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R2.3

Integrated Pedagogical Framework

GAMEDUCATE

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1. INTRODUCTION

Over the past decades, learning and pedagogical thinking has changed a lot both in theory and practice. Learning theories, activities, outcomes and pedagogical strategies have been newly shaped with the significant development in Information and Communications Technologies (ICT) (Jonassen, 2006; Stahl, Koschmann & Suthers, 2006). An important example of this is the concept of “Gamification”. Gamification is a modern approach to increasing people’s engagement by activating the human play instinct and directing a person’s focus and engagement to a specific task (Anderson, 2012). It involves creativity, critical thinking, problem solving, evaluating, communication and collaboration skills. If digital elements are added, then students also get the chance to learn digital essential components of the 21st century educational requirements.

In this context, gamification and digital tools have the potential to transform the learning objectives and classroom practice transforming the acquisition of information, learning by heart and flat coverage of content into the construction of active knowledge with the help of authentic learning methods (Herrington & Kervin, 2007). At the same time, teachers and students need a solid theoretical foundation to more effectively integrate mobile technologies for mobile learning into their teaching. This potential is what the GAMEDUCATE project aims to address.

The project “GAMEDUCATE” addresses digital transformation and gamification within school education by providing teachers with a gamification curriculum, innovative teaching tools as well as online and offline training on how to integrate such methods and tools within a formal teaching context.

In this sense, GAMEDUCATE includes the following objectives:

1. To gain insights on the current needs and skill gaps regarding innovative teaching methods and digital technology in education in the partner countries in order to assist in localising innovative pedagogical approaches, by conducting an in depth and holistic analysis of the national curriculum of each partner country, including desk research and field research (in the form of focus groups and surveys), consulting with teachers, school leaders as well as the Ministry of Education. This would assist in developing more personalised and relevant to the teachers in each country curriculum and training, which in turn can further enhance their key competences as well as their professional development and in doing that addressing the aforementioned school education priorities of supporting teachers as well as improving their key competences.
2. To enhance the professional development of teachers, school leaders and other teaching professionals by providing them with relevant and easily adaptable innovative teaching methodologies and pedagogies in the form of a curriculum (modules) in order to enhance and improve their teaching. It will also offer teachers relevant training for the curriculum development in virtual, hybrid and face to face learning environment as well as a best practice guide based on the impact assessment and feedback received from the piloting of the curriculum.

3. To create an integrated curriculum framework, consisting of 9 modules, based on the local curricula and the research conducted at each partner country, which can be used and easily adapted to curricula in other countries. This would enable the transferability of the results of GAMEDUCATE to different levels of education such as adult education, different sectors e.g. business and different countries in the EU and globally. This curriculum will consist of innovative teaching approaches such as gamification and digital tools and methodologies on how to easily and successfully integrate them in formal school teaching.
4. To provide a comprehensive digital toolkit which will include an online platform (including the curriculum material, namely the 9 modules produced), digital technology tools, videos and other multimedia means which teachers can incorporate into their teaching, thus improving their key competences and contributing into transforming their teaching into competence based as well as developing new ways of assessment, in line with the school priority related to improving key competences. This toolkit can also act as a means of digital transformation in education, as it will enable teachers, in addition to incorporating digital technology tools in traditional school settings, to also improve their digital skills as educators, which is one of the priorities of the Digital Education Action Plan (2021-2027).

In the course of the project so far, focus groups have been conducted in the seven project partner countries (Austria, Cyprus, France, Greece, Italy, Spain, Slovenia), where 33 teachers shared their opinions, experiences and needs on the topic of Gamification within school education. The results were summarised in a transnational report (R2.2 - Focus Group Report on local needs and expectations of GAMEDUCATE). The results of the needs analysis have of course also been incorporated into the present document.

This document R2.3 Integrated Pedagogical Framework is part of WP 2 - Curriculum Development and Validation.

The Integrated Pedagogical Framework has the purpose

1. to be an internal pedagogical framework that should be used as an project internal guidance for developing R2.4 The GAMEDUCATE curriculum/ training module
2. to serve as a pedagogical and theoretical foundation and orientation for the GAMEDUCATE project (especially the implementation phase within WP 3 - Digital Toolkit and WP 4 - Implementation of Curriculum)
3. to be useful also for further projects, organisations and sectors that are interested into implementing Digital Tools (specifically Gamification) within their teaching and learning environments

In detail, the application form states the following:

“Activity 2.3 seeks to standardise the Curriculum through the establishment of an integrated framework so that a) it aligns with EQF standards, b) it can be replicated to all partner countries, c) it can be transferred to other EU countries, and d) its innovative



approach can be transferred to other sectors and learning environments” (application form, p.59).

“The Framework will include details about the expected duration and format of learning activities, as well as indicate their alignment with appropriate European qualification standards.” (application form, p.52).

“Developed by ÖJAB with contributions by partners, it will analyse the localization findings and set them within a standardisation process to determine desired learning outcomes and ways to reach them. The report will be published on the project website as GAMEDUCATE’s exemplar practice.” (application form, p.59).

A pedagogical framework is crucial for incorporating gamification and digital tools into an educational curriculum since it provides a structured approach to learning, and ensures the integration of these elements in alignment with educational objectives and with specific learning goals and outcomes. The main objective of creating a specific pedagogical framework is to ensure that gamification and digital tools are not just added for novelty or entertainment but are intentionally designed to enhance and support the educational objectives of the curriculum.

In this context, a pedagogical framework provides a systematic approach to instructional design. It helps to create meaningful learning experiences by defining the overall structure, sequence, and progression of activities that incorporate gamification and digital tools. This ensures that the learning activities are coherent, scaffolded, and build upon each other to promote deep understanding.

In the best case, projects are dynamic and capable of adapting to circumstances in order to improve quality. Accordingly, it is possible that aspects recorded here will still change or develop further in the course of the project.

2. KEY FINDINGS

On a transnational level, the following main findings and implications for the GAMEDUCATE projects have emerged from the focus groups;

- *Different digital literacy levels among teachers:* There is wide variation among teachers in terms of their "digital" skills and experience, often derived from the age gaps. These different digital literacy levels should be considered in the development of further results, taking into account beginner as well as more digital advanced teachers.

For teachers who have little to no experience with the use of digital tools, we should try to accommodate the “fear of contact” to some extent. To stimulate their motivation and



curiosity, it would be good e.g. to present why these approaches are beneficial to highlight all its potential and relevance in order to motivate teachers to use them.

- *Lack of adequate equipment:* In all focus groups, the lack of adequate equipment (e.g., enough and functioning computers) was an issue. It should be kept in mind to pick up tools, apps, etc. whereas little equipment or just basic devices as possible are needed for the implementation of GAMEDUCATE material and to offer tools & games that would work offline as well.

- *Almost no experience with Gamification:* It can be concluded that among the focus group the participants have significantly more experience in the use of digital tools than in the area of gamification, where there is little to no experience among the participants (most likely experiences with simulations and role-playing games). For the further course of the GAMEDUCATE the project consortium would have to create a basic introduction in the subject area "Gamification" within school education. This could include practical and simple Gamification examples with accompanying instruction material on how to incorporate specific gamification elements into the lecture.

- *Practical approach:* Almost all focus groups would wish for additional practical examples and guidelines on how to use and implement specific digital tools within their daily teaching activities, in order to make it easier for them to develop an implementation scenario in their own conditions and teaching context. Some would wish for ideas on how to adapt them to different contexts (depending on the subjects, students' ages or level, or the length of the class/group). Here, it would have to be clarified whether the GAMEDUCATE resources allow the developed materials to be translated into the respective national languages for a better understanding and easier usage.

In two focus groups, it was also expressed that an exchange between teachers on this topic would be helpful for the practical implementation (e.g. how do other teachers incorporate specific tools, how do they deal with specific challenges). Such an exchange option could possibly be considered for WP4.

- *The age difference of the pupils* with the implied different learning needs should also be taken into account within GAMEDUCATE. This means that the learning materials and tools GAMEDUCATE will offer have to allow some differentiation regarding the age (as well as different subjects).

- *Dependency on teachers and schools efforts:* Whether digital tools are used in the classroom depends mostly on the teacher (their motivation and skills) as well as the school (depending on available equipment and resources and school management initiative).



- *Lack of access to tools:* Since many tools are fee-based, some tools are already falling away for teachers. Therefore, it would be relevant to make sure that GAMEDUCATE picks up tools that are not chargeable and are still usable in the medium and long term. Within 2 focus groups the lack of apps in the regional language was mentioned. This raises the question if GAMEDUCATE should focus on tools that are also available in multiple languages, besides English.

- *Time management:* The issue of time management came up in most focus groups in one way or another. For example, it was mentioned that a lot of time is lost when electronic devices don't work as they should, or that teachers often do not have enough time to get to know and familiarise themselves with digital tools on their own in addition to daily teaching. These challenges that teachers face should be considered by GAMEDUCATE. For example, one way would be to use games that are simple (little preparation and explanation time, little equipment needed, no registration of individual students). Another option would be for GAMEDUCATE to suggest a "Plan B" for class management in case the digital usage doesn't work like it should as well as listing possible challenges that students might experience. GAMEDUCATE could also point out digital tools that can make certain aspects of teaching even more efficient and beneficial regarding time management.

-*Security management:* What came up in some of the focus groups was the uncertainty and concerns about the data regulation and bureaucratic needs in the context of youth protection when using digital tools (e.g. regarding registration) as well as the risk of students going to websites that are not suitable for young people. Privacy policies vary from region to region, nevertheless this should not be ignored. Therefore it has to be discussed among the project consortium in which form this aspect should be taken up within the project.

-*Regional differences:* Although there were many similarities between the focus groups, there are regional differences as well. Some have already been mentioned before (e.g. regional data and youth protection regulations) and others will become apparent in the course of the project. Thus, the challenge for the project is to take into account the regional differences on the one hand and on the other to produce materials that can be used on a transnational level (and possibly easily adapted to regional conditions by the users).

-*Pedagogical Approach:* What was stated was that digital tools and gamification should be used to promote a specific pedagogical approach that includes experiential learning, fostering social interaction among students and disrupting "conventional" frontal teaching. It should allow experimentation, trial and error. At the same time it should not be the main focus, to use digital tools and gamification as an end in itself bearing the risk of "playing for the sake of playing" within lectures. Rather, it should be used as an add-on to daily

teaching to make the educational content tangible and experiential. Teachers should still be in the classroom as teachers, not ostensibly as technicians or animators. This approach should also be reflected throughout the GAMEDUCATE project.

3. GAMEDUCATE Curriculum

As mentioned at the beginning, one of the main outputs and goals of GAMEDUCATE is to develop a Training Curriculum for school teachers (and other teaching professionals) consisting of 9 modules.

The curriculum will

- be implemented in the course of the project online as well as within live trainings
- support teachers in learning more about Gamification and its integration within the school environment (theory, concrete digital tools, methodologies, etc)

This pedagogical framework will be the pedagogical base for the development of the Training Curriculum.

3.1. Gamification

Since "gamification" is one of the core concepts at GAMEDUCATE, a brief explanation of the project's internal understanding is useful at the beginning of this framework.

"Gamification" is generally defined as the use of game design elements, game-based methods and strategies in non-game contexts (Deterding, 2011). These elements can take the form of using quiz games, creating an adventure game or strategy games, simulations, etc. In other words, educators apply game design elements to an educational setting that allows the inclusion and integration of game elements and activities in a non-typical format (Kapp, 2012) by integrating the existing environment with the mechanics of the game. Essentially, it takes key elements of games such as design, action or activity, fun and competition to reach the goal, which is usually to make learning more engaging, immersive, and fun. In education, gamification is hoped to increase student engagement, promote a particular form of learning, or positively influence certain behaviours such as mutual support, punctual attendance, adherence to class rules, and the like.

Complex tasks require a high level of attention, which can be more easily achieved through the use of play elements. The human play instinct can be used beneficially in various fields of application (Eibl, Gaedeke, 2017). Ideally, on one hand, learning successes can be achieved and, on the other hand, the motivation to master the task in the best possible way can be increased (Huotari, 2012). The term gamification is also increasingly discussed in the context of social behaviour, since strengthening social interactions is a fundamentally



positive property of gamification (Hamari 2014). Thus, in addition to the (rudimentary) transmission of declarative knowledge, gamification offers the possibilities to strengthen social behaviour:

- to describe and explain
- to learn
- to influence (Herranz, 2013)

The aims of the modified “Gamification” lessons are to increase students` competences in social areas, to place game content in the school routine in a way that promotes motivation, to improve the learning experience and, with regard to high school students, to reduce the risk in the long term that young people in the ninth or tenth grade, especially in vocational schools, will become “NEETs” (Not in Education, Employment or Training). Three factors can be identified as the most significant benefits of gamification:

- Students are allowed to make mistakes and they can repeat a quest as many times as they like until they can solve it.
- Traditional exams are error-oriented. In the gamified system, however, XPs can be accumulated over a longer period of time and success is emphasised.
- Conventional instruction is mostly teacher-centred, while students in gamified instruction must solve tasks independently.

In the whole “digital field”, gamification also means the improvement and development of educational competencies and skills of teachers in the institutions and at the same time digitalization of education by adopting a broader mindset that encompasses digital skills, cutting-edge technology and human-centred design which has the potential to transform traditional classrooms and learning processes. The integration of digital technologies (desktop computers, mobile devices, the Internet, software applications, and other types of digital technology) improves the educational system. It includes transformation of the process to create better, faster, and more efficient outcomes based on greater interactivity, active participation of students and a more personalised way of teaching.

Accordingly, gamification within GAMEDUCATE always refers to digitalized gamification. When talking about “digital tools” in the following pages, this refers to the general use of various digital aspects (this implies both hardware and software) and thus also implies gamification.

3.2. Pedagogical Approaches

In order to prevent pedagogical activities from being carried out in an arbitrary and unreflective way, a pedagogical framework should provide a theoretical frame and a structure for pedagogical activities. Accordingly, it is relevant that the pedagogical approaches underlying the activities are also theoretically underpinned within the Pedagogical Framework. Talking about pedagogical approaches, a distinction can be made between the pedagogical philosophy (describing beliefs about how students learn) and



high level pedagogy (describing the approach and connection between philosophy of learning and action) (Goodyear 2005).

What should underlie all teaching activities and approaches is gender and diversity sensitivity. Therefore, it is important to teach inclusive and intersectional content to avoid unconsciously reproducing discriminatory practices.

For the incorporation of gamification and digital tools in the curriculum we suggest the following learner-centred/learner-driven pedagogical approaches.

Collaborative Approach:

The collaborative approach to education focuses on cooperative learning and working together in groups. It recognizes the value of social interaction and collaboration in the learning process. In this approach, students work in teams or small groups to complete tasks, solve problems, and share knowledge. They learn from one another through discussion, negotiation, and mutual support. Collaboration fosters communication skills, teamwork, respect for diverse perspectives, and a sense of shared responsibility. Kirschner et al (2011) notes that people may feel more confident regarding highly complex tasks when working in groups compared to working alone because they can use the processing capacity, expertise, and knowledge of others and because the high cognitive load can be distributed among group members. Incorporating gamification and digital tools into the educational curriculum can enhance the collaborative pedagogical approach by fostering engagement, teamwork, and interactive learning. It's essential to provide clear guidelines, expectations, and assessment criteria for collaborative activities that incorporate gamification and digital tools. Additionally, offering support, guidance, and opportunities for reflection can enhance the effectiveness of these approaches in the collaborative pedagogical environment.

Reflective Approach:

Burns et al (2012, 23) note that “Reflective pedagogy refers to the idea that professionals carefully evaluate their own work, seeking to understand their motive and rationals as well as their practice and then try to improve upon their work”.

The reflective approach encourages learners to engage in self-reflection and metacognition. It focuses on developing students' ability to think critically about their own thinking and learning processes. Reflective learners analyse their experiences, identify strengths and weaknesses, set goals, and monitor their progress. Teachers facilitate reflection by asking thought-provoking questions, providing feedback, and guiding students in self-assessment. This approach promotes self-awareness, autonomy, and continuous growth. Digital tools can foster the distribution and collection of reflection responses. By offering timely and constructive feedback to students on their reflections and

encouraging them to critically analyse their own thinking, educators can help to identify areas for improvement, and set goals for future learning.

Inquiry-Based Approach:

The inquiry-based approach to education focuses on fostering curiosity, investigation, and independent thinking. It centres around posing questions, conducting research, and seeking solutions through active exploration (Lee 2014). Students are encouraged to ask questions, formulate hypotheses, design experiments, gather and analyse data, and draw conclusions. This approach nurtures a sense of inquiry, scientific literacy, problem-solving abilities, and a deep understanding of concepts.

Summarising all three pedagogical approaches, we can say that each of them brings its unique perspective to education, promoting student engagement, critical thinking, collaboration, and the development of lifelong learning skills. Educators often combine elements from multiple approaches to create a dynamic and effective learning environment.

Gamification and digital tools have the potential to increase student engagement and motivation by making learning more interactive, immersive, and enjoyable. Using the following pedagogical approaches can help the educators to design activities that leverage these elements effectively, taking into account students' interests, abilities, and learning preferences in a student-centred learning environment.

3.3. Benchmark Index: Defined Learning Outcomes

For the development of and implementation of the curriculum, specific benchmarks will be created based on the R.2.2 Focus group report results. Benchmarking helps setting the standards, since it is data-driven and ensures that standards are targeted and focused on things that have the most impact. Von Kistowski et al (2015) define Benchmark as a "Standard tool for the competitive evaluation and comparison of competing systems or components according to specific characteristics, such as performance, dependability, or security".

Benchmarking is important for the creation of the curriculum for the educators involving gamification and digital tools because it provides valuable insights and reference points which will guide the design and implementation process. It will help to make informed choices regarding the selection of appropriate curriculum for the educators involving gamification techniques, digital tools, and instructional strategies. By analysing benchmarking data, the potential benefits, risks, and feasibility of incorporating specific elements into their curriculum can be evaluated.

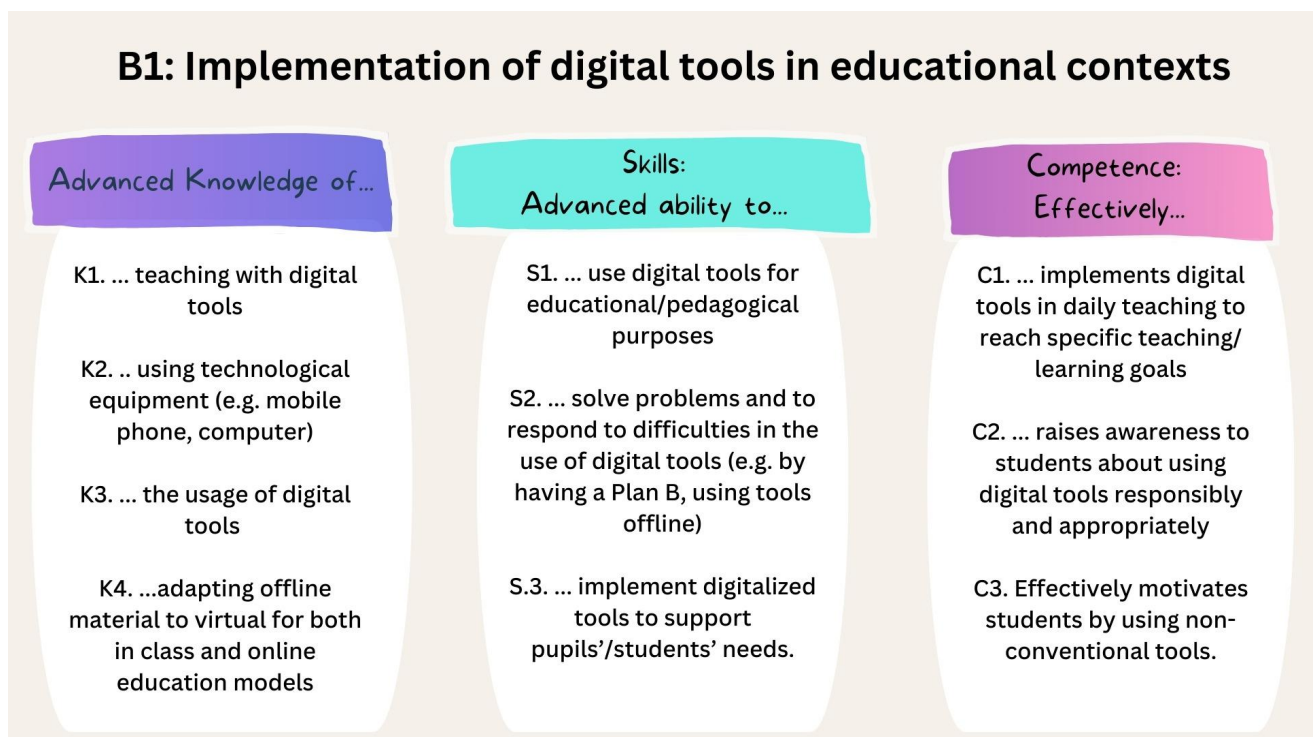
By comparing their program's performance against benchmarks, achievement of the desired goals and outcomes of the curriculum can be assessed. This evaluation process provides valuable feedback for continuous improvement and refinement of the curriculum

over time. Furthermore, benchmarking promotes quality and innovation by encouraging the curriculum to stay up-to-date with the latest trends, advancements, and emerging practices in gamification and digital tools in education.

Below is the benchmark index that will be applied throughout GAMEDUCATE, namely the curriculum as well as within the online and live trainings for teachers. The GAMEDUCATE benchmarking index will focus on the desired learning outcomes of the teachers within the GAMEDUCATE learning/training activities (WP3 and WP4). The defined learning outcomes should

- derive from the gaps and needs we discovered within the focus group
- align with the EQF standards (at least level 6) as stated within the application form
- be relevant for all partner countries/ have an transnational value

What is not mapped in the benchmarks-index is the exact school type. The Differentiation into pre-primary, primary and secondary school teachers will be done within the curriculum development.



(B1, B2, B3, etc. stands for "Benchmark 1", "Benchmark 2", "Benchmark 3", etc.)



B2: (Digital) Gamification in educational contexts

Advanced Knowledge of...

- K1. ... how to adapt (digital) gamification for pedagogical purposes (best practices)
- K2. ... digital gamification tools
- K3. ...how gamification can boost students' motivation and performance

Skills: Advanced ability to...

- S1. ... use the right gamification method for specific pedagogical goals
- S2. ... implement gamified tools to support pupils'/students' needs
- S3. ... solve problems and to respond to difficulties in the context of (digital) gamification

Competence: Effectively...

- C1. ... implements gamification in daily teaching to reach specific teaching/ learning goals
- C2. ... solves problems and is able to respond to difficulties in the use of digital games
- C3. ... motivates students by using gamification

B3: Role and Importance of gamification in kindergarten

Advanced Knowledge of...

- K1. ... gamification in kindergarten classroom teaching (e.g. advantages, disadvantages, best practice)
- K2. ... using different and age appropriate models for digitalised education in kindergarten
- K3. ...adapting offline material to virtual (for both in class and distance) education models

Skills: Advanced ability to...

- S1. ... research and understand online platforms, online games, online materials, required procedures
- S2. ... integrate established learning materials to an online environment
- S3. ... evaluate the impact of digital/gamified teaching

Competence: Effectively...

- C1. ... uses different teaching methods/models in the kindergarten classroom to reach specific pedagogical goals
- C2. ... measures the progress
- C3. ...familiarises the educational setting to digital tools



B4: Gamification in the context of inclusion

Advanced Knowledge of...

K1. ...an inclusive and intersectional use of digital tools and gamification (taking into account aspects such as LGBTQIA+, special needs, different languages, etc.)

Skills: Advanced ability to...

S1. ...create educational activities which take into consideration different life worlds, circumstances needs and abilities of the students

S2. ... use tools which are developed specifically for people with different needs & abilities

Competence: Effectively...

C1. ... design educational activities in a way to secures the inclusion of all students

C2. ... promotes the usage of the gamification and digital tools as methods of inclusion

B5: Digital tools & time management

Advanced Knowledge of...

K1. ... adequate time management in classroom in general

K2. ... good practices of time management techniques with digital tools in the classroom

Skills: Advanced ability to...

S1. ... apply digital tools for a better management in the classroom

S2. ... choose the right digital tool at the right time in order to be more efficient and effective

Competence: Effectively...

C1. ... uses digital tools in daily teaching in the context of better time management

C2. ... uses the right digital tools at the right time

C3. ... educates students on time management techniques (using digital tools) that will be useful to them at every stage of their lives



B6: Data protection regulations

Advanced Knowledge of...

K1. ... the current data protection regulations in the respective country and EU General Data Protection Regulation (GDPR)

K2 ... the data protection guidelines of the respective institution

K3. ... the interconnection between data protection and child protection/ youth rights

Skills: Advanced ability to...

S1. ... use digital tools in conformity with the GDPR

S2. ... detect the reliability of the used digital tools

Competence: Effectively...

C1. ... uses safe digital tools conforming with data protection regulations

C2. ... educates students about (the importance of) data protection in the context of children & youth rights and protection

B7: Media literacy and critical thinking

Advanced Knowledge of...

K1. ...media literacy in the context of digitalisation in the classroom

K2. ... methods to identify reliable information in the internet

Skills: Advanced ability to...

S1. ... find and access reliable and relevant information resources, as well as online tools

S2. ... critically analyse and evaluate the information available online and weak points of different digital tools

Competence: Effectively...

C1. ... chooses and implements reliable and relevant information

C2. ... promotes students' awareness about "fake news" as well as their autonomy by developing their media literacy skills and critical thinking



B8: Gamification and group dynamics

Advanced Knowledge of...

- K1. ... group dynamics, team theory & teamwork
- K2. ... how gamification can promote interaction & teamwork in class

Skills: Advanced ability to...

- S1. ... apply specific gamification tools according to current group dynamics
- S2. ... use gamification for fostering collaboration among students

Competence: Effectively...

- C1. ... teaches essential teamwork aspects to students through gamification
- C2. ... stimulates social interaction and promotes teamwork skills via gamification



B9: Creativity & artistic expressions through digital tools & gamification

Advanced Knowledge of...

- K1. ... the relevance and benefits of creativity and artistic expressions for the integral development of pupils
- K2. ... the wide range of online resources available for developing creativity (e.g. virtual reality, podcasts, 3D modelling, 3D printing, interactive stories)

Skills: Advanced ability to...

- S1. ... use of digital creative tools during lecture
- S2. ... use digital tools and gamification for developing pupils' creativity through different means and activities.

Competence: Effectively...

- C1. ... motivates students to be creative and express themselves through arts and artistic means with the use of gamification and digital tools
- C2. ... promotes open-mindedness, respect and empathy as key principles for the creation process through different gamification methods

B10: AI tools & Ethics

Advanced Knowledge of...

- K1. ... the (potential) role of AI in school education/ daily teaching (e.g. homework)
- K2. ... AI ethics (AI Code Of Ethics)
- K3. ... opportunities and risks of AI tools in school education

Skills: Advanced ability to...

- S1. ... incorporate AI in daily preparation and teaching appropriately
- S2. ... give homework in the context of AI
- S3. ... engage students critically with AI and to raise students' awareness of the risks, opportunities and ethical questions

Competence: Effectively...

- C1. ... implements AI tools in a secure and appropriate way within school education
- C2. ... raises awareness and critical thinking of students regarding AI

3.4. Strategies for reaching the desired learning outcomes

Once the learning objectives for teachers have been defined, it is equally important to elaborate how these learning objectives should be achieved in the course of GAMEDUCATE.

To achieve the Outcomes, the following measures will be set:

- Within WP 3 an online learning environment for teachers will be created, that will include an online digital toolkit to achieve desired learning outcomes. "This toolkit will include resources about digital technology tools that can be used in education, relevant examples of innovative pedagogies in school education and other relevant material. It will be fully web 2.0 compliant and will include all the standard and expected social media features that are now an essential part of on-line learning. Access to the project's Training Toolkit will be free and sustained even after the end of this project." (application form, p.60)
- Within WP 4, learning and upskilling opportunities for teachers will be organized, to bring teachers in direct contact with the GAMEDUCATE Curriculum.
- Additional multiplier events, where the opportunity for personal exchange as well as Q & A sessions on the topic of "Gamification in school education" will be offered.

3.5. Potential challenges

As we found out within the focus groups, most teachers have little to no digitised gamification experience. Therefore one challenge within GAMEDUCATE will be that the participating teachers will achieve an EQF level 6 (which corresponds to Bachelor knowledge and skill level) within only a few online and live training sessions.

Further challenges that we have discovered are the following once:

- **Students Engagement, Motivation and accessibility**

While gamification can enhance student engagement, maintaining long-term motivation can be a challenge. Some students may lose interest or become disengaged if the game mechanics or rewards are not well-aligned with their individual needs and preferences.

As well, not all students have equal access to technology or gaming experiences outside the classroom. Teachers need to consider how to provide equitable access to gamified learning experiences and ensure that all students can benefit from the approach.

- Lack of availability or bad functioning of digital tools

One of the concerns expressed also by participants of the focus group is also related with the availability and quality of resources, especially regarding digital tools. We must keep in mind differences in this respect, which are closely interrelated with the economic possibilities of the different centres and the students and their families. Not all centres have the possibility to afford enough digital devices for all the students or to change them frequently, so teachers may face the situation in which they have few digital devices or even old devices that don't function correctly, which implies difficulties for carrying out their labour efficiently. Because of this, it is key to make clear for the teachers that these problems may happen (sadly very frequently in some centres), but this doesn't mean that they cannot still take advantage of gamification and the use of digital tools. It is key to develop their ability to adapt to the situation and find suitable alternatives with the materials available: for example, sharing the computers, even only one for the entire class and performing the activities in teams; asking the students to use their phones, if possible; etc. Also, regarding the situation in which teachers ask the students to perform activities at home using digital tools, it is key to keep in mind different reasons. Thus, it is also very important to highlight the need to offer alternatives and adapt the curriculum to the situation of all the students irrespectively of their socioeconomic background and possibilities.

- Lack of experience of teachers

As we found out within the focus groups, most teachers have little to no digitised gamification experience. Therefore, one challenge within GAMEDUCATE will be that the participating teachers will achieve an EQF level 6 (which corresponds to Bachelor knowledge and skill level) within only a few online and live training sessions. For doing so, it would be key to: first, understand the starting point of participants and adapting the training to them, starting from very basic concepts if needed; second, to set a clear and well-organised program with well-established priorities before starting the training, as well as regulate and adapt it constantly during the development of the training accordingly with the needs of participants; and thirdly, to give priority to the creation of a good and solid basis that may allow the teachers to keep this training path even after their participation in this project. In this respect, it is fundamental to make clear for these professionals how important it is for them not only to acquire this expertise but also to keep updating themselves accordingly with social changes and students demands.

In this respect, potential problems may appear in the concrete case of older teachers, because of the age-gap regarding digital skills -as mentioned before-. It is also fundamental to take into consideration these differences and offer specific support to older teachers.

- Lack of motivation by teachers

Another potential problem could derive from the lack of motivation by teachers to adopt these new methodologies, since they require an active effort from their part. This

phenomenon may happen especially in the case of the professionals with long experience with traditional teaching methodologies: as they are very used to these ones, they may present some resistance for doing the efforts of changing their habits and usual practices. To reduce this risk it is fundamental to, as we mentioned before, emphasise the great benefits of these practices and methodologies, as well as facilitate this process of change by supporting teachers throughout the process with, for example, individual tutoring sessions.

- “Bad” students’ response or behaviour

Potential problems may be derived from the students’ response and behaviour. First of all, it is important to make clear for teachers that these methodologies are also new for many students: some of them have only experienced traditional methods and of course they also need time to adapt themselves to the new context. Thus, some patience is needed even if the initial response of the students might not be as good as expected. This is going to be a common learning process for both teachers and students towards a new way of learning and teaching. Another thing that may help in this scenario is to also explain to students the benefits of these activities as well as what is expected from them to make them work.

Second key aspect is related to the length of the group: most activities implying the active participation of students are performed better in smaller groups, which also allows the teacher to provide a more personalised support. Because of this, it would be preferable to form small groups when possible.

- Lack of time to implement gamification due to unsuitable schools programs

It is common for school programs to be overloaded. Even when teaching in a traditional way, teachers struggle to complete the imposed program within the allotted time. Sometimes, programmes are not even finished during the school year or teachers pass fastly on some subjects. Adding gamification could exacerbate the difficulties to complete the programmes in time, because of the time needed to explain the game and its purpose, and also to give feedback in order to extract the knowledge acquired thanks to the game.

Thus, to ensure the implementation of the gamification in daily teaching, governments should take into account its necessity when creating the programme.

- Concern about extended screen time

Anxiety and mixed reactions regarding the implementation of digital tools in the classroom and at home for homework / lesson preparation has been observed amongst teachers and parents, as such a practice would extend to a quite considerable degree the time children spend in front of screens. Concerns are also raised by health professionals discussing the impact of screen time in the children’s overall wellbeing and health. On the other hand, there are also various opinions on how digitalisation affects children’s and young people’s socialisation skills.

3.6. Security aspects: Data Protection and Youth Protection

The use of digital tools in the classroom is also always associated with data protection issues. Therefore, it is important to address this.

In order to use certain online tools, personal data often has to be shared, also by the students (e.g. e-mail address, name or age). In comparison to adults, children are less capable of understanding the long-term effects of consent to their data collection, therefore they deserve their data to be managed differently. While digital tools can bring many benefits to the children, it is still a challenge to protect and empower children, as well as to grant them control over their data (UNICEF 2021).

When using gamification and digital tools in education, there are several important security aspects to consider, particularly in relation to data and youth protection. In that context, the regional legal and institutional framework conditions should always be taken into account. On the one hand, data protection regulations and youth protection guidelines are specified at the political level. The educators should ensure that any personal information collected from students, such as names, contact details, or academic records, are handled securely and in compliance with applicable data protection laws (e.g., General Data Protection Regulation - GDPR). On the other hand, it is also important to find out which guidelines apply within the school, since this may also vary from school to school. Therefore, this should also be clarified with the school management.

Possible ways to implement appropriate data protection measures would be encryption, access controls, and secure storage, to safeguard student data. Appropriate consent and parental authorization for collecting and using students' personal data should be obtained. It's crucial to inform students and their parents/guardians about the purpose and extent of data collection, how it will be used, and who will have access to it. Techniques like anonymization and pseudonymization to minimise the risk of identifying individuals from the data should be considered. By removing or replacing personally identifiable information, student privacy can be protected while still gaining valuable insights from aggregated data. The educators should make sure that the digital tools and gamification platforms used have robust security measures in place. This includes secure communication protocols, regular security updates, and protection against common vulnerabilities, such as cross-site scripting or SQL injection. Strong user authentication mechanisms, such as unique usernames and passwords, to prevent unauthorised access to student data should be implemented. Additionally, appropriate access controls to restrict data access based on roles and responsibilities within the educational institution should be employed. Secure channels for transmitting sensitive data between users and systems should be used. Encrypted connections (e.g., SSL/TLS) should be employed to protect data while in transit, preventing interception or tampering. Monitoring mechanisms to detect any potential security breaches or data misuse should be implemented. It is advised to create an incident response plan in place to address security incidents promptly, minimise their impact, and communicate appropriately with affected individuals. Regular audits to assess the security



of your systems, processes, and data handling practices should be conducted. The educational institution should comply with relevant security standards, legal requirements, and industry best practices.

Furthermore teachers, administrators, and students should be aware of data privacy, security best practices, and potential risks associated with using gamification and digital tools. A culture of responsible data handling should be promoted and users making informed decisions regarding their privacy should be empowered. When using third-party gamification or digital tools, their security and data protection measures should be carefully evaluated. Their privacy policies, data handling practices, and security certifications should be reviewed in order to ensure they align with your institution's requirements. By addressing these security aspects, student data can be protected, promoting a safe learning environment, and ensuring compliance with data protection regulations and youth protection laws. For further input the comprehensive publication 'The Case for Better Governance of Children's Data: A Manifesto' by UNICEF is recommended.

4. CLOSING WORDS

In conclusion, embracing gamification and digital tools within the classroom can revolutionise the way we educate and engage students. By incorporating these innovative approaches into our pedagogical framework, we can create dynamic learning environments that foster collaboration, critical thinking, and a love for learning.

Gamification offers a powerful mechanism to capture students' attention and motivate them to actively participate in their education. By infusing game elements such as challenges, rewards, and friendly competition into the learning process, we tap into the natural desire for achievement and fun, making learning an enjoyable and immersive experience.

Furthermore, integrating digital tools amplifies the possibilities for interactive and personalised learning. Through the use of educational apps, online platforms, and multimedia resources, teachers can cater to diverse learning styles and adapt their instruction to meet individual needs. Digital tools also open up opportunities for global collaboration and the exploration of real-world scenarios, breaking down the traditional classroom walls and expanding students' horizons.

However, it is crucial to remember that the success of gamification and digital tools lies in the pedagogical foundation that underpins their implementation. Teachers should carefully design and align these strategies with learning objectives, ensuring they enhance the curriculum rather than overshadow it. Moreover, ongoing assessment and feedback are essential to gauge student progress and refine instructional methods.

The educator's role is to empower students with the skills and knowledge they need to thrive in a rapidly evolving world. By embracing gamification and digital tools, the educators are equipped with a powerful arsenal to engage and inspire the digital natives of today. Let us embrace this pedagogical framework, combining the best of traditional teaching with the endless possibilities of technology, and embark on a journey of

transformative education. Together, we can create a future where learning knows no bounds.

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