body Ukie, has continued to deliver a full range of events and activities for teachers, schools, pupils.

Acknowledgements

European Schoolnet is highly grateful to the Video Games Europe and its partners for their support in conducting this study and their own work on behalf of the *Games in Schools 2023-2024* project.

This research would not have been possible without the valuable input from the many teachers and educators who made the effort to fill in the *Games in Schools* online research survey. We would also like to warmly thank all the experts who participated in the focus groups and shared their views on digital games in education with us. Through their involvement in our advisory panel, Shahneila Saeed, Dominika Urbanska, David Verbruggen, Ollie Bray, Anesa Hosein, Lisbeth Last and Felix Serrao have guided us through the different phases of the research project. Furthermore, Rowan Daneels provided important research support with a first analysis of the quantitative survey data.

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Executive summary

The *Games in Schools* 2023-2024 research project, led by European Schoolnet and commissioned by Video Games Europe, aims to understand how video games are being integrated into teaching and learning across Europe. The study draws on insights from 1,474 educators across 26 countries and nine country focus groups involving experts from education, civil society, and the video games industry.

Key findings confirm that video games, when used effectively in classrooms, can enhance student motivation, support varied learning styles, and help explain complex subjects, including for students with special needs. However, the study emphasises the need for substantial investment in teacher training. Enhancing educators' digital skills and providing training in game-based learning methodologies is essential for realising the full educational potential of video games.

A wide range of video games can be used for learning, some of which have been specifically designed to support learning, while others, when combined with the right pedagogy, can be used to develop skills and knowledge. This includes commercial off-the-shelf (COTS) games, which are primarily built for entertainment but can be suitable for educational purposes.

The research highlights that access to reliable infrastructure is a major barrier. Schools require up-to-date hardware, software, and stable, high-speed internet, along with affordable access to video game licenses. Without these resources, the integration of video games in education remains limited.

Teachers and experts agree that video games must be age-appropriate, user-friendly, and aligned with national and local curricula to be effectively adopted in classrooms. Support from school leadership is also critical for teachers to successfully implement game-based activities.

In comparison with a similar survey carried out in 2009, the negative attitudes towards games among

parents, other teachers and school management were less frequently mentioned by teachers as an obstacle. A potential explanation for this distinction could be that in 2023, as compared to 2009, video games have become a more familiar medium for parents and educators, which may have contributed to the development of more positive attitudes towards game-based education these days. This being said, our expert focus groups do point to some continued concerns regarding online risks and excessive screen time, often amplified by negative media portrayals. Therefore, effective and transparent school policies and strong communication between schools and families are essential, ensuring that parents understand the educational value of video games while maintaining trust in their safe and responsible use.

The study also identifies several best practices across Europe, including initiatives in Luxembourg, where the Ministry of Education has integrated video games into the national Digital Sciences curriculum, and in Sweden, where Minecraft has been used to engage youth in civic decision-making processes. These examples demonstrate the benefits of cross-sector collaboration between educators, policymakers, and game developers.

In conclusion, while 36% of teachers surveyed already use video games in their teaching, significant challenges remain. Addressing these challenges requires continued investment in teacher upskilling, infrastructure improvements, and a coordinated policy framework that supports the adoption of video games in schools. The report's findings pave the way for moving from theory to practice, offering actionable insights into how video games can transform education and equip students with the skills needed for the 21st century digital society.

Key Findings

1 Use of video games for teaching:



2 Among these teachers, ICT teachers are the ones who most often incorporate video games into their teaching (54%).



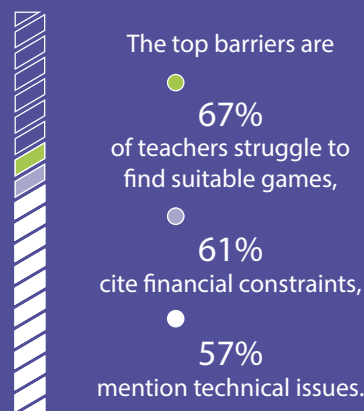
3 Video game preferences by type:



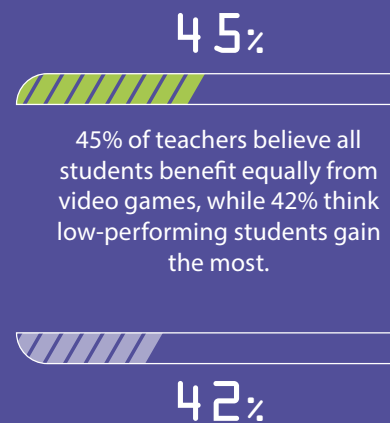
4 Subject areas using video games:



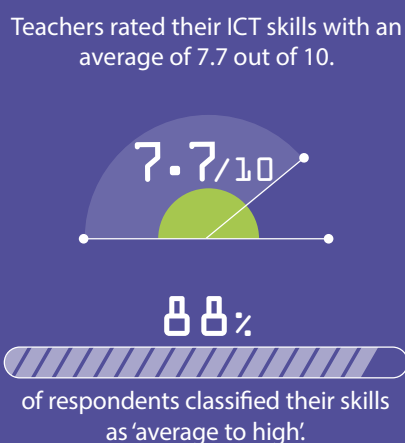
5 Barriers to video game integration:



6 Benefits of video games:



7 ICT skills:



8 Gender:

68% of teachers surveyed are female, 30% are male, and 2% preferred not to mention their gender. Among male teachers, 43% use video games in schools, compared to 33% of female teachers.



9 Video game frequency:



01 Introduction

Video games are increasingly popular, not only among children and youth, but among people of all ages. Half of all Europeans consider themselves to be video game players – of these, almost half are women (Goh et al., 2023).

Since its inception in the 1970s, mainly through arcade distribution, the video game industry – which includes console-based games, smartphone, mobile and PC games, as well as on-demand games streaming – has become the largest and fastest-growing sector in entertainment, surpassing film, and music. The industry has experienced significant evolution, particularly since the late 1990s and early 2000s, driven by emerging technologies and the transition from arcade to home systems like Nintendo's N64 and Sony's PlayStation. More recently, the advent of smartphones, alongside the development of "two-sided" console platforms, has played a crucial role too in shaping the current state of the video game industry (Goh et al., 2023). In parallel, esports are rapidly going mainstream, with individuals and teams across the world playing video games in leagues, competitive circuits, tournaments, or similar competitions, typically for in-person or online audiences, for the purpose of entertainment, prizes or money.⁸

With the demographic of video game players expanding considerably in recent years and over 3 billion video game players worldwide, it is no surprise that the video games industry is a massive business worth \$180 billion, surpassing the film industry. In Europe, the industry generated €25.7 billions in revenue in 2023 and directly employs close to 115,000 people including game developers, designers, writers, and music producers.⁹

From a European policy point-of-view, the European Union has launched various initiatives and funding

programmes to support and promote the growth of this sector and nurture a vibrant video games ecosystem. Examples include Horizon Europe (research and innovation), Creative Europe (cultural and technical elements) and the European Investment Fund regarding deep-tech and equity finance (Laaninen & Wessman, 2023).

Apart from the increasing economic and socio-cultural importance of the sector, substantive potential of video games is expected in fields such as education, inclusion, and wellbeing. As stated in a recent UNICEF report, the multibillion-dollar digital games industry has "been attracting the attention of children in a way few other business sectors do. This leaves the digital games industry with a unique opportunity to positively influence children's well-being due to the significant amount of time children spend playing in digital environments that are designed and controlled by industry actors."¹⁰ In line with this, it is relevant to equally point to the European Union's ongoing efforts to promote the development of a high-performing European digital education ecosystem, and to enhance citizens' competences and skills for the digital transition.¹¹ Within this context, the video game industry has been keen to point to the role video games can play to transform learning and teacher processes, as pedagogical support in the classroom, to close the gender gap in ICT and STEM careers, and to foster inclusion.¹²

As regards the educational potential of video games, many students and teachers are familiar with and invested indeed in video games (Nkadimeng & Ankiewicz, 2022). Digital games are increasingly being used in schools across Europe as a medium to teach pupils and to support learners' educational achievement (Pusey & Pusey, 2015; Nkadimeng & Ankiewicz, 2022). As highlighted already in the

⁸ [The guide to esports.](#)

⁹ [All About Video Games – European Key Facts 2023.](#)

¹⁰ [Responsible Innovation in Technology for Children Digital technology, play and child well-being.](#)

¹¹ [European Education Area: Digital Education.](#)

¹² [Joint EGDF-ISFE position paper on digitalisation of education.](#)

2009 *Games in Schools* research report *How are digital games used in school?*¹³, and in the more recently published 2023 *Guidelines for successful learning outcomes*¹⁴, given their capacity for engaging students, their cultural significance, and the diverse and extensive player base that includes both teachers and students, integrating video games into education allows educators to connect with students on a topic they are passionate about. This can help students improve the interest they have in school subjects and help them improve their learning outcomes (Voogt et al. 2016).

Despite the many opportunities that video games offer, not only for teaching and learning (Cipollone et al., 2014, Schifter & Moffat, 2018; Mayer, 2019), moral panics about the potential adverse effects of (excessive) video gameplay are still common. This is arguably fuelled by negative portrayals of video games in news outlets and other media, and the attention to the negative consequences of video games for children's mental health and wellbeing (Connolly et al., 2012). From an academic perspective, researchers consistently point out that more research is needed, especially of a longitudinal and experimental nature, to better assess and understand the actual impact, both positive and negative, of video games on children and young people, as well as their effectiveness and usefulness in the classroom (Mifsud et al., 2013; Mayer, 2019).

Against this background, the *Games in Schools* 2023-2024 research was designed to better understand how video games are used for teaching

and learning in schools across Europe, by addressing the following research questions:

- ★ Which innovative practices are taking place across European schools in terms of using digital games as educational and motivational resources in teaching and learning activities?
- ★ How do these practices fit within national policies, curricula, and educational contexts?
- ★ How does learning by playing and with digital games resonate with children and young people's everyday gameplay experience?
- ★ Which educational benefits and challenges does this all bring, according to teachers, education policymakers, and other experts and practitioners involved in our research?

To answer these questions, the current report is structured around the main findings of our literature review including recent research on digital games and education, an online survey carried out with 1474 teachers in 26 countries across Europe and the key lessons learned from the focus groups with experts in nine European countries. It also illustrates best practices, in the form of use cases, identified by the experts consulted during this research. Finally, we provide a list of recommendations for a range of stakeholders across sectors.

From a methodological point of view, the different components of this research project can be summarised as follows:

1.1 Literature review

We carried out desktop research to elaborate a balanced summary of recent research on video games in education.¹⁵ The resulting overview of relevant studies and empirical findings served to identify key concepts and definitions, to update the existing *Games in Schools* knowledge base and to inform the development of the research instruments

used. The literature review focused on a range of themes as described in Table 1.

¹³ [How are digital games used in schools?](#)

¹⁴ [Using video games in school – Guidelines for successful learning outcomes.](#)

¹⁵ A full academic reference list is available at <https://www.videogameseurope.eu/games-in-society/education/about-games-in-schools/>. In addition, we will reference a number of recommended publications in footnotes throughout the report.

Table 1. Key themes covered by the literature review

| Key themes | Aspects Researched |
|---|--|
| Educational uses of video games | <ul style="list-style-type: none"> What types of learning can be fostered using video games? What successful methodologies and strategies exist to foster learning through video games? |
| Opportunities related to the use of video games at school | <ul style="list-style-type: none"> What are educational benefits of using video games at school? What skills or competences can children gain from video games in education? In what way do digital games support teachers in their teaching practices? |
| Challenges related to the use of video games at school | <ul style="list-style-type: none"> What are typical challenges that teachers face when using video games at school? How are or can these challenges be overcome? |
| Enablers for the successful incorporation of video games at school | <ul style="list-style-type: none"> What factors help boost the use of video games at school? What are possible strategies to promote them? |
| Barriers that hinder the use of video games at school | <ul style="list-style-type: none"> What are the main barriers related to the use of video games at school? What are possible strategies to overcome these barriers? |

1.2 Online survey with European teachers

We conducted an online survey to understand how video games are currently being used for teaching and learning in schools across Europe. From April to July 2023, 1,474 teachers from 26 countries across Europe responded to this online survey. The questionnaire was designed to gain insights about whether and why teachers use video games for school-related activities, what types of games they find suitable for teaching and learning and

to learn more about teachers' experiences and their attitudes towards game-based teaching. The survey also explored potential barriers encountered by teachers when using games in a school environment. To gain a balanced perspective, the survey targeted both teachers using and teachers not using video games in schools. You can consult the survey in Appendix 1: Online survey questions.

1.3 Focus groups with educators, industry representatives and other experts

Nine focus groups were conducted online between May and August 2023 with experts from policy, education, civil society and industry sectors in Belgium, Croatia, France, Italy, Luxembourg, Poland, Romania, Sweden, and the UK. The aim of these focus groups was to complement the results from the *Games in Schools 2023* online survey. During these focus groups participants reflected on (1) their experiences and opinions regarding the use

of digital games at school, (2) the characteristics of appropriate games for education, (3) strengths, weaknesses, potential threats, and opportunities related to the use of digital games at school, and (4) existing policy and curricular initiatives to foster the use of video games in formal education in their respective countries. The length of the focus group sessions varied between 90 and 120 minutes. You can consult the focus group protocol in Appendix 2.

1.4 Case studies

The last stage of the *Games in Schools 2023-2024* research consisted of identifying inspiring case studies that illustrate good practices related to the use of digital games in education or other initiatives where video games and education intersect. The selected case studies constitute a wide variety of initiatives taking place in and out of school. They include:

- ✧ Teacher training programmes for educators to be able to use video games at school.
- ✧ Local, regional, or national knowledge networks that foster the collaboration among key stakeholders such as educators, academia, and the industry.
- ✧ Local policies that support and encourage the use of video games at school.
- ✧ School projects and activities where video games are successfully used to teach and learn.
- ✧ School curricula or study programmes that incorporate the use of video games in the classroom.

Overall, we hope that the ideas and findings resulting from these different research phases will support educators, policymakers, video game developers and other relevant stakeholders in making informed decisions as regards the use of video games at school, while stimulating a constructive dialogue among all those interested in creating better, diverse, and more innovative learning opportunities for children and young people in Europe and beyond.

Map of Europe highlighting countries featured in case studies from the report



02 Video games in education: What does the research say?

The primary goal of the *Games in Schools 2023* literature review was to deliver an updated overview of recent research on the use of video games in education. It aimed to clarify key concepts and definitions, refresh the existing knowledge base, and guide the development of research tools. The review therefore covers a range of topics, including gamification, game-based learning, serious games, and their educational implications.

Although research in this field has expanded rapidly over the past few decades, there is still no clear consensus on the advantages of video games in

education. Criticisms have arisen, focusing on the methodological limitations of studies and concerns about integrating educational content into gameplay without diminishing the enjoyment factor. Still, there is good evidence indicating that video games can boost motivation, enhance cognitive and social skills, and foster more inclusive learning environments. Despite these potential benefits, many educators feel unprepared to integrate such technologies into their teaching practices.

The following sections offer a non-exhaustive review of key literature and research studies in this area.

2.1 What makes a video game educational?

There is a continued lack of clear, agreed-upon terminology among researchers and educators who are trying to describe or understand what makes a video game educational. Terms such as educational games, serious games, or game-based learning are often used interchangeably in both academic and non-academic contexts, even if they can mean very different things to different people. Therefore, it is important to more clearly define a number of key concepts for the purpose of this report.

2.1.1 Different types of video games

A video game is an electronic form of entertainment that requires human interaction with a user interface to produce visual feedback on a screen. These games are played on platforms, which are electronic systems comprising hardware and software components, enabling their operation. While game consoles like Xbox, PlayStation, and Nintendo Switch are among the most popular platforms

today, video games are also enjoyed on personal computers, laptops, smartphones, and tablets (Jackson & Games, 2015).

Beyond providing visual stimuli, video games typically offer interactivity and feedback to players, often through audio or haptic peripherals like vibration or force feedback (Jackson & Games, 2015). The growing number of video game enthusiasts and the subsequent expansion of the game development industry have led to the creation of a wide variety of games and platforms. To help navigate this diversity, video games are commonly categorized based on their genre, such as action, adventure, sports, or role-playing games.

One way to categorise games is by their core mechanics—these are the central activities players must engage in repeatedly to advance through the game (Salen & Zimmerman, 2004). Zimmerman and Salen created a taxonomy of video game genres based on these mechanics, providing brief

descriptions and examples of games for each category. While this taxonomy is not exhaustive, it offers a useful framework for understanding

the most common genres and their distinctive gameplay elements (see Table 2).

Table 2. Taxonomy of video game genres by mechanic

| Game genre | Description |
|---|--|
| Action games | Action video games require players to react quickly, precisely and timely to overcome obstacles. Due to their simplicity, they are among the most inclusive video game genres. Their action game mechanics usually emphasise combat and feature various subgenres like fighting and first-person shooter games. Examples include so-called beat'em up, brawler or hack and slash games, and first-person or light-gun shooter games. |
| Adventure games | Adventure games prioritise gameplay over narrative, emphasising exploration and puzzle-solving. Considered a "purist" genre, they tend to exclude action elements, appealing to non-players. Examples include real-time 3D, text, and graphic adventures. |
| Action-adventure games | Action-adventure games merge elements from both action and adventures genres. They typically involve exploration, tools gathering, puzzle-solving and combat as mechanisms to resolve long-term challenges and smaller difficulties which are discovered through gameplay. This genre encompasses various styles like stealth, survival horror, tactical combat, platformers, and third-person shooters games. |
| Role playing games | Role-playing games (RPGs) expand on action-adventure gameplay by allowing players to control a party of characters through exploration, puzzles, combat, and encounters. The advent of low-cost high-speed internet connections and advanced multiplayer game architectures further expanded the genre, allowing the creation of Massive Multiplayer Online Role-Playing Games (MMORPGs) such as the highly popular World of Warcraft which enabled millions of players to interact in large online worlds. |
| Simulation and resource management games | Simulation games frequently task players with manipulating and overseeing the elements of a simulated real or fictional system to achieve specific objectives. This genre encompasses a wide range of features and characteristics. Common examples include vehicle simulation games such as flight simulators and train simulators, city construction and management simulations, business simulations, and life simulations. |
| Sports games | Sports games, a subset of simulations, cover traditional sports and activities like team sports, athletics, and extreme sports. They vary in focus with some emphasising gameplay (e.g. car racing games), others strategy and organisation (e.g. team management), and so forth. Despite their diversity, they remain popular and competitive, often mirroring existing teams and players. Through annual updates they reflect real-world changes, for example in the teams' constitution or line-up. Examples include Need for Speed, Arch Rivals, and FIFA. |

There are several other notable genres of video games, including music games, party games, programming games, trivia games, puzzle games, and board/card games. While new game genres continue to emerge, many existing genres have merged to form hybrids (e.g., action-RPG, action-adventure). Elements such as fast decision making and divided attention, typical of action games, are now common in traditionally non-action games like fantasy, role-playing and strategy (Dale & Green, 2017). The blurring of genre boundaries has made the classification of video games increasingly difficult. Many modern games combine elements from multiple genres or allow different play styles, making it hard to categorise them accurately (Dale & Green, 2017).

2.1.2 From gameplay to gamification and game-based learning

Gameplay has become an essential part of children's and young people's lives, offering more than just entertainment—it can also be a powerful tool for learning and some games have been specifically designed for the purpose of training or education.

At its core, gameplay is a learning process where players engage with a game, learn its rules and strategies, and improve their skills as they advance (Lindley & Sennersten, 2008; Ke, 2016). Already two decades ago, Gee argued that the principles of learning found in video games can be applied effectively in education. Video games challenge players to keep trying while teaching them how to

progress, making them valuable tools for creating innovative and effective learning environments (Gee, 2004).

Against this background, it is important to differentiate the following types of games further:

★ **COTS** stands for Commercial Off-The-Shelf games. Although COTS are commercial games built for entertainment, at times they can and have been used as instructional tools in the classroom (Groff, McCall, Darvasi & Gilbert, 2016).

★ **Entertainment games** comprise COTS, console games (video games), and online games (massively multiplayer online role-playing games).

★ **Design-based games** are games with a design focus rather than playing the game. These games may help students designing a digital product such as digital story telling or using visual coding tools to design games (Qian & Clark, 2016).

★ **Educational games** are games developed specifically for educational purposes, that is, to learn and teach (Qian & Clark, 2016).

★ **Digital educational games** are educational games which are digital (Pan et al., 2021).

★ **Serious games** are games that engage users with a specific purpose beyond mere entertainment, regardless of whether the user is consciously aware of it. This purpose can be set by either the user or the game's designer, thus even commercial off-the-shelf (COTS) games used for non-entertainment objectives qualify as serious games. They encompass both digital and non-digital formats, including visualisation technologies, simulations, and virtual worlds, all utilised for purposes beyond entertainment (Backlund & Hendrix, 2013). Serious games often find application outside formal education, such as in workforce training or promoting healthy behaviours among the general population, like encouraging healthy eating habits (Pan et al. 2021).

Focusing more specifically on the role games and gamification can play for learning and education, key concepts include:

★ **Gamification:** Gamification involves using game elements in non-game contexts to enhance engagement, motivation, and learning. In education, it means incorporating game design elements into learning processes to boost student motivation, creativity, collaboration, and retention (Landers et al., 2018; Dicheva et al., 2017). Successful gamification requires balancing fun with educational seriousness by using the right amount of game elements (Schulz et al., 2015).

★ **Gamified learning tools:** These are educational websites, systems, software, or applications that use game design elements to improve engagement, learning experiences, or academic outcomes. Unlike most video games, they are specifically designed for educational purposes (Luo et al., 2021; Luo, 2024).

★ **Game-assisted learning:** This approach integrates effective learning principles into game environments to enhance education. It uses the engaging nature of games to boost motivation and improve traditional learning methods (Qian & Clark, 2016). Game-assisted learning should promote interaction between the learner and the game, motivate learners, make the game enjoyable, and allow for learning through trial and error (Wu et al., 2012).

★ **Game-based learning:** This refers to using game-based approaches to support and improve teaching, learning, and assessment. Game-based learning involves using game elements and gameplay to help learners acquire knowledge and skills through problem-solving, providing a sense of accomplishment. It includes educational, edutainment, and entertainment games. When these games are digital, the term digital game-based learning is used (Pan et al., 2021).

2.2 How do video games foster teaching and learning?

Over the years, the use of both educational and entertainment games for teaching and learning has increased significantly (Tobias et al., 2011; Vogel et al., 2006; Backlund & Hendrix, 2013). Research

into the educational potential of video games has expanded accordingly, especially since the late 1980s, following the surge in video game sales

driven by the Nintendo Entertainment System (Hwang & Wu, 2012).

Our review of academic research from 2009 to 2024 shows that video games have potential indeed to positively impact various aspects of learning. In section 2.3, we will describe in more detail how a large variety of empirical studies highlight the positive impact video games can have on cognition, motivation, attitudes towards learning, and social behaviours, while helping learners to apply existing knowledge or enhancing skills like spatial awareness and problem-solving. They can offer immersive experiences and immediate feedback or help develop 21st century skills such as collaboration, communication, and creativity, while facilitating inclusion.

Yet, the efficacy and effectiveness of using games for teaching and learning is likely to vary across context. The success of educational games depends on factors such as the type of game, learner characteristics, and how they are used (Dempsey et al., 1994). Therefore, in section 2.1, we will first start by exploring in more theoretical depth why certain game mechanics and game-design elements may indeed help to improve the teaching and learning process.

2.2.1 Game mechanics and narrative

As previously explained, game mechanics refer to the structured activities that govern gameplay, comprising rules and the actions available to players. According to Järvinen (2008) and Sicart (2008),

these mechanics establish guidelines for player behaviour and determine how players can win or lose. Players devise strategies to navigate these mechanics effectively to achieve specific goals (Järvinen, 2008). As Salen and Zimmerman (2004) describe, game mechanics consist of a complex array of actions, with the core mechanic being the fundamental activity that players repeatedly engage in to progress towards the ultimate game state (Sicart, 2008).

While not all games emphasize storytelling, the narrative layer can significantly enhance player engagement. Even in games with minimal narratives, immersive storytelling elements can be embedded within the game world, enriching the player's experience (Ke, 2016). This interplay between mechanics and narrative creates a dynamic environment where players not only navigate rules but also become emotionally invested in the game's story, ultimately shaping their overall gameplay experience.

Against this background, Ke (2016) proposes to classify learning games according to their gameplay characteristics, in particular game mechanics and narrative aspects. She argues that the proposed categorisation is useful to better evaluate how learning is integrated in gameplay. Ke warns readers that "this genre categorisation is not aimed to be prescriptive or exhaustive, and a single learning game may belong to multiple genres at once" (Ke, 2016, p.223).

Table 3. Learning games genres according to core mechanics and narrative design (Ke, 2016)

| Game type | Core mechanics | Narrative |
|---------------------------|---|--|
| Causal puzzle game | Logic and thought during puzzle solving | <ul style="list-style-type: none"> ● Environmental storytelling: Maybe ● Backdrop story or mission: Maybe ● Localized narrative: No ● Open-ended: No |
| Action | Quick thinking and reflexes (e.g. in jumping, shooting) | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Maybe ● Localized narrative: No ● Open-ended: No |

| Game type | Core mechanics | Narrative |
|---------------------|--|--|
| Adventure | Long-term obstacle overcoming, involving constant exploration, item collection, and puzzle solving | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Yes ● Localized narrative: Maybe ● Open-ended: No |
| Strategy | Strategic deployment via system thinking and planning | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Yes ● Localized narrative: Maybe ● Open-ended: No |
| Role-playing | Interacting with characters, information collection, and decision making | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Yes ● Localized narrative: Yes ● Open-ended: Maybe |
| Simulation | Design, build, and resource management | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Maybe ● Localized narrative: No ● Open-ended: No |
| Construction | Design, build and resource management | <ul style="list-style-type: none"> ● Environmental storytelling: Yes ● Backdrop story or mission: Maybe ● Localized narrative: No ● Open-ended: Yes |

2.2.2 From learning theory to game design

Analysing the education potential of video games through the inherent components of gameplay design – game mechanics and narrative structure – makes it possible to draw a theoretical connection with a number of foundational learning theories.

To illustrate, according to Qian & Clark (2016), Vygotsky's (1978) sociocultural theory of learning (Vygotsky, 1978) aligns well with educational game design. More specifically, Vygotsky (1978) states that learning takes place when it is social, active, and situated, with play being conducive to learning. Similarly, players interact in role playing environments that allow them to explore social roles (inside and outside of the game), form hypotheses, test new ideas, and develop skills by playing. Many successful entertainment games provide realistic and immersive environments where players can learn through role play experiences. As such, these games can provide a successful design model for digital games-based learning (Gee, 2005; Squire, 2005). Along the same lines, flow theory (Csikszentmihalyi, 1990; Mirvis & Csikszentmihalyi,

1991) helps to understand the importance for learners to experience a state of "flow" where they are fully engaged in an activity that matches their skill level and presents a clear set of goals and immediate feedback. Entertainment game designers typically aim to achieve the same kind of balance, matching the game's challenge level with the player's skill level. Therefore, they collect data on the players, adapt challenges to maintain flow, and provide timely feedback. Shute (2011) argues that educational game designers should implement similar strategies, to ensure that flow is maintained when learning via game play, while avoiding too many interruptions through assessments, quizzes or tests.

In this sense, the central design challenge for educational games centres around their capacity to enable knowledge-based cognitive performance without disrupting gameplay, with domain-specific learning integrated into and activated by core game elements (Ke, 2016). To make this more concrete, Ke synthesized five major themes related to the design of learning games, namely, (a) game-based

learning as knowledge activation and knowledge acquisition, (b) learning integrated in game actions, (c) the blended learning spaces contrived by game mechanics and the game world, (d) meta-reflective and iterative learning during game play, and (e) in-game learning support (or scaffolding). Building upon this work, Lee (2020) attempted to make those five themes more comprehensible:

★ **Designing game-based learning as knowledge activation and acquisition:** Contemporary learning games aim for conceptual understandings rather than facts. They do this by building on prior knowledge that the player has or by introducing more complex ideas. They are not typically emphasizing repetitive practice or “drill and kill” activities.

★ **Learning integration via representation, simulation, or contextualisation:** Learning games provide novel and interactive ways of showing and experiencing concepts. Players can manipulate settings and actions in the game environment to explore the new concepts.

★ **Learning spaces contrived by game mechanics and game world:** The things that learners should be able to do after playing a learning game are often the actions one takes in the game. For instance, if players are supposed to become better at

categorising objects or comparing quantities, the game will often have players categorising objects and comparing quantities.

★ **Meta-reflective and iterative learning moments during game play:** To help support learning, learning games will embed opportunities for players to reflect on what they are learning (e.g., by letting players try and try again). Reflecting and trying new approaches helps learners to develop and refine their ideas.

★ **In-game learning support:** Help for players is embedded inside the game (e.g., hints and guides, digital notebooks, etc.) to help players with their learning.

Moving forward, this work can be used “as a set of criteria for evaluating commercial games that profess to be educational (...). If we use the Ke’s themes as a lens for looking at commercial educational games, we could distinguish how a game like *Civilization VI* exhibits differences in learning potential when compared to Kahoot” (Lee, 2020, pp 146 -147). It also demonstrates how the science of game-based learning is much more complex than simply providing students with a game and expecting increased motivation and knowledge acquisition (Ke, 2016).

2.3 What impact do video games have on education processes and outcomes?

To complement our theoretical exploration of how certain game mechanics and game-design elements may help to improve the teaching and learning process, we now shift our focus to the wider range of empirical studies which examine the impact the use of video games in education can have on motivation, learning outcomes, the development of skills and competencies, and inclusion.

While not exhaustive, this overview offers more in-depth insight into the intersection of video games and education, inviting readers to explore key research and existing reviews for further understanding.

2.3.1 Motivation

Intrinsic motivation refers to engaging in activities because they are interesting and enjoyable (Ryan & Deci, 2000).

In education, intrinsic motivation is crucial for academic success. Unfortunately, traditional school environments often fail to meet the conditions needed to sustain this motivation, which can negatively impact students. Self-determination theory suggests that intrinsic motivation increases when activities satisfy basic psychological needs such as competence, autonomy, and relatedness, rather than being driven by external rewards. When these needs are unmet, motivation tends to decline (Gnambs & Hanfstingl, 2016; Ryan & Deci, 2020).

In response, researchers have explored strategies like gamification—the integration of game-like elements into non-game contexts (Deterding et al., 2011). Gamification aims to meet students' psychological needs by incorporating elements such as leaderboards, group contests, and badges (Sailer et al., 2017). These elements are designed to boost motivation by fulfilling needs for competence, relatedness, and autonomy (Li et al., 2024).

Despite the promise of gamification, research on its impact on intrinsic motivation has been inconsistent. A recent review by Li and colleagues (2024) found that while gamification generally has positive effects on motivation, the impact sizes are often small. While gamified learning environments indeed tend to improve communication and collaboration, fostering a sense of community (Fernandez-Rio et al., 2022), leaderboards and badges can also create negative pressure, with task difficulty and unfamiliarity with gamification elements sometimes undermining students' perceived competence and autonomy (Li et al., 2024). Moreover, participation in gamified environments sometimes feels forced (Hanus & Fox, 2015; Li et al., 2024) with students' intrinsic motivation only being able to thrive when they have the freedom to make choices in their learning (Jones et al., 2022).

In gamified learning environments, addressing constraints related to competence and autonomy is therefore essential, with Li et al. (2024) recommending the following:

- ★ **Set clear goals:** Clearly define how students can succeed in their tasks. Reinforce understanding of gamification elements, such as integrating storylines with tasks to clarify objectives.
- ★ **Offer tasks with varied difficulty:** Provide learners with a range of task difficulties so they can select challenges that are neither too easy nor too hard. Tasks that are too simple or trivial are not engaging, and rewards that require no effort can also be uninteresting.
- ★ **Use relative leaderboards:** Instead of public leaderboards showing absolute rankings, use relative leaderboards to reduce frustration and discouragement among lower-ranked students. This

approach helps maintain motivation by minimizing negative impacts on intrinsic motivation (Ortiz-Rojas et al., 2019).

- ★ **Provide enough choices and opportunities for students' expression:** Allow students to make choices and express themselves. This can help increase students' perceived autonomy within the gamified environment. This could involve letting students choose their learning path (Fernandez-Rio et al., 2022), or customize their avatars (Sailer et al., 2014; Xi & Hamari, 2019).

2.3.2 Learning outcomes

Some research broadly highlights the positive impact of using games for learning outcomes. For instance, Clark et al. (2016) found that digital games exhibit a moderate to strong impact on cognitive learning outcomes compared to traditional instructional methods. Delafield-Butt (2021) also found a positive impact of games on learning outcomes particularly in subjects like science, mathematics, and foreign languages.

However, looking at the wider range of studies exploring the efficacy of digital games for educational purposes (e.g., Clark et al., 2016; Hays, 2005; Ke, 2016; Vogel et al., 2006), the methodologies and resulting findings have been largely inconsistent. For instance, Hays (2005) reviewed 48 studies published between 1982 and 2005 that researched the effectiveness of instructional games and noted that while games could enhance motivation and learning in subjects like math, social sciences, and vocabulary among K-12 students, information regarding game-related learning in other disciplines, such as health and geography, was scarce. Hays (2005) cautioned that not all studies reviewed were methodologically rigorous and found no conclusive evidence supporting games as the preferred instructional approach. Vogel et al. (2006) conducted a meta-analysis of computer games and simulations and concluded that these methods generally led to higher cognitive gains and more positive attitudes toward learning compared to traditional teaching methods. Nonetheless, they expressed reservations due to methodological limitations in the studies

analysed, which compromised the robustness of their findings.

More recently, Martinez et al. (2022) conducted a systematic review of intervention studies integrating entertainment video games into academic curricula. They concluded that video games can effectively enhance learning across various academic disciplines, particularly in foreign language and science education. However, they stressed that robust research on the impact of entertainment video gameplay on academic learning is still limited and lacking. They underscored the need for further research to fully understand the mechanisms underlying these effects, particularly in less-explored domains like environmental and social sciences, physical education, and programming. This suggests the importance of continued investigation to validate and expand upon existing findings in the field of video game-based learning, particularly in domains where less research is available.

2.3.3 Developing skills and competencies

Alongside its impact on motivation and learning outcomes, video games are also thought to more specifically contribute to the acquisition of cognitive and 21st century skills and competences (Qian & Clark, 2016).

a) Cognitive skills

Cognitive skills refer to skills such as retention, transfer, cognitive load, and knowledge acquisition as well as motor, spatial, and visual skills.

The most frequent outcome investigated in educational game studies is knowledge acquisition (Connolly et al., 2012; Li & Tsai, 2013) with less than one-third of studies investigating skills such as problem-solving skills (Li & Tsai, 2013). Although educational game studies reveal varying degrees of success depending on aspects such as academic topic, learner preferences or participant age (Hays, 2005; Young et al., 2012), there is plenty of evidence available on how games-based learning may positively influence learner's cognitive gains (Connolly et al., 2012; Hays, 2005; Vogel et al., 2006; Young et al., 2012).

Action games have been found to have significant cognitive benefits, with most robust effects on perception, spatial cognition and attention (Jackson and Games, 2015; Bediou et al., 2018). For example, individuals who are inexperienced or rarely play video games and are randomly assigned to play shooter games demonstrate improvements in attention allocation, visual processing, and mental rotation abilities compared to control groups. Some even indicate that the spatial skills enhancements from playing commercially available shooter games rival those achieved through formal education courses designed to improve these skills (Uttal et al., 2013; Green & Bavelier, 2012; Jackson & Games, 2015). In turn, spatial skills have shown to be significant in forecasting achievements in science, technology, engineering, and mathematics (STEM) while proficiency in STEM fields is associated with long-term career success and other positive outcomes related to 21st century skills (e.g. Jackson and Games, 2015; Qian and Clark, 2016). Research has also shown measurable changes in neural processing and efficiency related to playing video games. For instance, a study revealed that during a demanding pattern-detection task, regular players exhibited lower activity in the frontoparietal network, responsible for attention allocation, compared to non-players (Bavelier et al., 2012).

Importantly, not all cognitive domains benefit equally, with more research needed in areas not typically linked to action gameplay, such as multitasking, problem-solving and verbal cognition. Bediou et al. (2018) argue that research in different domains has repeatedly observed that not all video games have the same impact. *"Given the enormous range of completely different experiences that fall under the label of video games, attempting to identify how playing video games affects behaviour is analogous to attempting to identify how eating food impacts physiology"* (Bediou et al., 2018, p. 78).

Despite increasing interest in video gameplay as a tool for enhancing cognitive abilities, due to its engaging nature and potential impact on brain structure and function, research on this topic faces methodological challenges and limitations (Bediou et al., 2018). The relevant research literature is diverse and inconsistent, making it difficult to draw clear conclusions. Meta-analyses often produce

conflicting results, particularly in areas like executive functioning, memory, and general cognition. Only visuospatial cognition and attention show more consistent positive effects. Studies vary widely in how they define and categorize video games. Different studies focus on different cognitive domains and define these domains differently, further complicating comparisons. Factors like age, gender, education, and gameplay experience (novice vs. habitual player) can influence results but are often not consistently accounted for.

In short, specific genres or types of video games are likely to enhance specific types of cognitive skills, some of which may be transferred to real-world contexts. Further research is needed to determine if these advantages are consistent across different game genres, age groups, and socio-cultural backgrounds, as well as their applicability to diverse real-life situations. Additionally, future studies should examine potential cognitive drawbacks of video game playing, again accounting for both player and game characteristics (Jackson and Games, 2015). More broadly, there is a need for standardised research frameworks to better understand the effects of video gameplay on cognition. Without consistent definitions, concepts and methodologies, it is challenging to draw meaningful conclusions or advance our understanding of how video games impact cognitive abilities.

b) 21st century skills

21st century skills can be defined as the range of abilities required to succeed in work and life in today's world, including creativity and innovation, critical thinking and problem solving, communication and collaboration, and information, media and technology skills (Binkley et al., 2014). To cultivate these skills, learning should be situated, active, and problem based. Well-designed games can offer rich, problem-centred environments that foster meaningful learning by incorporating elements such as adaptive challenges, discovery, immediate feedback, clear goals, player autonomy, immersion, collaboration, variable rewards, and low-stakes failure (Anderson, 2011; Squire, 2011). Despite the growing interest in video games' potential to facilitate students' 21st

century skill development, there is a continued lack of empirical evidence demonstrating their effectiveness to do as such (Connolly et al., 2012). For example, Adachi and Willoughby (2013) found that adolescents who played strategic video improved their problem-solving skills which led to better academic performance. This improvement was attributed to the problem-solving focus and challenges in these games (Jackson and Games, 2015). Yet, the direction of causality often difficult to determine—good problem solvers may just be more likely to perform well in video games too (Steinkuehler & Duncan, 2008). Likewise, based on their examination of 29 studies which targeted 21st century skills as outcomes, Qian and Clark (2016) recognise the potential of well-designed games, but add that little is known about the specific game design characteristics required for situated learning to occur (Hays, 2005; Young et al., 2012). As such, using games for 21st century skills presents an interdisciplinary challenge, given the need to better understand which game design elements can make the learning environment more meaningful and effective across different contexts (Boyle et al., 2011; Qian and Clark, 2016).

c) Creativity

Creativity refers to divergent thinking, innovative thinking, originality, inventiveness, and the ability to view failure as an opportunity to improve (Binkley et al., 2014). Many consider creativity a 21st century skill that allows people to produce things that are both original and adapted with respect to the context in which they occur (Plucker & Makel, 2012; Lubart et al., 2015; Mercier & Lubart, 2023). Creativity is not restricted to great achievements, such as a masterpiece or an invention. On the contrary, anybody can be creative in different aspects of their lives, such as work or education (Mercier & Lubart, 2023). Here again, some researchers believe that traditional educational practices often hinder creativity by emphasising only one correct answer, and favouring conformity and standardisation (Plucker & Makel, 2012).

While the existing evidence is scarce, some empirical studies have explored the cognitive, social, emotional and motivational relationships which may exist between video games and creativity. For

example, Jackson et al. (2012) surveyed a sample of 491 children, aged 12 years old and they found significant positive correlations between frequency of video game play and multiple indicators of divergent thinking, i.e. the ability to generate multiple ideas from a single starting point. Yeh (2015) observed enhanced divergent thinking, after participants had played an action video game, compared to a non-action video game. Moffat et al. (2017) examined the effect of three types of video games on divergent thinking. In their study, they had participants play either a first-person shooter (*Serious Sam*), a puzzle game (*Portal 2*), or a sandbox game (*Minecraft*). Their research showed enhanced flexibility, after playing the first-person shooter and the puzzle game. Blanco-Herrera et al. (2015) researched the relationship between the amount of time playing video games and trait creativity and they found a positive correlation. In the same study, they compared the effect of playing *Minecraft* (with or without instructions) to two control conditions: playing a non-creative video game (*NASCAR*) and watching a TV show (*Crocodile Hunter*). Their findings showed that playing *Minecraft* without instructions improved graphic creativity, compared to the control conditions. However, no effect was found for either verbal divergent or convergent thinking. Čábelková et al. (2020) studied the relationship between video game play time and emotional creativity. They found that more time devoted to playing video games was generally associated with lower emotional creativity. However, they also found that this relationship was moderated by gender and, thus, for women, playing more video games was positively correlated with the originality component of emotional creativity, i.e. the ability to experience new and unusual emotions.

Mercier and Lubart (2023) carried out further empirical research in a workplace setting confirming that playing video games is positively related to creativity. In their view, this link can partly be explained through the mediating effect of psychological capital, with video games providing opportunities for players to develop efficacy, optimism, hope and resilience. For example, self-efficacy and attaining a sense of competency are necessary for players to advance to higher levels of

difficulty in games. Meanwhile, adversity is a core aspect of video games too, with hope and resilience often required to play games where players are “punished” for making mistakes (e.g. *Super Mario Bros*), or first-person shooter games, where being defeated by other players is an essential part of the game experience (McGonigal, 2015). In addition, Hsu et al. (2018) found that online social interactions and taking part in online communities such as massively multiplayer online role-playing games (MMORPGS) helped players to develop more social capital, which in turn led to higher psychological capital. Social interaction is, indeed, a key feature in online video games, and increasingly so, with group efforts often required to achieve game goals (Eklund, 2015).

d) **Collaboration**

The concept of collaboration in education is complex, particularly when students lack an intrinsic motivation to engage with one another. As highlighted by Teasley and Roschelle (1993), effective collaboration involves a sustained effort to build a shared understanding of a problem, which is often challenging in formal settings. Research suggests that when individuals recognise that their contributions can enhance group performance, they are more inclined to support one another. This perspective aligns with Nebel et al. (2017), who argue that perceived rewards from collaboration can foster a more cooperative environment among learners.

Video games, particularly those designed for collaborative play, have been identified as effective tools for promoting these skills. Qian & Clark (2016) emphasise that collaboration is a key design element in games, such as in massive multiplayer online roleplaying games like *World of Warcraft*. In these games, players must fulfil distinct roles—such as healer or warrior—which naturally encourages cooperation. The game’s design incorporates mechanisms that require players to work together to achieve common goals, making collaboration not just beneficial but essential for success. Game developers can further enhance this collaborative experience by modifying reward structures to prioritise team achievements over individual accomplishments, or by creating tasks that necessitate joint effort. This approach not only

promotes collaboration but also teaches students the value of working together, potentially translating these skills back into educational contexts. Overall, leveraging the engaging nature of video games may provide a pathway to foster more effective collaborative practices among students (Nebel et al., 2017).

From this perspective, collaborative learning through video games may offer several advantages over traditional educational methods:

1. Enhanced cognitive and affective outcomes:

Small group collaboration can positively impact cognitive skills, process efficiency, attitudes, and persistence (Lou et al., 2001; Sung & Hwang, 2013). It can lead to increased enjoyment and interest in the material, promoting deeper learning and better task performance (Plass et al., 2013; Fu et al., 2009; Johnson et al., 1986; Ke & Grabowski, 2007).

2. Boosted self-esteem and cohesion: Collaborative learning fosters self-esteem and strengthens group cohesiveness. This supportive environment encourages students to engage more actively and confidently in their learning.

3. Positive gameplay experiences: Working together in games can enhance the overall experience, resulting in feelings of fun, immersion, competence, empathy, and social connection (Oksanen, 2013). These positive experiences increase the likelihood that students will continue to engage with the game in the future (Plass et al., 2013).

4. Peer teaching and explanation: In collaborative settings, students often explain concepts to one another. This peer teaching not only reinforces their own understanding but also enhances overall learning performance (Dillenbourg, 2007; Dillenbourg et al., 1996). Verbalising knowledge encourages elaboration and stimulates higher-order cognitive processes (Mullins et al., 2011; King, 2008).

5. Efficient use of mental resources: From the perspective of cognitive load theory (Sweller, 1988; Sweller et al., 1998), collaboration allows for a more effective distribution of learning tasks. This shared workload reduces the cognitive load on individuals,

making learning more manageable and efficient (Kirschner et al., 2011).

Overall, these benefits suggest that video games can serve as effective tools for collaborative learning, creating engaging and supportive environments that promote deeper understanding and skill development. However, the impact of collaboration on learning may be influenced by various factors, which can either enhance or hinder the effectiveness of collaborative efforts:

1. Group heterogeneity: Diverse groups can bring different perspectives and skills, enhancing collaboration (Lou et al., 2001). A mix of abilities and backgrounds often leads to richer discussions and problem-solving approaches.

2. Task features: The nature of the tasks plays a crucial role. Tasks that are open-ended and allow for exploration tend to support collaboration better than closed or overly controlled tasks (Dillenbourg et al., 1996; Kirschner et al., 2008).

3. Group size: The size of the group can impact dynamics and engagement, with smaller groups often fostering more effective collaboration (Lou et al., 2001).

4. Provision of tutorials: Access to guidance and tutorials can help students navigate collaborative tasks more effectively, ensuring they have the necessary skills and knowledge (Lou et al., 2001).

5. General ability level: The varying ability levels among group members can influence collaboration, as mismatches may create challenges in communication and task execution (Lou et al., 2001).

6. Cooperative learning strategies: Implementing specific strategies for cooperative learning can enhance group functioning and outcomes (Lou et al., 2001).

7. Task difficulty: If tasks are too simple, they may not necessitate collaboration (Kirschner et al., 2011b; Lou et al., 2001). Conversely, appropriately challenging tasks encourage students to work together to find solutions.

In light of these factors, the study by Nebel et al. (2017) offers valuable insights. Their experiment involved participants rebuilding a house from the

novel *Effi Briest* in an adjusted version of *Minecraft*, with varying levels of task interdependence. Results indicated that increased task interdependence led to better performance and learning outcomes. The researchers noted that educational video games can effectively develop collaborative mechanisms since game designers can create environments where tasks cannot be accomplished alone, fostering collaboration organically. This potential for innovative gameplay underscores how educational video games can enhance cooperation and ultimately improve learning experiences (Nebel et al., 2017).

2.3.4 Inclusion

Research on game-based learning has also started to explore the opportunities and barriers video games may offer for inclusion, for instance for learners with special education needs, as a tool to foster gender equality, or to support other groups in vulnerable situations.

a) Special needs

In a recent review of the literature, Papanastasiou and colleagues (2022a) indicate that serious games appear to benefit children with special needs, helping to stay interested in their study by increasing motivation, independence, autonomy and self-esteem, in practically every subject area of the pre-school and primary education curriculum.

More specifically, the available research points to the positive effects of serious games on visuospatial and phonological skills, on attention and ADHD disorders, on students with autism spectrum disorders, on student's memory, and on students with mental disorders. As regards visuospatial and phonological skills, some serious games were created to support children with developmental dyslexia, training their rapid auditory skills, visual-spatial attention, and letter-to-speech sound integration, which in turn can help to improve reading skills (Gaggi et al., 2012, 2017). Serious games also seem to have positive effects on attention and ADHD disorders, as they can help to support people and students with ADHD to improve their academic performance through increased attention and control of impulsive behaviours (Drigas et al. 2014). Other studies have found that

video games can help enhance the motor planning and execution skills of ADHD students as well as their hand-eye coordination, concentration, memory, cognition, impulsivity and sustained visual attention (Bavelier et al., 2012; Retalis et al., 2014). The multiple sensory modalities and the immediate feedback provided by video games are some of the factors that can positively impact impulse control and increased attention (Papanastasiou et al., 2022b). Likewise, research has explored the positive impact of video games on autism spectrum disorders on people with intellectual disabilities and sensory impairment, among others (Aresti-Bartolome & Garcia-Zapirain, 2015; Jung & Sainato, 2015).

b) Gender

Research into female gameplay, although emerging, is still relatively scarce. In a recent study López-Fernandez et al. (2019) investigated the role of females in video game culture and the benefits associated with video games. They reviewed 49 relevant papers published from 2000 to 2018 and identified four key categories: i) the benefits of female gameplay, ii) reasons why women may play video games less than men, iii) perceptions and realities of female characters in video games, and iv) women's position in video game culture. The main findings highlighted that playing video games can enhance women's cognitive, social, and physical abilities. However, women are often less encouraged to engage in gameplay due to gender-based negative expectations and adverse experiences during gameplay. Video games are frequently linked to stereotypical male traits, such as excessive aggression, and often include sexualized content. Moreover, female players commonly face online harassment and develop coping strategies to deal with it. They also tend to seek different elements in games, which are often underrepresented in game design, limiting their gameplay experience. For example, the exaggerated and hypersexualised representation of female avatars can lead to negative social comparisons and reduced self-esteem.

López-Fernandez et al. (2019) concluded that women still face significant obstacles in the video game world. Some of the factors which help to

explain why women might play video games less often than men include gender expectations and peer pressure (e.g. social norms dictating that video gameplay is male dominated) and the online harassment woman may face in an online video game environment. Other factors identified in the study include gender bias, discrimination, sexism (e.g. doubting women's gameplay abilities) and marginalisation within the players' community. In turn, this can lead women to adopt coping strategies (e.g. anonymity or switching genders in-game) which may affect their gameplay experience and progression within games. Despite these challenges, research suggest that girls, even at a young age, have similar abilities to develop gameplay performance and strategy skills as boys (Blumberg & Sokol, 2004). As such, differences in video gameplay performance are not due to gender differences, but rather to the types of video games played and the time spent playing them (Olson et al., 2007).

Regarding the benefits of female gameplay, Fernandez et al. (2019) found that these are multifaceted, encompassing physical, mental, and social aspects. In their review of the literature, they came across several studies that explored the positive impact of video games on women, focusing on clinical and environmental interventions, as well as cognitive and social learning strategies. They noted that recent research has investigated how video games can enrich female participants' lives, particularly in terms of physical and mental health benefits. For example, some studies examined how video games can encourage exercise in older female adults with mobility issues, while alleviating pain in

fibromyalgia patients through cognitive distraction (Fraser et al., 2014; Mortensen et al., 2015). Mental health improvements were also noted, with video games being used as psychotherapeutic tools to aid recovery in adolescents (Denoyelles & Kyeong-Ju Seo, 2012) and improve attention in elderly women. Additionally, research into educational video game environments showed that women, regardless of video game experience, were equally capable of succeeding with such interventions as their male counterparts (Warden et al., 2016).

Girls' video gameplay behaviour could also have an impact on educational and career prospects. Looking more specifically at undergraduate degree selection, Hosein (2019) found that female students who are heavy players are more likely to study a physical science, technology, engineering, and mathematics (PSTEM) degree, but this was influenced by their socio-economic status. Similar associations with boys and PSTEM degrees were not found or were weak. Therefore, it seems that girls are more actively self-socialising or self-determining their identity groups through gameplay. As such, encouraging video gameplay in adolescent girls could be one possible pathway to engage more girls in PSTEM studies. In a similar way, initiatives that propose to teach coding through a game design and development process could "bring positive results to overcome the gap between the number of girls and boys in ICT courses and careers" (De Carvalho et al., 2020, p. 242). Hosein warns, though, that the way in which video games are integrated to achieve this purpose must be carefully planned "to continue inspiring those girls who are already players without alienating those who are not" (Hosein, 2019, p.232).

2.4 Using video games at school and in the classroom: enablers and obstacles

Despite the surge in popularity of video games and the large amount of research conducted on their impact, only few studies have tried to more systematically analyse the key drivers and barriers for the use of video games or game-design elements in school and classroom contexts. This has led to a noticeable gap in evidence-based policy recommendations and guidelines for the different types of education stakeholders concerned (Tsekleves et al., 2016).

2.4.1 Leadership at school level

As regards the school strategies employed to promote the use of digital games in education, these can be broadly classified in two main groups: (1) systemic approaches which formulate a clear vision and mission, fostering teachers' professional development, and ensuring proper resource allocation, and (2) more *ad hoc* initiatives which help to empower individual teachers, for instance

by creating leadership groups among the teaching staff. Both types of initiatives can significantly influence teachers' adoption of educational video games and are necessary to guide the successful integration of digital games at school (Hodedatov et al., 2024).

Within this context, the school principal's leadership is key to ensure the successful integration of video games in schools. As educational leaders, they bear the responsibility for overseeing school activities and driving changes within their institutions (Crow & Whiteman, 2016; Klein & Schwanenberg, 2022) including the introduction and implementation of digital technologies (Benoliel, 2017). The role of school principals as facilitators for the introduction of digital technologies became ever more crucial during the Covid-19 pandemic, which underscored the need to incorporate digital tools into teaching methods in response to the abrupt shift to online learning (Dubé & Dubé, 2021; Nikdel Teymori & Fardin, 2020; Winter et al., 2021). Principals who embrace technology in their work are likely to inspire their teaching teams to do the same. They serve as role models for technological adoption within schools, supporting teachers' capacity building in digital technology use, and fostering cooperation among staff.

More specifically, Hodedatov et al. (2024) point to the following key enablers for integrating digital game-based learning at school:

- ☆ **Shared school vision:** Creating comprehensive plans with clear objectives, established habits, and regulations, and allocating sufficient resources to achieve this vision are key.
- ☆ **Professional development:** Offering professional training and emotional support for teachers, meeting regularly, providing encouragement, and involving teachers in disseminating new technology are essential.
- ☆ **Resource allocation:** Addressing shortages in equipment, internet connectivity, and human resources by reallocating funds to improve infrastructure and purchase necessary devices and software is vital.
- ☆ **Gradual and participatory implementation:** Allowing teachers to progress at their own pace

and involving them in the implementation process collaboratively with school leaders fosters a supportive environment.

☆ **Leadership group as change agents:** Teachers who are enthusiastic about technology can drive change by sharing success stories, participating in decision making, and organizing peer learning sessions. These teachers can help promote the use of video games and other innovative technologies at school.

2.4.2 Common barriers at teacher level

Teachers are pivotal in introducing and implementing pedagogical innovations, particularly those involving technology. While many teachers are willing to incorporate video games in their teaching practices, there are different types of obstacles that may hinder them.

To illustrate, Groff, McCall, Darvasi & Gilbert (2016) identified four key aspects that educators usually worry about:

- ☆ Finding the right game for your specific educational needs.
- ☆ Being able to use games effectively.
- ☆ Being able to determine if students have learned from the games.
- ☆ Getting the right help and support when needed.

These and other common barriers are further described below:

a) Time constraints

Planning classes with video games can be time consuming (Marklund & Talyor, 2016), especially for new teachers and for those who may have little experience with game-based teaching or insufficient digital skills. Well-known time limitations make it challenging for many teachers to adjust their lessons or change the organisation of a school day (Becker & Gopin, 2016; Marklund & Taylor, 2016).

b) Teachers may struggle to view or use video games as meaningful learning tools

Some teachers miss a basic openness towards ICT. Others have doubts about the role video games

can play in a classroom environment (Hamari and Nousiainen, 2015; Bourgonjon et al., 2013). As such, teachers often struggle to see how they can use video games in meaningful ways for teaching and learning. This reminds us that although video games can positively impact learning outcomes, their use alone does not guarantee that students will achieve these outcomes. Educators must carefully consider what games to use in class, with which students and for which teaching objectives. To make this happen, more guidance and hands-on resources for teachers are needed on how to choose the right video games and how to effectively use them in class (Becker & Gopin, 2016).

c) **Weak links between video games and the school curriculum**

Even if they are open to use video games in schools, teachers often struggle to see how they could align their use with the needs of the curriculum. This is especially true for COTS which have not been designed for educational purposes, which typically makes it difficult to find direct links with end terms for a specific subject, particularly for educators unfamiliar with such games (Becker & Gopin, 2016). Therefore, Ince and Demirbilek (2013) point to the need for more curriculum-aligned games. Meanwhile, the use of video games may pose additional challenges to assessment tasks because, for instance, the scoring system used in COTS might not reflect if the students are meeting educational objectives (Becker & Gopin, 2016).

d) **Insufficient digital skills and video game literacy among teachers and school personnel**

Teachers need to possess a wide set of skills to use video games in the classroom (Marklund & Taylor, 2016) such as technical knowledge to set up the game in the classroom, gameplay skills and literacy to navigate through the game, and the pedagogical ability to connect the game to the subject matter. Teachers often feel unprepared to do as such (Ince and Demirbilek, 2013). In addition, they should be able to identify students who are struggling with the use of the game and feel confident to support those students in need of help (Marklund & Taylor, 2016). It is often falsely assumed that young people growing up in a digital age automatically possess the various skills and competencies required to deal with digital technology (Marklund & Taylor, 2016). Yet, when using video games in school, young or less experienced pupils are still likely to need help and support from more experienced users (van Rooij et al., 2010; Scolari, 2018).

e) **Insufficient organisational support and lack of adequate technological infrastructure**

As we have seen, another important barrier for teachers relates to the lack of organisational support and the lack of adequate technological infrastructure (Demirbilek & Tamer, 2010; Marklund & Alklind Taylor, 2016). To set up the required infrastructure, time and financial investments are needed at school level (Schulz et al., 2015). The presence of adequate devices, infrastructure and software is a requirement for the successful integration of games in the classroom, with digital games continuously evolving, and advanced technologies often not available in a traditional classroom (Pan et al., 2021).

2.5 **Conclusions from the literature review**

The increasing popularity of video games among young audiences has led to significant research into their educational benefits. Over recent decades, interest has grown in areas such as gamification, game-based learning, and serious gameplay. Many comprehensive reviews, including those by Connolly et al. (2012), Ke (2011), Qian and Clark (2016), and WuWu et al. (2012), have explored the potential

effectiveness of video games across formal, informal and non-formal education.

While early research lacked robust empirical evidence, more recent studies have begun to address these gaps. Connolly et al. (2012) found only 129 out of 7,392 papers provided solid evidence on the impacts of video games, suggesting progress is being made in addressing this issue. Despite scepticism, substantial evidence indicates that video

games can enhance motivation, improve cognitive and problem-solving skills (Egenfeldt-Nielsen, 2006), promote 21st century skills (Andersen & Rustad, 2022), and foster emotional and social development (Granic et al., 2014). Furthermore, the increased accessibility of video games in educational settings, driven by advancements in technology, provides diverse options to meet learning objectives. For video games to be effective learning tools, they must be designed with appropriate features, maintaining game flow and enjoyment while integrating sound learning theories (Ke, 2008; Young et al., 2012). Teachers' pedagogical and digital skills are also critical to creating successful game-based learning experiences. However, many educators feel unprepared to incorporate emerging technologies into their classrooms, underscoring the need for both initial and ongoing teacher training.

With this being said, for now, research on the benefits of video games for learning remains inconclusive. Qian and Clark (2016) point to continued methodological concerns and conflicting findings. Most studies emphasise knowledge acquisition, with limited focus on important skills like problem-solving. There is insufficient understanding of why students struggle to transfer knowledge and skills gained from games to other contexts, highlighting the need for further research on transfer mechanisms. Also, more clarity is needed on how subject-specific learning and skill

development can be integrated into gameplay more effectively (Martinez et al., 2022). More rigorous scientific studies are therefore needed to validate educational claims about video games. In turn, research should inform future policies and technological developments in this domain (Mayer, 2019).

Our own literature review has a number of limitations too. It offers a broad overview of the research on the educational impacts of video games, which may omit more detailed insights. Much of the evidence comes from systematic or critical reviews, which can narrow the scope of the findings. There is also a lack of robust empirical evidence to confirm the effectiveness of game-based learning, with many studies focusing on quantitative data and excluding potentially valuable qualitative insights. Additionally, research is often limited to specific countries, making it difficult to generalize the findings to other populations.

In conclusion, while research on educational games is fragmented and often anecdotal, video games and gamification continue to show promise as educational tools. By addressing shortcomings in pedagogy, instruction, and game design, educators can leverage the potential of video games to enrich learning experiences and develop essential skills in students.

03 Findings from the European survey with teachers

As part of the 2023-2024 *Games in Schools* research project, European Schoolnet conducted an online survey involving a large convenience sample of 1474 teachers from 26 European countries. The survey aimed to explore the current usage of video games for teaching and learning in schools. It delved into whether and why teachers use video games for school-related activities, what types of games they find suitable for teaching and learning, and their experiences and attitudes toward game-based teaching. Additionally, it investigated barriers encountered by teachers when integrating games into classroom activities or projects. To ensure a balanced perspective, the survey targeted European teachers both experienced and inexperienced in using video games for educational purposes.

Through its various networks, European Schoolnet launched an open call to distribute the survey online to schools and relevant institutions. The survey, available in 13 languages, was accessible from

April to July 2023, and it was disseminated with support from various national partners, including ministries of education, industry, and civil society organisations, through European and national newsletters, websites, social media, and other platforms. While the English version was widely distributed across Europe, targeted efforts were made to distribute national language versions in Belgium, Croatia, Finland, France, Germany, Greece, Italy, Poland, Portugal, Romania, Spain, and Sweden.

In the following sections we present the survey results and address questions such as:

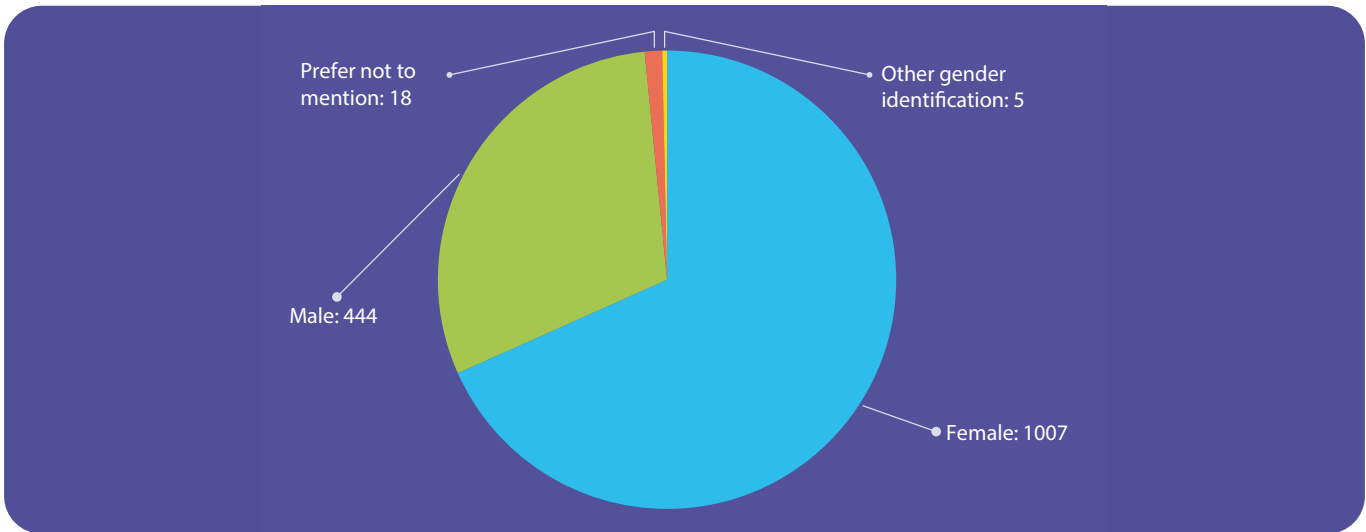
- ★ Who are the European teachers using video games in schools?
- ★ Why do they use video games in their classes and how?
- ★ What types of barriers do they encounter for game-based learning? What options do they see to overcome them?

3.1 Which European teachers responded to the online survey?

3.1.1 Demographic characteristics

Among the 1474 teachers who responded to the survey, the majority are female (68%). Only 30% of the respondents are male and 2% preferred not to mention their gender or identifies with another gender (See Figure 1).

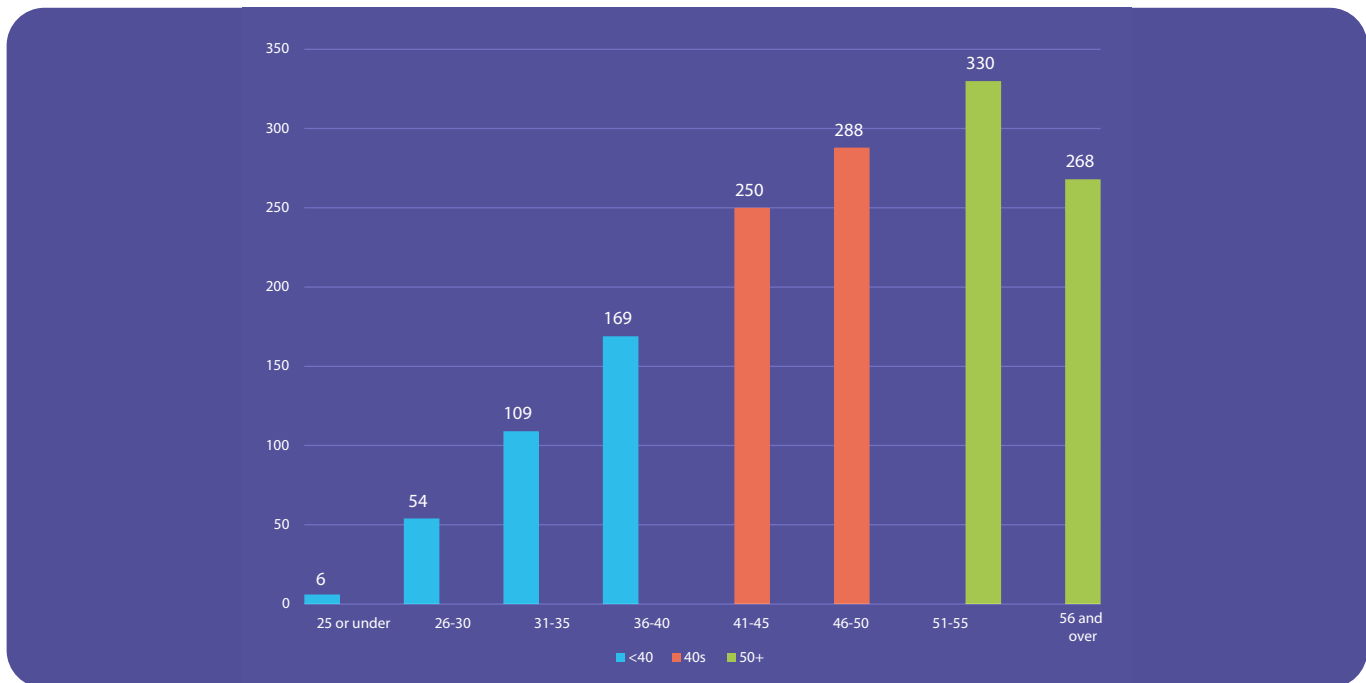
Figure 1. Gender (N= 1474)



Most respondents are older than 40 years old (77%), with 36.5% being in their 40s and 40.5% being 50 or older. As illustrated in Figure 2, the smallest group

represented in the survey are teachers aged 30 or younger (23%).

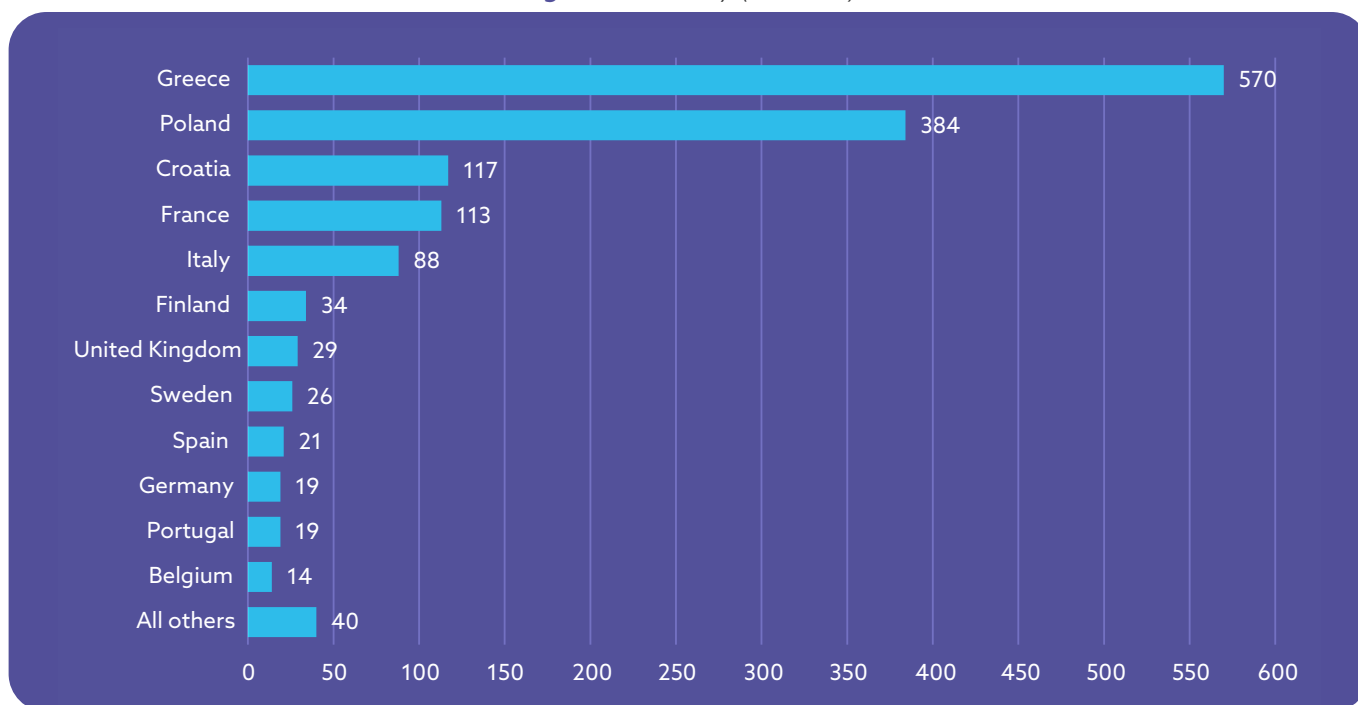
Figure 2. Teacher's age (N= 1474)



The age and gender of our survey respondents largely corresponds to the European distribution of teachers. According to Eurostat (2021), of the 5.24 million teachers employed in primary, lower secondary and upper secondary education in the EU, women accounted for most of this workforce (73%, 3.8 million teachers). As regards their age, only 8% of these teachers were younger than 30 years old. In contrast, 39% of teachers were 50 or older.

The respondents come from 26 different European countries. Despite this wide variety, most responses are from teachers in Greece (39%) and Poland (26%), as illustrated in Figure 3.

Figure 3. Country (N= 1474)

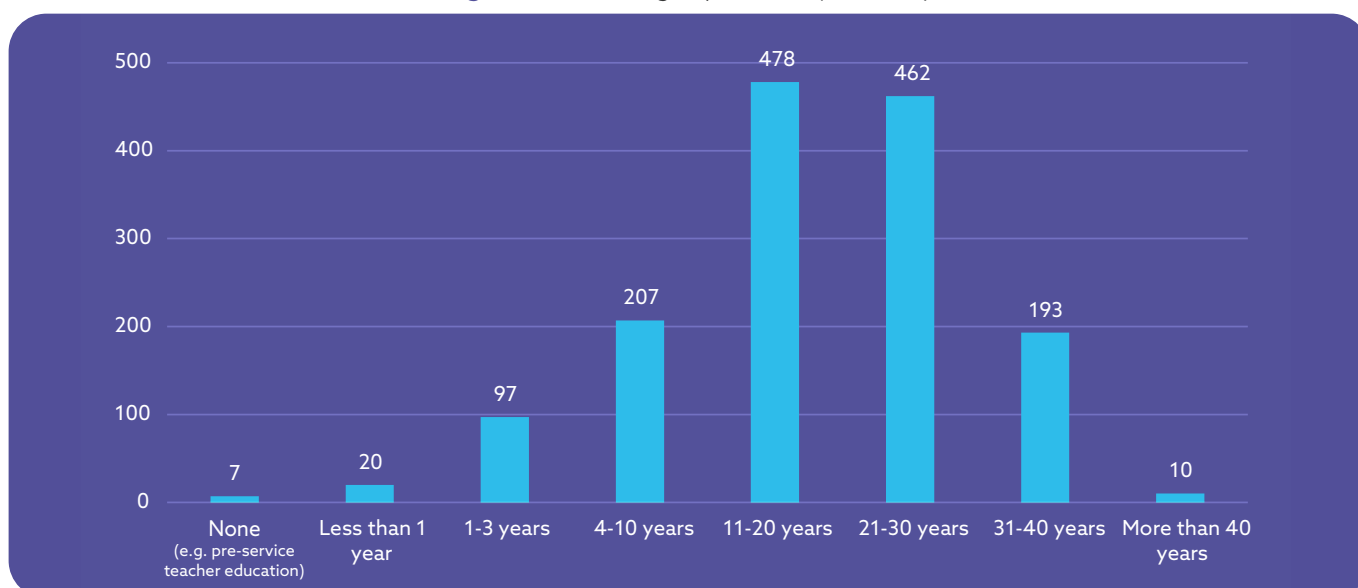


The “all others” category refers to the countries where less than 10 teachers filled in the survey. These include Romania (9 respondents), Austria (5), North Macedonia (5), Armenia (4), Turkey (3), Switzerland (3), Slovenia (3), Lithuania (2), Serbia (1), Luxembourg (1), Hungary (1), Estonia (1), Cyprus (1), and Bulgaria (1).

3.1.2 Teaching background and ICT skills

As regards their teaching experience (Figure 4), most respondents (63%) have taught between 11 to 30 years. Only 14% of the teachers surveyed have more than 30 years of experience and 23% have less than ten years of experience.

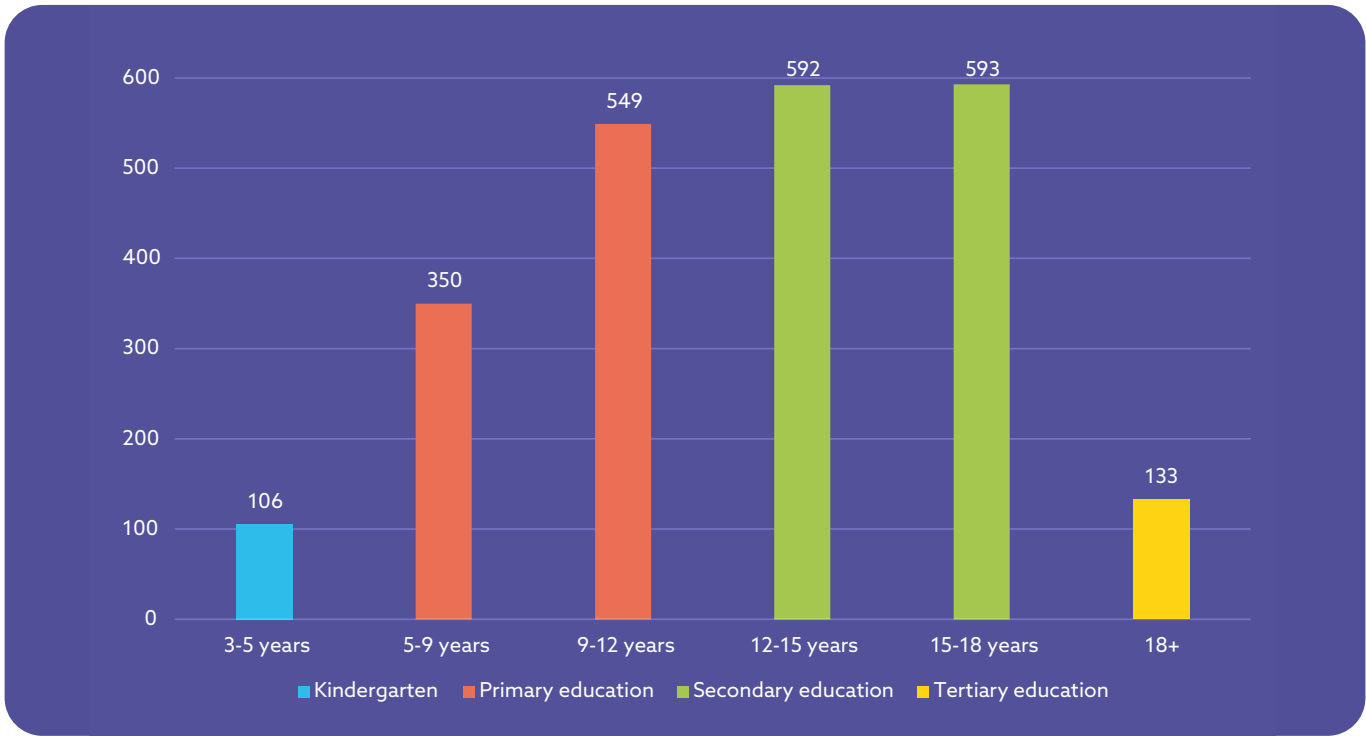
Figure 4. Teaching experience (N= 1474)



Regarding the education level taught by respondents, participants could select multiple options ranging from kindergarten to adult or tertiary education (see Figure 5). Most respondents

(67.5%) teach in secondary education to children aged 12-18 and 44% teach in primary education to children aged 5-12 years old. Only 7% teach in kindergarten or adult/tertiary education (9%).

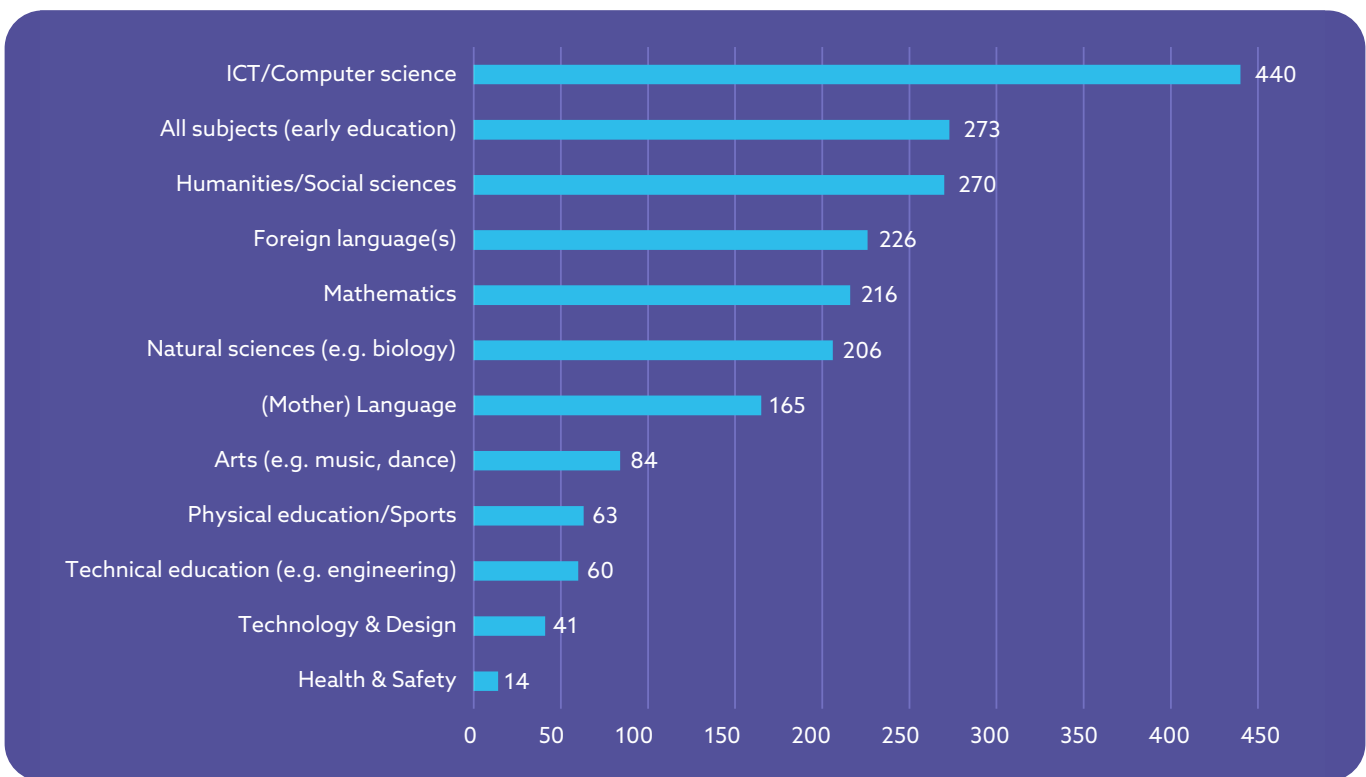
Figure 5. Education level (N= 1474)



As shown in Figure 6, the most popular subjects taught by the respondents are ICT and computer sciences (30%), humanities and social sciences (e.g. geography, history, economics) (18%), foreign languages (15%), mathematics (15%) and natural sciences (e.g. biology, physics, chemistry) (14%). The rest of the respondents (18.5%) indicated that

they teach "all subjects", typically in line with their teaching role in kindergarten or in the early years of primary education. Our findings mirror existing research showing that the most common curricular areas where video games are implemented are STEM (Science, Technology, Engineering, and Math), English language and social studies.

Figure 6. Subjects taught (N= 1474)



In the survey, teachers evaluated their own ICT skills on a scale from 1 to 10, where 1 indicates a non-user and 10 signifies an expert level. The overall average rating was notably high at 7.7. When categorised into two groups—low to average (scores of 1-5) and average to high (scores of 6-10)—an impressive 88% of respondents classified their ICT skills as average to high.

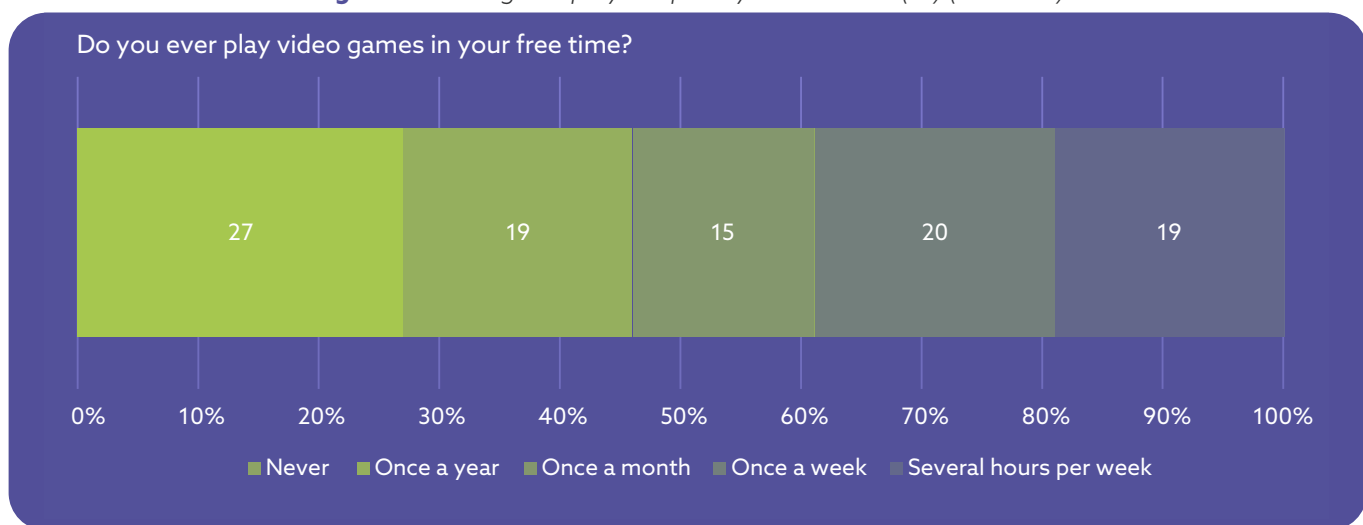
Breaking it down by subject area, ICT teachers reported the highest self-assessment score, with 96% indicating average to high skills. This was closely followed by teachers in the natural sciences at 92%, math teachers at 89%, teachers of all subjects at 88.5%, and foreign language teachers at 86.5%. These results suggest a strong confidence among teachers in their ICT capabilities, particularly among those specialising in ICT and science-related fields.

Alongside the teachers' high ICT skills, the findings also suggest that respondents use ICT applications for different school-related activities: 94.5% use ICT to prepare for lessons, 93.5% use it during in-class teaching, 85% engage with ICT to create or modify teaching content, 75% uses it to provide personalised feedback and support to students and 75% use it to communicate with parents.

3.1.3 Playing games and gameplay skills

A final profile characteristic in the survey focuses on teachers' engagement with video games outside the school environment. Regarding their frequency of play during leisure time, nearly three-quarters of the participants (73%) reported playing video games at least once a year outside of school, while 39% play at least once a week. Figure 7 presents the complete distribution in percentages.

Figure 7. Video gameplay frequency in free time (%) (N= 1474)



Like the ICT skills, teachers were asked to rate their own game-playing skills on a scale from 1-10. Overall, they rate their game-playing skills just below average with a mean score of 4.7, which is notably lower compared to their self-reported ICT skills (7.7). Divided into low to average and average to high gameplay skills (cf. ICT skills), only 40% of the respondents rate their video gameplay skills as average to high.

3.1.4 General attitude towards video games

Respondents were invited to share their opinions on video games outside the school environment. They used a five-point scale (1 = Disagree strongly to 5 = Agree strongly) to rate various statements regarding the advantages and disadvantages of playing games. Table 4 provides a general overview of how much teachers agreed or strongly agreed with each of the statements.

Table 4. Teachers' attitudes towards video games

| Statement | Disagree strongly | Disagree | Neither disagree nor agree | Agree | Agree strongly |
|---|-------------------|------------------------------|------------------------------|------------------------------|----------------|
| Video games help to develop problem-solving and strategic-thinking skills | 46 (3.1%) | 66 (4.5%) | 285 (19.3%) | 837 (56.8%) | 240 (16.3%) |
| Video games promote teamwork and collaboration | 64 (4.3%) | 206 (14%) | 463 (31.4%) | 583 (39.6%) | 158 (10.7%) |
| Video games are beneficial for physical health and mental well-being | 296 (20.1%) | 483 (32.8%) | 478 (32.4%) | 175 (11.9%) | 42 (2.8%) |
| Video games help the user to relax | 79 (5.4%) | 192 (13.0%) | 474 (32.2%) | 594 (40.3%) | 135 (9.2%) |
| Video games allow players to talk to others and make friends | 54 (3.7%) | 137 (9.3%) | 456 (30.9%) | 649 (44%) | 178 (12.1%) |
| Video games are fun | 39 (2.6%) | 79 (5.4%) | 288 (19.5%) | 756 (51.3%) | 312 (21.2%) |
| Video games promote antisocial and aggressive behaviour | 110 (7.5%) | 282 (19.1%) | 555 (37.7%) | 413 (28%) | 114 (7.7%) |
| Video games pose commercial risks to children | 32 (2.2%) | 95 (6.4%) | 432 (29.3%) | 652 (44.2%) | 263 (17.8%) |
| Video games are addictive | 32 (2.2%) | 62 (4.2%) | 181 (12.3%) | 655 (44.4%) | 544 (36.9%) |
| Video games portray minority groups poorly | 182 (12.3%) | 328 (22.3%) | 760 (51.6%) | 168 (11.4%) | 36 (2.4%) |
| Video games portray women poorly | 149 (10.1%) | 309 (21%) | 742 (50.3%) | 224 (15.2%) | 50 (3.4%) |
| Video games are a waste of time | 195 (13.2%) | 479 (32.5%) | 573 (38.9%) | 165 (11.2%) | 62 (4.2%) |

The data indicate a mix of positive and negative attitudes toward video games among teachers. They recognise certain benefits, such as enjoyment, relaxation, and the development of skills like problem-solving and teamwork. However, there are concerns about issues such as addiction, commercial risks, and more in the middle ground.

Scores for more contentious topics, like the potential for promoting antisocial behaviour and whether video games are a waste of time or beneficial for health, are generally neutral. Notably, the statement "video games are addictive" received the highest average score (4.1), reflecting strong feelings among teachers regarding the potentially addictive nature of video games.

Teachers also generally agreed that "video games are fun," with a relatively high average score of 3.8. Similarly, the statement "video games help to develop problem-solving and strategic-thinking

skills" also received a score of 3.8, indicating recognition of educational benefits. In contrast, the perceived benefit of video games in facilitating social interaction and friendship formation was more modest, reflected in an average score of 3.5 for the statement "video games allow players to talk to others and make friends."

The statement "video games are beneficial for physical health and mental well-being" received the lowest score, indicating disagreement among teachers regarding the health benefits of video games. However, there is some agreement that video games can promote relaxation and encourage teamwork and collaboration, which received an average score of 3.4.

Regarding the negative statements, teachers are somewhat divided on whether video games may promote antisocial or aggressive behaviour, with a score close to neutral (3.1). There is significant

concern about the commercial risks that video games may pose to children, as indicated by an average score of 3.7 for both the statements “Video games pose commercial risks to children” and “Video games promote antisocial and aggressive behaviour.”

There is slight agreement that video games tend to portray women poorly, with a score of 2.7, although this is still closer to neutral. Teachers also generally agree that video games do not adequately represent minority groups. Additionally, while teachers tend to

disagree with the idea that video games are a waste of time, their responses remain close to neutral.

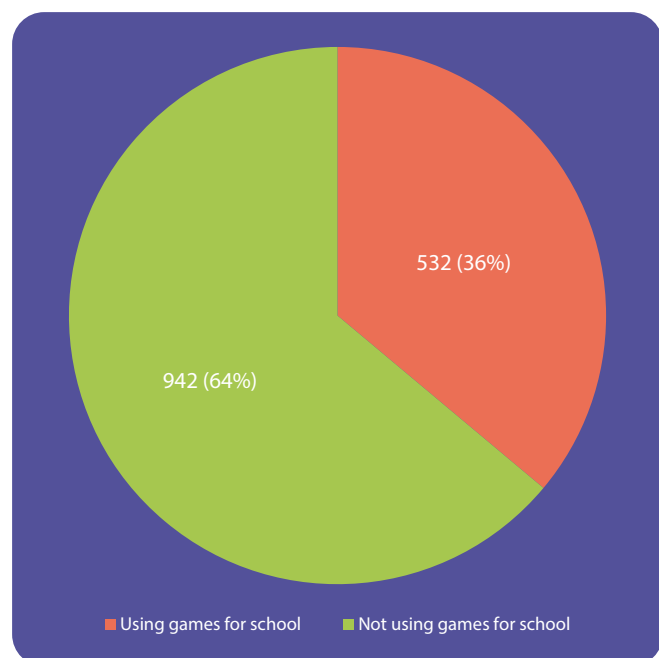
Overall, when considering the twelve statements, respondents exhibit a fairly neutral attitude toward video games outside the school environment, with a mean score of 3.1 out of 5 (where 3 indicates neither disagree nor agree). It is noteworthy that while respondents tend to agree more with positive statements than negative ones, they also strongly feel that video games are potentially addictive.

3.2 Who are the European teachers using video games at school?

In this section we dive deeper into the subgroup of teachers who indicate using video games in their teaching. We also make comparisons with the overall sample of teachers in terms of demographics, teaching experience and ICT and gameplay skills.

Out of the 1474 respondents who filled in the survey, 36% mentioned using video games for school-related activities. This seems a relatively low number, especially compared to the 2009 *Games in Schools* survey where 70.6% (373 out of 528 respondents) mentioned using video games in schools. The current survey, however, includes a considerably larger and more diverse sample of respondents. Moreover, during the recruitment of participants we made a conscious effort to target both teachers who use and those who do not use video games at school because we were also interested in understanding the barriers that hinder the integration of video games and game-based pedagogies in European schools.

Figure 8. Using games for school (N= 1474)



Looking at gender, 334 female, 190 male teachers and 8 participants who do not disclose their gender claim using video games at school (See Table 5). Within this group, most use video games a couple of times a year (54.4%) or once or twice a month (27.6%).

Table 5. Teachers’ usage of video games at school by gender (N = 1474)

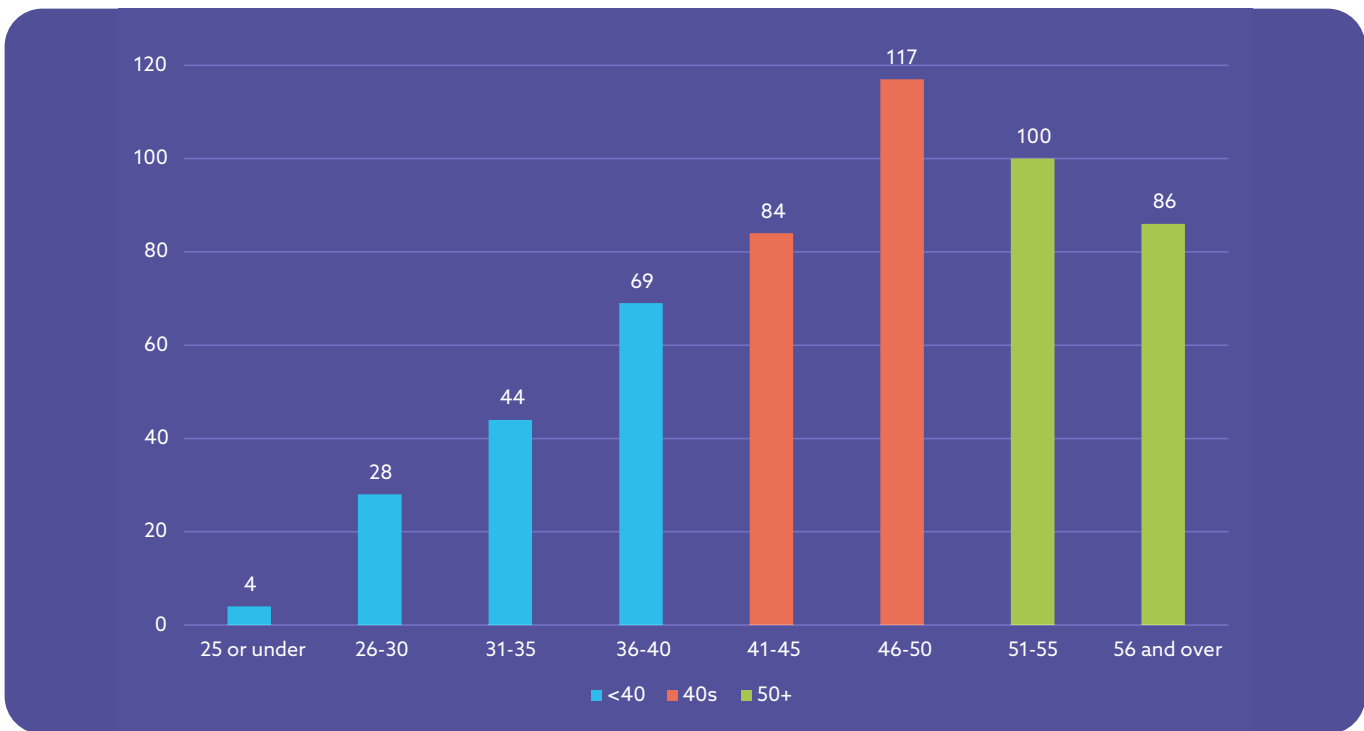
| Gender | Using games for school | Not using games for school | Total |
|--------|------------------------|----------------------------|-------|
| Female | 334 (33.2%) | 673 (66.8%) | 1007 |
| Male | 190 (42.8%) | 254 (57.2%) | 444 |
| Total | 532 (36.1%) | 942 (63.9%) | 1474 |

If we compare users and non-users of video games within each gender, we see that almost 43% of the male respondents use games in schools compared to only 33% of female teachers. In other words, in the general sample there are more female teachers using games in schools (since there are more female teachers in the sample and in the general population). However, when we compare teachers using and not using video games at school *within* each gender group, we see that the percentage of

male teachers using video games is higher than the percentage of female teachers.

A similar pattern is observed with age. If we consider all the teachers in our sample (N=1474), we see that most teachers who use video games at school (73%) are 40 or older compared to teachers younger than 40 (27%) (see Figure 9). This is not surprising because our data is not evenly distributed across ages and, in fact, most teachers in our sample are 40 or older (77,1%).

Figure 9. Age distribution of teachers who use video games at school (N= 532)



However, when we analyse teachers' educational video game usage within these age categories, we see a different trend, namely, that younger teachers use video games the most. Indeed, as observed in

Table 6, 53% of teachers aged 30 or younger use games at school, compared to 40% of teachers in their 30s, 37% in their 40's and 31% of teachers aged 50 or older.

Table 6. Teachers using and not using video games at school according to age

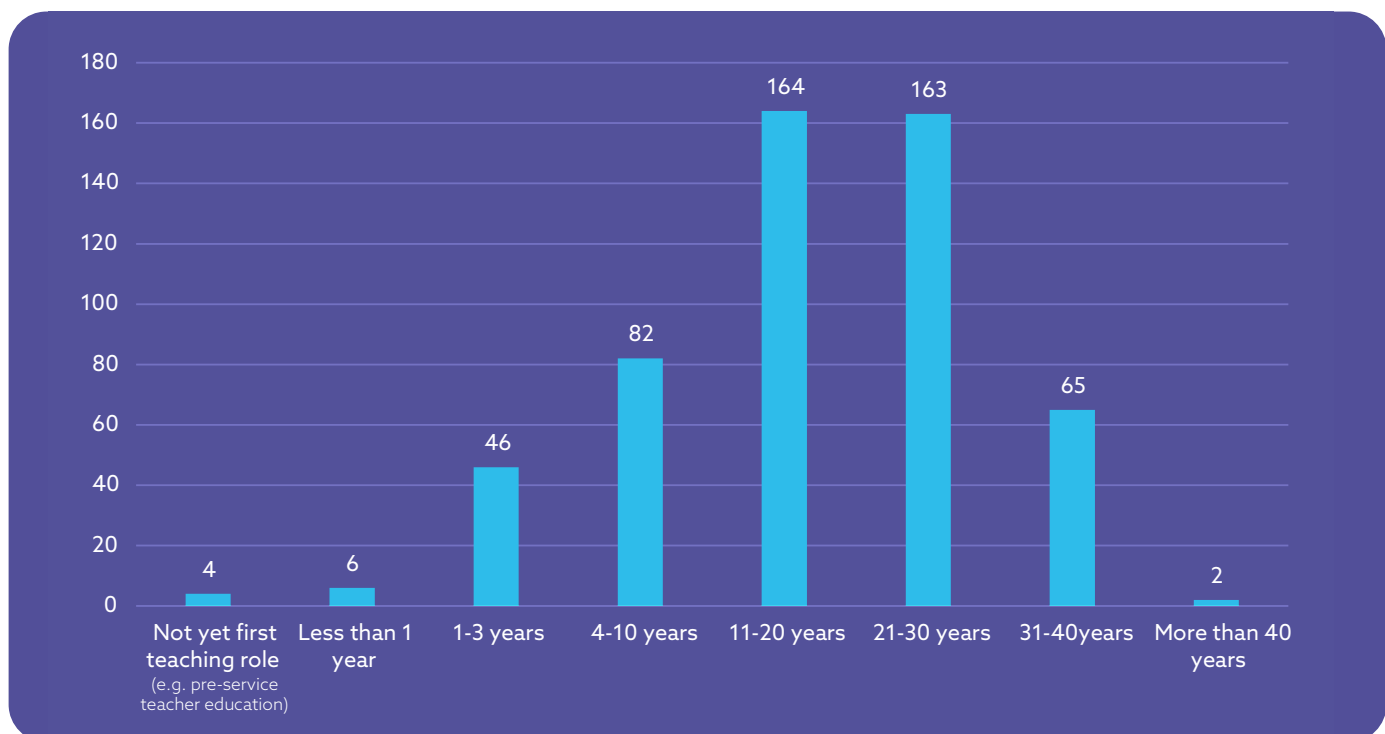
| Age | Using games for school | Not using games for school | Total |
|--------------|------------------------|----------------------------|-------------|
| 30 or less | 32 (53.3%) | 28 (46.7%) | 60 |
| 31-40 | 113 (40.7%) | 165 (59.3%) | 278 |
| 41-50 | 201 (37.4%) | 337 (62.6%) | 538 |
| 50 or older | 186 (31.1%) | 412 (68.9%) | 598 |
| Total | 532 | 942 | 1474 |

Our analysis suggests that multiple factors may be influencing this situation. Younger teachers, having been exposed to digital technologies from an early age, may feel more confident using video games as educational tools. Additionally, it is likely that a greater number of individuals in this younger age group have experience as players. As noted earlier, gameplay skills can be a significant factor in teachers' decisions to incorporate video games into their teaching. Their increased self-efficacy in video games may encourage them to explore these resources and integrate gamification into their lessons. In *chapter 5*, we will present similar findings from our national focus groups and case studies,

where several educational experts emphasised the importance of hands-on experience with video games, a strong understanding of the curriculum, and effective teaching strategies for the successful implementation of games in the classroom.

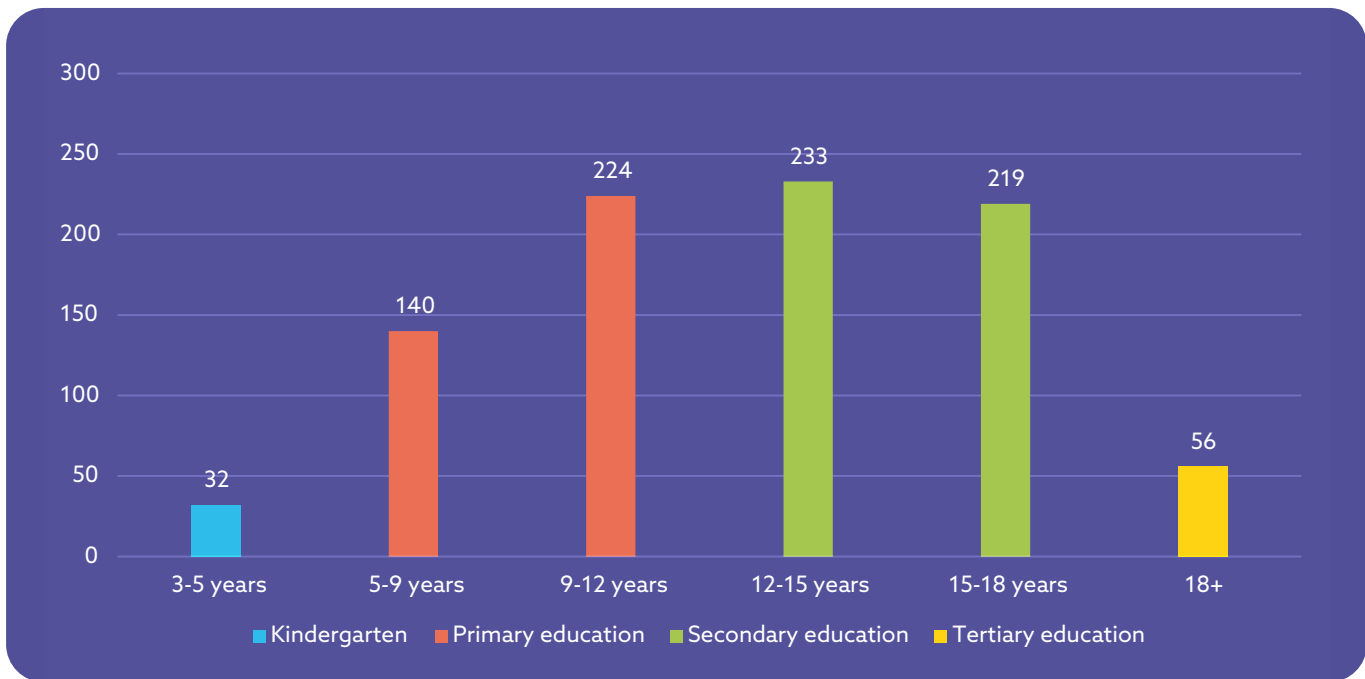
Regarding teaching experience (see Figure 10), most teachers who use video games (62%) have considerable teaching experience, ranging from 11 to 30 years. Meanwhile, 26% have less than ten years of experience, and only 12.5% have more than 30 years of teaching experience, reflecting a similar distribution to the overall sample.

Figure 10. Teaching experience of teachers using video games (N= 532)



As regards the educational level taught by these teachers, most respondents using video games in schools are teaching in secondary education to pupils aged 12–18 years old (69%) and/or in primary education to children aged 5–12 (51%). 10.5% teach in tertiary education and only 6% of our respondents teach in kindergarten. This distribution again mirrors the distribution of the general sample (See Figure 11).

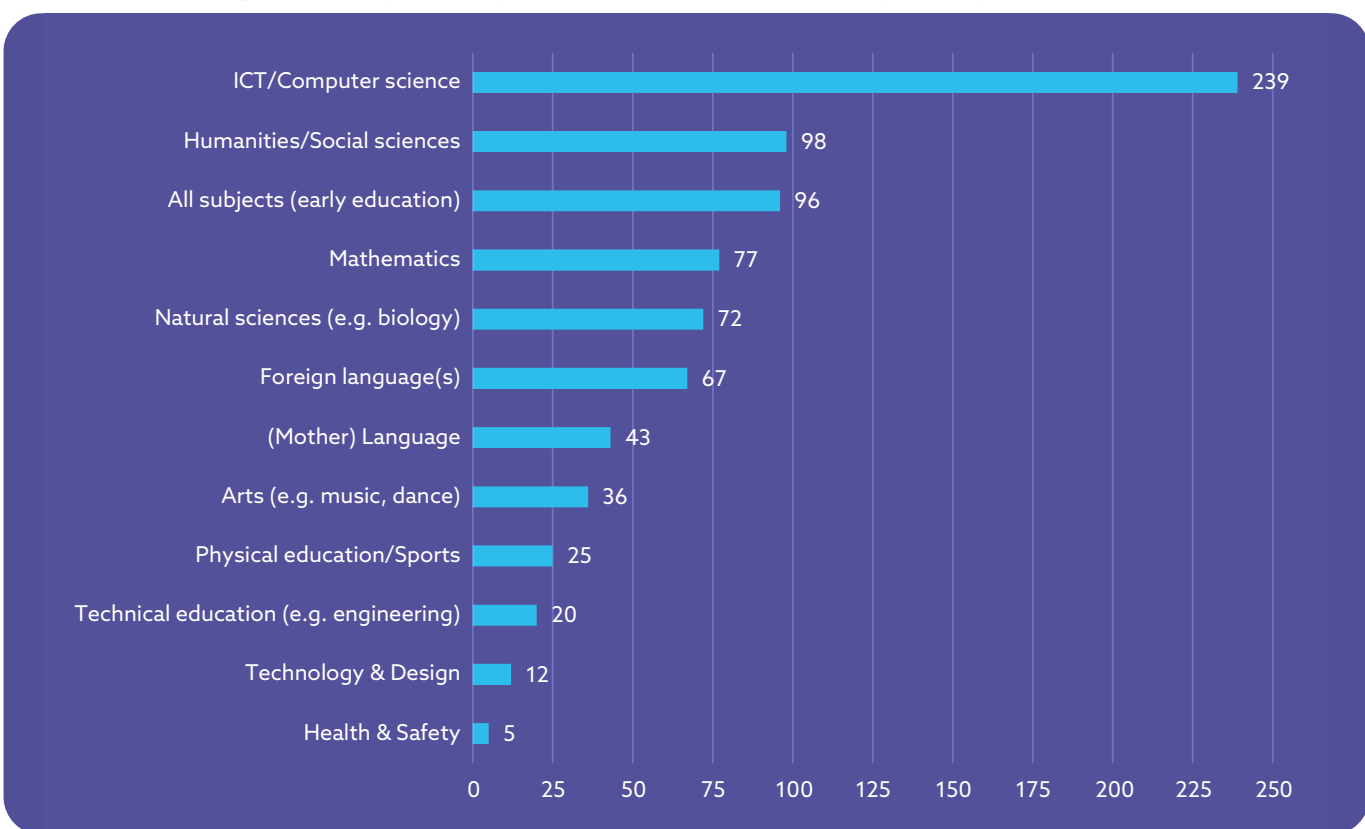
Figure 11. Education level taught by teachers using video games (N= 532)



Among the teachers who use video games at school (N=532), ICT or computer science teachers are the ones who use video games most often (45%). As observed in Figure 12, other subjects

where video games are popular include humanities and social sciences, "all subjects" (early education), mathematics, natural sciences, and foreign languages.

Figure 12. Subjects taught distribution of teachers using video games (N= 532)



When comparing teachers who use video games in the classroom with those who do not, we find that the majority of ICT teachers (54%) incorporate video games into their teaching, followed by art teachers (43%) and physical education teachers (40%). However, caution is advised in interpreting these results, as art and physical education teachers comprise a small percentage of all teachers using video games for educational purposes in our sample (4.7% and 6.8%, respectively). Thus, these findings may not accurately reflect broader patterns of video game usage in European schools.

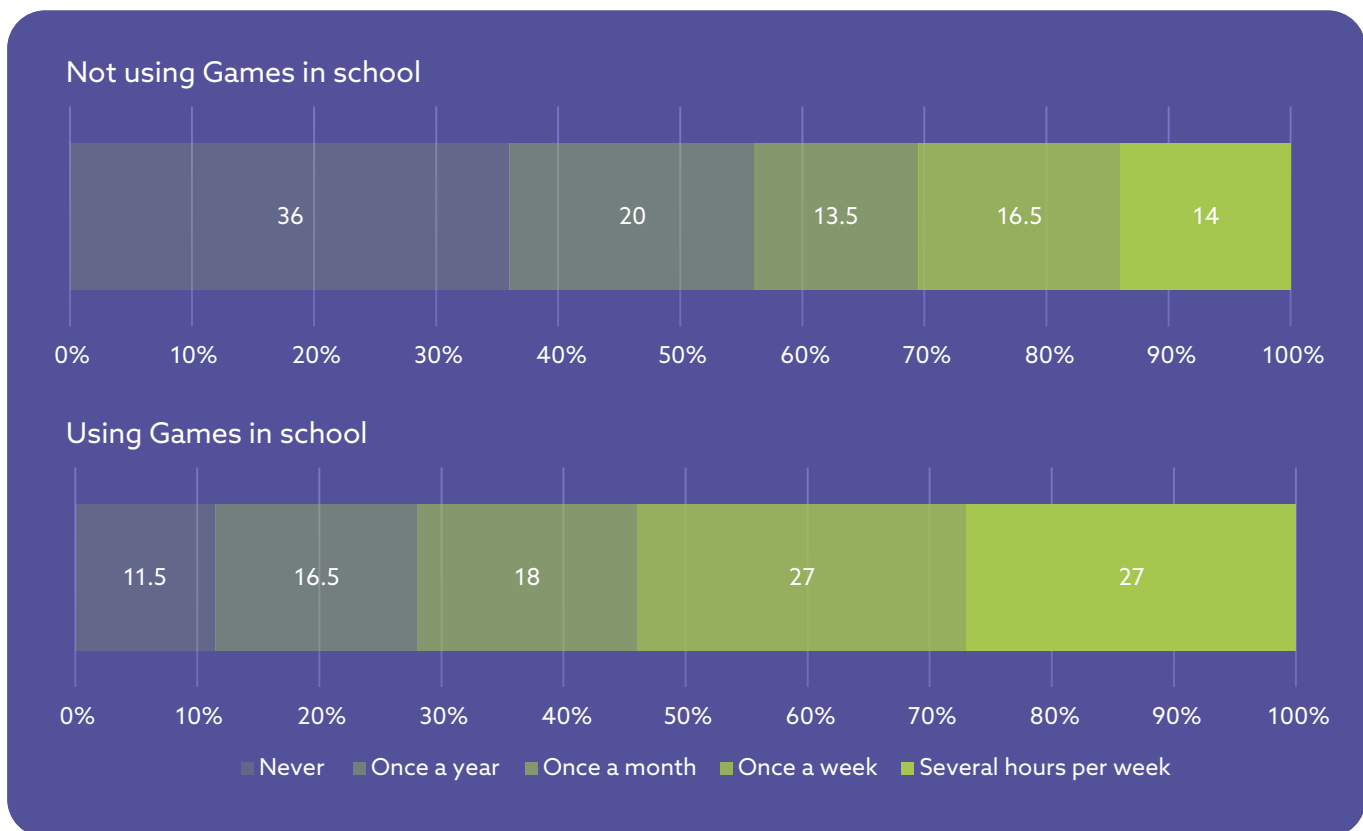
Additionally, teachers who use video games rate their ICT and gameplay skills significantly higher than their peers who do not use video games. On average, these teachers rate their ICT skills at 8.1 out of 10 and their gameplay skills at 5.7, compared to overall sample ratings of 7.7 for ICT skills and 4.7 for gameplay skills. In contrast, teachers not using video games report lower ICT skills (7.5) and gameplay skills (4.1). Notably, 91% of teachers using games consider their ICT skills to be average to high, compared to 86% of those who do not use video

games. A more pronounced gap exists in gameplay skills, with 54% of teachers using video games rating their skills as average to high, while only 33% of non-users do so.

Furthermore, teachers who incorporate video games in their classrooms tend to engage in gameplay during their leisure time more frequently. Specifically, 88.5% of these teachers play games in their free time, with 54% playing at least once a week. In contrast, 64% of teachers who do not use video games in class engage in video gameplay during their free time, and only 30% play at least once a week (see Figure 13).

Our findings indicate that teachers' gameplay skills, rather than solely their ICT skills, are a critical factor in the use of video games in educational settings. This underscores the need for targeted initial and ongoing training opportunities aimed at enhancing teachers' gameplay skills, in addition to general ICT training, to promote innovative pedagogies such as game-based learning.

Figure 13. Video gameplay frequency in free time by usage of video games in school (%) (N= 1474)



Finally, as previously mentioned, the survey included twelve statements about video games to gauge general perceptions. Tables 7 and 8 provide a comparison of average agreement levels between teachers who use video games in the classroom and those who do not, focusing on six positive and six negative statements. Teachers who incorporate video games into their teaching typically express more positive and fewer negative attitudes compared to their peers who do not use video games. For instance, Table 7 indicates that, on average, teachers who use video games agree that games are enjoyable and that they contribute to

the development of problem-solving and strategic thinking skills.

In contrast, teachers who do not use video games tend to hold neutral views on these statements, neither agreeing nor disagreeing. Similarly, for other positive statements, such as "Video games allow players to communicate and make friends" and "Video games promote teamwork and collaboration," both groups of teachers responded neutrally, indicating neither agreement nor disagreement.

Table 7. Positive attitudes towards video games (N= 1474)

| | Using games at school (N= 532) | Not using games at school (N=942) |
|---|--------------------------------|-----------------------------------|
| Video games help to develop problem-solving and strategic-thinking skills | 4 | 3.7 |
| Video games allow players to talk to others and make friends | 3.8 | 3.4 |
| Video games promote teamwork and collaboration | 3.7 | 3.2 |
| Video games help the user to relax | 3.6 | 3.2 |
| Video games are beneficial for physical health and mental well-being | 2.8 | 2.3 |

Note: 1= Disagree strongly, 2= Disagree, 3= Neither disagree nor agree, 4= Agree, 5= Strongly agree.

Table 8 illustrates teachers' agreement or disagreement with negative statements about video games. On average, both groups of teachers tend to disagree with most negative statements, such as "Video games portray minority groups poorly" and "Video games are a waste of time." Furthermore, both groups are neutral on average regarding the statement "Video games pose commercial risks to children." Regarding the statements "Video games are addictive" and "Video games promote antisocial

and aggressive behaviour," opinions are more varied. Teachers who do not use games in the classroom generally agree with the statement that "Video games are addictive" and remain neutral on whether "Video games promote antisocial and aggressive behaviour." In contrast, teachers who use video games in school disagree with the assertion that "Video games promote antisocial and aggressive behaviour" and express a neutral stance on the claim that "Video games are addictive."

Table 8. Negative attitudes towards video games (N= 1474)

| | Using games at school (N=532) | Not using games at school (N=942) |
|---|-------------------------------|-----------------------------------|
| Video games are addictive | 3.9 | 4.2 |
| Video games pose commercial risks to children | 3.5 | 3.8 |
| Video games promote antisocial and aggressive behaviour | 2.7 | 3.3 |
| Video games portray women poorly | 2.7 | 2.9 |
| Video games are a waste of time | 2.2 | 2.8 |
| Video games portray minority groups poorly | 2.6 | 2.8 |

Note: 1= Disagree strongly, 2= Disagree, 3= Neither disagree nor agree, 4= Agree, 5= Strongly agree.

In conclusion, despite the uneven characteristics of our sample, the data allows us to broadly describe the “typical” teacher who uses video games for educational purposes. This teacher is typically male, in their 30s, has considerable teaching experience, and teaches ICT or computer science. Additionally, they play video games in their free time and

generally hold positive views toward video games. However, it is important to note that many European teachers do not fit this profile but are still interested in or already using video games in education. In the following sections, we explore their motivations, expectations, and needs in greater detail.

3.3 Why do European teachers use video games in school?

3.3.1 Attitudes towards using video games in school-related activities

Like the question about attitudes towards video games in general, the survey included five statements regarding teachers’ attitudes towards using video games for school-related activities. Using a five-point scale (1= Disagree strongly to 5= Agree strongly), respondents could agree or disagree with the following statements:

- ☆ “Video games have no place in school.”
- ☆ “I would like to use video games more often in my lessons.”
- ☆ “I would like more guidance and support on how to use video games for teaching and learning.”
- ☆ “I would like to know more about the experiences of other teachers using video games for teaching and learning.”
- ☆ “Teachers should not only use games in schools but also teach about video games to encourage safe and responsible gameplay.”

Overall, respondents seem to have rather positive attitudes towards the use of video games at school with a mean score of 3.8 out of 5. When comparing teachers already using games with those not using games in school, there is a significant difference in mean scores: 4 vs. 3.7 for the respective two groups. This can be interpreted as teachers already using games in school having, in general, more positive attitudes regarding the use of video games for education. Interestingly, as observed in Table 9, both groups of teachers have similar mean scores for the statements related to teacher training (e.g., “I would like more guidance and support on how to use video games for teaching and learning” and “I would like to know more about the experiences of other teachers using video games for teaching and learning”). This seems to indicate that, in general, European teachers are willing to learn and would like to be offered more training opportunities about the educational uses of video games. Table 9 shows the mean scores for each individual statement, for the overall sample and the two subgroups of teachers.

Table 9. Attitudes towards video games at school (N=1411)

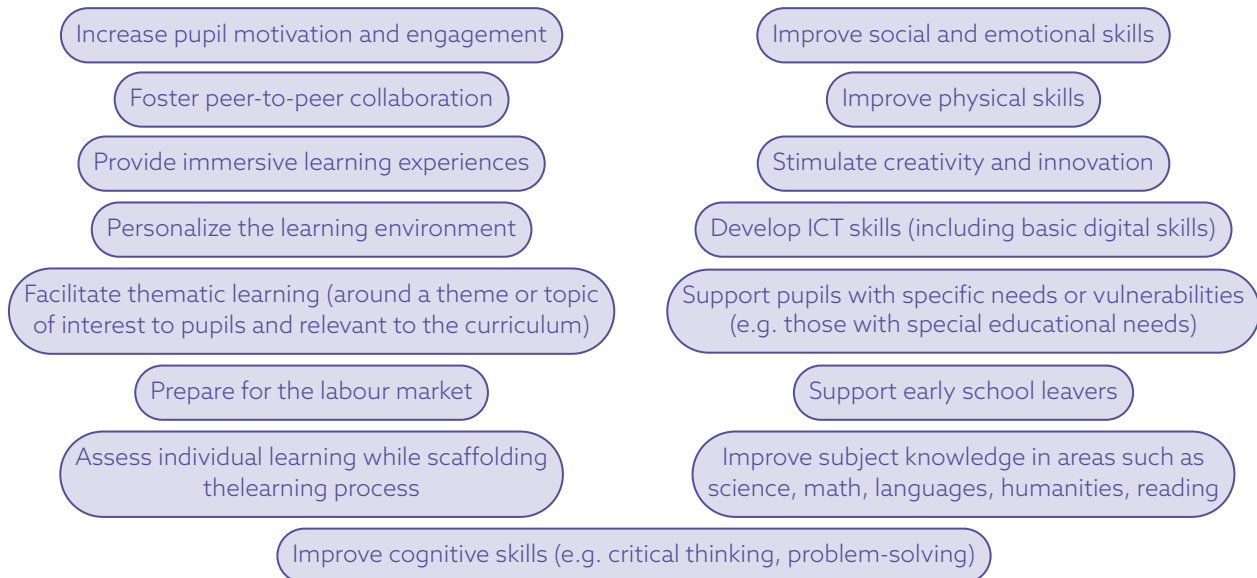
| | Overall (N=1411) | Using games for school (N= 532) | Not using games for school (N= 942) |
|---|------------------|---------------------------------|-------------------------------------|
| Video games have no place in school | 2.3 | 2 | 2.5 |
| I would like to use video games more often in my lessons | 3.4 | 3.7 | 3.2 |
| I would like more guidance and support on how to use video games for teaching and learning | 3.9 | 3.9 | 3.9 |
| I would like to know more about the experiences of other teachers using video games for teaching and learning | 4.1 | 4.1 | 4 |
| Teachers should not only use games in schools but also teach about video games to encourage safe and responsible gameplay | 3.9 | 4.1 | 3.7 |
| Total | 3.8 | 4 | 3.7 |

3.3.2 Perceived benefits of using video games at school

The *Games in Schools 2023* survey also inquired about the potential benefits of video games for education. Respondents were presented with 15 statements describing various benefits and

outcomes resulting from the use of video games at school. On a five-point Likert scale (1= Disagree strongly to 5= Agree strongly), participants were asked to indicate to what extent they agreed or disagreed with the following statements:

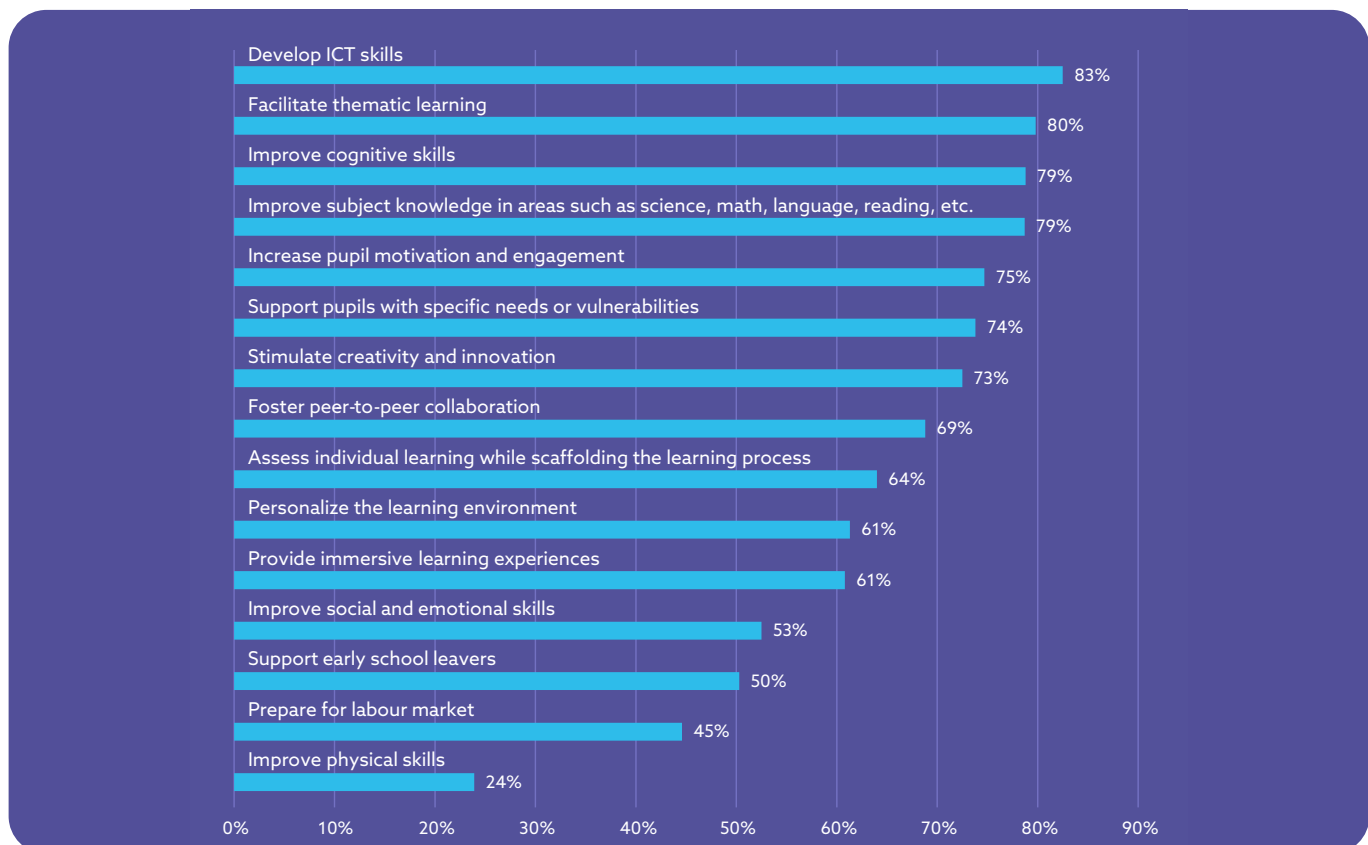
Table 10. Benefits and outcomes associated with video games at school



Teachers overall agree with most of the listed benefits and educational outcomes of video games with mean scores ranging from 3.5 to 4. Figure

14 provides an overview of the percentage of teachers who agreed and strongly agreed with these statements.

Figure 14. Benefits and outcomes of using video games at school according to teachers (N= 1289)



We can see that, in general, teachers associate game-based teaching primarily with learning outcomes such as developing ICT skills (83%), thematic learning (80%) and improving cognitive skills (79%). Aspects such as improving students' motivation (75%), supporting pupils with specific needs (74%), stimulating creativity and innovation (73%) and fostering peer-to-peer collaboration (69%) were also perceived as potential benefits of video games. Supporting early school leavers (50%), preparing for the labour market (45%), and improving physical skills (24%) were less often regarded as potential outcomes resulting from the use of video games at school.

When comparing the benefits and outcomes between teachers who use video games and those who do not, our findings indicate that teachers who already use games tend to agree more with the potential benefits of game-based teaching (mean score: 3.9 out 5) compared to those who do not use games at school (mean: 3.5).

For comparison, the 2009 *Games in Schools* survey also enquired about the benefits of video games in the classroom. In a similar fashion, teachers back then were quite positive about the benefits of game-based teaching and identified the development of ICT, social, intellectual, and cognitive skills as

important outcomes of video game use at school. One noteworthy distinction with the current survey is that in 2009 teachers were mostly positive about the contribution of educational games to students' motivation to learn and in supporting students with specific needs. These potential benefits were less prominent in the current survey, although they are still considered important to some extent.

3.3.3 The ideal video game

In an open question, respondents were asked to write down three keywords describing the ideal game for teaching. The word cloud in Figure 15 shows the most frequent descriptors suggested by educators. The keywords mentioned the most are "fun" and "educational" followed by terms referring to the motivational aspect of video games (e.g. "interesting", "engaging") and the potential pedagogical outcomes of games (e.g. "creative thinking", "problem solving", "learning", "knowledge", "developing skills"). Another group of (less prominent) keywords refer to game design or game dynamics aspects (e.g. "puzzles", "clear feedback", "being strategic", "challenging"). Another category of descriptors focuses on collaboration (e.g. "team", "group", "teamwork", "cooperative").

Figure 15. Word cloud of key words describing the ideal educational video game (N= 1474)



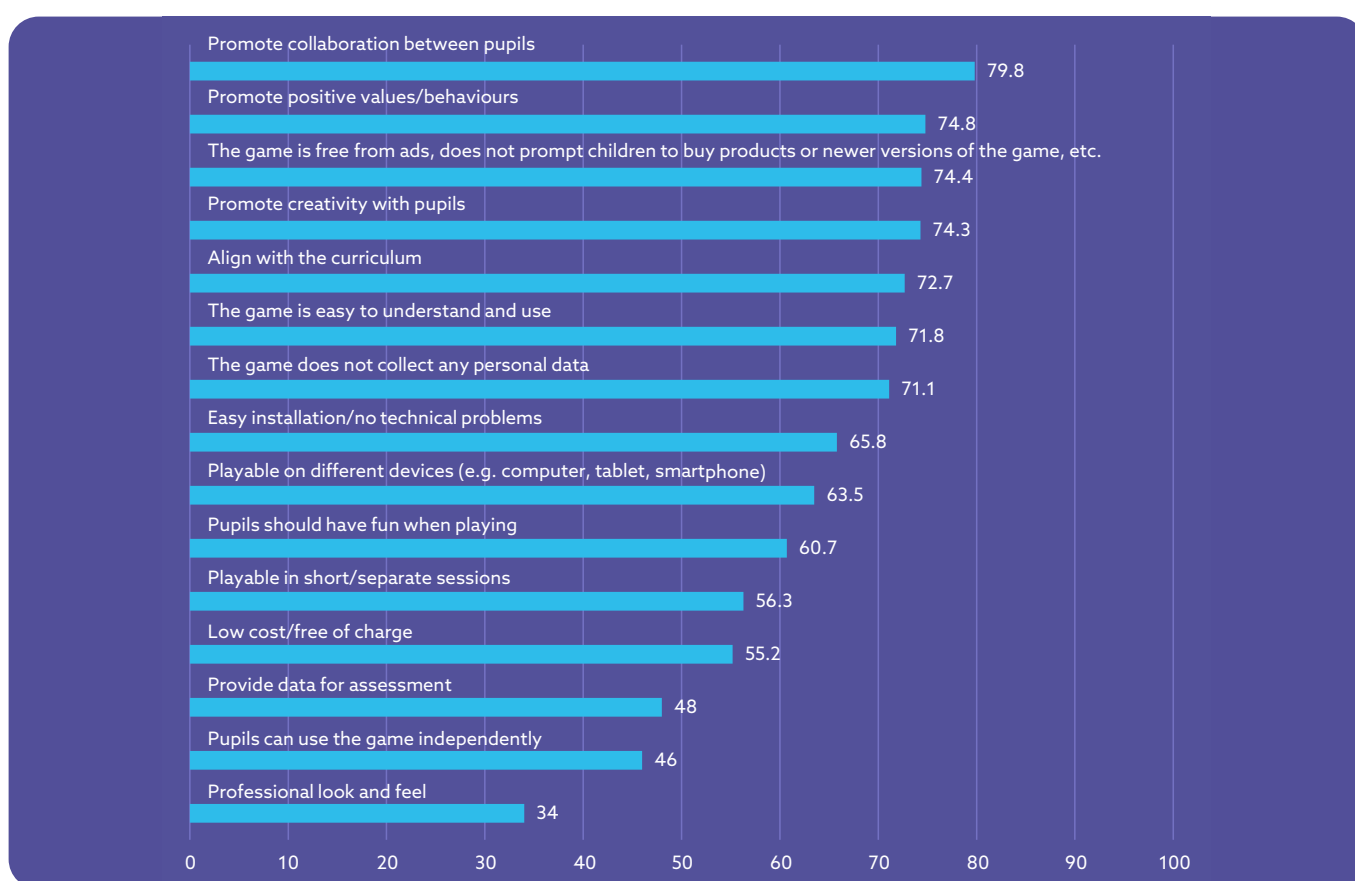
It is interesting to observe that many of the descriptors chosen by teachers have been

researched. As illustrated in our review of the literature, an important body of evidence suggests

that entertainment video games can enhance motivation, foster cognitive and problem-solving skills (Egenfeldt-Nielsen, 2006), promote 21st century skills (Andersen & Rustad, 2022) enhance emotional and social domains (Granic et al., 2014) and promote more inclusive learning environments. An important consideration from our literature review is that the success of learning experiences fostered by video games increases when gameplay is designed with adequate features, respecting game flow and the gameplay experience, while drawing upon robust learning theories as basis for meaningful learning processes and outcomes (Ke, 2008; Young et al., 2012).

Later in the survey, respondents were asked to choose from a list of 15 attributes those which they believed video games should have to be useful and adequate for teaching (see Figure 16). Teachers could select as many attributes as they wished. In order of popularity, the qualities most respondents selected were that games should promote collaboration among students (79%), promote positive values and behaviours (74%), should be free from ads and not instigate pupils to buy in-game products or newer versions of the game (73%), promote creativity (73%), and should align with the curriculum (72%).

Figure 16. Qualities of games for school-related activities (%) (N= 1454)



This overview shows that teachers in the survey assess the potential of games to support children’s development of skills or competences (e.g. collaboration, creativity, promoting positive values and behaviour) and pedagogical aspects of the game (e.g. aligning with curriculum) as relatively more important than other aspects of the game, such as usability or technical features (e.g. easy

installation, compatibility with different devices or look and feel). It is also interesting to observe that, although “fun” was the most common keyword used by educators to describe the ideal game for teaching, when provided with a more extensive list of game features, the entertainment aspect becomes less important than pedagogical and online safety concerns (e.g. commercial or privacy-

related risks). Because the multiple-choice question about the qualities of the ideal game came after the open question in the survey, it is possible that, when answering questions spontaneously the respondents focused on the first aspects that came to mind (e.g. "fun"). However, when provided with a more exhaustive list of attribute options, some respondents changed their minds and attributed more importance to aspects related to online safety and usability.

Comparing the responses of teachers using and teachers not using games in schools, we can see that while "promoting collaboration between pupils" is the quality that both groups of teachers mentioned most often, there are slight differences to be noticed. Interestingly, teachers already using video games in their teaching give more importance to the potential benefits of games (e.g. collaboration, creativity, positive values) and the user-friendliness of games, while teachers who do not use games attribute greater importance to online safety aspects (e.g. games being free from ads and protecting children's privacy).

Table 11. Top five qualities of games for school-related activities (N= 1474)

| Using games at school | Not using games at school |
|---|---|
| Promote collaboration between pupils | Promote collaboration between pupils |
| Promote creativity with pupils | The game is free from ads, does not prompt children to buy products or newer versions of the game, etc. |
| The game is easy to understand and use | Align with the curriculum |
| Promote positive values/behaviours | Promote positive values/behaviours |
| The game is free from ads, does not prompt children to buy products or newer versions of the game, etc. | The game does not collect any personal data |

When comparing this ranking with the *Games in Schools 2009* survey, we observe that teachers back then gave more importance to aspects such as increasing students' motivation, which is less commonly mentioned in the current survey. It is important however to note that back then no specific questions about privacy or commercial risks were included. Conversely, qualities that were highlighted in both the 2009 and the 2023 surveys are that video games should align with the curriculum and be easy user-friendly. This finding, which was also confirmed by participants from different countries in our focus groups, is important. It implies that many teachers still do not feel confident to use video games at school. As hypothesised earlier, teachers' need for more user-friendly games may be related to teachers having insufficient gameplay skills, while the need for games to fit the curriculum may reflect lack of time and insufficient know-how about innovative pedagogical approaches that would encourage the meaningful integration of video games and other innovative learning tools in class.

Finally, in an open field question, respondents had the possibility to provide additional qualities they felt were important but were missing from the given list. These include:

- ★ "The game should provide students with a challenge and require skill to complete."
- ★ "The game includes an interesting story."
- ★ "The game is inclusive and accessible to all kinds of pupils."
- ★ "The game is age appropriate."
- ★ "The game does not include addiction or violence-inducing content."

3.3.4 Suitable types of gameplay

The *Games in Schools 2023* online survey asked teachers which types of games and gameplay they consider most appropriate to teach. Teachers could select multiple options.

In terms of types of games, most teachers consider game-based apps or websites that are specifically designed for learning specific content or skills (e.g.

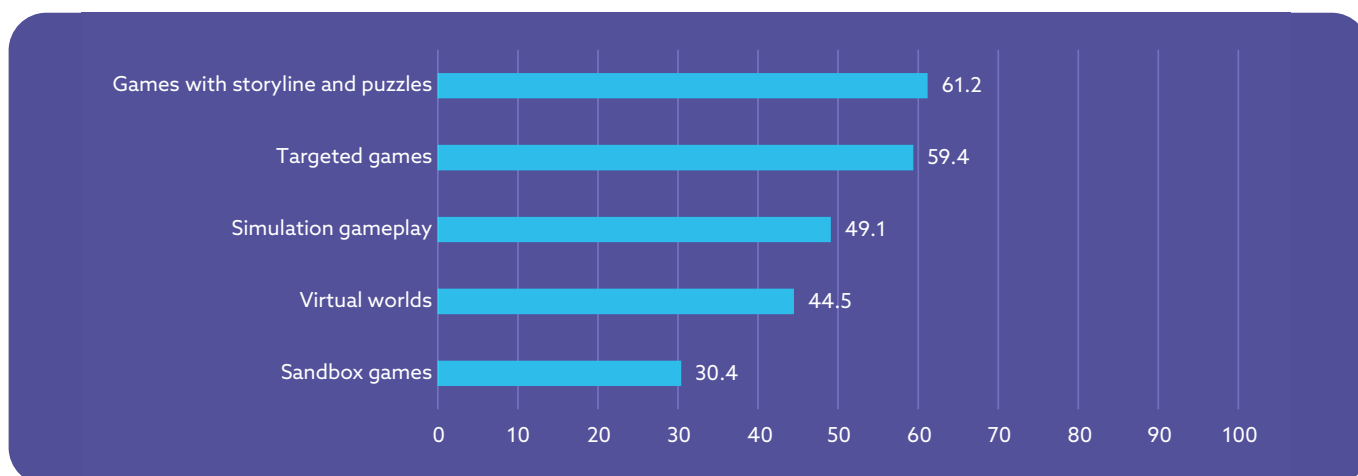
languages, math, etc.) as most suitable for the classroom (66%). 48% of our respondents believe that design tools that enable students to (learn how to) create video games themselves (for instance, *Roblox* or *Game Maker*) are suitable games for school-related activities too. Finally, entertainment games with possible learning potential such as *Minecraft* or *Assassin's Creed* are ranked the lowest but are still rated as suitable games by 28% of all respondents.

If we compare the responses of teachers using and not using video games in the classroom, we see that both groups believe that games developed with an educational purpose (e.g. *Serious Games*) are the most suitable types of games for game-based teaching (see Figure 17). Notably though, while almost 50% of the teachers already using video games believe that entertainment games can be suitable for school-related activities, only 16% of those who do not use video games in their classes

think that entertainment games are well-suited for teaching. This latter result may indicate that, although some entertainment games are being used already in the classroom (e.g. *Minecraft* or *Assassin's Creed*), they are still perceived by most teachers mainly as forms of entertainment, rather than learning tools.

Regarding the type of game that are more suitable for school, most teachers (61%) consider games that include a storyline and puzzles (e.g. to explore a topic or concept) as the most suitable for teaching and learning (61%), followed by games that target the development of specific skills (59%), simulation gameplay (49%), virtual worlds (44%) where players need to complete quests by drawing on their knowledge of a specific subject, and open-ended sandbox games (30%), i.e., games where players get tools and contexts to construct more knowledge or reach specific outcomes (e.g. *Roblox*).

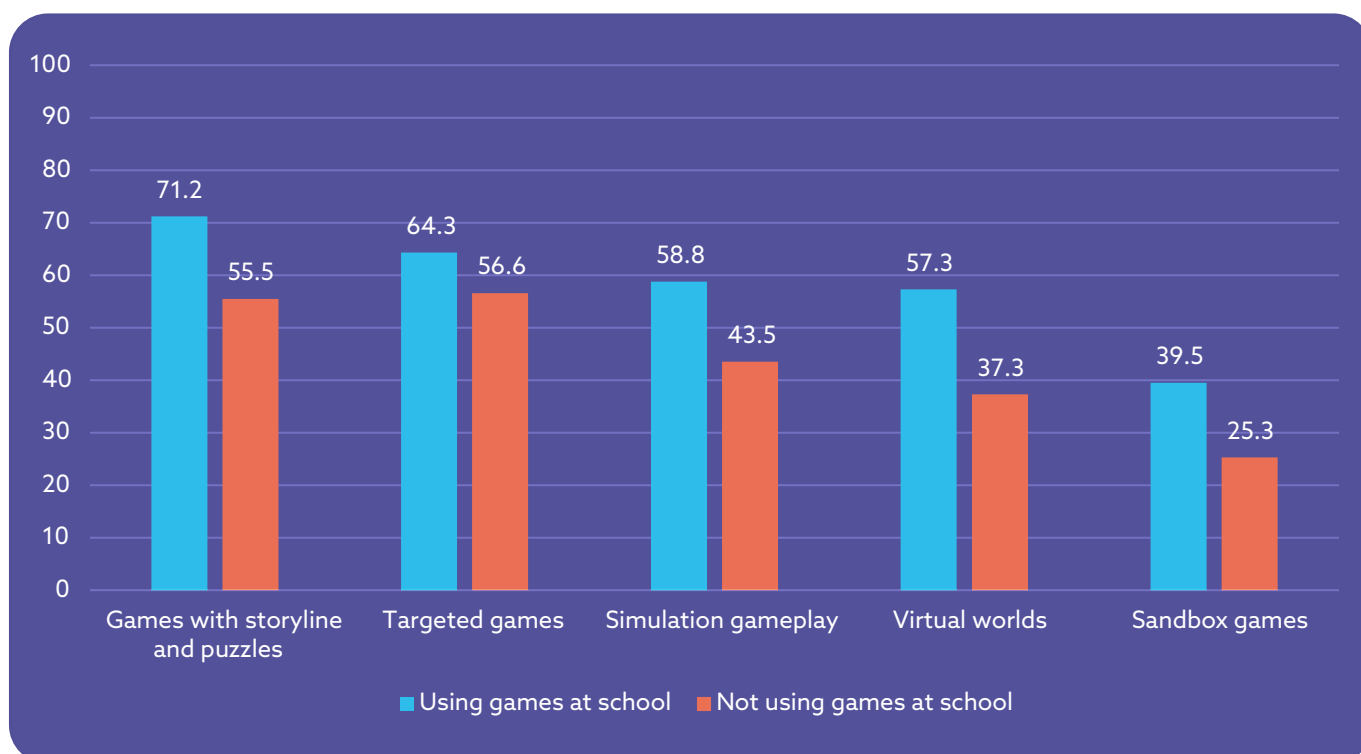
Figure 17. Most suitable types of gameplay for teaching (%) (N= 1474)



When comparing these results between teachers who use and those who do not use video games in the classroom, we see that both groups follow a similar pattern. Looking at the responses in Figure 18, it is interesting however to observe that teachers who use video games consistently rate all types of gameplay higher in terms of their suitability for

education than their counterparts not using video games at school. For instance, while almost 40% of teachers using video games at school consider sandbox games such as *Roblox* or *Minecraft* suitable to teach, only 25% of teachers not using video games consider these games as appropriate.

Figure 18. Most suitable types of gameplay for teaching (%) (N= 1474)



These findings seem to suggest that most teachers prefer games that target specific subject matters or skills rather than games which offer pupils a lot of freedom as is the case of virtual worlds and sandbox games. This finding is consistent with teachers' preference for games which align well with the school curriculum and with specific learning objectives. It is also possible that teachers are just more acquainted with the former types of video games or consider them more user-friendly to use in the classroom.

3.3.5 Different ways of working with pupils

In terms of how teachers use video games in their classrooms, respondents reported various

approaches, including working with students in small groups (65%), individually (44%), or as a full class (42%). Teachers can also use video games outside of regular class time, such as between lessons or as homework. However, a comparison across countries (see Table 13) shows that teachers in most countries are less likely to assign games as homework or between classes. Notably, Portuguese teachers are an exception, using games between lessons or as homework as frequently as in the classroom. In contrast, teachers in the UK and Germany most often employ games for full-class activities, while those in Sweden, Belgium, and other countries more frequently use video games with students individually.

Table 12. Student involvement by country (N= 1474)

| | Alone | Pairs/Small groups | Full class | Homework | In-between lessons/activities |
|---------|-------|--------------------|------------|----------|-------------------------------|
| Greece | 20% | 33% | 26% | 15% | 18% |
| Poland | 39% | 45% | 29% | 21% | 10% |
| Croatia | 27% | 34% | 24% | 15% | 28% |
| France | 27% | 43% | 20% | 20% | 10% |
| Italy | 30% | 67% | 52% | 31% | 17% |
| Finland | 50% | 53% | 44% | 27% | 18% |

| | Alone | Pairs/Small groups | Full class | Homework | In-between lessons/activities |
|----------------|------------|--------------------|------------|----------|-------------------------------|
| United Kingdom | 35% | 55% | 62% | 14% | 21% |
| Sweden | 50% | 46% | 31% | 27% | 12% |
| Spain | 38% | 52% | 33% | 19% | 19% |
| Germany | 16% | 58% | 63% | 11% | 21% |
| Portugal | 32% | 68% | 47% | 37% | 42% |
| Belgium | 57% | 50% | 50% | 14% | 21% |
| All others | 65% | 63% | 43% | 40% | 35% |

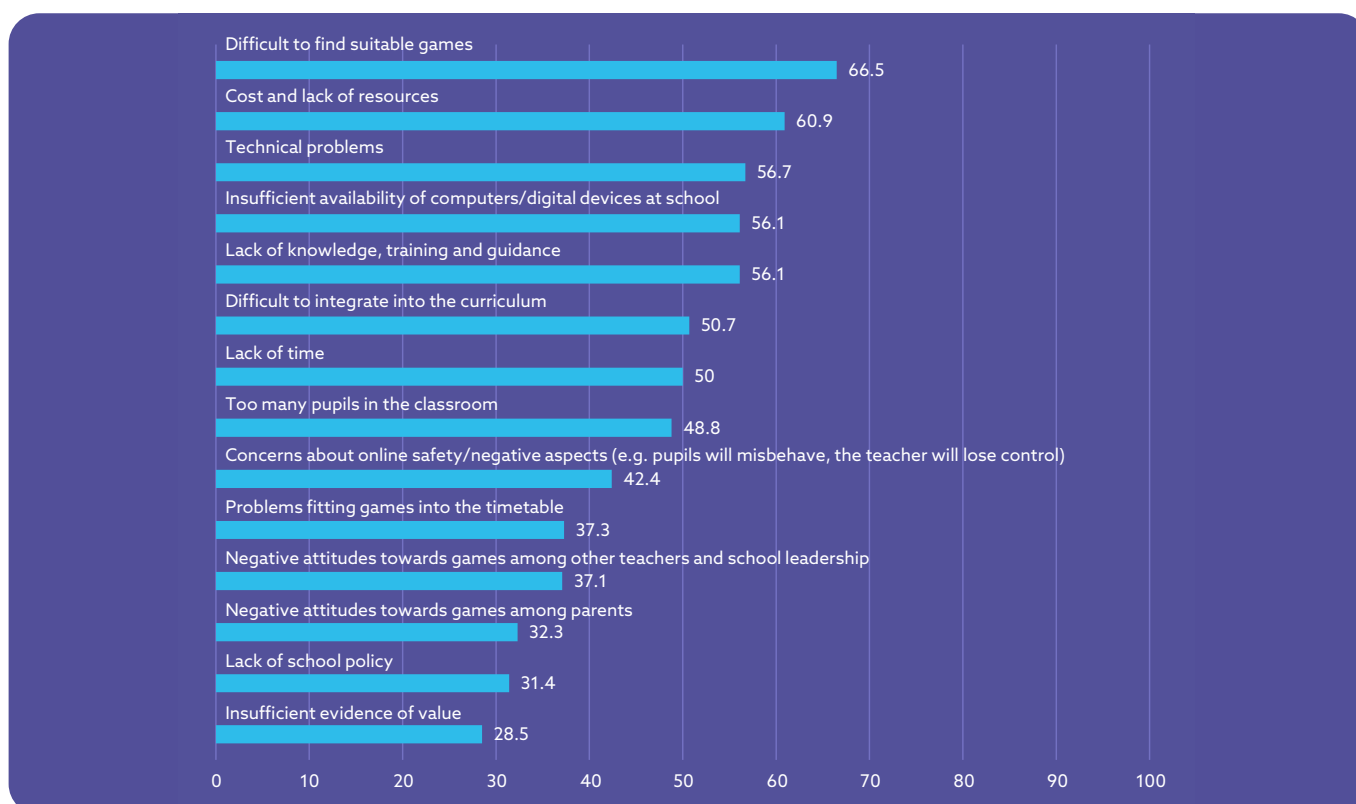
Note. Percentages do not add up to 100%, as a single respondent could select multiple types of student involvement. Percentages in bold are the highest percentage per country.

3.4 What are the main barriers to using video games at school?

As discussed in the literature review, while many educators are willing in principle to incorporate video games in their teaching practices, different types of obstacles may hinder the use of games at school. These include time constraints, finding the right game, weak links between video games and the curriculum, being able to use games effectively and to determine if students have learned from those games, getting the right help and support when needed, insufficient organisational support or the lack of adequate technological infrastructure.

In our survey teachers were asked to identify the barriers that hinder their use of video games at school (see Figure 19). Confirming previous research, the main obstacle identified by teachers was the difficulty to find suitable games (66.5%), followed by the lack of financial resources (61%), technical problems (57%), lack of knowledge, training, and guidance (56%), and deficient infrastructure (56%) such as the limited availability of computers or digital devices at school.

Figure 19. Barriers to using games for school-related activities exist (%) (N= 1454)



Besides finding suitable games that align well with the curriculum, and struggling with limited time, human and financial resources, and infrastructure, one third of our respondents referred to the negative perceptions of video games by parents and teachers, the lack of adequate school policies, and insufficient knowledge about the empirical evidence on the value of game-based learning as important barriers as well.

Interestingly, as Table 14 shows, there are practically no differences in the main barriers identified by the teachers who use video games at school and those who do not. In fact, both groups identified difficulties to find suitable games and lack of

financial resources as the most important obstacles schools must overcome, followed by lack of knowledge, training, and guidance for teachers who are not yet familiar with game-based learning, and technical problems for their counterparts. These findings illustrate the need for structural support for schools which should consist not only of financial and technical resources, but also capacity building to provide school personnel with the necessary skills, confidence, and resources to meaningfully incorporate video games and other digital technologies into the curriculum.

Table 13. Top five barriers to using video games at school (N= 1474)

| Using games at school | Not using games at school |
|--|--|
| Difficult to find suitable games | Difficult to find suitable games |
| Cost and lack of resources | Cost and lack of resources |
| Technical problems | Lack of knowledge, training, and guidance |
| Insufficient availability of computers/digital devices at school | Insufficient availability of computers/digital devices at school |
| Lack of knowledge, training, and guidance | Technical problems |

Finally, respondents could add other barriers they considered important. These additional obstacles referred to aspects such as the increasing amount of time that pupils spend on screens (e.g. using social media or gameplay), class-related barriers (e.g. type of pupils, school climate) and concerns about games “not bound by EU legislation and regulations” such as some games produced outside of the European Union.

Comparing these findings to the *Games in Schools* 2009 survey, we can again observe some interesting similarities and differences. For instance, the cost of using video games and finding suitable games were ranked among the top three barriers in 2009 and in the current 2023 survey. Finding suitable games was ranked as the third most common barrier in 2009, and it became the biggest barrier identified by teachers in 2023. This change may be due to the sharp increase in the offer of video games potentially suitable for education available in the market nowadays, but also probably to the fact that many educators feel insecure at the moment of

choosing adequate games for their pupils because of increasing stringent EU regulation (e.g. GDPR), the lack of knowledge about what constitutes age-appropriate games (e.g. little knowledge about PEGI) and the lack of access to local, user-friendly databases of suitable games for education. Interestingly, all these barriers also became evident during the focus group discussions we carried out with local experts.

Last, an important difference between the results of both surveys is that in 2009 the negative attitudes towards games among parents, other teachers and school management were more frequently mentioned as an obstacle than in the current survey. A potential explanation for this distinction could be that in 2023, as compared to 2009, video games have become a more familiar medium for parents and educators, which probably has contributed to the development of more positive attitudes towards game-based education these days.

3.5 How do teachers overcome existing barriers to game-based teaching?

Beyond the abovementioned barriers, the survey asked teachers about possible ways to overcome the obstacles identified. Our findings show that teachers attribute great importance to continuous professional development. Many also consider the value of online courses and virtual communities for teachers (63%). Self-taught learning and belonging to online communities for players are considered as effective by a smaller number of teachers (47% and 24% respectively). Interestingly, initial teacher training is considered as way to overcome existing barriers by only 22% of teachers. A possible explanation could be that teachers with several years of teaching experience tend to consider younger generations of educators as already possessing the necessary skills for game-based teaching.

When comparing the responses of teachers who use video games with those who do not, we observe that online courses and teacher communities, in-service professional development and self-teaching are considered as the best ways to overcome existing barriers for the teachers who use video games at school. Teachers not acquainted with video games at school also consider in-service

professional development as important. However, for them the availability of educational resources and teaching materials and online courses and communities for teachers are perceived as more important.

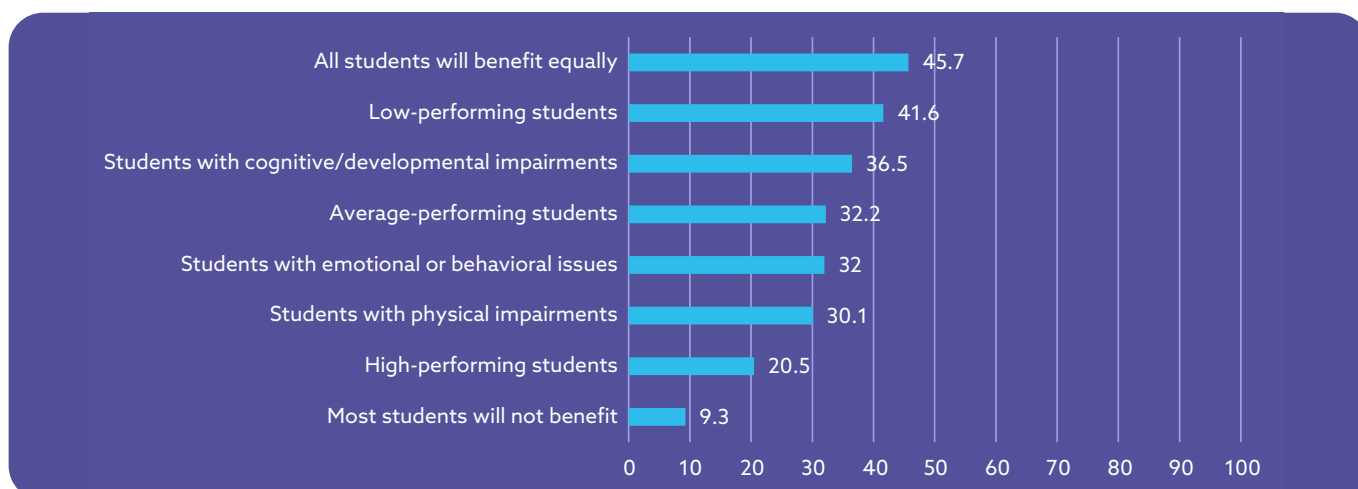
Comparing the current findings to the 2009 survey, we see some common patterns and one major difference. The two most important support systems in 2009 were the internet and colleagues/ other teachers (mentioned by 51% and 42%, respectively). The 2023 survey combined these two items into one: online courses and communities of teachers. This item was the second most mentioned option in the current survey. Therefore, we can conclude that connections with other teachers, both off- and online, remain an important source of support when using video games for teaching. However, courses and workshops were the lowest ranked support systems back in 2009 (only 4% mentioned this), while 69% of the current sample indicates this as the best support system. This could rely on the fact that nowadays more resources and training opportunities are available and accessible to teachers, as illustrated further in our focus group results.

3.6 Inclusion and diversity: do all pupils benefit equally from using video games at school?

The *Games in Schools* 2023 survey asked teachers to identify the types of students who, in their opinion, would benefit most from game-based teaching. They could select among nine multiple-choice options. As Figure 20 shows, teachers' opinions are divided: 45% believe that all students

will benefit equally, 42% believe that low-performing students will benefit the most and 37% think this is rather the case for students with a cognitive or developmental impairment. Importantly, only 9% of the respondents believe that students will not benefit from video games at school.

Figure 20. Who benefits most from game-based teaching (%) (N= 1474)

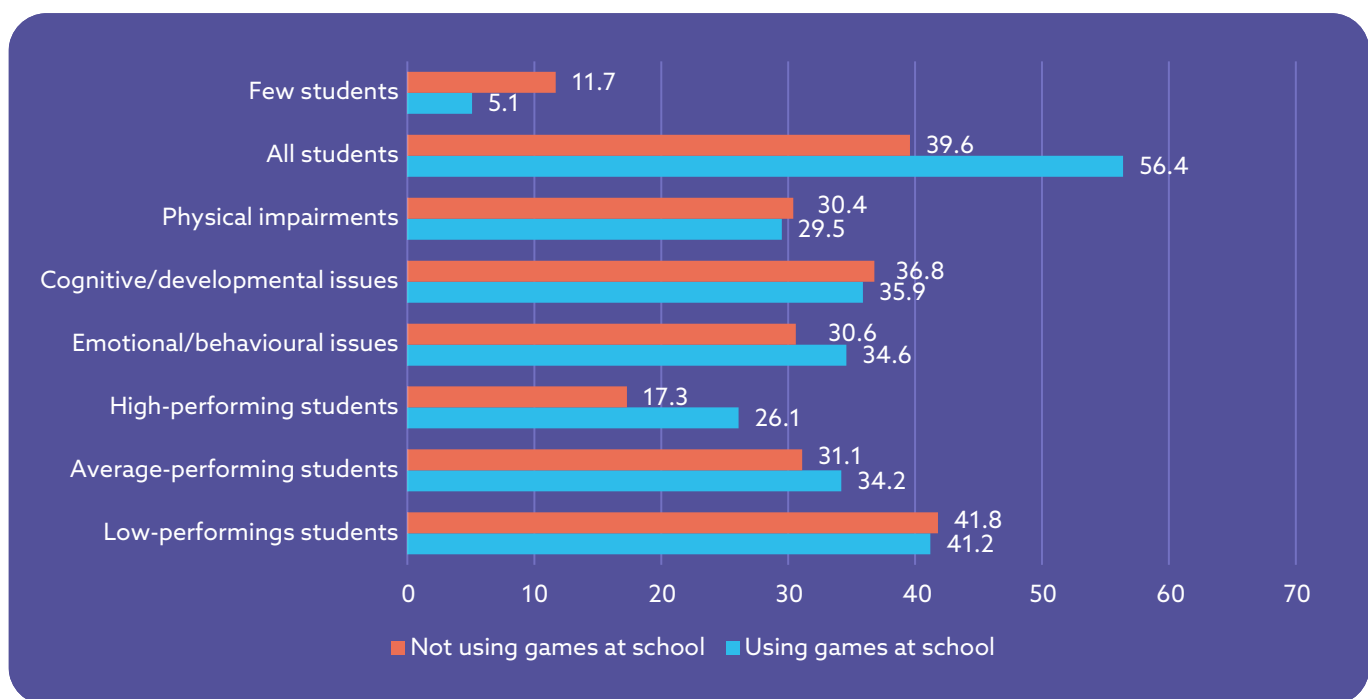


In addition, some respondents further commented on the survey that using video games at school would mainly benefit “students who are motivated and have experience with playing games”. Another respondent mentioned that the types of benefits gained from video games “depend on students’ individual needs and skills level”.

As observed in Figure 21, when comparing the answers from the teachers who use video games at school to those who do not, we see that although their responses follow a similar pattern, there are slight differences. For example, in proportion,

teachers who use games at school are more inclined to believe that all pupils can benefit equally from video games (56%), as opposed to only 40% of the teachers not using video games at school. Another considerable difference is observed in the statement that high-performing students will benefit the most. Here, 26% of teachers using video games and 17% of teachers not using video games believe that high-performing students will benefit most. Conversely, 12% of teachers not using video games believe that video games will not benefit most pupils, compared to only 5% of teachers who have experience using video games at school.

Figure 21. According to teachers; who benefits most from game-based teaching? (N= 1474)



In the *Games in Schools 2009* survey, teachers also suggested that educational games could benefit all kinds of students, including those with special needs and low motivation. This is in line with our literature review, with some authors arguing that serious game-based learning can help students with attention, memory, and executive control issues as well as with mental or developmental disabilities in almost every subject area of the curriculum for preschool and primary education (Papanastasiou et al., 2022). Indeed, research has found positive effects of video games on visuospatial and phonological skills, attention and ADHD disorders, autism and spectrum disorders, memory, and

mental disorders. As regards, visuospatial and phonological skills, existing research highlights the potential of serious games on, for example, treatments for developmental dyslexia for children (Gaggi et al., 2012, 2014). Panastasiou and colleagues further argue that serious games and games-based learning have a potential to contribute to several areas of learning (e.g. intrinsic motivation, learning by doing, social learning through engagement, located true “actual” learning, personalised learning, and learning from failure) and that these same areas can also have a significant impact on inclusive education.

In comparison with the *Games in Schools 2009* survey, the current survey included an additional open question where teachers were asked whether they believed that girls and boys would benefit equally from video games at school. 51% of the respondents indicated that both girls and boys would benefit equally from video games. However, almost half of the teachers surveyed (49%) believe that the benefits would not be the same for both genders.

Teachers who believe that both girls and boys can benefit equally from video gameplay at school, referred to their own experiences using video games in the classroom to explain why they feel this way:

"From experience, they [girls] are as competitive as the boys, and as adept at the game as them."

"I see that both boys and girls are extremely motivated and attracted to video games."

Teachers in this category agree that, sometimes, differences can occur depending on the genre of the game, or the content being covered by means of the game. In their view, young people enjoy using digital technologies, such as video games, to perform all types of activities and to fulfil various developmental tasks. Because digital technologies are an important part of young people's lives, using video games in the classroom would be familiar to them and might help them enjoy their learning experiences more, independently of the gender they may identify themselves with:

"Most children like to learn through some form of play."

"In 2023, boys and girls like playing games a lot!"

"I think both boys and girls are positively predisposed to using video games in teaching because it is something their lives are intertwined with."

Other teachers argued that personal interests, the choice of game and video games didactics, rather than gender differences, would account for the potential differences in how male and female

students experience video games in the classroom. Some respondents mentioned that if teachers select "good games" that are inclusive for all gender identities and which arouse students' interest and engagement, game-based learning would positively impact children, independently of their gender.

By contrast, the other half of the teachers believe that gender differences exist in how male and female students (would) experience the use of video games at school. Some teachers argue that many people conceive video gameplay as a primarily male activity and that, as a result, female players are often confronted with negative stereotypes and societal prejudices. This could lead to (some) girls being reluctant to play video games:

"They [girls] are imbued with societal prejudices so inevitably they react differently."

"Unfortunately, video games are often still perceived as something more for boys."

Other teachers explained that because girls mature sooner than boys, some might consider video games as childish and, thus, they would be less interested in video games. Others complained that because game developers and the video game industry predominantly target a male audience, game themes and narratives tend to be more appealing to boys than to girls. Moreover, female game characters and avatars are less common and tend to be poorly represented in most video games, as illustrated in the following quotes:

"The games industry is targeted to boys and needs to include more girls."

"Girls are underrepresented as characters in games."

Finally, some teachers argued that boys tend to be more competitive and impulsive or that girls are more focused on interpersonal interactions/. This is likely to impact their gameplay experiences as well as the benefits they could obtain from integrating games in the classroom.

Interestingly, many of the views expressed by the teachers in the *Games in Schools 2023* survey seem to have some foundation in the available research

evidence. For instance, in our literature review we found that girls, even at a young age, can develop video gameplay performance and strategy skills just like boys (Blumberg and Sokol, 2004), and that differences in gameplay performance are not due to gender differences, but rather to the types of video games played and the time spent playing them (Olson et al., 2007). As such, while

playing video games can benefit female players cognitively, socially, and physically, they are indeed underrepresented and often discouraged, due to negative gender stereotypes or overly aggressive or sexualised content. Meanwhile, game features that could be particularly appealing to women are not frequently incorporated into game design (Lopez-Fernandez et al., 2019).

3.7 Conclusions from the European survey: what has changed since 2009?

To conclude, we compare key findings from the 2009 and 2023 *Games in Schools* teacher surveys, emphasising the need for caution due to differences in sample sizes and representativeness. Despite these limitations, the comparison reveals key trends in the use of video games in European schools over nearly 15 years:

★ **Potential benefits of video games:** Both surveys show that many European teachers view video games positively, recognising their potential to develop ICT, social, intellectual, and cognitive skills. Video games can benefit all kinds of students, including those with special needs and low motivation.

★ **Curriculum alignment and usability:** Teachers in both surveys stressed the importance of video games being aligned with the curriculum and user-friendly. This suggests that many teachers still lack confidence in using video games in the classroom. This may stem from various factors, such as time constraints, teachers' limited video gameplay skills, and insufficient knowledge of innovative teaching methods.

★ **Suitability for school activities:** In 2009, teachers prioritised the motivational and engagement aspects of video games, while in 2023, concerns about online safety and data privacy became more prominent. Despite these differences, both surveys emphasise the importance of games having educational value and being age appropriate.

★ **Barriers to using video games:** The primary barriers identified in both surveys include the costs, licensing, and finding suitable games. However, in 2023, finding suitable games became the biggest challenge, with concerns about age appropriateness

and GDPR compliance frequently mentioned. This reflects teachers' insecurity about selecting the right games for educational use, with experts suggesting to create local databases of suitable games to address this issue.

★ **Gender differences:** The 2023 survey included an open question on gender differences, revealing that nearly half of the teachers believe game-based learning primarily benefits boys. This contrasts with the 2009 survey, which did not focus as much on gender. The findings highlight existing gender divides and underscore the need to promote equal opportunities in STEM and science fields for girls and women.

★ **Changing attitudes:** A significant difference between the surveys is the decrease in negative attitudes towards video games among parents, teachers, and school management. This change likely reflects the growing familiarity with video games, leading to more open attitudes towards game-based learning.

★ **Support systems for teachers:** In 2009, courses and workshops were the least favoured support systems, but by 2023, they were ranked as the best support options, with 69% of respondents endorsing them. This shift may indicate that more formal training opportunities and accessible resources have become available, which help teachers better integrate video games into their teaching.

Overall, the comparison highlights both the ongoing challenges and the evolving acceptance of video games in education, with an increasing emphasis on curriculum alignment, teacher training, and addressing gender disparities.

04 Findings from the national focus groups and case studies

Focus groups held online from May to August 2023 gathered experts from diverse sectors across nine European countries, namely, Belgium, Croatia, France, Italy, Luxembourg, Poland, Romania, Sweden and the UK. They discussed digital game use in schools, appropriate game characteristics, strengths, weaknesses, threats, opportunities, and existing policy initiatives. The research also identified case studies showcasing successful practices in digital game integration in education. These included teacher training programs, knowledge networks, supportive policies, successful school projects, and curriculum integration involving

video games. The focus groups were transcribed and then analysed by a researcher. As explained to the research participants, all data used in this report were pseudonymised

The main findings from the focus groups are summarised in the following sections. Based on the experts' views, we identified opportunities, challenges, enablers, and obstacles to the use of video games in formal education in the countries studied, while putting into the spotlight a number of national or local initiatives supporting the incorporation of video games at school.

4.1 Belgium (Flemish Community)

The focus group in Belgium (Flemish Community) was carried out online on June 30th, 2023 with five participants involved: two secondary school teachers, one academic, one representative from the Ministry of Education and the CEO of a leading media and digital literacy organisation in Flanders

4.1.1 Opportunities and challenges

Overall, the Flemish focus group participants held positive views about the potential of video games for education. They exchanged opinions about the types of skills and competences that children can develop through video games such as social, communication, digital and soft skills especially when the games allow children to cooperate (e.g. to solve a challenge together), to strategize and to socialise (e.g. through multiplayer online games or by playing games with classmates at school). They cited that planning, logical and strategic thinking skills can be developed through video games,

especially because video games offer children possibilities to problem solve and troubleshoot.

One of the participants explained that video games allow children to develop their digital skills in less demanding, free from stress contexts because they can help create a safe environment and teach children it is okay to lose sometimes. They also referred to aspects such as increased students' motivation and engagement or the fact that video games can help to students increase their confidence in digital and other types of skills.

*"Motivation is one of the biggest strengths because game play is everywhere... [so if you start] your lesson from there then they're motivated to learn, which is awesome."
(Educator, Belgium)*

Participants also referred to potential challenges to game-based learning implementation such as an

important digital gap among schools, media panics around video games and online safety concerns.

*"The [digital] gap among some schools is very, very big. And if you're not even comfortable in using a digital board because there was[n't] budget in your school to have one, the bridge to using a console is very, very big."
(Educator, Belgium)*

Table 14 summarises the main opportunities and challenges afforded by video games according to the focus group participants from Belgium.

Table 14. Belgium: Opportunities and challenges of video games at school

Opportunities

- Video games can be **interesting to all** children, independently of their gender.
- Increased **student motivation** and engagement.
- Video games can support teaching **different learning styles**.
- Video games can help to **increase confidence** in digital skills.
- Video games can **help explain complex subjects** more clearly to students due to the many interacting aspects games offer.
- Video games offer the students and teachers **immediate feedback**. This can support learning processes.
- If data is collected respecting and protecting children's privacy, it can also be **an opportunity for teachers to improve their lessons** and understand where students may need additional support.
- Video game use could be **an opportunity to teach children about data protection and media literacy**, for example through privacy settings and good passwords.
- Video game use in schools could be **an opportunity to teach parents and children about digital risks** in an age-appropriate way.

Challenges

- **Teachers often dislike video games and blame video games** when students misbehave or do not study.
- It is **challenging to convince teachers of the benefits** of video games.
- Many **game developers focus on making entertaining games** rather than educational ones.
- **Teachers often lack necessary experience**, media literacy, training, and budget for video games in teaching.
- The current **landscape is very scattered** in terms of using gamification in lessons, the quantity and quality of uses across the country.
- **Inequalities** in terms of digital equipment and resources at school.
- While video games can benefit everyone, there are **children that won't be engaged** by video games because they don't like them.

4.1.2 Enablers and obstacles

During the focus group participants were invited to reflect on the aspects that, in their views, facilitate the use of video games at school. They referred to human and financial resources such as capacity building opportunities for teachers and increased school funding opportunities such as the Digisprong.¹⁶ They also mentioned the increasing

expertise about video games in education and teachers' motivation and willingness to innovate at school. Policy developments to boost digital skills, especially after the Covid-19 crisis, were also considered as important enablers.

¹⁶ Digisprong | Vlaams Ministerie van Onderwijs en Vorming.

"After Corona most schools now not only have like an ICT coordinator, but also a pedagogical ICT teacher. And so, I think that's already a good step towards implementing digital skills into the curriculum and maybe also the person who has the time on their hands to make this connection between the curriculum and the games that are available." (Educator, Belgium)

"Yeah, that's what I hear from my teacher of mathematics. She would love to teach Python with Minecraft, but she doesn't have the time... She's very interested and enthusiastic. But there's no time. And she blames it on the [attainment goals and the curriculum]." (Teacher, Belgium)

The focus group participants also referred to existing obstacles, such as an already packed curriculum, parents' resistance to more screentime at schools, or negative portrayals of video games in the media.

Table 15 summarises the enablers and obstacles identified by the Belgian participants.

Table 15. Belgium: Enablers and obstacles to video games in education

Enablers

- Using the **PEGI ratings as guidance for teachers** to choose age-appropriate games.
- Introducing an exclusively **educational version of already popular games**, would make games more useful and safer for the classroom because children are already familiar with some commercial games and enjoy those games.
- **Initiatives that bring together game developers with education professionals** through funding could be an opportunity to produce better educational games.
- There have been **improvements introduced due to Covid-19**. As time goes on, video games are increasingly more accepted in teaching.

Obstacles

- **Negative media portrayals** and branding of video games affect perception of them.
- **Deciding which games are fit for children** already pose several challenges for teachers, especially for those who are less acquainted with digital games or whose digital literacy and skills may be deficient.
- Teacher's **low digital confidence**
- Teacher's **lack of knowledge and strategies to make adequate judgments about the appropriateness of games** (e.g. knowing if a game is age appropriate or GDPR compliant).
- **The workload, pressure, and curriculum restrictions** are too high for teachers to introduce video games into their teaching.
- **There often is no sufficient time** to experiment with new tools such as games, because teachers are pressured to meet government curriculum targets.
- ICT is not taught by itself, but integrated into other lessons, which may have caused children to miss out on some basic digital skills.
- Generally, good quality **learning materials are lacking**.
- **Resistance from parents** is a potential risk which is rooted in fear for children's safety from factors such as gameplay addiction, age-inappropriate content, speaking to strangers online, cyberbullying, etc.
- Some **adults are critical of games** in teaching as a less serious form of learning.
- There is a risk that **parents do not understand or adhere to PEGI**.

4.1.3 Keys to success

One of the teachers explained that in his experience, most teachers do not have the time to spend integrating games into their lessons. To combat this, he suggested working in teams or utilising a motivated teacher to educate others in the school. The school he works in gave him time to make lesson plans for colleagues to involve games, which allowed him to share his knowledge in this area. Other participants agreed with this approach. However, they also added that there should be budget for initiatives like this, as often teachers use their "free time" and sometimes their personal digital devices. A representative from the Ministry of Education explained that schools get a budget from the government through the Digisprong programme. This initiative is meant to provide digital devices to school students, as well as learning tools and training so that teachers can improve their digital skills. It is up to the schools to decide what this budget is spent on.

Another crucial factor identified by the focus group participants was parents' support. This is especially relevant because nowadays many parents are often concerned about screen time, excessive video gameplay and gameplay addiction. Therefore, participants believed that using video games at school could be seen as problematic for some families. To counteract this, participants proposed more open and proactive communication with parents in this respect. From their point of view, being transparent with parents about how video games fit into the pedagogical vision of the school could help ease this concern, as expressed by one of the participants:

"Interacting with the parents and inviting them in and being very open, showing them what you are doing, letting them play what you are playing was good to counter those questions they had." (Teacher, Belgium)

Another participant also highlighted the benefits of including parents in video games, as it allows them to share an interest with their children. The example

she gave was *Minecraft*, which is popular among the children in her school.

"I think 70% of the students here are playing Minecraft. It's a language that they are speaking." (Teacher, Belgium)

Reflecting on current schools needs in Flanders, participants suggested that a game library, providing materials, licenses, and training could help schools to succeed in using video games.

"I think you really need to state why you are doing it, and it has to be in your pedagogical vision of your school that 'This is why we're doing it.'" (Civil Society Representative, Belgium)

As regards teacher needs, participants mentioned that it is important for teachers to know the curriculum well so that they can spot opportunities where video games would be useful and giving teachers the chance to try playing the game themselves, so they can understand how it could be interesting to use in their class. The group agreed that hands-on experience with the game, in combination with knowing the curriculum and effective teaching strategies are needed for teachers to use games in class. Other participants reinforced this idea by stating that it is important to link to the curriculum and that teachers have the technical skills and imagination to use these tools. During the discussion, participants drew comparisons with using movies in class, explaining that just as you need to know whether a movie is connected to your lesson plan and that you have the resources for it, the same is true for video games.

"[I] think it's essentially the same thing as using movies in the in the classroom. You need to know if it's an educational movie, you need to know what the movie is about and [you] have to realise that you can connect it to your lesson, and have the necessary equipment and time to [use] it." (Civil society representative, Belgium)

Following this idea, one participant suggested that advertising educational games along with lesson

plans could help teachers get concrete ideas about how video games could be used in the classroom. Last, it was highlighted that some teachers lack digital skills and confidence which prevents them

from exploring video games in the classroom. It was suggested that step by step lesson plans, beginning from the very basics of working the console, can help teachers with low digital confidence.

Advancing education through video games: Flanders, Belgium

In 2018, the Flemish Government introduced its first [Action plan for the gaming sector](#), covering the period from 2018 to 2021. This plan was developed in response to the sector's rapid growth and its increasing significance in Flemish society. By 2020, nearly 40% of Flemings owned a video game device, and 54% engaged in gameplay at least monthly, according to the [Digimeter 2020 report](#). Despite the sector's substantial expansion and the rise in local game companies, it faced several challenges, including limited revenue, insufficient investment, and a lack of adequate local support mechanisms.

A review conducted in late 2021 assessed the effectiveness of the initial Action plan. While the review acknowledged that the plan had achieved some success, it also identified key areas for improvement. These included the need for better capital attraction and financial support, enhancing business skills, and greater international visibility for the sector.

In response to these findings, the Flemish Government decided not to pursue a new action plan but instead developed the [Level Up vision document](#) for the period from 2022 to 2025. This vision document is designed to provide a more flexible strategic framework that builds on the previous plan's achievements while allowing for adaptability to the sector's rapid changes. The vision document includes the creation of an oversight platform that will facilitate biannual reviews and adjustments to ensure ongoing alignment with sector needs.

The vision document also highlights several initiatives aimed at integrating game-based learning into Flemish schools, such as [Digisprong](#) and the [Game.Learn.Grow](#) toolbox. These efforts reflect a supportive policy environment for innovative pedagogies. Despite these initiatives and growing interest in game-based learning, the actual use of video games in Flemish education remains relatively limited.

Key organisations involved in the Flemish video game sector include:

- Department of Culture Youth and Media
- Digisprong Knowledge Centre (Flemish Ministry of Education and Training)
- Impact Connecting (Organiser of OMG (Onderwijs Met Games))
- Mediawijs
- Flanders Game Hub
- Flanders Audiovisual Fund (VAF)
- Flemish Games Association (FLEGA)
- Video Games Federation Belgium (VGFB)

These organisations play crucial roles in supporting and advancing the sector's development and integrating video gameplay into educational contexts.

Case study Belgium: OMG – The annual event that brings educators, game developers and experts together

By Lander Van der Biest

Lander Van der Biest is the expert of applied video games in education at [Impact Connecting](#). He also created [Gamekunde.be](#), a website where he shares free lesson plans with other teachers to help them use video games in their own classrooms. The experience of Gamekunde combined with his experience in event management brought the idea to life of hosting [OMG \(Onderwijs Met Games\)](#) [Educating with Games], the first fair about games in education fair in Flanders.

a) What is OMG?

OMG is the biggest games in education fair in Flanders. The first edition was organised in May 2023 with the aim to bring teachers, game developers and other professionals and practitioners interested in games in education together and through lectures, workshops and hands-on exhibitions inspire educators to explore the potential of video games in the classroom.

The main mission of OMG is to showcase practical ways of using video games in education and to raise awareness about the benefits of game-based learning. This is achieved by combining an interactive expo with interesting keynotes and hands-on workshops where participants can put into practice what they learn during OMG. Teachers can join masterclasses given by local and international experts. In a variety of in-depth workshops, participants learn how to use specific games at school. This approach helps to demonstrate that anyone can use video games in education.

Although there are many serious and commercial games which can be used in the classroom, many teachers find it difficult or time-consuming to

implement game-based learning activities at school. By trying out different games and exchanging game-based learning experiences, OMG participants realise that using video games in the classroom is not as difficult as they tend to think.

“Teachers were surprised about the fact that so many video games already exist that can be used in education. It was also clear that although many teachers are eager to use video games in their classrooms, they lack inspiration and good examples, which is exactly what OMG tries to offer.” (Lander van der Biest, Co-organiser OMG)

Due to its success, OMG will now return on a yearly basis. The main edition will take place every two years while smaller OMG islands will pop up during other events to promote the use of video gameplay in education on a regular basis. An event of this scale was unknown to Belgium before.

b) Interesting facts

★ **OMG focuses on learning in a broad sense.**

This is reflected in the wide range of games and activities offered during the event, from serious and commercial games to art installations, VR, and XR experiences. In this way, participants can enjoy a wide offer and try out games and game-based learning activities suited to their interests and needs. OMG also pays attention to issues such as media, digital and video gameplay literacy, as well as important aspects such as accessibility, diversity, and online safety.

★ **The OMG event is aimed at teachers, youth workers and anyone working with students of any age**, including adults. By bringing game and instructional developers in contact with practitioners, OMG offers a unique opportunity for networking which can lead to a better and more accessible games for education offer. Since game developers showcase their games and educational products during the expo, developers can pitch their ideas to teachers who can then make better informed decisions about the use of video games in their own classes. Since the first edition of OMG in 2023, important partnerships have been made between schools and developers. As such, some of the game-based learning activities showcased

during OMG have reached Flemish classrooms. Additionally, by trying out games at school, game developers obtain valuable feedback which can serve to improve their video game educational offer.

c) Main achievements

☆ **OMG gives visibility and raises awareness** about the potential benefits of using video games in education.

☆ **OMG offers educators guidance and inspiration** about how to use video games in the classroom. This is achieved through workshops, lectures and by trying out games and other educational tools. Because of its hands-on approach, OMG allows participants to try out video games while getting acquainted with innovative game-based class activities and methodologies that can be used during their lessons.

☆ **OMG brings teachers in close contact with game developers.** This allows teachers to get acquainted with an up-to-date offer of games and game-based learning opportunities in an accessible way. Moreover, by being in closer contact with educators, developers can get feedback from actors in the field, which is valuable to improve their products and educational offer.

"I think an event like OMG could certainly be organised in other EU countries and it would be really powerful if we could work together on that. I think EU countries could certainly benefit from this and reach a new audience and market by working together on such an event. I think there's a lot of unexplored potential there and we're happy to help others set up such an event." (Lander van der Biest, Co-organiser OMG)

4.2 Croatia

The focus group in Croatia was carried out online on July 10th, 2023 and counted with 4 participants: a social worker from the NGO Centre for Missing and Exploited Children and educator from the Croatian Safer Internet Centre, a primary school computer science teacher, and two industry representatives from the Telcom industry which actively collaborate with the Croatian Safer Internet Centre. Below we summarise the key findings from this focus group.

4.2.1 Opportunities and challenges

Participants gave their opinion about the main opportunities and challenges afforded by video games at school. For instance, the fact that video games can help improving pupils' motivation or offer additional support to children with disabilities.

"I thought about children as a strength... Lots of children now, they already play games, or they're already online. They are our opportunity to learn. Maybe [teach] their teachers something about technology." (Civil Society Representative, Croatia)

"For children with disabilities, video gameplay can help them to communicate that they are equal part of the society so they can achieve goals. It's for them aspirational." (Industry representative, Croatia)

Table 16 provides an overview of the main opportunities and challenges identified by the focus group participants from Croatia.

Table 16. Croatia: Opportunities and challenges of using video games at school

Opportunities

- Video games help **improving pupils' motivation, teamwork, and creativity**. Besides, skills gained during gameplay can be transferred into the offline world.
- Access to **free online educational programs** to improve teachers' digital skills.
- **Possibility for kids to teach parents and teachers** something which connects adults with their interests.
- Video games are an **opportunity to create trust with students, building an open relationship** through demonstrating mutual understanding of technology. This trust can incentivise children to open about their online issues.
- Video games are **good for a range of competences and skills** (e.g. hand-eye coordination) as well as to gain or improve one's **knowledge** (e.g. improve foreign language skills) or change one's attitudes towards learning.
- Video games can help **boost leadership, planning, strategizing, and goal orientation**. For instance, when children work in teams, they use different strategies to reach the goal in video games, and they also learn to overcome obstacles, consider different pathways, connect ideas together to build strategies and think ahead.
- During game playing **children communicate with others**. This can help reduce social isolation.
- Video games **help children with disabilities** to feel included, inspired, and equal, through allowing them ways to participate, connect and play, which may not be available offline due to their disability.

Challenges

- Lack of or **insufficient school equipment** and internet connectivity. Many schools do not have tablets or digital tools in the classroom. However, utilising mobile phones could be an opportunity to give children access to online resources.
- **People and families living in socially disadvantaged areas do not have access** to good internet connection and often lack technical and digital resources.
- Video games are often **portrayed negatively in the media** which is a challenge because it instils fear in parents and teachers.
- **Parents worry about screentime**.
- Many **teachers and parents do not understand the positive learning opportunities** of technology and only consider it as a fun or social tool.
- Video game use in class **depends on the teachers' willingness to use them** and their teaching style.
- Some participants believed that both girls and boys are playing video games equally. However, despite this apparent decreasing gender gap, **gender stereotypes are still present in many video games**.

4.2.2 Enablers and obstacles

During the focus group participants were invited to reflect on the aspects that, in their views, facilitate or hinder the use of video games at school. They referred to the fact that many kids play video games in their free time, so there is an opportunity to harness that for education. Also, since the Covid-19 crisis more teachers are using video games and other digital resources. Important obstacles identified by the participants include the lack of consistent school funding for digital education and the low interest in this topic. On a policy level, digital education was not seen as a priority. Table 18 summarises the main enablers and obstacles identified by the focus group participants.

Table 17. Croatia: Opportunities and challenges of using video games at school

Enablers

- **Teachers are already using video games** and digital resources in teaching, particularly since the Covid-19 crisis.
- Many **kids already play video games**, so there is an opportunity to harness that for education.
- Increased **interest in professional careers related to video games development** can act as an incentive for schools to incorporate video games in their teaching practices.
- In school subjects such as **computer science** there are opportunities to use video games.
- Access to **education editions of popular video games** and handbooks of how to use video games in the classroom (e.g. *Minecraft* education edition).

Obstacles

- Lack of consistent **school funding** for digital education.
- **Low interest** in this topic from the education ministry and many teachers. On a policy level, digital education is not a priority.
- **Structural changes are necessary** before any implementation. The public tender system bureaucracy to work with schools (e.g. Contracts with ISPs) requires reform, however there is a lack of political support in this area.

4.2.3 Keys to success

Multiple participants commented that schools need support from above, from policymakers and school leaders, but also from partners. Better physical infrastructure, more modern equipment and connectivity access were highlighted by all participants as imperative for video games to succeed in schools. Many schools have low quality or no Wi-Fi access which is not suitable for video gameplay. As a matter of fact, one of the educators discussed how in her experience many schools had slow and old PCs, very few had laptops or smartboards, and none had Wi-Fi connections. She was unsure if this was due to school policy or if they simply lack access.

"When I enter the school for educating parents or kids, we always bring our laptops, PC's in schools which I was in are very slow and old"
(Civil Society representative, Croatia)

One of the industry representatives explained that introducing internet to all schools has been in the political discourse for a long time, however, only recently over the Covid-19 crisis access began to improve slightly. Everyone agreed that education on digital tools (including video games) is necessary for teachers to have the capacity to educate students.

"The teacher needs the knowledge. I think it's very important to have knowledge about digital skills." (Industry representative, Croatia)

Participants mentioned how this can be a challenge with older teachers due mainly to a lack of confidence. Participants further agreed that teachers, irrespective of their age, need support and confidence, as often fear is holding them back from engaging with digital resources stemming from a lack of support and experience with technology. Since Covid-19 there is some more animosity towards online teaching. In this sense, this crisis was also felt as an opportunity for many teachers to learn digital skills. However, the teacher training offer remains insufficient. An industry representative explained that they offer some training opportunities for people in general, but that a large majority of applicants always end up being teachers, even if they are not the primary target audience. In her view, this illustrates that teachers want to learn but don't know where.

When asked about what training would look like for digital skills for teachers, participants suggested that digitally capable teacher(s) could organise seminars for less experienced colleagues inside the school. However, since there is no financial support nor time allocation, the teachers would need a great intrinsic motivation to make it happen. One educator added that many teachers are already exhausted and

overwhelmed by digital challenges they don't know how to address. The group collectively agreed that incentives would be necessary to encourage teachers to participate in training, as relying solely on the goodwill of a few teachers is not a sustainable approach.

On a policy level, participants agreed that it is vital to prioritise education, with a large and consistent budget. This would allow teachers to be more innovative and not lose ambition. Also important is to raise awareness about the opportunities afforded by video games in education. Basic knowledge of technology is lacking in a lot of families. The lack of

education combined with the negative portrayals in the media leads to a lot of parents forbidding gameplay and mobile phone usage.

*"Sometimes their perception of video game is like we were playing at the school. 'We didn't do anything, we were playing', so parents think 'okay what are you doing at school? Just playing games?' And so that could be a problem. So, we should start with the kids, always explain, always make them understand why and how we are playing that game."
(Educator, Croatia)*

4.3 France

The focus group in France was conducted online on June 6th, 2023 with three participants: two primary school teachers with experience in integrating video games into their classrooms, and a teacher trainer from the regional authority who coordinates the *Robotics, New Languages, and Digital Worlds* initiative. Additionally, a researcher specialising in game development-based learning was interviewed separately. Below is a summary of the key findings from both sessions.

4.3.1 Opportunities and challenges

The French participants highlighted the significant benefits of video games for children's development, including enhancements in problem-solving, creativity, and strategic thinking. They noted that video games promote collaboration, improve writing skills, and bolster digital literacy, mathematics, and communication abilities. The researcher emphasised that game creation serves as a valuable educational tool, enabling students to acquire both digital and non-digital competencies. Through the process of developing video games, children engage in writing scripts, exploring narratives and character development, and collaborating with peers. This hands-on experience fosters ownership and purpose, as students create projects aimed at engaging an audience.

The researcher also pointed out that video game development equips students with a diverse skill set, including programming, creativity, design,

storytelling, and subject-specific knowledge in areas such as French, mathematics, and physics. She noted that projects can be tailored to focus on particular skills, facilitating reflection and reporting on learning outcomes. Based on her extensive work with schools, she observed that students take greater pride and exhibit increased motivation when they create their own games, suggesting that game development is more advantageous than merely playing educational games, as it cultivates a broader range of skills while encouraging teamwork and communication.

A teacher trainer agreed, noting that integrating game creation into the curriculum is often more straightforward than aligning traditional gameplay with educational objectives. He highlighted that game projects can encompass various learning goals, such as character analysis, storytelling, and music. Additionally, he mentioned that video games can have a positive impact on transversal skills and on children's well-being and added that when students are aware of their teacher's involvement in video gameplay, it helps build trust and strengthens relationships. A primary school teacher further emphasised that when children can demonstrate their skills and knowledge, particularly in the context of video games, they experience greater satisfaction and confidence in school.

"When children can show how they manage their skills, how they can share their knowledge even on

video games, they feel much better in the school.”
(Primary school teacher)

While acknowledging the potential drawbacks of video games—such as excessive screen time and exposure to inappropriate content or behaviours—the participants underscored research and practical experiences illustrating the positive role of video games in education. They identified several opportunities, especially for students with learning difficulties, including heightened motivation and engagement, increased peer learning opportunities, and a supportive environment for trial-and-error learning.

“Some students don’t learn much in traditional classrooms and when they start creating a video game, they reveal themselves. So yeah, we have a very good results with this population.” (Researcher and teacher trainer, France)

However, the participants also noted several challenges associated with integrating video games into educational settings. Prevailing negative stereotypes hinder acceptance, and varying opinions on the educational value of video games complicate efforts to persuade educators and administrators. Additionally, financial constraints may limit access to necessary materials and infrastructure in some schools. Parents often express concerns regarding excessive screen time, gameplay addiction, and online safety. Moreover, assessing student performance in the context of video games presents difficulties, as current evaluation tools may not be reliable.

An overview of the primary challenges and opportunities identified by the French focus group participants is provided in Table 18.

Table 18. France: Opportunities and challenges of using video games at school

Opportunities

- Video games promote **active learning** among students.
- They enhance **motivation and engagement**, leveraging their popularity with children and young people.
- They facilitate a **trial-and-error approach** to pedagogy.
- Learning through play is **engaging** and helps keep students focused on tasks.
- Video games provide increased opportunities for **peer learning**.
- They allow students to **develop skills** by achieving objectives through various pathways.
- Creating video games, rather than just playing them, supports educational goals and helps **re-engage students** with school overall.
- There is an opportunity to develop projects with a **wide range of games**, including those that are well-known among children.
- Students who typically struggle with learning and lack motivation may perform better with game-based learning, as it offers them **freedom and agency**. Some students prefer this learning style.

Challenges

- **Conflicting views on the positive and negative impacts** of video games, make it difficult to persuade educators and school administrators of their educational value.
- Video games are often associated with **negative stereotypes**, and changing these media representations is challenging.
- Some schools do not have **sufficient funds** to invest in equipment and infrastructure.
- **Parents express concerns** about excessive screen time, gameplay addiction, and other online risks associated with video games.
- **Measuring student performance** resulting from video games is challenging, and not all assessment tools available are reliable.

4.3.2 Enablers and obstacles

During the focus group participants highlighted several factors that can either facilitate or hinder the integration of video games in educational settings. Key enablers mentioned include active learning, motivation, engagement and confidence. Due to their popularity, video games allow children to be active in their learning, they help increase pupils' motivation and engagement, and they support trial-and-error pedagogy.

Participants also identified significant obstacles to the use of video games in schools. Negative

stereotypes can hinder acceptance among educators and parents, while the need for adequate resources and infrastructure may pose challenges in some schools. Additionally, concerns from parents regarding screen time, exposure to inappropriate content and gameplay "addiction" were also highlighted. These factors can contribute to resistance against integrating video games into educational settings.

Table 19 summarises the primary enablers and obstacles identified by the French focus group participants.

Table 19. France: Enablers and obstacles of using video games at school.

| Enablers | Obstacles |
|---|--|
| <ul style="list-style-type: none">● The popularity of video games and children's familiarity with them foster a supportive learning environment.● The engagement in video gameplay is becoming more balanced across genders.● Many parents and educators engage with video games, improving their understanding of their educational value.● There is an increasing interest in innovative pedagogies like game-based learning.● To guide schools in the effective use of video games in the classroom, the French Ministry of Education is exploring various methods to integrate games into schools and assess their benefits. As part of an interministerial strategy launched in 2019, it conducts monitoring and experimentation with e-sports to guide schools in the effective use of video games in the classroom. | <ul style="list-style-type: none">● Introducing video games in schools can be challenging and time-consuming.● Educators often struggle to identify suitable video games for school use, including determining age appropriateness and GDPR compliance.● Children who are not familiar with video games may struggle with certain game-based learning activities, potentially leading to a lack of motivation.● Teachers require training to effectively manage video game creation projects, making it difficult to implement these activities despite recognising their potential benefits for student skill development.● Restrictions on mobile phone use in classrooms prior to high school may impede game-based activities that rely on mobile devices.● Parental concerns regarding the impact of video games on children can pose significant barriers to their integration in educational settings. |

4.3.3 Keys to success

For the successful integration of video games in education, teachers require support from school management, particularly from inspectors and principals. Some of them are sceptical about the educational value of video games. A participant suggested that to gain this support, teachers must present evidence demonstrating the benefits of video game use, such as highlighting additional skills acquired compared to traditional methods. Establishing a teaching community to facilitate

exchanges, training, and discussions about the educational merits of video games is also essential.

Three key pillars for effective video game use in schools are:

★ **Open communication with parents:** Engaging parents is crucial to foster acceptance and understanding of video games in the educational context.

★ **Teacher training:** Providing educators with training on the pedagogical applications of video games is vital for their effective use in the

classroom. However, simplicity in game design is also important, as some students and teachers may not be familiar with video gameplay.

☆ **Access to adequate infrastructure:** Many schools lack sufficient technical resources, necessitating that video games be compatible with older computers. This limits the range of video games that can be used. A teacher noted that in primary schools they do not have much technology at all, due to the way primary school equipment is funded.

Participants emphasised the need to actively engage girls in technology and video gameplay to promote inclusivity. A teacher trainer noted the importance of educating students about the underrepresentation of women in the Video Game industry and improving girls' perceptions of STEM careers. He observed that girls tend to perform better in single-gender classes compared to mixed-gender environments.

Beyond the games themselves, attention must be paid to game development. Collaboration between game developers and educators can ensure that educational priorities are embedded in the development process. One researcher mentioned creating a guide linking video game production tasks to specific aspects of the high school curriculum, which aids in persuading sceptics, facilitating project creation, and assessing outcomes. However, teachers often face challenges in aligning video games with curriculum standards due to constraints in time, knowledge, or resources. Therefore, it is more effective for experts to develop resources and make them available for teachers.

A teacher noted the importance of providing teachers with more opportunities to collaborate and learn from one another. Some teachers who are players outside of school are eager to incorporate video games into their classrooms but struggle to justify their educational use. Participants agreed on the need for training courses focused on game pedagogy and better equipment. Additionally, as teachers have limited time, game-based activities should align with the curriculum and specific learning objectives to fit within regular teaching hours.

An academic researcher pointed out that many teachers hesitate to use video games due to a lack of knowledge about coding, because they do not know how to manage such projects, and because of insufficient training in this area. She emphasised that the learning process involved in video game projects is more important than the final product. Teachers often exceed their contracted hours for these projects and rightfully seek compensation for their extra efforts. However, funding is limited, making it essential to persuade the Ministry to invest more in this area. Local research is also needed to demonstrate the value these activities provide to schools and to identify the specific learning objectives they support. Finally, participants agreed that enhancing collaboration with academic institutions could improve schools' understanding of the educational impact of video games and promote further partnerships in this field.

Case study France: Combatting school dropouts through the creation of video games

By Chloé Vigneau

Chloé Vigneau holds a PhD in computer science and a Master's in Digital Communication from CELSA, with 10 years of experience in digital project management. After completing a specialised Master's in serious games at Gobelins, she now works as a freelancer for a number of Serious Game studios, teaches video game courses, and provides consultancy on communication and gamification. Chloé defended her PhD thesis titled "Learning by Making Video Games in High School" in July 2024. She now runs [Copotato](#), a company dedicated to developing serious games and educational resources. Additionally, Chloé leads the [Learning by Making Video Games](#) working group, which is supported by the French Ministry of Education.

a) What is the Learning by Making Video Games project?

This project originated from a call for proposals issued by the French Ministry of Education. ScienceXGame, a chair at École Polytechnique, proposed the initiative Learning by Making Video Games to explore how creating video games can teach students valuable new skills. The research group comprises various stakeholders, including local French administrations (DANE Versailles, DANE Créteil, DANE Bordeaux, DANE Clermont-Ferrand), companies (Toxicode), associations (Fusion Jeunesse), and research labs (LIP6, CNAM). The group commenced its work in 2021 and is scheduled to conclude in 2024.

The methodology employed, known as Game Development Based Learning (GDBL), represents an innovative approach to utilising video games in the classroom. This method not only treats video games as a playable medium but also fosters creativity, aiming to motivate students to acquire programming skills and encourage them to pursue careers in computer science and ICT. The project, grounded in GDBL principles, seeks to combat school dropout rates by engaging students through a novel learning experience that equips them with essential skills.

"Our research group believes that the Game Development Based Learning approach should be replicated in other countries. This is because it enables students to develop 21st-century skills, which are already being taught in most EU countries. To successfully replicate it, we will share the template and resources we produced in 2024, as well as the results of our experiments." (Chloé Vigneau)

The primary objective of this project is to introduce an alternative pedagogical method and tools that leverage video games for learning new skills, particularly 21st century skills. The project began with a comprehensive overview of the current state of Game Development Based Learning (GDBL), which revealed several key insights:

★ **Skill acquisition:** Creating a video game enables students to acquire and apply academic skills.

★ **Educational framework:** This activity necessitates the design of a specific educational framework to be implemented in the classroom.

★ **Impact of tools and methodologies:** The selection of digital tools and the methodologies employed significantly influence the effectiveness of the workshops.

In response to these findings, the project focused on three main areas to develop theoretical and practical resources for teachers interested in experimenting with GDBL:

★ **A methodology:** A framework for creating or adapting skills frameworks specific to game development activities.

★ **Video game templates:** Pre-designed templates that simplify the video game creation process, allowing students to concentrate on skill development rather than technical details. This approach enables students to begin by modifying existing templates before designing their own games.

★ **Assessment toolbox:** A toolkit for teachers to evaluate student progress, as well as for researchers investigating the impact of GDBL on pedagogy.

The target group for this project includes teachers and students aged 6 to 18 engaged in Game Development Based Learning. The project specifically aims to support students at risk of dropping out of school and girls who may hesitate to pursue scientific studies, with an emphasis on inclusivity, ensuring that students with disabilities can also participate.

Teachers from any discipline can be involved, as video game creation encompasses a wide range of skills, including art, writing, programming, and organisation. The use of templates simplifies the video game development process, making it accessible even for teachers without programming expertise.

b) Interesting facts

★ This initiative is led by ScienceXGame, a chair created by École polytechnique and Ubisoft. It focuses on three main objectives:

☆ **Networking:** Hosting events that bring together experts from the video games industry and scientific researchers.

☆ **Education and research:** Supporting student projects that blend science and video games, as well as research related to the thesis “Learning by making games”.

☆ **Game development:** Creating a video game aimed at popularizing a complex scientific topic: particle physics.

c) Main achievements

☆ The primary achievements include successfully motivating students to acquire new skills and fostering interest among teachers in utilising the Game Development Based Learning methodology.

☆ Experimentation will continue throughout 2024, with a comprehensive review of all accomplishments planned for the project’s conclusion.

d) Tackling challenges

☆ The primary challenge is the anxiety some teachers feel towards video games, particularly those who are unfamiliar with them. However, after participating in a training session or initial experimentation, they realize that it is not necessary to be a player to implement Game Development Based Learning. The provided templates are designed to minimise technical difficulties, allowing students to focus on acquiring the skills intended by the teachers.

☆ Additionally, finding the appropriate tools and methodologies to create effective educational video game templates is crucial. To address this, the project benchmarked 120 game engines and tools for video game creation, identifying those suitable for classroom use. Options that are GDPR compliant, affordable or free, user-friendly, and well-documented were prioritised. Following this, a methodology is being developed for creating video game templates that can be adapted across various disciplines, enabling students to learn targeted skills relevant to their specific courses.

4.4 Italy

On July 4th, 2023, an online focus group gathered seven participants from Italy—an educator, an academic, two video game instructional designers, a representative from the Ministry of Education, a representative from the Ministry of Culture, and an industry representative—to discuss the role of video games in education. The key findings from this session highlight a positive outlook on the educational potential of video games.

4.4.1 Opportunities and challenges

The experts agreed that video games can offer valuable opportunities for students to develop various skills, including problem-solving, collaboration, time management, and logical thinking. They noted that video games can also enhance understanding of academic subjects and improve concentration. For example, the instructional designers pointed out that games like *Minecraft*, *Fortnite*, and *Roblox* have been effectively used to teach coding and creative design, thereby enhancing students’ digital skills. Participants also commented that video games can support a range

of learning outcomes and engage students in novel ways.

“When they are playing games, they are completely concentrated because they are facing some challenges. They love challenges. So, when we put our students in this environment, they challenge themselves and they are concentrating to achieve the goal.”
(Ministry of Education representative, Italy)

An academic added that video games can also foster socio-emotional skills like perseverance, idea-sharing, mediation, communication, and creativity. However, she noted that not all games promote these skills and that they are not acquired automatically. Reflecting on the gameplay process is crucial; students should be encouraged to think about their decisions and strategies while playing to fully benefit from these socio-emotional skills.

“I don’t think that all these kinds of learning and abilities are learned in an automatic way. Students need to reflect on the ability, the process, the strategies that they are working on.” (Academic, Italy)

Participants enthusiastically explored the benefits and challenges of using video games in education. They noted that video games can enhance students' understanding of digital media and stimulate interest in STEM subjects by fostering creativity. However, they also identified challenges such as insufficient school infrastructure, limited budgets for games and equipment, a need for innovative teaching methods, and concerns about online and cybersecurity risks.

"There are some potential risks that the schools and the teachers are not very ready for, for example, cyber security risks because a lot of commercial games have social platforms and so they are open to software [attacks]." (Industry representative, Italy)

Table 20 provides an overview of the main challenges and opportunities identified by the Italian focus group participants.

Table 20. Italy: Opportunities and challenges of using video games at school

Opportunities

- Using video games **can generate interest for STEM** and leverage the students to create something new.
- Almost all **children are already engaged with video games** regardless of gender.
- Video games are **already being introduced by enthusiastic teachers** at school through special projects or extracurricular workshops and activities.
- Video games are good at **generating curiosity**, which is key for successful learning experiences
- **Using existing free, online platforms** that students are already using them can have a great potential for educational purposes.
- Video games are a great **opportunity for tangential learning**, where you play a game for fun, but it generates interest which you use to delve deeper into a particular topic using other methods.
- There is a **good opportunity for inclusion** because the video game environment often lowers language and other types of barriers. Video games can be played with children across the world and can be more inclusive of children with different types of disabilities.
- **There is an opportunity to educate the parents** when the games are introduced to the schools.

Challenges

- Current didactical approaches are usually obsolete. More **innovative pedagogies are needed** to accompany adequate technology use at schools.
- There have been good video game uses across Italy but there is **no network to share these experiences**. Such a network could help create a community of like-minded teachers across the country.
- **Lack of a repository for best practice** and use cases which could help less motivated or less experienced teachers.
- **Deficient technology and infrastructure** at schools.
- Students know and play high budget, mainstream games, but they are not well-informed about other kinds of games. This is problematic because they may be closed off to potentially good for education, but lower budget, games.
- **Many educational games are "low quality"** and are often just a playful way to transform content rather than promoting opportunities to develop a different learning experience through an original game and approach.
- **Some games have more risks than others**, such as cloud-based or open chat games and not all teachers are prepared for cybersecurity risks that come with these platforms.
- It is important to **consider the balance** between the use of digital resources at school and physical activity.
- **More budget is needed** for games, equipment, financing updates to national educational books and curriculum.
- Many **teachers are critical of video games use at school**, which can be demotivating.
- Many **parents lack knowledge of video games generally**, including the costs and risks or the use of tools such as parental controls.

4.4.2 Enablers and obstacles

During the focus group, participants reflected on factors that either facilitate or hinder the use of video games in schools. They highlighted the need for enhanced collaboration between the video game industry and educational sectors to develop more effective educational games.

"[An opportunity is] the possibility to oversee the whole didactic with gamified interactions and finally transform applied games in commercial products with revenues." (Industry representative, Italy)

A policymaker noted that they are collecting best practices across Italy to work together as a community, involving schools as mentors for other schools in the innovation process. The goal is to systematically support schools by involving teachers in the innovation process and addressing their needs.

Table 21 outlines the key enablers and obstacles identified by the focus group participants.

Table 21. Italy: Enablers and obstacles to video games in education

Enablers

- The **National Digital Plan for schools** which considers video games in the context of education as well as new job opportunities.
- **Available national funding opportunities** for projects aimed at implementing informal education, including video games.
- **Video games in education has increasingly become a topic of interest.** This is evident in some local initiatives and festivals.

Obstacles

- **Creating a video game is expensive**, and **investors are much more drawn to entertaining games** where they can make more profit than educational ones. Making games that are educational, but at the same time interesting for students is difficult and expensive.
- Most **teachers need a much better understanding of video games and their potential for education.**
- **It is important to foster dialogue across various Ministries** to have a concerted approach because this is a transversal issue that includes many stakeholders.
- **Effective communication about the benefits of video games in teaching is needed** on different levels, for instance, between schools and families, but also among researchers, the industry and policymakers.
- **Lack of experts in the video game market and educational relationships with schools**, students, and families.

4.4.3 Keys to success

Participants agreed that many schools lack the necessary computing equipment and internet access to use video games effectively. They also highlighted the importance of training and opportunities for teachers to engage with video games. An academic emphasised that teachers need to understand how to integrate video games into their curriculum and develop instructional design and evaluation skills through training. Continued support after training is also crucial. Additionally, an educator noted that the lack of

holistic assessment methods in Italy makes it challenging to evaluate the diverse skills fostered by video games.

"This is a problem if you want to use video games, you cannot concentrate your evaluation on contents of the subject matter. You have to evaluate how the students work together in groups, how do they relate to each other, what kind of product they can create through the video games." (Educator, Italy).

An educator noted that there is a fundamental difference in how mistakes are perceived in video games versus traditional schooling. In video games, mistakes are seen as essential for progress, whereas in schools, they are often penalised. He suggested that for schools to be successful in using video games, they need to adopt a more progressive view on mistakes.

*"The main problem is that video games are based on mistakes. It is the base for a better performance. [But] mistakes at school are a problem. Teachers evaluate, assess their students through mistakes. So, this is a big problem because this means [we need] to change the vision of our way of learning."
(Educator, Italy)*

A video game instructional designer emphasised the need to measure the effectiveness of video games in schools to provide evidence of their impact on students. An academic added that video games should be integrated into teaching as part of a broader approach rather than used as isolated experiences. She also mentioned it is important to ensure students recognise and understand that they are learning through video games:

*"Students must be convinced that they really can learn with video games, I mean school is based on grades and they fear they can lose some average in their school outcomes if they start to use a new methodology to learn."
(Academic, Italy)*

Participants highlighted that teachers lack time to incorporate video games into their lessons and need either curriculum integration or additional extracurricular time. A representative from the Ministry of Culture noted that integrating video games into Italy's formal curriculum is a challenging but politically supported goal, with discussions ongoing among relevant Ministries. Participants also suggested that a European-wide repository

of educational games would help teachers select suitable games. Additionally, concerns were raised about parental opposition to video games in schools due to fears of excessive gameplay at home.

A video game instructional designer pointed out the difficulty of selecting appropriate games for the classroom. They proposed that a European-wide repository of applied and educational games would be beneficial, as it could help teachers find suitable, age-appropriate, GDPR-compliant, and engaging games that they might otherwise not discover. Participants were not aware of such a database existing.

Additionally, there was concern among participants that parents often worry about their children spending too much time on video games at home, leading to reluctance about their use in school:

*"We live in a country where video games are often demonised and where play, and study are [considered] opposite concepts. You play or you study. But they are not opposite concepts and games can be used as we do with books, with movies, and other media."
(Video games instructional designer, Italy)*

An academic suggested that schools can use the classroom to educate parents about the benefits and ethics of video games. She found that organising parent events at school was effective. Another video game instructional designer noted that millennial parents, who are often players themselves, are more receptive to video games in education. He also mentioned using video games in parent conferences to show how they can be a tool for engaging with children. Examples included using games for civic protection scenarios and in hospitals to support children with specific illnesses. These stories helped convince parents of the value of video games. Clear communication about the educational benefits is key to gaining parental support.

Advancing education through video games: Italy

In Italy, the use of video games in education is gaining traction through various initiatives and policies. Since 2018, the annual [VIPRO DAYS](#) event has explored how video games can serve as educational resources and cultural tools. This event, featuring lectures and panels in Italian and English, engages a diverse audience including museums, cultural institutions, students, and game developers. It highlights the potential of video games to enhance the understanding of heritage and promote cultural narratives.

The [VIPRO EDU](#) programme is a significant example of how video games are being integrated into educational settings. It provides a variety of courses for cultural institutions and students at different educational levels, focusing on topics such as game design, historical games, and educational applications of digital games. Key initiatives include [Press Start to Learn](#), which helps secondary school students and teachers incorporate digital games into curricula and basic game design, and [Play/Ground](#), which allows primary school students to create visual novels about their local heritage, thus using games as a medium for cultural exploration.

These programmes are supported by national and local policies that recognise the educational benefits of video games. They aim to enhance video gameplay literacy, integrate games into educational frameworks, and use video games to promote Italian cultural heritage. The ongoing efforts include maintaining an archive of games set in Italy and collaborating with game developers to produce content that reflects Italian culture.

Overall, Italy's educational policy landscape increasingly supports the use of video games as a valuable tool for both learning and cultural promotion, reflecting a broader recognition of their potential impact.

Case Study Italy: *Maker Camp – Leveraging the potential of video games to enhance 21st century skills*

By Marco Vigelini

Marco Vigelini is CEO of [Maker Camp](#). He was the first in Italy to introduce the Minecraft video game as an educational tool in Italian schools in 2013. To date, he is recognised among the top 10 Minecraft educators in the world, is the only Minecraft Certified Trainer in Italy, and is a speaker in Italy and abroad on Education Technology and the promotion of video games in cultural contexts.

a) **What is Maker Camp?**

Maker Camp is an innovative company that combines brand, culture, and learning in the world of video games. They specialise in creating educational experiences through popular video games such as *Minecraft*, *Roblox*, *Fortnite* and esports to enhance 21st century skills—complex problem solving, critical thinking, creativity, collaboration with others. With these video games, Maker Camp develops solutions for museums, cultural attractions, and educational institutions, conveying their content to children, families, and schools through gamification elements.

Maker Camp organises national and international contests to engage the whole school community aiming to encourage grassroots participation and promote local areas. Here are two initiatives by Maker Camp that show how they work with the Italian education sector using video games:

★ **Maker Camp Contest: bridging history, culture, and civic education in Italian schools with *Minecraft*.**

Since 2018, the Maker Camp Contest has demonstrated the effectiveness of using video games for education. This initiative has allowed schools to incorporate game-based learning into their regular teaching, growing from a local project to involve over 600 Italian and 100 international schools. The contest highlights how *Minecraft* can boost engagement and learning on cultural and societal issues, promoting active citizenship and appreciation for heritage and sustainability.

In collaboration with national cultural institutions and UNESCO sites, Italian schools have participated in *Minecraft*-based contests focusing on themes like Raffaello, Dante, the Longobards, Fellini, civic education, and sustainable development. Notably, creations from the Raffaello contest were displayed alongside Raffaello's original works at the National Gallery of Marche, showcasing how video games can connect students with cultural content, leveraging the engagement of video games as a medium of communication, and making complex topics more accessible and appealing.

Educators have praised the initiative for improving student integration, cultural assimilation, and collaboration. This project illustrates the potential of game-based learning technologies to enhance inclusivity, develop 21st-century skills, and create a more interactive and engaging educational experience.

★ **Lega Scolastica esports: fostering inclusivity and skill development through competitive video gameplay.**

The Lega Scolastica esports initiative is the first competitive video game championship for high schools, promoting not just fun, but also inclusivity, soft skills development, and interest in STEM subjects. This initiative exemplifies how esports can be leveraged in an educational context to achieve various pedagogical goals.

Lega Scolastica esports is an extra-curricular initiative, where students connect from their schools to participate in esports. It bolsters school belonging, combats school dropouts, and encourages the development of teamwork, communication, and critical thinking skills, with a special focus on STEM disciplines, through active

involvement in esports. This initiative also offers self-learning courses on *Unity*, *Roblox Studio*, and *Unreal Editor for Fortnite*. The inclusive environment transcends traditional sports by breaking down physical, cultural, and gender barriers.

The Lega Scolastica esports initiative, which is expanding to middle schools and introducing a female-majority team championship in the 2023-2024 school year, offers an innovative educational approach. It has greatly increased student engagement, inclusivity, and skills development. Teachers have observed improvements in students' communication, critical thinking, and teamwork, as well as increased involvement from previously at-risk students and a reduction in physical, cultural, and gender barriers.

"The inclusive environment provided by esports has been recognised as a major advantage. Excitingly, we are planning international finals with other European partners, such as British esports, emphasizing the growth and reach of this initiative. The success and potential of "Lega Scolastica Esports" illustrate the compelling role esports can play in education." (Marco Vigelini, CEO Make Camp)

b) **Interesting facts**

★ Maker Camp has launched two projects with a medical centre specialising in autism and child neuropsychiatry, using *Minecraft* and *Roblox* to engage children with special educational needs and to improve emotional intelligence through video games.

★ In partnership with the University of Florence, Maker Camp is creating scenarios to help children understand and respond to risks like floods, earthquakes and fires. They also developed educational content for the Foundation of Venice's 1600th anniversary, focusing on economic education and environmental preservation using *Minecraft* and *Roblox*. Additionally, new educational settings are being developed for major UNESCO sites in Italy.

c) **Main achievements**

★ During the Covid-19 outbreak in March 2020, Maker Camp was invited to join Telecom Italia's Maestri d'Italia initiative and Operation Digital

Risorgimento, providing live-streamed educational sessions for young children.

☆ Since December 2018, Maker Camp has collaborated with INDIRE, a research organisation of the Italian Ministry of Education, coordinating approximately 300 institutes in educational experiments using *Minecraft*.

☆ Maker Camp launched the first Italian esports league for high schools. The national competition aims to engage students in extra-curricular activities and develop soft skills, with Lenovo and Intel as technology partners, Telefono Azzurro as scientific partner, and Istituto Luce Cinecittà as logistic partner.

d) How do these initiatives contribute to enhancing the use of (video)games in education?

☆ These innovative teaching and learning methods leverage the engagement of video games as a

medium of communication and making complex topics more accessible and appealing for students.

☆ Teachers involved in these initiatives have reported better integration of students with difficulties, smoother cultural assimilation, and increased collaborative work between male and female students.

☆ These initiatives demonstrate the power of modern game-based learning technologies in promoting inclusivity, fostering 21st century skills, and making the educational process more interactive, appealing and personalised. They also help foster school belonging, combat school dropouts, and encourage the development of teamwork, communication, and critical thinking skills, with a special focus on STEM disciplines.

4.5 Luxembourg

The focus group in Luxembourg was carried out online on August 9th, 2023 and counted with four participants: one educator, one academic, one representative from the Ministry of Education and one civil society representative. Here, we summarise the main findings from this session.

4.5.1 Opportunities and challenges

When participants discussed the main opportunities and challenges afforded by video games at school, they referred to similar aspects as previous focus groups, however they also indicated that video games can help people of all ages with emotional balance, self-expression, and getting in touch with their inner selves.

"I really recognise that this is a very nice medium for school students who are not able to express themselves in another way, so video gameplay is some kind of expression in getting in touch with emotions." (Civil society representative, Luxembourg)

Participants also reflected on the fact that games allow children and young people to try things and make mistakes in a safe environment because

consequences do not matter as much as they do in the "real" world.

*"You have to try things and you will fail... Listen, it's OK to make errors. It's OK to fail. But what you have to do is get up again. Try again. Look what you have learned and then try to do it better. And that's one of the fantastic things that games can provide."
(Educator, Luxembourg)*

During the session participants also referred to the challenges to introduce video games at school such as the potential for excessive screen time and the fear of gameplay addiction. While excessive gameplay is a real problem, an educator argued that the main problem are not games but rather children lacking offline hobbies, achievements, and prospects. In his opinion, this would be one of the main reasons children spend so much time in front of screens.

Table 22 provides an overview of the main opportunities and challenges identified by the participants.

Table 22. Luxembourg: Opportunities and challenges of using video games at school

Opportunities

- **Video games can help people of all ages with emotional balance**, self-expression, and getting in touch with their inner selves because they are immersed in the game.
- **Collaboration, communication and solving complex tasks** are skills that can be developed through video games.
- **Games are a great place to try things and make mistakes**, because consequences don't matter as much as they do in the real world.
- **Video games can be used as an incentive to explore topics on a deeper level**, by generating interest through the game and guiding students to understand the topic further.
- **Video games bring fun into schools** and recognise youth culture.
- **Video games are intrinsically motivating**. They help incentivise and make learning topics and complex concepts more interesting.
- **There is an opportunity to connect students to life experiences** and give them transversal competences.
- **Game books**, such as "choose your own adventure" books, are an opportunity to ease sceptical teachers into using games in the classroom.

Challenges

- **Personality, social, and gendered traits affect the usefulness of games in class** and problematic behaviour such as gameplay addiction.
- Video games are a double-edged sword when it comes to concentration skills. **Although games allow you to practice concentration, this concentration is hard to transfer to other contexts where the child is less interested** in.
- **Reinforcement mechanisms make games more addictive**, and game developers are financially incentivised to employ these mechanisms to make games more profitable.
- **Many young people play games to distract themselves from negative feelings or unpleasant emotions** rather than to express them. This may undermine the development of tolerance, patience, and delayed gratification. Moreover, some may focus on negative emotions like anger and frustration because they are not emotionally mature enough to observe the other emotions going on.
- Some students may misappropriate the educational side of games, to justify any game they want to play.
- A **lack of interest** (particularly from heads of schools).

4.5.2 Enablers and obstacles

During the focus group participants were invited to reflect on the aspects that, in their view, facilitate or hinder the use of video games at school. They referred to an engaged and enthusiastic community of practitioners who are already using video games in their classes and an increasingly favourable policy landscape. As regards existing obstacles to introduce video games in school, participants mentioned teachers' lack of time and motivation to use video games, lack of acceptance from (some) parents or head principals, the expensive cost of licences and equipment and the adverse effects of screen time, for instance, on sleep quality, among others. Table 23 summarises the main enablers and obstacles identified by the focus group participants.

Table 23. Luxembourg: Enablers and obstacles to video games in education

Enablers

- There is an **enthusiastic community of practitioners** already engaged with this topic.
- Every school has a “school developer”, who is a strategist, and this is an opportunity to bring games into the school plans.
- The **Ministry is aware of the benefits of video games** which is helping to advance policy and curricular advancements in the area.
- The **Ministry are creating a platform** by 2025, working with partners across Luxembourg, to address concerns and build connections with people who are not in touch with video games.
- The **increasing availability of resources** such as booklets on digital game-based learning and a taxonomy of games in learning. However, some resources are not widely spread yet because Video gameplay in pedagogy is still very niche.
- There is a **new subject in lower secondary education** called Digital Science. One of the six topics in this course is video gameplay.
- There is the DiGRA (Digital Games Research Association) conference in Luxembourg in 2026, which will also include several **educational events**.

Obstacles

- To implement video games in teaching, there needs to be a **restructuring of the curriculum**, and **technical support** provided for teachers.
- **Teachers lack time** and sometimes **motivation** to use of video games.
- Lack of **acceptance from (some) parents**.
- **Expensive licences and equipment**.
- A **lack of research** on the **negative effects of screen time**, for instance on sleep quality, which could be a risk if using more screen time in class. Although screen time can be regulated at school, it would require working closely with parents to factor in the usage outside of school.
- There should be more **research** before introducing video games into schooling to ensure that it is **beneficial for learning**.
- There is a risk of “chocolate covered broccoli” – using the appearance of a video game to distract from a more traditional lesson, or only to track student achievement.
- It is challenging to find ways to **have valid performance assessment** of game-based learning.
- **More sustainable policies are needed.** In Luxembourg, the political responsibility for video games (in education) is heavily fragmented across ministries/departments, which means that efforts and investments are typically ad hoc and short term.

4.5.3 Keys to success

School leadership should provide opportunities to experiment with games, allowing teachers to experience the benefits of video gameplay firsthand. There needs to be space for experimentation, and support should be available even if teachers face setbacks. These challenges should not be seen as failures, but as part of the process of trying different methods to engage students. Pedagogical freedom, time, and making teachers feel at ease are essential for integrating games into schools. It is also important that schools recognise games as valuable learning tools, appropriate for the classroom environment.

“You need some space for experimentation and that’s where [the school leadership] should be involved too... You need the insurance that someone is supporting you, even if sometimes you will fail as a teacher or an educator, [it] just will happen. But this is not in my mindset. It is not a failure. You just give them the freedom to stick, to continue, and to try on another way to reach the pupils.”
(Civil society representative, Luxembourg).

Support from school principals and staff is crucial for teachers, particularly if issues or complaints arise. Ministry-level backing is equally important. Having professional knowledge about learning through games and fostering trust among educators are key to successful implementation. A positive school culture is needed, as unexpected challenges are likely to occur, and technical support and proper infrastructure should be ensured. Teachers also

require support from a management team willing to invest in the necessary infrastructure and advocate for the needs of video gameplay-based learning.

“Teachers need support, which they can only receive from management or a directorate that understands the need to invest in infrastructure and advocate for these initiatives with the Ministry.” (Educator, Luxembourg)

Knowledge about video games and their connection to learning, as well as open-mindedness, are vital. However, there’s a need for more research to confirm the benefits of video games in education. On a class level, teachers must link games to learning objectives, helping students reflect on what they have learned. It is also important to inform

parents and to be transparent about the use of games in education to alleviate potential concerns or objections. Teachers should understand the educational science behind games to build trust with parents and be able to explain their value. An academic further commented that it is essential to engage all teachers in this process:

“If we were to implement games on a systematic basis, we need to get all teachers on board.” (Academic, Luxembourg)

Finally, video games must be accepted as learning tools not only within schools but also in wider society. Changing the perception of games among parents, many of whom view them negatively, will continue to be a significant challenge.

Advancing education through video games: Luxembourg

Digital games offer unique opportunities for children and adolescents to experience a sense of agency, practice teamwork, and interact with diverse topics. The challenge in education is to harness this enthusiasm and leverage students’ motivation to engage with digital content and their video gameplay behaviours. To this end, the Ministry of Education is actively advancing policies and curricular developments related to video games. Schools have dedicated “school developers” who see this as an opportunity to integrate games into educational plans. By 2025, the Ministry will launch a platform in collaboration with partners across Luxembourg to connect with those less familiar with video games and address any concerns.

Luxembourg has seen a rise in resources like booklets on digital game-based learning and other practical resources. Notable examples include the first SCRIPT-themed issue for the Year of Media Education entitled: [Digital game-based learning](#), which explores how to effectively integrate digital games into the classroom, and the [Play Seriously](#) handbook. The SCRIPT issue provides practical guidance on incorporating digital games into teaching, offering inspiration and motivation for educators to implement these approaches effectively. The handbook targets educators and youth workers in informal education, connecting the digital experiences of young people with innovative methods in informal education and youth work. Both aim to enhance educational and didactic support, fostering innovative learning approaches. Despite these advancements, many of the available resources are not yet widespread, as the use of games in pedagogy remains niche.

Video games also figure in key education policies and initiatives such as the introduction of a new subject, Digital Science, introduced in lower secondary education which includes video gameplay as one of its topics. Furthermore, the DiGRA (Digital Games Research Association) conference in Luxembourg in 2026 will feature educational events to highlight these advancements.

Key organisations active in the field of video games in education include:

- Service national de la jeunesse (SNJ)
- Service de Coordination de la Recherche et de l'Innovation pédagogiques et technologiques (SCRIPT)
- L'Institut de formation de l'Éducation nationale (IFEN)
- Fit4Gaming
- Game On Lëtzebuerg Spillt
- Spillfabrik
- [Social Gaming Luxembourg](#)

Case Study Luxembourg: Games as a key subject of the Digital Sciences Curriculum

By Daniela Hau

Daniela Hau is the Head of Innovation at SCRIPT and a PhD researcher. SCRIPT is the coordination service of research, education technologies and innovative pedagogies, which is part of the Ministry of Education, Children, and Youth.

She holds a master in media and game pedagogy and has lead several pilot projects on digital and analogue gaming in class. As a result, the SCRIPT issued a guideline on [Digital spielend lernen](#). Her current work spans various educational innovations, with a particular focus on AI in education. She leads various educational initiatives, integrating cutting-edge technologies and innovative methodologies to enhance the learning experience.

In her research, Daniela focuses on AI in education, specifically exploring teacher adoption and practical applications in the classroom. She is currently investigating factors that influence teacher acceptance of AI and developing real-world AI scenarios for the classroom. This approach aims to bridge the gap between theoretical AI applications and their practical use in education.

a) The Digital Sciences – Focus on Games course in a nutshell

Games are more than entertainment. They are a confluence of art, technology, storytelling, and teamwork. They shape cultures, build communities, and offer unique insights into problem-solving and creativity. Recognising their impact, the Ministry of Education has crafted a comprehensive subject focusing on six key topics, with one devoted entirely to games.

The primary responsibility for this new [Digital Sciences](#) subject rests with the innovation department of SCRIPT (*Service de Coordination de la Recherche et de l'Innovation Pédagogiques et Technologiques*), which is part of the Ministry of Education, Children, and Youth. A dedicated working group of secondary school teachers has been instrumental in developing the concept, as well as the comprehensive teacher and learner training programmes, handbooks and guidelines.

After a 1-year-experimentation phase during the school year 2021-2022, it was introduced in September 2022 on a national basis. It was implemented in grade 7 in all secondary schools in 2022-2023 and will gradually be integrated in grades 8 and 9 by 2024-2025. As such, the primary target group of this initiative are students in lower secondary education. The [course](#) integrates digital literacy and game-based learning into the curriculum, enhancing student engagement and preparing them for future technological demands. The initiative not only fills existing educational gaps but also aligns with Luxembourg's broader economic and technological objectives, preparing

students for the challenges and opportunities of the 21st century landscape:

- ☆ **Enhancing digital literacy:** Directly addressing the need for digital skills in a rapidly advancing technological landscape.
- ☆ **Highlighting the importance of games in learning:** Recognising games as influential in culture and education, encouraging critical engagement and creative thinking.
- ☆ **Aligning with work life:** Equipping students with skills like problem-solving and digital proficiency, crucial for modern workplaces, especially in sectors like finance and technology.
- ☆ **Strengthening STEM education:** Making STEM subjects more engaging through game development, thereby inspiring interest, and potential future careers in these fields.

More specifically, the “Digital Sciences” course includes 6 key themes:

- ☆ The game, analogue or digital, alone, or together, a whole programme!
- ☆ My digital world and me: algorithms, communication.
- ☆ The World Wide Web, its network and me: cybersecurity, ethics, critical thinking.
- ☆ Do you speak IT? My language, their language! Big Data, Internet of Things.
- ☆ A machine smarter than me, does it exist? Artificial intelligence, creativity.
- ☆ The robot, a partner for good or ill: Robotics.

The “Digital Science – Focus on Games” subtheme covers the following components:

- ☆ **Game literacy:** This section offers students a deep dive into the core mechanics and principles of games, providing insights into game design and storytelling.
- ☆ **Game development:** This practical segment allows students to gain hands-on experience in game creation, covering aspects like coding and graphic design.
- ☆ **Ethics and social impact:** Focusing on the societal implications of games and gamification, this module

promotes critical thinking about the content and consequences of games.

As such, the course represents a significant step towards modernising the educational landscape, going beyond the basic technical handling of computers and word- or number-processing software and passive consumption of digital content. Instead, it emphasises learning and innovation skills such as critical thinking, problem-solving, teamwork and creativity. It also fosters digital literacy skills, encompassing information literacy, media literacy, and understanding of information and communication technologies, encouraging both the creative and responsible engagement with video gameplay.

The beneficiaries of this initiative extend far beyond the students who are its primary audience. Educators stand to benefit significantly from well-structured teaching materials and comprehensive training programs, which enable them to effectively impart knowledge on this contemporary subject. Furthermore, the course indirectly benefits the broader educational community by fostering digital literacy and critical thinking about digital media among young learners. As students gain insights into game design, development, and ethics, they are also developing skills that are increasingly vital in our technology-driven world, thereby benefiting not just themselves but also the future workforce and society at large.

Another innovative aspect of the “Digital Sciences” course is its evaluation system, which utilises digital badges in the open badges format. These badges serve as a digital representation of students’ achievements and skills acquired during the course. This modern approach to assessment not only motivates students but also provides a tangible, shareable record of their accomplishments in the digital realm.

Additionally, the course is designed with inclusivity at its core, allowing teachers from diverse backgrounds to effectively teach the subject. This flexibility ensures that educators, regardless of their primary area of expertise, can confidently guide students through the curriculum. The diverse teaching perspectives brought by instructors from various disciplines further enrich the learning

experience, providing students with a well-rounded understanding of the multifaceted world of video games.

b) What are the main achievements of this initiative?

☆ **Enhanced digital literacy:** One of the significant achievements of the "Digital Sciences - Focus on Games" course is the marked improvement in digital literacy among students. They have gained a deeper understanding of game mechanics, development processes, and the broader impact of digital games and gamification on society.

☆ **Teacher empowerment:** The course has successfully empowered teachers from various disciplines to confidently teach this contemporary subject. Through targeted training and adaptation of resources, teachers have expanded their teaching skills, enabling them to guide students effectively in this new domain and to use game-based learning methods to design their lessons.

☆ **Student engagement:** The introduction of game-related topics has notably increased student engagement. The relevance and appeal of video gameplay as a subject matter have made learning more relatable and interesting for students, thereby enhancing their overall educational experience. It also exposes students to a wide variety of careers in technology and design and inspires them in their future career choices.

☆ **Promotion of critical thinking:** The course has fostered critical thinking among students, particularly through modules focusing on the ethics and social impact of video games. This encourages students to not only consume digital content but also to thoughtfully consider its creation and effects, cultivating a more responsible and discerning approach to digital media.

This initiative further contributes to enhancing the use of video games in education through several key aspects:

☆ **Legitimising games in education:** By formally introducing the key topic "Focus on Games" into the curriculum, the initiative legitimises video games as a valuable educational tool. It shifts the perception of games from merely recreational to educational,

demonstrating their potential as vehicles for learning.

☆ **Game-based learning:** The course provides a framework for incorporating game-based learning techniques into the classroom. Teachers are equipped with the knowledge and resources to effectively use video games as teaching tools, which can improve engagement and facilitate experiential learning.

☆ **Critical analysis and creation:** Students not only learn to analyse and critique games but also gain skills in game design and development. This hands-on experience encourages creative thinking and problem-solving and could inspire students to create educational games themselves.

☆ **Interdisciplinary approach:** The course integrates elements from different subjects, such as technology, art, storytelling, and ethics. This interdisciplinary approach showcases how games can be used to teach various concepts, making learning more dynamic and interconnected.

☆ **Promoting digital literacy:** As students explore the mechanics and impact of video games, they develop a deeper understanding of digital media. This enhances their digital literacy, an essential skill in the modern educational landscape.

☆ Overall, the initiative paves the way for a more innovative, engaging, and effective use of video games in the educational context.

c) What have been the main challenges faced by this initiative?

☆ **Teachers' unfamiliarity with subject matter:** One of the main challenges encountered was the initial unfamiliarity of some teachers with the subject matter, particularly those from non-technical backgrounds. This required a concerted effort in teacher training and resource development to ensure educators were comfortable and confident in delivering the course content.

☆ **Balancing curriculum requirements:** Integrating a new subject like "Digital Sciences - Focus on Games" into the existing curriculum posed challenges in terms of time allocation and balancing with other academic requirements. Finding the right

equilibrium to ensure comprehensive coverage without overburdening students was crucial.

☆ **Resource allocation:** Ensuring adequate resources, both in terms of materials and technology needed for the course, required strategic planning and sometimes innovative solutions to provide a consistent learning experience across different educational settings (e.g. analogue and digital variations).

To tackle such difficulties in the future, several strategies could be employed:

☆ **Continued professional development:** Regular and comprehensive professional development programmes for teachers can enhance their comfort and competence with the subject matter, especially for those from non-technical backgrounds. In addition, teacher training ensures the integration of digital game-based learning and video games as an educational tool to break down the prejudice that it is just entertainment.

☆ **Feedback mechanisms:** Establishing robust feedback mechanisms from both teachers and students can inform continuous improvement in course content and delivery, ensuring the course remains relevant and effective.

4.6 Poland

The focus group in Poland was carried out online on August 9th, 2023, and counted with 3 participants: a teacher trainer, an academic and a representative of the Polish Association of video games Developers. Below we summarise the key findings from this session.

4.6.1 Opportunities and challenges

During the focus group participants gave their opinion about the many opportunities, but also the challenges afforded by video games at school. For example, they argued that languages, especially foreign language skills can be practiced through video games, and that video games can help support the development of cooperation through teamwork.

"Children are very different in their skills and competences, and they do not feel comfortable with doing everything perfectly, so when they have a chance to learn together and also to play together or to learn by playing, then they can share the competences and it's very important." (Academic, Poland)

Some participants indicated that children and young people can learn how things work in simulated spaces, without risks of the physical consequences and that video games help children develop mechanisms to cope with failure.

"You don't want to fail when you are learning ... and there are bad feelings about the failure. In games you still have bad feelings if you fail, but you want to try again and again and again and again to win... I think it's really important that you learn that it is something that is in life, sometimes you fail, and you try again."
(Teacher trainer, Poland)

As potential challenges participants referred to the fact that many children are active players at home, so the (educational) games presented in class may not be as interesting to them. They also pointed out that the teaching from games is not always transferred to other aspects of the player's life. The main challenges and opportunities identified by the focus group participants from Poland are summarised in Table 24.

Table 24. Poland: Opportunities and challenges of using video games at school

Opportunities

- **Foreign language skills** can be practiced through video games.
- It is possible to **learn how things work in simulated spaces**, without risks of physical consequences.
- Games help children to learn to **cope with failure**.
- The social aspects of video gameplay can help **develop teamwork and cooperation skills**.
- Some games can help **develop creativity**.
- Video games can help with **empathising and accepting different perspectives**.
- By using immersive technology children can gain **practical skills** (not just soft skills) like public speaking, using devices, learning how to behave in hazardous situations.
- Some games encourage children to **exercise**.

Challenges

- Polish schools are quite traditional, and it is **difficult to integrate more innovative pedagogies** such as game-based learning.
- Innovation-minded teachers are still a minority and there is little flexibility or individuality in teaching.
- Tangential learning is an opportunity of video games, but it is **hard to implement on a large scale** in formal education.
- Although there are valuable ways to use a screen in education, **parents may be in opposition** to video games because of online safety concerns such as screentime or addiction.
- Many children are very active players at home, so the **games presented in class may not be as interesting** to them.
- Sometimes the teaching from games is **not transferred** to other aspects of the player's life.

4.6.2 Enablers and obstacles

During the session participants were also invited to reflect on the aspects that, in their views, can facilitate or hinder the use of video games at school. They referred to obstacles such as existing digital gaps not only in terms of access to devices and connectivity, but also in terms of skills and use. Another aspect discussed was the fact that the Polish educational system is quite traditional and top-down. In the participants' view this may hinder the use of more child-centric and innovative pedagogies such as game-based learning.

Among the enablers identified, the Polish participants mentioned that little by little more schools, teachers and parents are becoming interested in video games and many teachers, especially younger ones, are open to innovative education methods and technology use in class. A favourable EU policy landscape was also considered crucial. For instance, one participant referred to existing EU regulations supporting the development of digital content, including games, in local languages, as an opportunity for game developers to develop content in local languages that is more accessible for teachers and schools.

Table 25 summarises the main enablers and obstacles identified by the focus group participants.

Table 25. Poland: Enablers and obstacles to video games in education

Enablers

- There are already **approved games for education**.
- There are **some schools, teachers and parents interested in video games** and many teachers, especially younger ones, are open to innovative education methods.
- Some **ministries are recognising the educational potential** of games.
- **EU legislation** supports the development of digital content, including games, in local languages.
- **Popular video games and companies** have been developed in Poland and media are starting to see the commercial potential of the games industry.
- This may **incentivise young people to follow careers in this field**, which can eventually lead to more acceptance of video games at school by educators and parents.

Obstacles

- Some kids can't afford a good computer at home so may not have as much knowledge of games as wealthier students. Therefore, **bridging existing digital gaps** in terms of access, skills and use remains key.
- There is a **lack of evaluation** on the efficacy of video games for education and thus, more research is needed.
- Guidelines on screentime from recognised organisations such as the World Health Organisation (WHO) and the American Academy of Paediatrics (AAP) can **discourage the use of screens** at school.
- Many parents do not see sufficient changes or progress in traditional education, so they are starting to look for alternative options like **homeschooling** where innovation may be more preponderant.

4.6.3 Keys to success

During the discussion participants agreed that to succeed, the whole school community, from the school management to parents, need to be supportive of video games.

"You really need to feel that you have the support from the important ones, your principal, your director or maybe your government, that it won't be a disaster if it doesn't work in the way we thought it will. So, this [is a] supportive innovation development environment and it's not only about parents, pupils, or teachers but also about this administration managing directors." (Academic, Poland)

"In Poland we have a lot of different initiatives, different institutions, groups of teachers who try to be innovative in education, but they usually are divided and it's harder to make this huge impact on the national level when you are divided." (Industry representative, Poland)

In many Polish schools, there are issues with equipment functionality and internet access, which must be addressed to facilitate the use of video games in education. A participant emphasised the importance of strategic public investment, noting that despite the Ministry's ongoing efforts to provide

new laptops, many schools still face challenges related to inadequate infrastructure. Collaboration among the public sector, businesses, game developers, and educational institutions is crucial to make progress.

Meanwhile, to effectively integrate video games into the curriculum, teachers require more guidance and training. Education should transition from static resources, such as textbooks, to interactive content, including video games. A website or online library that offers game recommendations and ready-to-use education materials for various subjects could help teachers save time and reduce feelings of overwhelm. Participants noted that a number of relevant English-language websites already exist, providing databases of games, outlining their ease of use, and how they can be used for education purposes, for different age groups. Yet, there is a need to have this kind of website available in localised form, because language barriers continue to exist, and the education context can heavily vary across countries too.

A participant underlined the importance of exploring additional solutions that can support teachers in their local contexts, such as workshops and tutoring. At the same time, workshops often have limited geographical reach, so establishing a network of

experienced teachers to train their peers in the use of video games could be an effective alternative.

Within this context, an academic noted that there is an ongoing discussion in Poland regarding the choice between serious games and commercial games. While commercial games often provide more enjoyment, which is a key aspect of using games in education, many teachers lack what is termed "gameplay capital". This means that they may not play games, hold negative views about them, or find them difficult to use. As a result, incorporating commercial games into the classroom can be challenging, because this requires teachers to familiarise with both the subject matter and the rules of the game to effectively engage with it.

As noted by participants from other countries in this study, many teachers are already struggling to keep up with the curriculum, which leaves little room for incorporating additional content such as video games. Consequently, many educators are hesitant to adopt innovative teaching methods, as these can be time-consuming, requiring software installation, teacher training, and student preparation.

"A lot of teachers want to try new things. We just need to provide them with the easiest way to start." (Teacher trainer, Poland)

Meanwhile, it is crucial to communicate to parents the rationale and methods for using video games in the classroom, as parents often perceive video games in schools as a waste of time. At policy level, incorporating video games into the curriculum presents an opportunity to legitimise their use in schools, recognising them as educational tools rather than mere entertainment. Against this background, one participant highlighted the Polish video game *This War of Mine*, which has been integrated into the secondary school curriculum as recommended interactive school reading, indicating that the government recognises the educational value of games.

Case Study Poland: *The first video game to make its way to the Polish National Education System*

By Dr Dominika Urbańska-Galanciak

Dominika Urbańska-Galanciak is doctor of humanities in the field of cultural studies, University of Warsaw. She is the Managing Director of the Association of Producers and Distributors of Entertainment Software (SPIDOR), she is responsible for the promotion of responsible use of video games and their use in education. She is author of the book "Homo player. Styles of reception of computer games" and member of the programme board of the Polish Game Research Society. She is member of the board of Pan-European Games Information (PEGI) and Women in Games ambassador. Since 2019, she is also a member of the Consultative Committee of the Polish Safer Internet Centre.

a) **This War of Mine: The first video game in history to be included in a core curriculum**

Since 2023, for the first time in Polish history, the Ministry of National Education included a video game in the high school curriculum as recommended interactive school reading. *This War of Mine* is a unique and critically acclaimed video game produced by the Polish [11 bit studios](#) about civilians trying to survive in a city ravaged by armed conflict. It is characterised by extraordinary realism in reflecting the grim reality accompanying wars and uncompromising portrayal of the morally and physically devastating fight for life. At the same time, the interactive aspect of the video game allows to look at difficult topics from the perspective of a participant.

On the [Ministry of Education website](#), the game is offered free of charge by 11-bit studios. A [66-page brochure has been prepared alongside for teachers](#), which contains all necessary information about the game and lesson plans together with

a description of the substantive objectives of the lesson, complementary materials, and worksheets. The lesson plans were prepared by experts from the Adam Mickiewicz University in Poznań. They cover the following subjects and lessons titles:

☆ **Polish language** – Lesson title: *War from a civilian's perspective*. A comparative analysis of the video game *This War of Mine* and the book *Memoirs of the Uprising Warsaw* in the context of the creation of the hero.

☆ **Social studies** – Lesson title: *This War of Mine as a basis for discussion about human rights in the realities of armed conflicts*.

☆ **Ethics** – Lesson title: *Solidarity regardless of the circumstances*. Video games as a space for developing empathetic attitudes.

b) **Interesting facts**

☆ The initiative is a good example of cooperation between the private sector, such as the video game industry, and the public sector, represented by the Ministry of Education. In its aim to reach schools, the project is also supported by the GovTech Center – an inter-ministerial team operating at the Prime Minister's office.

☆ The educational value of the game, emphasised by teachers who have used the game in their work with students, is primarily the narrative layer.

☆ 2023 was the first year of the initiative. As an accompanying event, the Foundation for Great Stories together with the Centre for the Development of Creative Industries announced a competition for students and teachers at secondary schools. The competition task for students was to write a story, reportage or diary based on the video game.

c) **Main achievements**

☆ The initiative helps to strengthen students' involvement in the topics discussed during lessons. The interactive nature of the experience, its emotional layer and subdued aesthetics, and above all, the narrative that the player shapes by taking

steps on his own, make *This War of Mine* present war in a compelling way. Decisions made by the player may cause remorse due to their potential consequences. Telling the story through player decisions helps understand the atrocities civilians are exposed to during armed conflicts.

☆ The game encourages students to learn history by presenting the conflict in a broad geopolitical and socio-cultural context.

☆ The game can be used as part of students' meetings with school psychologist and provide a basis for group reflection on open-minded attitudes towards other people's problems, also in everyday life.

☆ The lesson plans are designed to respond to the teacher's various needs: from the possibility of group work at school to encouragement for reflective play at home.

☆ The game helps develop literary skills. Like a work of literature, it can be subjected to linguistic and literary stylistic analysis supplemented with contexts resulting from interactivity.

d) **Main challenges**

☆ The implementation of the initiative involves the use of computer laboratories, access to which is limited in some schools.

☆ The requirements resulting from the need to implement the core curriculum do not give teachers enough time to include additional activities, especially innovative ones.

e) **How does this initiative contribute to enhancing the use of video games in education?**

Proposals for the use of games and gamification methods in education are often addressed to younger students. The *This War of Mine* initiative contributes to increasing the share of games in education because it is an offer addressed to secondary school students who have sufficient knowledge and emotional maturity to fully benefit from the interactive form of education.

"The award-winning video game This War of Mine is a Polish success story which can be discussed in pedagogical and social contexts in other countries too. The game confronts a player with the realities of civil wars, following the example of several masterpieces of 20th century prose. All characters and events presented in the game are fictional, and the story created by the player is universal and transnational. Deepening humanistic reflection on human rights, solidarity and dignity are universal ethical values for students throughout Europe and beyond."
(Dominika Urbańska-Galanciak, SPIDOR Managing Director)

4.7 Romania

For Romania, an online focus group interview was conducted on August 9th, 2023 with two participants: a deputy head teacher and an industry representative. Below is a summary of the key findings from this session.

4.7.1 Opportunities and challenges

Romanian participants discussed the various opportunities and challenges that video games present in schools. They noted that video games can enhance student motivation by making learning more enjoyable and relatable to their experiences. The educator highlighted how video games can bring lessons to life:

"I can describe how a medieval castle looks, the clothing of men and women, and so on. But we all know an image is worth more than a thousand words. Being able to see, touch, and enter that environment is far more valuable for education than just describing it."
(Educator, Romania)

Participants also suggested that the increased motivation from game-based learning could help address the issue of school absenteeism, a significant challenge in Romanian education:

"In underprivileged areas, some pupils are not as engaged with school, and they may not think that attendance is important. But if you make it more interactive by using video games, you can help boost students' attendance." (Industry representative, Romania)

Additionally, participants mentioned other potential benefits of using video games in schools, such as promoting strategic thinking, teamwork, and communication, particularly through multiplayer and strategy games:

"Pupils socialise in a different, non-formal way because they're doing what they like. They don't feel constrained. They don't have an authority to tell them what is good and what is not. And they can improvise, work together, and solve problems creatively." (Educator, Romania)

Participants identified several challenges that could hinder the adoption and integration of video games in the classroom. One key issue raised was the negative perception of video gameplay, which may make teachers hesitant to use video games in their lessons. Additionally, while some teachers may possess the skills to effectively incorporate games, many may lack the time, motivation, or necessary knowledge and digital skills.

In terms of resources, participants acknowledged that access to infrastructure and connectivity varies

widely across the country. They also pointed out that there are few educational games available, and even suitable options, like *Minecraft*, can be difficult to align with the curriculum. The discussion also addressed the gender gap. While other focus groups reported progress in reducing gender disparities, Romanian participants rather indicated that inequalities in ICT and digital skills still persist. They agreed that introducing video games in schools could help to reduce these inequalities.

Despite these challenges, the educator stressed the importance of keeping up with technological advancements, as today's students are growing up

in a vastly different digital environment compared to past generations.

"Students today are exposed to much more information than we were at their age, and we must recognise that they are growing up in a different, more challenging environment. It's new and difficult for us to understand. They were born into this digital era... It's hard to maintain some of the traditional aspects of education, like reading." (Educator, Romania).

Table 26 provides a summary of the main challenges and opportunities identified by Romanian focus group participants.

Table 26. Romania: Opportunities and challenges of using video games at school

Opportunities

- Video games offer the potential to **make school more engaging for students**, which is particularly important in countries like Romania, where attendance rates, especially in disadvantaged areas, are a concern.
- Integrating video games into education can **help reduce existing gender disparities** in ICT and digital skills.
- Students can **have fun while learning**. For instance, learning about history by being immersed in different cultures and historical periods in a game.
- Video games **allow children to express aspects of their personalities or interests** that may not typically be showcased in the classroom, such as sharing their hobbies or Video gameplay strategies.
- Multiplayer and strategy games **foster skills like strategic thinking, cooperation, and communication**, as students work together to devise plans and achieve common objectives.
- Video games can enhance hand-eye coordination and multitasking abilities.
- Certain games, such as puzzle games, **encourage focus and attention to detail**, which can be beneficial for children with learning difficulties.
- Video games can **cater to various learning styles**, making education more inclusive.
- Teaching students to create their own games can **enhance their IT skills** and deepen their understanding of video game mechanics.
- Video games **provide an effective way to learn foreign languages**, particularly English.
- They also offer **opportunities for immersive learning experiences**, such as through augmented reality.

Challenges

- The **negative perception of video gameplay** can make teachers hesitant to incorporate video games in the classroom, particularly if they believe that such games are distracting or expose students to potential online risks.
- Teachers may **lack the motivation or time** to implement them in their lessons.
- Access to **infrastructure and connectivity is uneven** across the country, limiting the ability of some schools to utilise video games in education.
- There is a **limited selection of educational games available**, and even popular options like *Minecraft* can be challenging to integrate into the curriculum.
- **Commercial games are not always suitable for school use**, as they are not primarily designed with educational purposes in mind and may contain age-inappropriate content.
- **Online risks associated with video games**, including exposure to violent or inappropriate content, as well as commercial pressures, are a concern for educators and parents alike.
- While incorporating fun into education is beneficial, **not all aspects of learning can be entertaining**. Some students may become easily frustrated with tasks they find unengaging, and the immediate rewards often found in video games can make it difficult for them to appreciate the time required for educational achievements. This is particularly challenging in a digital culture that prioritises instant gratification.

4.7.2 Enablers and obstacles

Participants also reflected on the factors they believe can either facilitate or hinder the use of video games in schools. Key enablers mentioned included motivated and capable teachers, strong infrastructure and connectivity in certain schools, students' enthusiasm for games, and financial support from the EU.

However, participants also identified several obstacles, such as significant educational inequalities across Romania, the "bad reputation"

video games have among some parents and teachers, and concerns about online risks.

"They can be a strength of the system but can also be a challenge, because of the bad image that some teachers have of games. When they hear video games, they think of something bad that distracts children from what they should be doing." (Industry representative, Romania)

Table 27 summarises the main enablers and obstacles identified by the focus group participants.

Table 27. Romania: Enablers and obstacles to video games in education

| Enablers | Obstacles |
|--|--|
| <ul style="list-style-type: none">● Motivated teachers, open to explore game-based learning at school.● Support through European funding to upgrade schools and equipment, especially after the Covid-19 crisis.● Supportive local governments which bring in investment for education and encourage innovative pedagogies.● The quality of internet connectivity in Romania, which participants described as of good quality.● The enthusiasm of students for video games can enhance engagement in learning.● The video games sector can create jobs, boost the economy, and foster collaboration between education and industry, leading to increased opportunities. | <ul style="list-style-type: none">● Significant disparities exist in Romania, with many schools, especially in rural areas, lacking adequate equipment and resources.● The rigid curriculum hampers teachers' ability to innovate in their pedagogical approaches, limiting their opportunities to experiment with new teaching methodologies and integrate innovative resources such as video games and other technology-enhanced learning tools.● The negative views held by some parents and teachers regarding video games pose a challenge to their acceptance and integration into the classroom.● There are apprehensions about exposing children to age-inappropriate content and the risk of video game addiction, which can raise concerns among educators and parents alike. |

4.7.3 Keys to success

Participants agreed that schools lack sufficient infrastructure and equipment, emphasising the need for a larger budget to address these gaps. They also highlighted the importance of providing education programmes and resources to support teachers in effectively using video games in the classroom, noting that ongoing teacher training is crucial.

The deputy head teacher stressed the need for educational games specifically designed for schools, rather than commercial games. He emphasised that these games must not only be engaging but also lead to concrete outcomes, such as the

development of new abilities, skills, or knowledge by the end of each class. According to him, if games are used solely for entertainment without clear educational achievements, valuable class time is wasted.

"It's ok to learn having fun, but it's not ok just having fun." (Educator, Romania)

The industry representative added that while children tend to gravitate toward commercial games, teachers often prefer educational ones, suggesting that a combination of both would be ideal. She cited the example of the Polish 11 Bit Studios' video game *This War of Mine*,

which focuses on the personal experiences of individuals living in war zones. In her opinion, this game represents a strong collaboration between game developers, teachers, and the Ministry of Education, demonstrating the potential for effective partnerships to create meaningful educational content that resonates with both students and educators.

"It's a morph, a combination, a mix between an educational game and a commercial game that everyone loves and adores." (Industry representative, Romania)

The industry representative suggested that effective collaborations between game developers and schools to adapt commercial games for educational purposes would be highly beneficial. However, the deputy head teacher cautioned that some games may be perceived as propaganda if they are not entirely accurate, emphasising the need for teachers to be careful when selecting games, as children may have difficulty distinguishing between true and false information. Both participants agreed that only safe, age-appropriate games should be used in schools.

The deputy head teacher also pointed out that teachers need adequate equipment, such as projectors and consoles, to integrate video games into lessons. While his school has most of the necessary resources, they still lack video game consoles to fully implement these educational activities. He added that the government should provide clear guidance on what kind of video games to use in schools and how to use them. Currently, there are no regulations, rules of engagement, or structured advice on how to ensure that games create a high-quality learning experience.

"The majority of the games are not suitable for use in school because they're very violent...I emphasised the idea that the state authorities must introduce rules how to use games in school. Now we are like in the Wild West, meaning that we are trying to use it, but we don't have rules, specific rules, or rules of engagement. We need regulation." (Educator, Romania)

Participants agreed that there needs to be greater awareness about the potential of video games, the variety of games available, and what children are playing at home. They also stressed the need for more education on the video game industry, its benefits, and how games can be effectively used as tools in the education system. The deputy head teacher emphasised that motivating teachers is key, as they need to understand how games can be a valuable asset in their teaching.

Regarding language requirements, the deputy head teacher remarked that games don't necessarily need to be in Romanian, as most children today have a good understanding of English. However, the industry representative noted that for older teachers, games in English might present a challenge. She suggested that having more games available in Romanian would be ideal, but also highlighted that games in English could offer an opportunity for students to improve their language skills.

On a curricular level, participants mentioned that some steps are being taken to introduce technology into classrooms, such as initiatives to incorporate VR tools (e.g. VR goggles) and small video games into textbooks. The new middle school curriculum introduced in 2017 includes digital textbooks in PDF format that feature small interactive icons, which provide access to digital content like quizzes, animations, or videos for additional learning. The Ministry is considering incorporating short minigames (lasting up to 5 minutes) into these textbooks, which could serve as a stepping stone for integrating more video games into education.

However, participants pointed out that lack of time and curricular flexibility are major challenges. Teachers often have little room to innovate, as most teaching time is strictly prescribed, leaving limited opportunity for experimenting with new pedagogical methods or incorporating innovative tools like video games. This rigid structure makes it difficult for educators to introduce new, technology-enhanced learning approaches in the classroom.

"We don't have enough time in curriculum for what we'd like to do because we are in a centralised system. There is strain from making the curricula say what to do in each specific hour. You don't have time at your disposal... I don't have spare time to use it for video games." (Educator, Romania)

Case Study Romania: Games in Schools Romania

By Andreea Medvedovici Per

Andreea Medvedovici Per is the Executive Director of the Romanian Game Developers Association (RGDA), Vice-President of the European Games Developer Foundation and Co-Founder of Women in Games Association Romania. Andreea is passionate about the game development community, wearing many hats inside it.

a) What is Games in Schools Romania?

In 2022, the Romanian Game Developers Association (RGDA) [translated the Games in Schools handbook into Romanian](#). From previous experiences in other countries using the handbook, RGDA recognised that without sufficient support and resources for teachers, meaningful progress in implementing games in the classroom would not occur. As a result, RGDA decided to launch a one-year pilot project alongside the handbook's release, providing additional guidance and support to 33 teachers of Math, History, and English from 12 schools across the country.

The programme offered teachers the necessary support to effectively apply the concepts learned from the handbook, helping them identify suitable games to enhance the curriculum and discover engaging methods for interacting with students in a video game-enhanced teaching environment. The selected schools for the pilot programme were located in rural or underprivileged areas, where students often faced poor performance on standardized tests and had alarming rates

of absenteeism, with some even experiencing complete school abandonment.

RGDA believes that this initiative can help prevent school dropout rates by providing a more engaging and motivating learning experience for children. Furthermore, as digital skills are increasingly essential for success in today's society, this innovative teaching approach aims to help students develop crucial digital and soft skills, such as teamwork and strategic thinking, that will benefit them in their personal lives and future careers, enabling them to thrive in an increasingly digital world.

b) Interesting facts

During the pilot project, which ran from October 2022 to September 2023, over 8,000 students in grades 5 to 8 participated in enhanced learning experiences in History, Math, and English through video games. Key highlights include:

★ **Support Initiatives:** RGDA developed how-to videos and created WhatsApp support groups for participating teachers during the pilot.

★ **Public Reach:** The initial phase of the Romanian *Games in Schools* project reached approximately 570,000 people.

★ **Future Plans:** For 2024, based on insights gained from the pilot and additional resources created, RGDA aims to expand to 300 schools nationwide, involving at least 1,800 teachers (two per subject—Math, English, and History) and 1,200 secondary school classes (including one class each for grades 5, 6, 7, and 8).

★ **Student Impact:** The initiative is expected to benefit around 32,400 middle school children, assuming an average of 27 students per class.

c) Main achievements

★ **Curriculum Development:** A math teacher involved in the programme is designing a curriculum for an optional class titled "Learn Math with Video Games," which she hopes to include in the national curriculum for nationwide use.

★ **Support Materials:** RGDA has produced significant supplementary materials to facilitate the

integration of games in schools, adding value to the handbook.

★ **Core Teacher Team:** RGDA has established a core team of experienced teachers who will continue to support the program's future deployment, providing invaluable feedback, practical ideas, and guidance for other educators interested in the Games in Schools initiative

d) **Main challenges**

The primary challenge faced by the programme has been the stringent curriculum in Romania, which allows little flexibility for teachers to incorporate additional activities in the classroom. This rigidity complicates the integration of video games into the learning process, as there is insufficient time to meet both curriculum requirements and engage students through gameplay. Consequently, the pilot programme required adjustments and modifications. While this involved a process of trial and error, the active engagement of participating teachers in refining the programme has given developers confidence that future iterations will be more accessible and easier to implement for educators.

e) **How does this initiative contribute to enhancing the use of video games in education?**

Teachers often find themselves overworked, underpaid, and tired, making it challenging to stay

current with innovative teaching methods like game-based learning.

By offering a practical, hands-on handbook on how to integrate games into classroom instruction, the programme aims to stimulate teachers' interest in game-based learning. The availability of this handbook in Romanian also helps to eliminate language barriers.

Without such a resource, which provides essential knowledge, practical guidance, and straightforward steps for incorporating video games into lessons, many educators would struggle to use games effectively in their teaching. By tailoring the *Games in Schools* handbook to address the specific needs and realities of Romanian teachers, RGDA aims to equip educators with the support necessary to begin or enhance their use of video games in the classroom.

"Our country is ranked lowest in terms of digital skills but also ranks low in standardised tests and school attendance in many communities around the country. A programme such as Games in Schools does not only help with teaching digital skills but also with better results at tests and school attendance since video games are something practically all children like." (Andreea Medvedovici Per, Executive Director of RGDA)

4.8 Sweden

The focus group in Sweden was carried out online on August 10 August 2023 and counted with six participants: a game developer, a video game producer, a university professor teaching games development, a Deputy Mayor of a City council and former teacher, a representative from the Swedish Games Industry and the Head of Secretariat for the Games Industry association of Sweden. Here, we summarise the main findings from this session based on the key research questions.

4.8.1 Opportunities and challenges

Participants gave their opinion about the main opportunities and challenges afforded by video

games at school. They referred to aspects such as the many (digital) skills and abilities that can be taught by means of games such as logical thinking skills, digital skills, gameplay literacy but also soft skills such as cooperation and leadership, as well as creative, social, communication and language skills.

"It should be normal for schools to talk about, understand, and criticise games and to be well educated audience members, which is what schools do with books. They do it with literature, they do it with music, they do it with audio-visual media to some extent." (Industry representative, Sweden)

Some participants thought that children can learn by playing, but also by creating games and reflecting about the games content and mechanics. Other participants acknowledged the potential of video games to stimulate more meaningful, and natural learning environments, while shifting the traditional power dynamics of the classroom. In this sense, participants agreed that the added value of games lies not only in the skills directly gained from video games, but also the context around it:

"When we're talking about using games in schools, I think we should look at the whole setting in the school and in the classroom. It's not just the sitting down [with] one pupil playing one game and seeing what skills could be transferred from that game." It's the whole social setting and the context in which you apply this game, and how the game can be used for discussing things. It can be used to discuss how things are portrayed in games and compare to our reality." (Game developer, Sweden)

During the session, participants also discussed the challenges that schools face when incorporating video games in their teaching and learning practices. Among others, they referred to insufficient school budget for video games, inadequate or deficient infrastructure and the need for more capacity building opportunities because not all teachers are comfortable with digital tools. Table 28 provides an overview of the main opportunities and challenges identified by the focus group participants from Sweden.

Table 28. Sweden: Opportunities and challenges of using video games at school

Opportunities

- Some **(digital) skills/abilities** such as logical thinking skills are developed through both playing and creating video games, as well specific gameplay literacy.
- Video gameplay comes more naturally to children, and this is an opportunity to develop more **meaningful, child-centric ways of learning** at school.
- Some video games can help children develop **soft skills** such as cooperation and leadership, as well as social, communication and language skills.
- There are **creative skills** that can be learnt through games creation such as art and writing.
- **Knowledge on school subjects can be supported** and made more interesting through video games and playful learning. For instance, by using worlds/characters that children are familiar with from games can help them to learn other subjects with more enthusiasm.
- **Games creation** can be good to teach children about systems and how different factors work together to produce systemic changes (e.g. how video games could be used to achieve the Sustainable Development Goals)
- Video games give the **opportunity to explore other worldviews**. Because the game designers impart their worldview on the game, through discussion and analysis of the game, children can learn to be critical of how different parts of the world portray themselves and others through games.

Challenges

- **Insufficient school budget** for video game and inadequate or deficient infrastructure.
- **Not all teachers are comfortable with digital tools** (e.g. Scratch) and video games. It is too difficult to teach through a game that you haven't played yourself. Therefore, more capacity building opportunities are required.
- **Considerable time is required to prepare lessons** where video games are well connected to the curriculum, especially if teachers are not familiar with those games.
- Although **some (digital) skills** and abilities are introduced during video games, they **may not be fully developed, applicable or transferable** to other settings.
- Because of **GDPR** schools cannot use certain games or platforms (e.g. Discord).
- Video games can be difficult for teachers to manage in the class. The teacher needs to feel that the **game is meaningful, accessible, and easy** to use.
- **Parental concerns** could be a risk because schools are under pressure from parents in many ways and new teaching methods such as video games can cause concern.
- Regardless of if their worries are based in truth, teachers cannot ignore them, particularly around the **screen time issue**.
- There are **misunderstandings around what games can achieve** in education.

4.8.2 Enablers and obstacles

During the focus group participants were invited to reflect on the aspects that, in their views, facilitate or hinder the use of video games at school. They referred to the flexibility of the school curriculum as an enabling factor because it makes it possible for teachers to use video games at school and draw meaningful connections to curricular content.

Some also pointed out that people's familiarity with some games (e.g. *Minecraft*) allows their smooth integration at schools. Among the obstacles identified by the participants, they referred to teachers' lack of time and the many demands imposed to teachers as important obstacles to properly introduce video games at school. Table 29 summarises the main enablers and obstacles identified by the Swedish focus group participants.

Table 29. Sweden: Enablers and obstacles to video games in education

Enablers

- A lot of people already play games in their free time (e.g. *Minecraft*). The **familiarity with these games** allows their smooth integration at schools.
- Because the **curriculum in Sweden is very flexible** and open to the school and teachers, it is possible to use video games and draw meaningful connections to curricular content.
- **Swedish schools have a responsibility to teach about media literacy** and it is in the curriculum integrated across different subjects.
- **Programming is part of the curriculum**, integrated into maths subject, which gives the opportunity to create games and hold workshops for students.
- **“Culture school”** is a great system where municipalities offer after-school creative activities at a discounted price, and some Swedish municipalities include video games in their programmes. It is a much easier system to change than the regular school because it is quicker and less hierarchical.
- There is a **Swedish network of culture schools cooperating around making games** across different cities.
- Formal digitalisation in the school system
- Games are in the regional development plan of some regions (e.g. Västra Götaland county).

Obstacles

- A **demanding school system** that expects teachers to take care not only of their teaching duties, but also of the mental health, sexual education, and other important aspects of students' lives.
- **Lack of time to properly introduce video games at school.** Although many teachers would love to use games in their classes, they are fatigued due to their many other school related responsibilities.
- Video game use at school **depends on the interest of the individual teachers** and whether they are comfortable with technology.
- Despite the opportunities offered by the “culture school”, **not all municipalities have included video games in their regional programmes.** This is dependent on how open the local authorities are to games.
- It is difficult to find a business that will support pedagogic games.

4.8.3 Keys to success

Having a strategic vision for technology in schools is important. This implies having clear and attainable goals, but also sufficient budget allocated for adequate school infrastructure including costs of maintenance, licences, etc. An industry representative noted that with good management there are more opportunities for innovative methodologies such as games-based teaching. For instance, certain schools see themselves as ‘IT positive’ or innovative. In these schools’ management usually supports innovative activities and invest in better access to technology and software. Therefore, instead of solely targeting teachers to persuade them to integrate video games at school, participants agreed that it is crucial to target higher levels such as school

management, public school networks or mother companies of private schools which may be part of a larger corporate structure. Educating teachers’ organisations or unions about the benefits of video games for education could also be a good access point to stimulate employers to provide the tools teachers need to grow in this area, as well as talking to policymakers.

To target higher management levels and policymakers, some participants commented that reaching an agreement about the benefits of games in school and the related implementation challenges is necessary. This would help school management and school principals to make better informed decisions. In this sense, a former educator noted that research and evidence are important, however, showing best practices would be more effective because teachers and principals are interested in successful teaching experiences and methods. In

sum, participants agreed that although changing educators' attitudes towards video games use at school can take a long time, this can be achieved by identifying opportunities to inspire educators and school management, by providing robust evidence about the actual benefits and potential risks of video gameplay, and by communicating best practices.

Participants also considered important to combat moral panics. In the participants' views, although moral panic about video games has been a constant in Sweden in the last decades, the focus of such moral panic has shifted. In the past people worried mainly about the impact of video games on violent behaviour, nowadays they worry about screentime dependency and the negative impact of video games on mental health. To counteract moral panics, good quality research and balanced communication about the impact of video games are key. He added:

"Part of what we can do as a trade body and what others can do as part of the game's ecosystem is to nuance the negative stories with good positive stories, which is another added benefit of for example, games in culture school. And I think there's an overarching attitude toward games: Either you think games do things to people or you think people do things with games." (Industry representative, Sweden)

Some participants further commented that the negative depictions of video games have reached politics. A former educator added that there is a general 'anti-digitisation' discourse in Swedish politics and that many have blamed the declining school results on digitalisation of education – although there is not enough scientific evidence to prove it.

When discussing teachers' needs, participants noted that video games could be part of teachers' initial training because nowadays video gameplay use depends a lot on personal interest and having the skills to apply game-based learning. Participants added that gameplay literacy is important, as well as a good training offer in game pedagogy. Access to support and teachers' networks were also mentioned as necessary to share experiences and good practices. A former educator added that the

time constraints of schools don't allow for a lot of time to plan classes and cooperate with colleagues or enhance their video game skills. He also noted that teachers can't do what they want:

"The other problem I would say is that teachers and principals are probably the Swedish civil servants with the clearest legal mandate directed to them in law."

As regards existing initiatives to foster the use of games in education, a games developer explained that they host a Gaming Literacy Day once per year, and this year it is going to be targeted towards educators so that they can get acquainted with methods and practical tools teach about games and how to use them. She added that individual teachers have a hard time developing extra things (like games) into education, so she suggested a national or European project to work on teaching guides to integrate games in schools would be beneficial. For this, national, regional, and European (financial) support would be useful.

A games producer added that currently video games are acknowledged commercially as a great export industry, but not as a cultural art form. He noted that improving this policy could get games acknowledged in different aspects of school and culture. He believed these policies need more effort, spaces for dialogue and funding from the government.

Finally, a games developer added that Sweden doesn't have a national video games strategy. Norway has one which is a big picture of the games industry and how games are impacting society and how they can support it, which includes games as cultural expression in schools. She thought Sweden would benefit from a similar national strategy.

Advancing NEETs through video games: Sweden

[FCV Sweden](#) has developed the [Gamecamp](#) concept to re-engage young people in education, specifically targeting NEETs (Not in Education, Employment, or Training). The initiative has successfully utilised gamification and game-based learning, with a notable 97% of participants transitioning to education or employment since its launch in 2021.

The Gamecamps, held during summer and winter, offer courses in programming, game design, digital graphics, and pitching techniques. Participants also create their own games and benefit from insights shared by guest lecturers from the video game industry, serving as positive role models.

The concept, developed in collaboration with Jobbcenter and municipal adult education, aims to address the exclusion experienced by young adults who are not engaged in work or study. By combining study and career guidance with game-based learning, Gamecamp helps boost self-esteem and motivation among participants.

A key component of the programme is the board game [Hot Skills](#), which prepares participants for the workforce through strategic challenges.

The Gamecamp initiative is supported by various local organisations and emphasises the importance of collaboration to tailor programmes to local needs.

Case Study Sweden: Fostering youth participation in local decision-making through Minecraft

By Felix Gyllenstig Serrao

Felix Gyllenstig Serrao is a licensed teacher of Social Studies and Geography for grades 6 to high school. He works as a pre-school teacher at Frölundaskolan in Gothenburg, where he teaches IT. His goal is to use digital tools in a way that standard analogue tools cannot be used. He lectures all over Sweden and is the author of the book "Minecraft as a pedagogical tool" published by Natur & Kultur.

Through his blog [Spelläraren.se](#), Felix informs parents about the video games their children play and how they can relate to games and game culture.

a) Citizen dialogue with youth through Minecraft

This initiative emerged in the fall of 2020 when nine municipalities in the Gothenburg region conducted **the Lupp 2020 youth survey**. In preparation for the next survey iteration, the municipalities continued working as a network, with the aim to keep an up-to-date view on relevant youth issues, fostering knowledge exchange on matters concerning young people. The participating municipalities recognised a need to improve the living conditions for young individuals.

Against this background, a [citizen dialogue](#) project was developed in 2023, financed through the sub-regional development funds (DRUM) from Region Västra Götaland, to offer a method for young people to articulate how their daily surroundings could become safer and to facilitate and motivate more meaningful and health-promoting recreational activities. The initiative involved using *Minecraft* as a creative tool for citizen dialogue between youth and decision-makers, aiming to strengthen the influence of young people in areas that concern them directly. The project aligned with the cultural mission and the Regional Cultural Strategy of Västra Götaland for 2020–2023, emphasising the importance of youth influence and creative expression. The initiative engaged young people from diverse backgrounds,

encompassing gender, location, and potentially socio-economic factors.

The target group were children and young people aged 8-19 in the participating municipalities. The collaboration involved relevant officials, including cultural, leisure, education, and urban planning personnel, as well as politicians. The main beneficiaries of this initiative included not only the participating youth but also municipal decision-makers, cultural and leisure sectors, and the broader community.

b) Interesting facts

- ★ The project placed a significant emphasis on cultural and recreational perspectives, aligning with the cultural mission and the Regional Cultural Strategy of Västra Götaland for 2020–2023.
- ★ By integrating cultural and leisure aspects into the dialogue, the initiative aimed to enrich the lives of young people in the region beyond immediate safety concerns.
- ★ The initiative allowed each participating municipality to tailor the workshop according to its specific needs and concerns. This flexibility ensured that the dialogue was contextually relevant and addressed the unique challenges and opportunities in each community.

c) Main achievements

- ★ Using *Minecraft* as a tool for civic dialogue proves to be effective for several reasons. Firstly, it taps into a platform that youths are already familiar with, providing a comfortable and engaging space for communication. By incorporating this popular tool, conversations are infused with a sense of enjoyment, creating a more receptive atmosphere.
- ★ One key strength lies in breaking away from traditional methods, injecting creativity, and excitement into what might otherwise be considered dull exchanges. This departure from conventional approaches helps dismantle resistance barriers, fostering a more open and dynamic dialogue.
- ★ Choosing to engage on the youths' own turf is another winning strategy. By entering their preferred arena, whether virtual or digital, it not only captures

their attention but also encourages them to open up more freely. The dialogue that occurs during gameplay takes precedence over the act of building in *Minecraft* itself, emphasising the importance of the ongoing conversation. It makes the process and dialogue during the process more important than the result of what they have built.

- ★ The initiative emphasised empowering young individuals by providing them with a platform to express their views and actively contribute to shaping their living environment. By using *Minecraft*, the project facilitated a hands-on, creative approach to discussing and addressing issues, promoting a sense of ownership and agency among the youth.
- ★ This unconventional approach has garnered positive reactions from various professionals, including teachers, architects, and urban planners.

d) Tackling challenges

- ★ Good collaboration with the stakeholders involved: One important challenge of this initiative was leveraging technology, especially video games, to schools. To tackle this issue, proactive steps had to be taken, such as acquiring *Minecraft* accounts. A good collaboration and the invaluable assistance from the dedicated individuals working within the Gothenburg region were key to the success of this initiative.
- ★ Offering technical support: The organisers actively participated in the installation process of *Minecraft* and served as technical support throughout the entire workshop.
- ★ Having clear goals and a well-defined implementation strategy: Maintaining a sense of structure, goals, and focus within the *Minecraft* setting is crucial. This ensures that the dialogue remains purposeful and aligned with the intended outcomes. As such, designing the dialogue and the purpose of the civic dialogue was very important.

"We encountered some challenges like leveraging technology especially in an educational setting. Because this isn't a universal reality for every school, we took proactive steps by, for example, acquiring Minecraft accounts. We also received invaluable assistance from the dedicated individuals working within the Gothenburg region." (Felix Gyllenstig Serrao)

e) **How does this initiative contribute to enhancing the use of video games in education?**

The initiative demonstrates how you can use *Minecraft* – in or outside the school – as a tool to consult young people. By using the medium they love, you give young people an opportunity to democratically express themselves, in a way that politicians, city planners, and other relevant stakeholders, will listen to them.

4.9 United Kingdom

The focus group in the UK was carried out online on September 9th, 2023, and counted with four participants: two secondary teachers with plenty of experience in the use of video games in class, one academic, one representative from the Ministry of Education. Here, we summarise the main findings.

4.9.1 Opportunities and challenges

During this session, participants shared their views on the main opportunities and challenges presented by video games in schools. They highlighted several positive aspects, noting that video games help children develop a wide range of digital and soft skills, including teamwork, collaboration, communication, computational thinking, problem-solving, and creativity. They also noted that while classroom games are typically low-risk due to being closed off from the public, proper teacher training is essential to ensure safety through effective setup and risk mitigation. Additionally, there is an opportunity to promote more accessible and inclusive games that can integrate with various assistive technologies.

Participants noted that while some schools use games like *Scratch*, *Minecraft*, and quiz websites,

other video games remain unpopular, and progress will be slow until their benefits are widely recognised. They highlighted challenges such as teachers lacking the knowledge or skills to integrate video games into the curriculum effectively and limited access to technology, as many schools have low-spec hardware and headteachers are reluctant to invest in consoles. Therefore, games should be available on alternative platforms. Additionally, subjects outside of Computer Science often face limited access to technology, with computer rooms frequently unavailable. Teachers unfamiliar with managing students using computers may also struggle to integrate technology effectively across various subjects.

"This is the gap: you can have access to all the devices in the world and children can have the devices and you can still do a task that doesn't redefine the learning and doesn't focus on the way that technology can promote the learning." (Academic, UK)

Table 30 provides an overview of the main challenges and opportunities identified by the focus group participants.

Table 30. United Kingdom: Opportunities and challenges of using video games at school

Opportunities

- Children develop **teamwork and collaboration** skills by sharing resources, working together, and reviewing each other's solutions.
- **Computational thinking skills** and subject-specific competencies are enhanced, depending on the program used.
- **Problem-solving and logical thinking** skills are strengthened through both playing and creating games.
- Designing games fosters **creativity and soft skills**, as well as improving presentation abilities and narrative design skills.
- Children **create games** in the Computing curriculum using programs like *Scratch*.
- **Resilience is developed through playing and designing games**, as students learn to debug and solve problems.
- The games used in the classroom are typically low risk, as they are closed off from the public. When teachers are properly trained to set up games and mitigate risks, **they are generally safe**.
- **Online safety is included in statutory safeguarding training for teachers.** From September 2023, teachers must be vigilant in using filtering and monitoring systems at school. If games are perceived as a hazard, teachers may avoid them, so it is important to have informed discussions about safeguarding while leveraging the benefits of games.
- There is potential to promote **more accessible and inclusive games in schools**, which can work with various assistive technologies.

Challenges

- Access to technology is vital in schools, as many have **low-spec hardware and limited investment in consoles**. Games should be available on alternative platforms, and teachers outside of Computer Science may struggle to manage technology, hindering integration.
- The introduction of video games in schools typically relies on the **enthusiasm of individual ambassador teachers**; sustainable approaches are necessary that do not depend on the willingness of a few individuals.
- **Teacher training** should include how games can enhance learning rather than simply replace traditional methods like pen and paper. Keeping teachers updated is essential for building their confidence and competence in teaching, but it is a significant challenge due to the **rapid evolution of the digital environment**.
- Video games are considered a legitimate qualification in post-16 education, making discussions and gameplay more appropriate in that context. However, **limited focus on video games in earlier education** results in fewer students choosing this path post-16.
- The use of traditional video games in English schools is lacking; while some games are utilised, there is **limited discussion about their pedagogical application in lessons**.
- In Northern Ireland, school computers are required to be connected to a single server, which blocks any content containing the word "game", except for *Scratch* and *Minecraft*. While this security measure aims to protect children, it **restricts access to potentially beneficial and age-appropriate online video games**.
- Children are often excited about video games and familiar with playing them, while teachers may have less experience. This can create **discomfort for teachers** if students are more knowledgeable about games than they are.
- Teachers are trained to maintain control of the classroom; however, video games offer a wider range of teaching methods that **require confidence and a willingness to relinquish some control**. This shift in teaching approaches also necessitates changes in assessment practices.

4.9.2 Enablers and obstacles

In the focus group, participants were asked to reflect on factors that they believe either facilitate or hinder the use of video games in UK schools. They expressed concerns about online risks, particularly those related to the well-being of children and

potential changes in their behaviour and attitudes, such as excessive screen time. However, they also raised critical points about the media's portrayal of video games. One participant highlighted how the media often focuses on isolated case studies and then generalises the negative impacts of video games, which may distort public perception. This

highlights a tension between real concerns about online safety and media-driven narratives that may exaggerate or oversimplify the effects of video game usage:

"I'm not underestimating that safety is important, but we are only promoting the negative. We aren't promoting that through [video games] young people find online communities, make friends, become part of a global network, learn. We promote the cases when something went wrong... its part of human nature to be cautious and vigilant. And these are the points that will come across in the points reported, [but] the experience we have when it's managed well and it's done with the specific purpose in mind, the outcomes have been positive." (Academic, UK)

Other obstacles identified by the participants include gender imbalance, teacher's lack of clear pedagogical purpose when using video games and school's overreliance on enthusiastic and knowledgeable teachers to introduce and use games in school.

Participants also noted that many children are already accustomed to playing video games, while most teachers may not have the same level of familiarity. This dynamic can make teachers feel uncomfortable if students are more knowledgeable about games than they are. Traditionally, teachers are trained to maintain control in the classroom, but video games introduce a broader range of teaching methods, from more traditional, didactic approaches to more playful and interactive ones. This shift requires teachers to have confidence and be willing to relinquish some control. In addition to adapting teaching styles, this approach also calls for a change in how students are assessed, emphasising the learning process rather than traditional outcomes.

"That does involve a little bit of letting go when you're sort of, you're shifting your role of 'I am the founder and source of all knowledge' to 'I'm facilitating your learning and I'm providing you with tools and mechanics where you're going to progress'. And I'm, in this instance, acting more as a facilitator rather than the master of all knowledge - that's a bit of a dynamic shift." (Academic, UK)

Table 31 summarises the main enablers and obstacles identified by the focus group participants.

Table 31. United Kingdom: Enablers and obstacles to video games in education

Enablers

- Some **schools allow children to use their own devices** for things like *Quizlet*, but it is up to the school's policy, and this may be the only way of bringing games into the class.
- There is a rise in individual **teachers who are open to exploring commercial video games** in the classroom.
- **The games industry is growing**, and it is a priority of this sector to recruit more talent. Although government investment has not been very high, there has been a shift in focus from government to try to support creative and digital industries.
- **The video games industry is becoming more involved in education** and more studios are producing distinctly educational games. Having these professional educational games that are more fun is a plus.
- **Developing games is already part of the Computing curriculum in the UK.** The use of video games to develop computing skills is part of the digital literacy policy.
- The **development of a Digital Creativity General Certificate of Secondary Education (GCSE)** is useful because there is a lack of teaching on digital creativity in the current curriculum.
- The **UK government is interested in supporting digital and creative industries.**
- The **Online Safety Act 2023** will hopefully serve to guarantee a more consistent approach about promoting safety as a priority which may bring more positivity about using games in the classroom.
- The **government announced that they expect all schools to deliver some form of computing education** throughout their time at school, not just in Computer Science.

Obstacles

- There are **a lot of negative stories in the media about video games** causing poor well-being, and it is important to change the narrative by working together to improve this.
- The prescribed curriculum is a barrier to using games. In fact, **the use of games is not mentioned in the curriculum** and their use is very light touch. Nevertheless, games creation is included in the curriculum and is taught in Initial Teacher Training.
- **Schools do not have enough guidance in professional pathways and the job market** so it is important to understand what jobs young people can get in the games industry. Career progression is a missing element in UK schools.
- There is a **lack of teaching on digital creativity** in the current curriculum.
- There are **many teachers who are biased against video games**, especially commercial ones. Yet, if teachers are very clear about the educational purpose of the game, then it should be ok to use them, even if they are commercial.
- **Video games are not recognised** as being valuable **educational tools** and **commercial games are not taken seriously** in traditional academic circles and in society, which stunts growth until perceptions are shifted.
- There is a **gender imbalance in the Computing subject.** Several factors contribute to this imbalance. Activities that have everyone in mind rather are better than gender segregated activities which may exclude children who do not want to stand out or who do not fit in the traditional gender binary.

4.9.3 Keys to success

The participants agreed that schools require funding for resources and support from leadership and governing bodies. One academic noted that when seeking approval from senior leadership, teachers need research to back their proposals. However, with digital technologies and digital literacy evolving so rapidly, keeping teachers informed and confident in these areas is challenging. Therefore, professional development for teachers is crucial. Collaborating with teachers will help to ensure that the use of games in schools is implemented effectively and efficiently.

Research plays a key role, as it is difficult to convince headteachers without solid evidence. This research is also valuable for communicating with parents, who often express concerns and may not be aware of the benefits of using games. One academic pointed out that there is limited research on the long-term effects of games and the skills they can develop over time. Teachers need this evidence to demonstrate that games can genuinely benefit students, helping to convince leadership to invest. While small-scale efforts are sometimes necessary, it would be beneficial to have a clearer understanding of the broader impact.

"There's still work to be done with sort of changing hearts and minds around the use of video games because there's still a stigma that video games are only good for doing a little bit of assessment at the end of a unit, and it's [just] a bit fun, but not really recognised as being a truly valuable educational tool."

Participants spoke about different ways teachers could become educated on video games either as part of their initial or continuous Teacher Training, for instance practical courses focused on games or as part of a larger digital skills professional development course which could have some sections on the inclusion of games in classrooms. Participants agreed that this type of training needs to be in the workload considerations of teachers, and there should be dedicated technical support.

As highlighted in some of the other focus groups, the UK participants also referred to the importance of platforms or networks where teachers can share information, experiences, and practical tips about how to integrate video games in their school subjects, such as Teach Meets where groups of teachers from similar subjects share ideas and digital resources.

There is a responsibility for providers (e.g. games developers) to be critical of their own work and provide evidence to prove that games work. One participant noted that it can be helpful to have a third-party evaluator because if the headteacher isn't interested, there won't be any video games in schools. It is important, therefore, to find people who the headteachers trust to approve games and to disseminate research. Headteachers are more likely to listen and accept evidence from organisations such as local authority and council, central government, or careers organisations.

"We can make portals and we can make websites and we can do all of these things, but the only people that are going to read it are the people that have the motivation to go and actively look for it, and those are the people you don't need to reach because they're already brought into it in some way, shape or form."

There also needs to be the teacher support and a staffing structure around them to feel that this is possible. Many educators are worried about lessons not working out the way they expect, not being able to deal on their own with technology-related issues, or kids being distracted by video games; Therefore, it is important to give teachers both freedom and confidence to try things out and to explore both innovative pedagogies and video games as a learning resource.

"If you know you've only got a finite time in terms of what you have to deliver, you're going to pick the things that you know work already rather than trying something new. So, time is a factor." (Academic, UK)

Some parents may still feel uncertain about the educational value of video games, thinking that children are simply "playing" rather than learning. It is important clearly communicate with pupils and their families, so they understand the learning objectives of the lesson. This involves integrating the video game into a structured teaching approach, starting by explaining the teaching methods and ending with a reflection on what students learned through the game. This helps them recognise their achievements. Rather than focusing only on the final "product", it is essential to make explicit the process that leads to these outcomes. This teaching method calls for a shift in assessment to focus more on the learning process rather than just the result.

At a policy level, the development of a Digital Creativity General Certificate of Secondary Education (GCSE) is significant because the current curriculum lacks sufficient focus on digital creativity, which is a key part of the Digital Skills Strategy. While there is a Computer Science GCSE that emphasises programming, and there was an IT GCSE that has since been removed, opportunities for students to explore digital creativity remain limited. In younger years, students engage in digital creativity activities (such as through video games), but beyond that, the only options are Computer Science or film and media studies, neither of which adequately address digital creativity. Although there is a vocational qualification that includes digital creativity, many schools stigmatise vocational pathways, often reserving them for students with lower academic performance, which limits access for all students.

Currently, students are expected to continue their computing education across other subjects, but this integration is inconsistent. The 14-16 age group in particular lacks sufficient opportunities to develop digital creativity skills, making it difficult for students to pursue careers in this field unless they are highly motivated. The proposed Digital Creativity GCSE would address this gap by providing an introductory pathway into the games industry and other digital creative fields.

Although the Computing curriculum for students aged 5-14 is intended to cover Computer Science, digital creativity, and digital literacy, its implementation varies greatly between schools. Additionally, the Teaching Standards and the Core Content Framework for preservice teachers do not explicitly reference the use of digital technologies, including video games, as teaching tools, despite the potential benefit of providing teachers with guidance on integrating technology effectively into the classroom. This omission is notable, as earlier versions of these standards did include such references.

Furthermore, while the government has invested in the Skills Up initiative, which focuses on post-16 digital skills, video games play a larger role in education after age 16. In contrast, for students under 16, the use of games is less common and left to the discretion of individual teachers. In primary education, game-based apps are used to support learning, but there remains a disconnect between the concept of gamification and the use of video games as valuable educational resources.

For broader acceptance of games in education, the curriculum needs to explicitly incorporate their use, especially to gain support from school governance. Without approval at this level, progress in integrating video games as learning tools will be slow. Finally, some participants acknowledged the importance of out of school, after school, computing clubs and community organisations in promoting the use of games.

Case Study United Kingdom: *Digital Schoolhouse – Inspiring and engaging learners and educators with creative computing and digital skills*

By Shahneila Saeed

Shahneila Saeed is Head of Education and Director of the Digital Schoolhouse program at Ukie and a former teacher with over two decades of experience in computing education. Shahneila played a key role in shaping the UK National Curriculum for Computing and has been recognized as one of GI.biz's 100 most influential women in the games industry. Shahneila has received the "MCV" award for educational impact. Currently, as Head of Education and Director of the Digital Schoolhouse program at Ukie, Shahneila remains dedicated to shaping the future of computing education.

a) **What is the Digital Schoolhouse programme?**

[Ukie's Digital Schoolhouse](#) is a not-for-profit programme which enables primary schools, secondary schools and colleges to experience free creative computing workshops from their local Schoolhouse.

The programme is funded almost entirely by the video games industry. Alongside its lead partner Nintendo UK, additional partners include PlayStation, Electronic Arts, SEGA, Ubisoft, Outright Games and Scirra. The programme has also received local and national government support previously, along with funding from Arts Council England.

The programme was developed by Shahneila Saeed who is Head of Education for Ukie and Director of the programme. It uses a play-based learning approach to teaching computer science and creative digital skills. Getting hands on with magic tricks, play dough, storytelling, dancing or even playground games are all playful techniques that form a key component of the Digital Schoolhouse curriculum.

Schools and colleges apply to join the Digital Schoolhouse programme and become a certified "Schoolhouse". Nominated Lead Teachers from each of these institutions then receive training which combines expertise and current thinking from both industry and academia. The Lead Teachers then use the skills and knowledge developed during training along with the vast array of free curriculum resources available to deliver workshops to local primary schools. Thereby, the programme aims are to inspire and engage both learners and educators with creative computing and digital skills.

The workshops delivered are free, and schools do not pay to join the programme. Schoolhouses are selected based upon their knowledge and ability to deliver computing and their desire to do so creatively. They support a wider community of schools with their own computer science delivery in an effort to upskill the local community.

The programme aims to be as inclusive as possible, aiming to provide innovative, creative and high-quality computing education equally to all children, with [over 40 different resources](#) freely available to help upskilling teachers.

b) Interesting facts

- ★ Digital Schoolhouse delivers immersive careers education through events and activities.
- ★ The programme created the first school-based esports tournament in the UK. This was launched in 2016 with just 4 schools, reaching over 400 students. It is currently reaching over 50 schools nationwide with an estimated reach of almost 10,000 students aged 12 – 18. The tournament not only raises interest in careers within the video game sector as well as developing an appetite for studying computer science, but it also develops key soft skills.
- ★ Digital Schoolhouse also created the first ever junior esports tournament for primary schools. Reaching over 3000 students aged 8 to 11 years old. This multi-title tournament serves as a cross curricular teaching activity where students apply a range of skills through the medium of esports.
- ★ Through the programme the Festival of Play was created, a tech conference for children between the ages of 8 to 15. The conference aims to teach and

engage children with creative digital technologies, whilst serving as valuable teacher professional development at the same time.

- ★ The programme has also developed One Minute Mentor, a series of short 60 second videos where students are able to hear an industry professional talk about their role and providing advice for the future. These videos have been integrated into lesson plans and are used by schools widely.

- ★ Digital Schoolhouse offers online lessons and activities that can be played directly from YouTube, these began during Covid-19 and facilitated home learning.

c) Main achievements

- ★ Developed the first ever school-based esports tournament in the UK at both junior (8 – 11 years) and senior (12 – 18 years) levels.

- ★ Mentioned as an example of best practice by the UK Government in their Creative Industries Sector Vision report.

- ★ Consistently significant [high impact](#) on the quality of teaching and learning over the last 10 years of the programme.

d) Main challenges

Securing enough financial partnerships to back Digital Schoolhouse's vision for growth can slow growth. For example, a significant contribution could be made to the development of digital skills in local communities through an expansion of its work in Libraries. However, lack of funding for this has stifled growth in this area.

e) How does this initiative contribute to enhancing the use of video games in education?

Digital Schoolhouse does not just demonstrate how video games can be used in education, but it facilitates its implementation in the classroom. The activities and initiatives provide key guidance and infrastructure as well as classroom resources and materials to facilitate adoption by teachers. The training days provide an open forum for discussion, creating a two-way dialogue between industry and education. The programme contextualises the delivery of computer science through video games and in so doing make the curriculum subject more attractive to a broader range of students.

05 Conclusions

The popularity of video games among children and young people has sparked significant research into their potential educational value across formal, informal, and non-formal learning environments. There is now a substantial body of evidence supporting the educational value of video games. Both educational and entertainment video games have been shown to improve motivation, cultivate cognitive and problem-solving skills, promote 21st century competencies, foster emotional and social growth, and support more inclusive learning environments. Advances in technology have also made these tools increasingly accessible in schools, offering diverse ways to meet educational goals.

This report set out to explore how video games are being used in European classrooms today, building on the foundational research from the previous 2009 *How are digital games used in schools?* study. Through surveys of 1,474 educators from 26 countries and nine focus groups, it became clear that video games are seen by many teachers and experts as important tools for enhancing learning. Video games not only motivate students but can also accommodate different learning styles and simplify the delivery of complex concepts, including for students with special needs. However, there is a clear need for greater investment in professional development for teachers, as 88% of teachers assessed their ICT skills as average to high, but many still require specific training in game-based learning.

The findings also show that teachers who incorporate video games into their teaching tend to have higher self-assessed ICT and video gameplay skills compared to those who do not use games in the classroom. Additionally, teachers who use video games in teaching are more likely to engage with gameplay in their free time, suggesting a correlation between personal video game experience and professional use. For instance, 45% of teachers using video games in our survey are ICT and computer science teachers, compared

to 18% humanities and social science teachers.

This underscores the need for focused efforts on improving teachers' digital and gameplay literacy as part of broader pedagogical development, as well as increased efforts to link innovative pedagogies to a wider range of curricular areas.

The successful integration of video games into education is contingent upon the availability of affordable and high-quality technical infrastructure, including reliable internet access, hardware, software, and video game licenses. 66.5% of teachers reported difficulties in finding suitable games, while 61% cited financial constraints, and 57% mentioned technical issues as barriers to integrating video games into their classrooms. For video games to be effectively used in educational settings, they must align with national and local curricula, be age-appropriate, and user-friendly. Crucially, support from school leadership and higher authorities is necessary to facilitate the meaningful adoption of game-based learning strategies.

While video games hold potential, concerns from parents regarding online risks and excessive screen time present barriers. These concerns are often amplified by negative media portrayals. Effective and transparent school policies and strong communication between schools and families are essential in addressing these concerns, ensuring that parents understand the educational value of video games while maintaining trust in their safe and responsible use.

The study also highlights the need for collaborative efforts between educators, game developers, instructional designers, and academic experts to create engaging and meaningful educational content and resources. This cooperation is vital for designing evidence-based learning environments that effectively integrate video games. Furthermore, involving children, families, and policymakers in this process will help shape innovative, child-centric educational practices across Europe.

In conclusion, the evidence suggests that video games—whether designed specifically for education or as entertainment—have the potential to transform learning. By addressing key challenges such as pedagogical integration, infrastructure deficiencies, online safety, and the well-being of students, educators can harness the power of video games to create dynamic, skill-building learning experiences for young people.

06 Recommendations for key stakeholder groups

Based on the findings from the 2023-2024 *Games in Schools* research report, and the comparisons with the previous 2009 study, several recommendations

can be made for key stakeholders involved in the integration of video games into educational settings:

6.1 For policymakers and educational authorities

☆ Increase funding and access to resources:

- **Invest in infrastructure:** Ensure that schools have access to up-to-date hardware, software, and reliable internet connectivity. This is essential for successfully integrating video games and other digital technologies into the classroom.

- **Facilitate access to affordable licenses:** Free or low-cost licenses for educational video games can enable schools to innovate and explore methodologies like game-based learning without financial constraints. Local authorities can facilitate access to these games, licenses, and other innovative educational resources by collaborating with the game sector. These partnerships must take place within an ethical framework which respects children's rights and ensures their safety in the digital environment.

☆ Consistently invest in teacher training and development:

- **Foster digital literacy and skills development in schools:** By promoting continuous professional development and offering adequate resources, teachers will gain confidence and skills to integrate video games and other digital technologies into the curriculum. This will help students engage meaningfully and responsibly with video games and other digital tools.

- **Encourage the meaningful adoption of innovative teaching methods,** such as game-based learning approaches, which have demonstrated potential to increase students' motivation and engagement in education.

☆ Establish clear guidelines and support structures:

- **Develop national databases:** Create and maintain updated databases of suitable games for education, available in different languages, that are age-appropriate, GDPR-compliant, and aligned with local curricula. This would alleviate teachers' concerns about finding suitable games, addressing the limited time available for finding effective innovative teaching materials.

☆ Enhance educational support for disadvantaged groups:

- **Ensure comprehensive, inclusive digital education:** Schools play a critical role in fostering digital competencies. To promote equitable access to digital skills and address both digital and social inequalities, it is essential that schools provide comprehensive digital education that is accessible to all students. This education should not only be thorough but also engaging. Leveraging innovative strategies such as game-based learning can help effectively capture students' interest and enhance their skill development.

- **Address gender disparities:** Promote gender-neutral and inclusive video games in educational settings to ensure equal opportunities for all students, especially in STEM and science fields where gender divides are still prevalent.

☆ Promote digital parenting and video game literacy:

- **Support families in guiding their children's use of digital technologies:** Recognising the challenges many families face in guiding their children through the digital landscape, it is essential to provide accessible digital literacy

resources tailored to parents and carers. These resources should include training in video game literacy and practical strategies for effective digital parenting. Empowering parents with these tools will enable them to better support their children's digital experiences.

Key takeaway: Consistently invest in teacher training and encourage the meaningful adoption of innovative teaching methods, such as game-based learning.

6.2 For school leaders and administrators

☆ Cultivate a school culture that embraces creativity and innovation. Encourage an open-minded atmosphere for teachers and students to experiment with new ideas and teaching methods, including game-based learning. This can lead to a more dynamic and effective learning experience.

☆ Support professional development:

- **Commit to continuous learning:** Participate in professional development opportunities to enhance your digital skills and understanding of game-based learning. Gaining knowledge in these areas will better equip you to guide and support your teaching staff as they adopt innovative, technology-based teaching practices.
- **Offer regular training:** Provide ongoing professional development opportunities focused on game-based learning, digital skills, and innovative teaching methods. Encourage participation in courses and workshops, such as the [Games in Schools MOOC](#) available in the [European Schoolnet Academy](#).
- **Promote responsible digital citizenship:** Schools should provide resources and guidance to help students develop responsible digital habits, including managing screen time, game literacy and practicing safe online behaviours. By learning to navigate digital spaces safely and critically, students can make informed choices about their online activities and learn to be active and responsible digital citizens.

- **Encourage peer collaboration:** Foster a collaborative environment where teachers can share innovative best practices and resources, such as game-based learning, both within and across schools.

- **Facilitate teacher autonomy:** Give teachers the flexibility to choose video games and design innovative learning activities based on the specific needs and interests of their students, while ensuring that these choices support the overall educational objectives.

- **Develop partnerships with local experts to enhance educational practices and resources:** Focus on connecting with professionals who can provide valuable insights and relevant expertise. This collaboration will enrich the curriculum and innovate teaching methods, creating a more comprehensive learning environment for students.

☆ Engage with parents and the wider school community:

- **Communicate benefits clearly:** Develop transparent policies on the use of video games at school and actively communicate these to parents. Explain how video games can be used meaningfully to enhance learning, addressing common concerns about screen time and online safety.

- **Foster a shared vision:** Work towards creating a whole-school culture that embraces the responsible use of video games in education, at school and home, ensuring that all stakeholders—teachers, parents, students, and administrators—are on the same page.

Key takeaway: Participate in professional development opportunities to enhance your digital skills and understanding of game-based learning, and support your teaching staff as they adopt innovative, technology-based teaching practices.

6.3 For teachers and educators

☆ Enhance digital and video gameplay literacy:

- **Engage in game-based learning:** Incorporate game-based learning activities in your classes to make learning more engaging and to build problem-solving, critical thinking, and collaboration skills. These activities should align with students' interests, making learning both relevant and enjoyable.
- **Encourage self-directed exploration:** Encourage students to explore digital tools and games that support their individual learning goals. With the support of teachers, they can select (educational) games that match their needs and interests, cultivating a sense of autonomy and responsibility in their learning.
- **Encourage collaboration among students:** Schools should encourage collaborative projects that allow students to share their knowledge, learn from one another, and build teamwork skills within a digital context. Game-based learning and other innovative pedagogies can help encourage peer-to-peer cooperation.
- **Engage in continuous learning:** Take advantage of available professional development opportunities to enhance your digital skills and understanding of game-based learning. Use resources like the [Games in Schools Teachers' Handbook](#) and free online courses offered on the [European Schoolnet Academy](#) to stay updated on best practices.
- **Experiment with different games:** Explore a variety of educational and entertainment video games that have educational potential. Consider how different types of games can be adapted to suit different learning styles, activities and objectives.

☆ Align games with curriculum and teaching goals:

- **Ensure curriculum integration:** Select video games that can align with national and local curricula. Work with colleagues and students to identify how games can be integrated into lesson plans to enhance educational outcomes.

☆ Foster inclusivity and engagement:

- **Select inclusive games:** Choose games that are inclusive of all gender identities and are designed to engage a diverse student population. Ensure that the games you select are free from stereotypes and promote positive values.
- **Adapt games to student needs:** Use video games as tools to support differentiated instruction, especially for students with special needs or those who may be less motivated by traditional teaching methods.

☆ Engage with parents and the wider school community:

- **Share best practices:** Regularly share your experiences and strategies for using video games in the classroom with your colleagues. Participate in teacher networks and online communities to exchange ideas and resources.
- **Communicate benefits clearly:** Explain to your students and their parents how video games are being used to achieve learning outcomes and to enhance learning, addressing common concerns about screen time, privacy, commercial risks and general online safety concerns.

Key takeaway: Embrace innovative teaching methods, work with students to identify meaningful ways to integrate games into lesson plans and communicate clearly with parents about the educational value and purpose of using video games at school.

6.4 For the video game sector and industry stakeholders

☆ Collaborate with educational experts and engage with teachers and parents:

- **Work closely with teachers and educational experts** to (co-)design game-based learning, video games or gamification resources that align with national and local curricula. Ensure that the video games chosen for these activities are user-friendly, age-appropriate, and support specific learning objectives.
- **Collaborate with educators and experts to identify user-friendly and age-appropriate commercial off-the-shelf (COTS) video games** that align with national and local curricula. Use this knowledge to (help) create accessible databases of games suited for education.
- **Offer transparent and affordable licensing models:** Provide clear and affordable licensing models for educational institutions, making it easier for schools to access high-quality games, minimising financial or legal barriers.

- **Provide clear information about data privacy policies:** Inform educators and parents in an accessible and user-friendly manner on how data from video games used at school may be collected, stored, and used.
- **Focus on accessibility:** Design and/or promote games for education that are accessible to children and young people with diverse needs, including those with cognitive or developmental impairments.
- **Cultivate inclusivity:** Ensure that the video games you develop and/or promote for educational use embrace inclusivity and avoid reinforcing gender, cultural, or other sorts of bias and stereotypes.

Key takeaway: Work with educators and experts to (co-)design game-based learning resources and to identify COTS that (can) meaningfully align with local curricula.

6.5 For parents and the wider school community

☆ Engage with school and teachers:

- **Understand the educational value of video games:** Take an active interest in how video games are used in your child's education. Attend school meetings or workshops that explain the educational value of video games and how they can enhance learning.
- **Support school initiatives:** Be supportive of the school's initiatives to integrate video games into the curriculum. Provide feedback to teachers and administrators and work together to ensure that video games are used effectively and safely in the classroom.

☆ Have an open dialogue with your children:

- **Support your child and show interest:** Try to understand why and how your child is engaging

with video games. Aim to ensure that your child's use of video games is balanced and contributes positively to their learning experience. Encourage healthy gameplay habits and be open to the benefits of games in education. Provide support in navigating any potentially problematic situations, fostering a positive and constructive relationship with video gameplay.

Key takeaway: Support your child's balanced use of video games and engage with school initiatives to integrate them into the curriculum, encouraging healthy video gameplay habits, and providing constructive feedback to educators.

6.6 For researchers and the academic community

☆ Continue advancing research and evidence-based practices:

- **Track long-term effects:** Implement longitudinal studies to assess the long-term impacts of video games on various educational outcomes, including cognitive development, motivation, and academic performance. This can provide a deeper understanding of the sustained benefits and potential drawbacks of game-based learning.

- **Explore diverse game types and platforms:** Research the effectiveness of different types of video games (e.g., simulation, role-playing, puzzle) and game mechanics across various educational contexts and subjects. Analyse how different types of games (mechanics) support different learning objectives and student needs.

- **Evaluate game-based learning models:** Examine various pedagogical models for integrating video games into the classroom, including gamification and game-based learning. Evaluate which models are most effective for different age groups, subject areas, and educational settings.

☆ Enhance collaboration and knowledge sharing:

- **Foster cross-disciplinary collaboration:** Collaborate with teachers, students, the video game sector and other experts to ensure research findings are practical and applicable. Jointly identify appropriate games for education and develop frameworks and guidelines for their effective use in education.

- **Share research findings:** Make research findings accessible to educators, policymakers, the media sector and the public. This transparency helps bridge the gap between research and practice, facilitating informed decision-making and a balanced media coverage.

- **Encourage teacher-led research:** Support and promote action research projects where teachers investigate the impact of video games in their own classrooms. This can provide valuable

insights into practical challenges and effective strategies for game-based learning.

☆ Contribute to curriculum development and policy:

- **Inform curriculum design:** Provide insights into how video games can be integrated into curricula across different subjects and educational levels. Help develop frameworks that guide the selection and implementation of educational games in alignment with learning objectives.

- **Inform and influence educational policies:** Collaborate with policymakers to create standards and guidelines that facilitate meaningful, effective and equitable use of games in education.

- **Develop and promote evidence-based guidelines:** Establish evidence-based guidelines for educators on the effective use of video games. These guidelines should address issues such as game selection, integration into lesson plans, and assessment of educational outcomes.

☆ Address ethical and practical considerations:

- **Reflect on the potential impact of video games in education on children's rights and privacy:** Research the possible implications of using video games in school on children's rights, data privacy and security. Develop guidelines for ensuring that video games used in education comply with data protection regulations and safeguard students' personal information and children's rights.

- **Examine inclusivity and accessibility:** Investigate how video games can be designed to be more inclusive and accessible to students with diverse needs. Research how games can address and overcome existing barriers related to gender, disability, socio-economic status, etc.

- **Assess screen time and health impacts:** Study the health impacts of increased screen time associated with video game use in education. Examine how to balance screen time with other activities and mitigate potential negative health effects.

☆ Encourage innovation and future research directions:

- **Explore emerging technologies:** Research the potential of technologies such as artificial intelligence (AI) or virtual reality (VR), in enhancing game-based learning experiences. Evaluate their effectiveness compared to traditional video games.
- **Study video game design and educational impact:** Analyse design elements and research how specific elements of video games, such as narrative and mechanics, impact educational outcomes. Identify best practices for designing games that are both engaging and educationally effective.
- **Assess global and cultural perspectives:** Conduct cross-cultural studies to explore how video games are used in education across different cultural and regional contexts. Compare findings to understand global trends and adapt practices to diverse educational environments.

Key takeaway: Collaborate with educators, students, video game developers, and other experts to identify suitable games for education and create effective usage frameworks, while ensuring research findings are widely accessible to bridge the gap between research and practice.

By addressing these recommendations, all stakeholders can contribute to creating a more effective and inclusive environment for using video games in education, ultimately enhancing student learning and engagement. Researchers, in particular, can contribute to a more nuanced and comprehensive understanding of the role of video games in education, ultimately supporting the development of effective, evidence-based practices and policies that enhance learning outcomes for students across Europe and beyond.

List of references

Appendix 1: Focus group protocol

Appendix 2: Online survey

The full list of references, the focus group protocol and the online survey questionnaire are available at <https://www.videogameseurope.eu/games-in-society/education/about-games-in-schools/>.

GAMES

in schools

