GAMIFICATION AND GAME-BASED LEARNING THROUGH TEACHERS' EYES

A comparative study in Cyprus, Hungary, Slovakia and Romania

Impressum

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Contents

INTRODUCTION

The 21st-century skillset demanded by many a workplace these days clearly challenges the educational systems around the world, many of which still operate on 20th-century principles. As Seymour – Papert (1991) put it:

*"Success in the slowly changing worlds of past centuries came from being able to do well what you were taught to do. Success in the rapidly changing world of the future depends on being able to do well what you were not taught to do." (*Vision for Education: Caperton & Papert)

Education struggles on both a systemic and an individual level to meet the challenges of the Fourth Industrial Revolution *(the term was used by Klaus Schwab in 2015 at the World Economic Forum)* characterised by rapid shifts and changes in technology, which requires a flexible, open, and adaptable approach to learning and teaching that is not inherent in the way schools are run these days. Some of the issues facing teachers all over the world include the ever-decreasing attention span of their students, competition from online resources (why should we memorise facts that are readily available online), a slump in motivation and the ability to focus, the struggle to give meaningful and varied feedback to students, making learning more engaging, designing meaningful individual learning paths for students, creating a stress-free environment to enhance student productivity as well as showing the added value of education in students' lives.

One possible answer to some of the issues outlined above might be the introduction of gamification and game-based learning, which offer certain solutions to disrupt the traditional ways in which schools function and prove to be useful tools for immersive learning and increasing student engagement. Games and playing create positive associations and stir positive emotions in most people and it seems reasonable to assume that – since everyone enjoys games and playing – their systematic introduction to the ways we learn might reap true benefits for all. In this paper, we set out to find out how teachers in four countries feel about gamification and game-based learning, how they think these concepts influenced them (both positively and negatively), what stumbling blocks they struggle with in implementing gamified structures in their schools and what sources they look to for assistance and help to solidify workable gamified practices.

2. BASIS OF GAMIFICATION

It is important to note that gamification is an umbrella term for a variety of tools, methodologies, and concepts; it might serve a useful purpose to define its scope in the present study. Under the term gamification, we refer to the usage of game design elements in a non-game context *(Detering et al, 2011)*. It is also important to stress that in the professional literature, there are two subcategories when it comes to gamification: one is called structural, and the other is called content gamification. The first refers to gamifying the process of education, the latter is somewhat closer to game-based learning as it gamifies the content of education. Yet, the lines are often blurry within those terms, hence this study also aims to clear them out at least to some extent, however, it is important to note that it mainly focuses on structural gamification.

In practice - as it was mentioned above - gamification means the application of specific game elements (e.g. points, badges, leaderboards, etc.) in a nongame context (e.g. education). If it is used in the context of structural gamification it is considered an alternative form of assessment, trying to free teachers from the trap of marking. Marks and averages are inherently unfair and a constant source of stress for students. As an example, imagine a marking system whereby students receive marks from 1 to 5 (this example refers to countries where 5 is the best possible mark). In a scenario where a student has already received two 5 marks but fails one test (and receives a 1, their average dropping to 3.67), they will need five further 5 marks to work back the average to 4.5, which is typically the minimum average to receive the best mark at the end of the year. This, in turn, means that during the course of the school year, a student becomes acutely aware that failing just one test at any given time might prove fatal. As a result, students feel more stressed, all the points of assessment become high-stakes for them, and will often resort to cheating to ensure failure does not ensue.

It is easy to see that marking is one of the ways schools negatively affect students and steer the system away from what the 21st-century economy would later demand of them. Risk-taking is not encouraged, individual learning paths are much harder to design and the role of the teacher is still partly just to "put down the sword", meaning focusing only on discipline and obeying rules. Marking and averages do not seem to serve the purpose of an open stress-free environment in schools. In the Teaching and Learning Toolkit (*EvidenceForLearning, n.d.)*, researchers have looked at the efficiency of certain practices in schools (e.g. collaborative learning approaches). All concepts were examined along three dimensions - implementation cost, evidence strength, and impact. In other words, they looked at how expensive it is to introduce that concept, then examined the strength of scientific

research to back it up, and finally established its impact (positive or negative) expressed in months/year (i.e. if you implement the given concept, it is going to add or take away a number of months' worth of instruction to a school year). It is no surprise that metacognition and self-regulation feature very high on the list (+7 months of impact), together with collaborative learning (+6) and feedback (+6). It seems reasonable to argue, therefore, that any system of lesson planning, classroom management, and assessment that fosters these three innovative concepts might add significant value to any educational system.

Gamification might provide a practical framework, within which all these concepts can thrive, and offer teachers a practical step-by-step guide to implementing these. It is, unfortunately, beyond the scope of the present study to describe this process in detail. There are, however, the basic tenets that it helps to bring forward:

a. Continuous assessment: it simply means that students' progress is measured over a time period (e.g. a month), rather than at certain points of the learning process. Instead of tests, they have targets to reach and a month to reach them. Along the way, they receive plenty of feedback in various ways that helps them design and modify any existing learning path they might be on to achieve the goals set out for them.
b. Self-regulation: through giving students goals (which would be "missions" in games), they are also provided with chances, and opportunities to display their acquiring the skills needed to reach their goals.
c. Feedback: rather than being given one mark for a test, students have more and varied opportunities to showcase their development. A key to a successful school is feedback. Gamification helps teachers set up their unique system of feedback, which helps students through its structure and variety.
d. Added value for education: simply put, a system based on gamification principles never really focuses on what a student knows, rather than on what they have learned, and how they have progressed.

All the above amply show that structural gamification goes beyond a simple and mechanical handing out of points and badges on a leaderboard. Its true value emerges as it provides a practical framework for 21st-century learning design to prevail in schools, with a tangible, relatable process of self-development for teachers.

3. BASIS OF GAME-BASED LEARNING

Playing digital games has been growing in popularity in the past decades, so much so that studies found that 99% of boys and 94% of girls play digital games as it was indicated in the Pew Internet and American Life Project *(Lenhart et al., 2008)*. We can safely assume that numbers in Europe do not differ too much. Furthermore, the amount of time spent playing digital games is staggering, ranging from 7 to 10 hrs a week in the USA, in 2008 *(Lenhart et al., 2008)*. If we look at fresher data we can also see that the numbers are increasing: in the USA 10% of the gamer population played over 20 hours a week in 2021. On the other hand, in Europe, the average gaming time is 9,5 hours per week, but the study says that Europeans tend to spend more time in front of their TVs than people in the USA. *(Jovanovic, 2023)* It is beyond the shadow of a doubt, therefore, those games play an important role in young people's lives, and harnessing that willingness and motivation might yield significant results if schools were able to tap into that motivational pool.

The gamer is willing to solve puzzles, and problems, persevers in the face of challenges, learns at their individual pace, and creates their individual learning paths through interaction with the game. Besides, players become actively involved in games, constructing knowledge, and developing skills and attitudes through the game interface. Finally, the interactive, social aspect of games should be taken into consideration, as games often necessitate interaction and collaboration among players.

Considering the above, it might be surprising why games have not overtaken schools by storm, as most of the above-mentioned characteristics coincide with a successful model of 21st-century education and its goals and ultimate objectives. There can be many reasons: first of all, the notion of games is so wide it is hard to pin down what is meant by "games" at all as they range from board games to first-person shooters to strategy games and MMOs, so when involving games in classrooms it can be extremely hard to assess them in a comparable method, only because of their different features. Furthermore, games are providing an extremely learner/player-centred experience, therefore the gaming activity produces very variable learning outcomes if we are considering games-based learning. Thus, when discussing the use and efficiency of games for education, one must be aware of the limitations of such an all-encompassing label.

School is supposed to be the place of serious learning – as many a teacher, parent, and even student would argue – therefore there is little or no place for 'just playing'. Traditional instruction (e.g. frontal knowledge transmission) has not much going for it in the 21st-century context, but face validity is one of its advantages. By this, we mean that a frontal presentation has the outward appearance of

meaningful schoolwork that both teachers and students are accustomed to. The use of games (paradoxically by their nature of being interesting and genuinely engaging) will often be considered as "non-learning", to which parents might object, fearing their child will not possess the knowledge necessary to advance (e.g. pass a state exam).

Educators often confuse and blur teaching and learning, believing their primary role in the classroom is to make sure all the content material the national curricula demands of them is covered in class, which often results in rattling off data, names, places, and facts in quick succession. This usually fills teachers with a sense of relief, in the sense, that they know they did what was required of them. Little wonder that a fully packed national curriculum will provide teachers with little wriggle room to innovate and create competency-based projects or create tasks that engage students in deep learning. This stress will often lead to early burn-out of teachers, or a psychological defence, meaning that we can often meet with the following arguments when it comes to innovation: teachers point out their reasons in curricula for not implementing innovative ideas, or they claim that they simply do not have the time, or nominally introduce games and playing in the classroom as a fun add-on to the required workload, even when that workload had partly been placed already on students. We might overcome these arguments by giving them hands-on tools (like Gamifactory[1] and MotiMore[2] - *both of these sites are developed by the project partners*) to reach for fast and easy, thus easing the workload.

The all-encompassing connotations of the word "games" is also dangerous as it might provide teachers with the pretence of being innovative and meeting the requirements of the 21st-century schools if they use an online quiz machine. Yet it is important to stress that involving an online quiz doesn't equal to game-based learning nor to a gamified classroom and it should not be referred to as such since the quiz stays at the paradigm of instruction and assessment, just as much as a paper-based quiz would. However, interest in those kinds of ICT tools can be a good starting point to develop professional interest, which may lead by time and with a shift of paradigms to deeper professional knowledge in the fields of GBL and gamification.

A final consideration that informed this query among teachers is to what extent teachers can double as game designers. It must be noted that creating unique, engaging, interesting games that take into consideration the content material of any subject at any given time, necessitates a skillset that is hard to come by. Creating good games is a resource-intensive activity, both in terms of time, energy, and

[1] Gamifactory. Developed by Impact Games, reachable: https://gamifactory.eu. GBL website.
[2] MotiMore: Developed by Enabler Ltd, reachable: https://motimore.com. Gamification LMS +CMS.

finances. When a genuine attempt has been made at incorporating game culture in school curricula in a meaningful way, it came with the realisation that time needs to be dedicated to this by teachers, there is an infrastructure that is to be built around the concept, and a special skill set needs to be added (e.g. in Quest schools, game designers collaborate with teachers in specially allocated time slots during the week in order to create or mod games in a relevant manner). Given the amount of work teachers have to do in an average week, it is highly unlikely that a series of meaningful, engaging games could be designed by them that foster collaboration, teach the material at hand, allow for individual learning paths, and intrinsically motivate students. More often than not, individual efforts by teachers result in oversimplified game mechanics that display a vague resemblance to games (e.g. a board game where students throw dice and move pegs to reach the goal, and they have to answer questions when they land on a square).

4. AIMS OF THE RESEARCH

Our primary aim is to tap into teachers' beliefs concerning gamification and game-based learning, to understand their thoughts as well as both positive and negative experiences regarding them.

Furthermore, there might be other issues worth considering in order being able to establish correlations with gamification/game-based learning, namely

a. teachers' willingness to embrace new ideas,
b. teachers' attitudes toward assessment,
c. teachers' attitude towards constructivist and connectivist pedagogies.

Below is a list of concepts that served as a basis for the study:

A. Establish whether participants are aware of the existence of gamification/game-based learning,
B. See what interpretation of gamification/game-based learning they are on board with, how they define them,
C. Get a general picture and understanding as to what teachers consider fair assessment in alignment with their students' needs (ie. teachers' attitudes towards assessment, marking in general),
D. What advantages or disadvantages do they perceive about changing their approach to assessing students and providing feedback,

E. Tap into their willingness of steering away from traditional marking - see how this correlates with the general attitude to teaching in general

5. RESEARCH QUESTIONS

The research consists of a qualitative part (interviews) and a quantitative part (a questionnaire designed based on the analysis of the interviews). At the outset, the following questions were formulated.

1. What is teachers' understanding of gamification/game-based learning and are they aware of their existence at all?
2. What is teachers' definition of gamification/game-based learning, i.e. what do they mean when they say gamification/game-based learning?
3. What is their attitude towards gamification/game-based learning (based on hearsay or personal experience)?
4. What hinders or facilitates the implementation of gamification and game-based learning in teachers' daily practice?

6. PARTICIPANTS

6.1. Interviews

The first part of the research consisted of interviews with practicing teachers to establish certain issues and concerns that they might have. The primary goal of the interviews was to gather issues that teachers face to serve as the basis of the questionnaire to be assembled.

In this phase of the research, there were several focus interviews held, with altogether 31 participants from four countries (Cyprus: 4, Hungary: 4, Romania: 17, Slovakia: 6), all teachers of different contexts. We analysed the interviews with the so-called "constant comparative method", creating relevant categories to the study based on the raw data, which led us to the creation of the questionnaire.

6.2. Questionnaire

On the basis of the results the interviews yielded, a questionnaire was assembled and administered to educators in all participating countries. Below are some demographic descriptors of the participants:

6.2.1. Nationalities

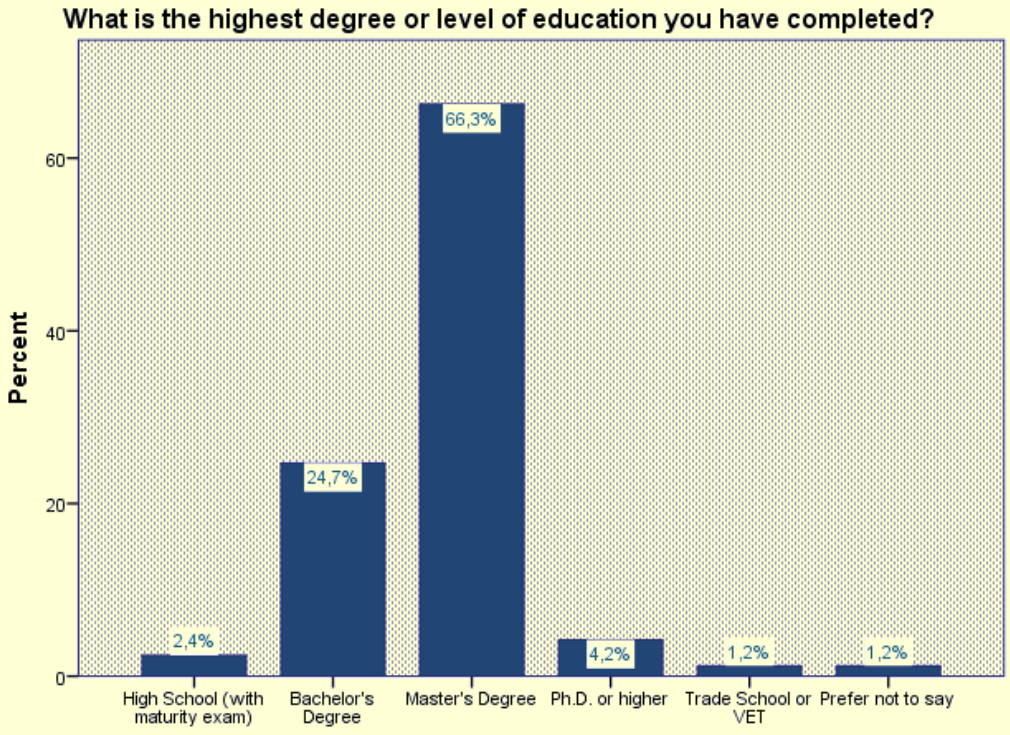
There were altogether 166 participants filling in the questionnaire, from Cyprus (n = 31), Hungary (n = 56), Romania (n = 44), and Slovakia (n = 32).

6.2.2. Gender

The majority of participants were female (n = 139), with only 26 male teachers and with 1 participant who preferred not to say their gender.

6.2.3. Level of education

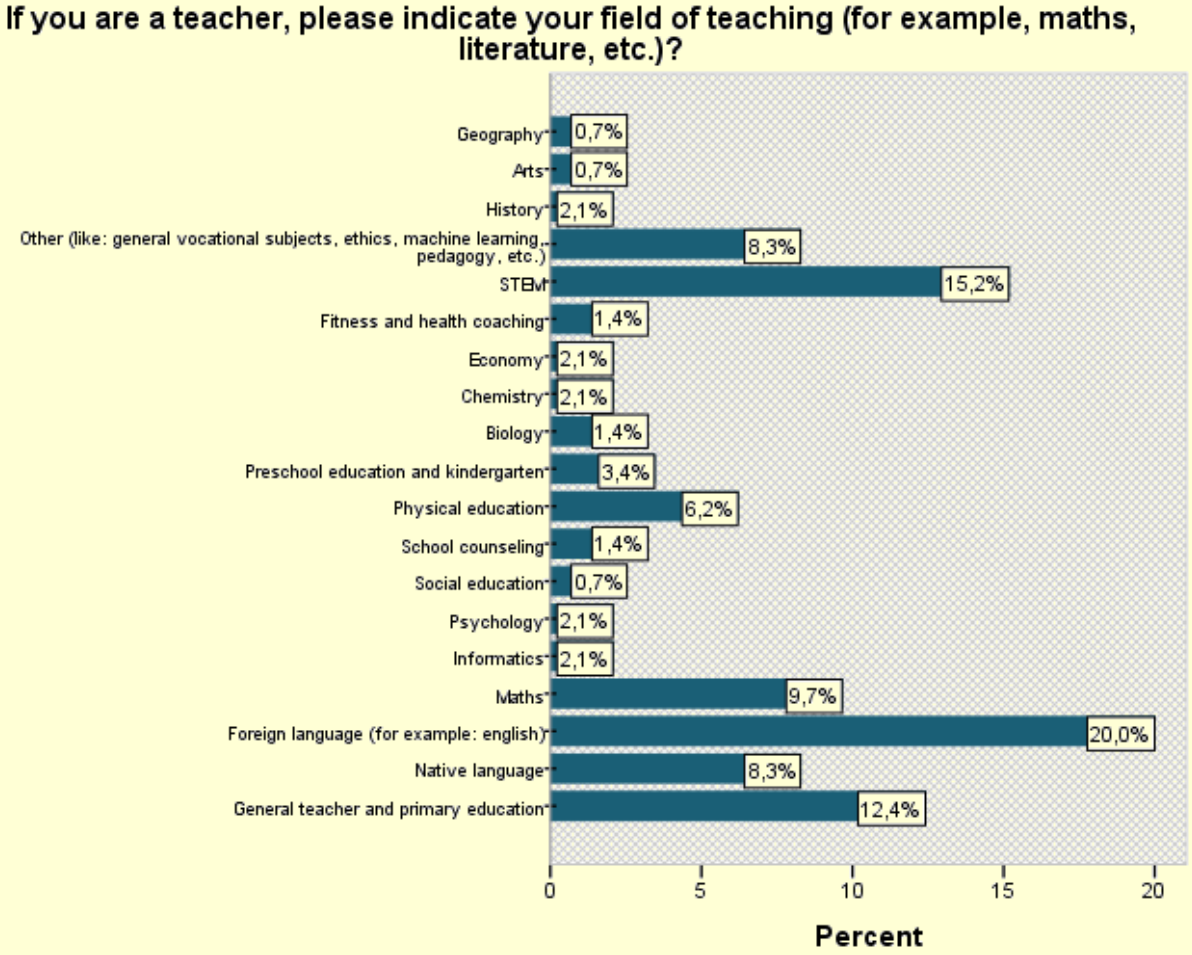
The following graph shows the level of education of the participants



1. picture: The highest level of education among participants

6.2.4. Subjects taught

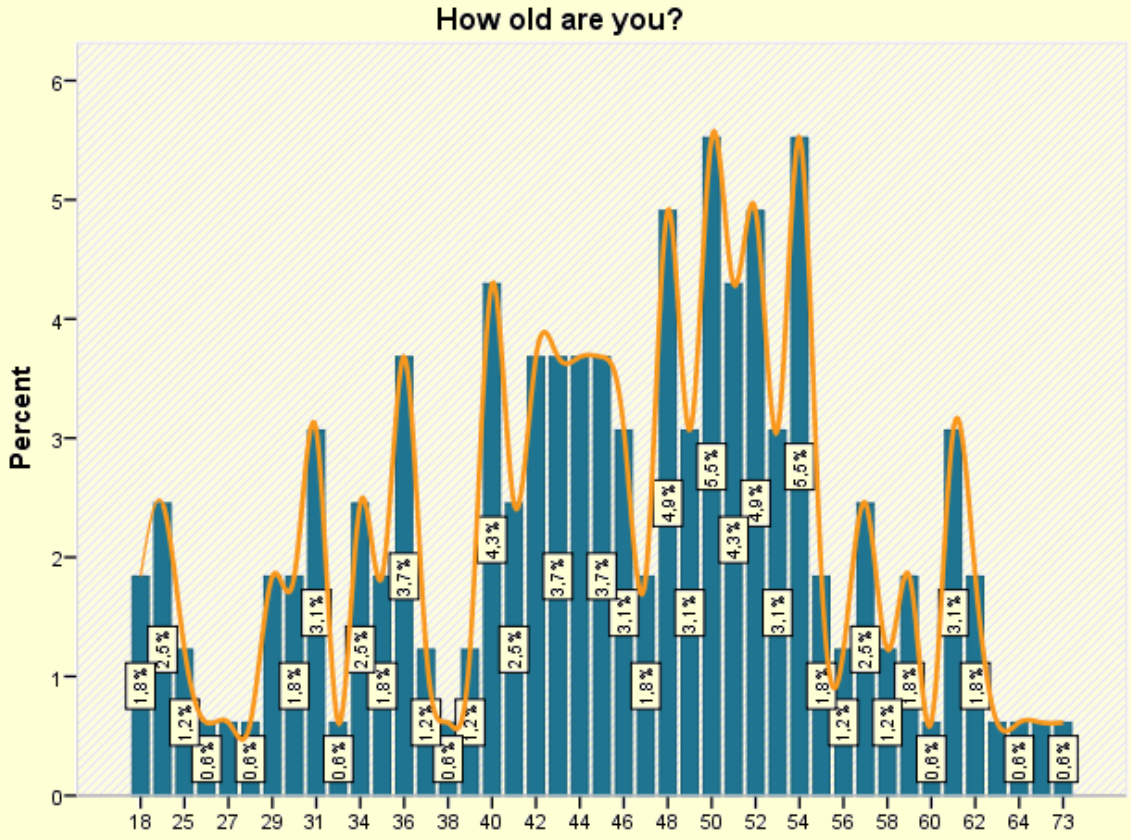
The following graph shows the distribution of different school subjects among the participants.



2. picture: Subjects taught

6.2.5. Age

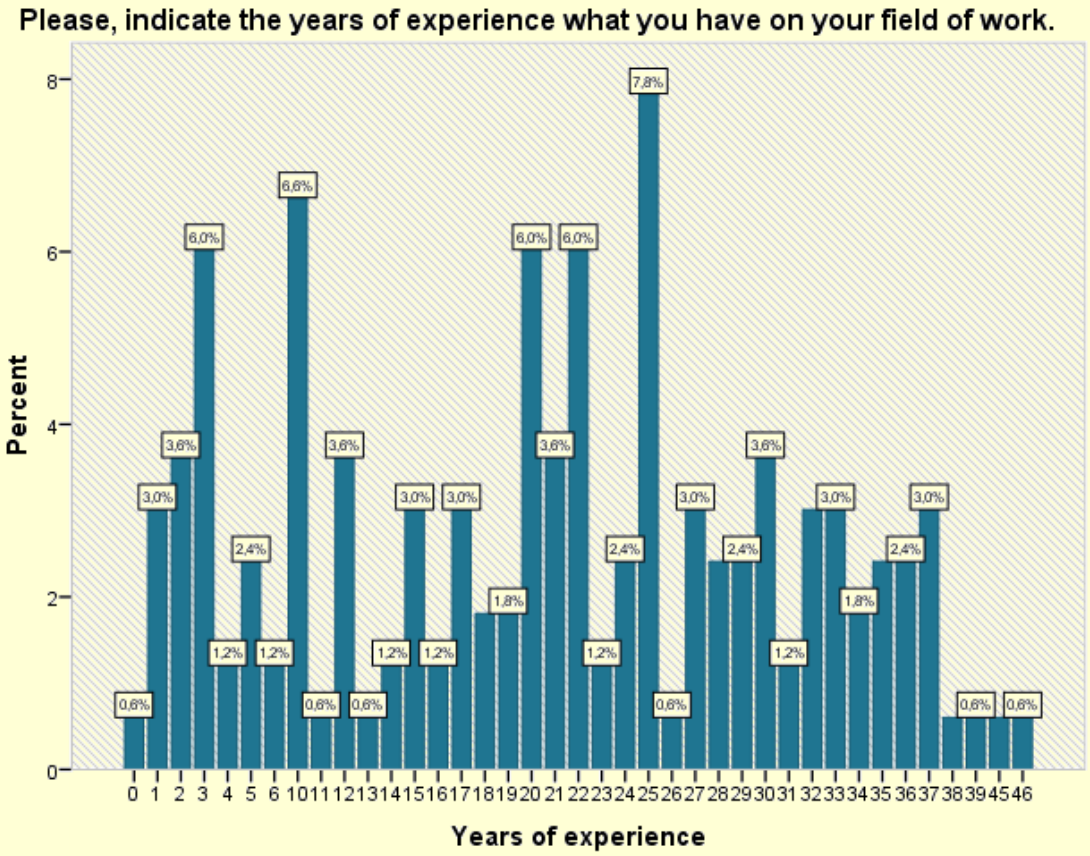
As seen below, the participants confirmed the aging population of teachers as the curve is skewed to show the majority of our participants to be over 40 years old, and we have also experienced a gap between age 18 and 25.



3. picture: Age of the participants

6.2.6. Teaching experience

The participants of the study were mostly experienced teachers, with only a few novices (mean: 20,7 years, standard dev: 11,1 years). The graph below shows the distribution of experience expressed in years.



4. picture: Years of teaching experience

7. RESEARCH DESIGN AND INSTRUMENTS

7.1. Phase 1: Qualitative research

This took place in the form of a semi-structured interview.

The results were analysed using the constant comparative method, whereby the answers of the participants were coded, and categories of meaning were established.

7.2. Phase 2. Quantitative research

Based on the results of the qualitative research phase, a questionnaire was designed and administered to a larger sample of participants (n = 166).

Results were analysed using statistical tools and methodologies using IBM SPSS 22 and Microsoft Excel.

8. RESULTS AND DISCUSSION

8.1. Interviews

There were 31 interviews conducted in the four participant countries, with the primary objective of unearthing issues related to gamification and game-based learning. There were 10 guiding questions *(see measurement tools at the end)* that related to the following principles: what positive and negative experiences teachers have in connection with gamification and game-based learning, how teachers give feedback, what motivates teachers to innovate, what they perceive they would need to innovate, and finally, what basic pedagogical principles inform the teaching practices of the participants. The last tenet intended to explore any possible correlation between constructivist pedagogical principles the participants might hold and their willingness to innovate in their classroom practices.

The results of the interviews were analysed and formed the basis of the next stage of the research, in the form of a questionnaire, which was forwarded to a wider population of teachers in all four participating countries.

The interviews were analysed using the constant comparative method, units of meaning were established and the following categories emerged.

8.1.1 Advantages

First, the advantages and positive aspects of gamification were discussed, below is the summary of the main concepts emerging from these interviews.

Feedback

It was felt by many participants that gamification and game-based learning could play an important role in giving feedback to students. The involved teachers acknowledge and embrace gamification primarily in the form of structural gamification *(if we understand gamification under Karl Kapp's division which separates structural and content gamification, as it was mentioned at the beginning of the study*) and harness its potential to motivate students through different forms of giving feedback. Some mentioned "*immediate feedback*" through points, while others referred to gamification as a "*reward system*" that will "*keep the students motivated*" and some claim "*treats may motivate the level of participation in the games*". Also, a correlation was perceived between varied and detailed feedback and an increase in students' level of motivation ("*feedback increases motivation*"). Finally, the automated nature of providing feedback through digital tools was seen as an advantage in connection with giving feedback.

Motivation

Doubtless, the most positive aspect of gamification and game-based learning in the eyes of the teachers participating in our study was its effect on students' motivation. Nearly all of the participants referred to motivation in the interviews and they all felt the use of gamification and game-based learning had a positive effect on how students approached and engaged with learning tasks.

Some teachers felt gamification and game-based learning helped in "*shifting focus to their intrinsic motivation (when they [the students] do something, they build their skills, get better)*", also they felt it was possible to create more "*immersive activities*" with "*more responsive kids*" as the students' presence is "*more felt during the lesson*" and they felt they could "*manage to cover a wider spectrum of students*" and be able to "*get students engaged regardless of the topic*".

The second powerful concept emerging from the interviews concerned learning autonomy and the creation of individual learning paths, a process that students might be a part of. Teachers claimed through gamification and game-based learning "*there are other skills developed, after a time students learn goal-setting*" and how to "*allocate time and resources*", and finally how gamification and game-based learning helps in "*closing the gap between real life and the educational setting*".

Stress

One of the most clearly emerging positive aspects of gamification and game-based learning in the classroom is their effect on reducing stress in the classroom. As one might assume, if individual learning paths are created, a varied system of feedback is established, continuous assessment is in place and the focus is on learner autonomy and the added value of education, a significant reduction in the perceived stress of both students and teachers is to be expected.

One of the most frequently raised issues is, accordingly, how gamification and game-based learning helps to reduce stress in the classroom, both during instruction and assessment. Teachers claimed "*game-based learning reduces stress during the assessment of students' development*", "*as for gamification, there's much less stress in students*", "*with points I lift the stress off students*", "*it reduces stress; students say they will not be very anxious*".

One of the most important aspects of a wider survey, therefore, should be the connection between gamification and game-based learning and the perceived level of stress in the classroom.

ICT

In the past, teachers and innovators in education have often been dismissed as "*tool-oriented*", which meant that the primary focus was felt to be on new tools, applications, and on IT, rather than ICT. Furthermore, one of the barriers often quoted in spreading innovative practices is supposed to be the lack of IT skills in educators. If they do not possess the skills necessary to navigate an application, it will definitely prove a bottleneck in introducing new applications.

In time, however, there seems to be a shift from software to pedagogy. During the interviews, there was hardly any mention of a lack of IT skills or more training needed in that respect. IT companies and experienced designers – together with an ever more user-friendly technology – have bridged the gap in teachers' skills and available technology. This was further aided by the COVID pandemic, which provided the push necessary for those who seemed unwilling to jump on the bandwagon before.

The development of ICT skills is not anymore seen as an important prerequisite of a successful introduction of gamification and game-based learning in the classroom, it is more like – as one teacher put it – a "*collateral advantage*". Furthermore, when participants were asked what help they needed and from what sources, methodology and pedagogical training – or access to information and applications beyond a pay-wall – were frequently mentioned. IT or ICT hand-on practice and training never, yet it is also important to note that the involved teachers were not newcomers to this

sector. This seems to indicate a new era, in which the question is not anymore how to navigate or use a tool or an application, but rather, to what pedagogical end it could be best exploited.

To confirm or counter this assumption, the use and perceived significance of ICT tools (such as tablets, laptops, mobile phones) will be assessed in the questionnaire.

8.1.2 Pedagogical innovation

During the interviews, one of the issues teachers often brought up was the link between gamification and game-based learning and innovative pedagogical practices. ICT tools in themselves should not be considered innovative, as it is the quality of their application in the classroom that qualifies their implementation as such. It is one of the long-standing myths concerning ICT tools that their presence is a sign of innovation. During the interviews it transpired, however, that access to hardware and a reasonable internet connection are hardly the main barriers to innovation anymore.

Reference has been made to teachers' being more prepared to design lessons in a new mindset and includes differentiated instruction as high in their list of priorities, claiming gamification and game-based learning provided a framework within which differentiated instruction becomes much easier to execute.

Acknowledgment of individual learning paths and their role in education is another factor brought up in connection with gamification and game-based learning. As one teacher put it, "*When using games children who generally do not participate can be seen engaging with others and the content.*" They also mention how "*seeing the level of each child as I try to help them develop little by little*" motivated the teachers themselves.

Finally, cooperative learning and project-based learning periods were repeatedly mentioned, which might mean that gamification and game-based learning foster an atmosphere in which these innovative pedagogical concepts thrive. Also, it might be an indication that it is the other way around, and it is innovative teachers who embrace these concepts that are more receptive to gamification and game-based learning.

These possible connections were considered very important right at the output, therefore all participants in the interviews were asked to state what ideas they held as central to their practices to establish what pedagogical principles informed their classrooms.

Credibility

Some of the participants mentioned how credibility is an important part of their driving principles. "*I'm credible when I can freely do things*", as one of them put it. To teach by "*showing a personal example*" is another mention in this category.

Motivation through success in student progress and interaction

One of the main principles (or rather, a source of motivation for teachers), is their students' success. "*Selfless help*" played a part as well as being "*motivated when I can motivate someone else*". Teachers felt that "*being able to learn - from students*" is also crucial; proving that in their view education is not a one-way street.

Learning rather than teaching

Yet another important factor that transpired seemed to be the approach to education. For most of the participants, it was learning and learner outcomes rather than instruction and assessment (i.e. marking) that mattered. Teachers mentioned "*connectivity*", a "*holistic approach*", a "*focus on competencies gained by students*", metacognition, and "*students to be able to reflect on their learning process*", students' participation, active presence, and engagement in the classroom.

8.1.3. Challenges and barriers

Needless to say, gamification and game-based learning yield not only positive experiences and success stories but also challenges and occasionally frustration. It might be argued, however, that any pedagogical paradigm shift whose introduction is smooth and free from any frustration on either the part of the students or the teachers, might not even constitute a paradigm shift at all. Education (especially public education) is a conservative field that has remained in many parts unchanged for centuries, with the same underlying principles informing the daily practice of the majority of teachers. In order to break through the walls of traditions and habits, any innovative methodology should count on a backlash from all parties involved. Students may feel a new way of assessment is breaking down working processes in place for centuries, or even feel that "playing" or any form of "game" is out of place in the classroom – when it comes to official marks or school reports.

Therefore, teachers participating in the interviews were asked about the challenges and frustrations they face. Below is a brief summary of the main findings.

Teacher's loss of control over students' work and class activities in general

Using digital innovative tools (i.e. hardware, such as tablets, mobile phones, and laptops) is still perceived as attractive to students, however, teachers complain about a lack of control over classroom procedures. Teachers feel they are "*unsure about knowledge transition*" and claim that "*when they are open to using phones for games, they use it for something else as well; they do not focus on that task only*". Such intrusion of technology into the status quo of the well-behaved classroom might result in a "*noisy environment which can disturb others*".

Parents' involvement

Another issue that teachers face is how to best communicate gamification and game-based learning to their colleagues, students as well as parents. As it has been mentioned before, any paradigm shift creates some form of disruption to the daily life of students. Some of the most typical concerns – as transpired from the interviews – were that playing and games are "*not a serious form of instruction*", some went as far as to say they had been told it is "*unworthy of a respectful school environment*". It is felt, therefore, by many that gamification and game-based learning might contribute to the loosening of the ties that hold our educational system together. Furthermore, it might prove a challenge to the existing hierarchy of the school system, where the preferences of principals and teachers tend to be taken into consideration before those of the students.

Parents, similarly, might feel that gamification and game-based learning might result in their children acquiring less and being left behind, as one of the participants put it "*parents might perceive playing at school negatively (kids are not learning)*". Also, marks and school reports are traditionally held in high esteem in most societies, how a child performs is expressed in (reduced to, one might argue) a number, a letter, or a percentage. The comfort of these simplified, superficial forms of assessment are obvious: all can relate to them (e.g. saying "*my child is a straight A student*" is understood by everyone in a community), whereas forms of feedback and gamified structures that aim to give students formative assessment and appreciate the uniqueness of each student might yield results that are less comparable, less definitive and need to be explained or clarified. When intrinsic motivation is the key target in using a game in the classroom, results are not easily translated into a scale of 1 to 5 (or any kind of grading system).

Teachers mentioned it is not always easy to "*make parents understand what gamification and game-based learning is about*", and "*with parents, it still counts as a big novelty, although its use is quite*

widespread". Parents "n*eed to be 'propelled out' of their concepts of averages, or 'what mark is my son/daughter*'".

8.1.4 Gamification and game-based learning as "good-to-have"

As games, playing, and "fun" activities often seem to contradict the classical concept of "learning" – i.e. the teacher talking and the students passively listening – teachers and students tend to think of these as an "appendix", something that is added to the core activities in schools in order to serve as a source of relaxation, "letting off steam" or simply for comic relief. As one teacher put it, "*when I see the students are tired, we play a relaxation game to develop motivation*". For another "*game-based learning [I used] for recap lessons*".

This results in a reluctance to engage students with either gamification or game-based activities as they are viewed to work to the detriment of "real education". Teachers repeatedly expressed their frustration with the amount of material that has to be covered in class, and also the pressure from administrators as well as parents and the students themselves, to focus on exams at the end of the year or school-leaving exams. Playing games seems superfluous and extravagant to them. A luxury many cannot afford.

This dissociation of gamification and game-based learning from the core teaching activities does produce some tension. One of the reasons is that, if they are seen as competing factors for a teacher's resources (time, energy), it will become patently obvious that there is in fact no time for both traditional learning and gamification and game-based learning to work effectively at the same time. The teacher expressed this by saying "*the educational program was sometimes so pressing that there was no time to do something like this*", they would need "*more time (a lot of curriculum, not enough hours allocated)*", or "*you can use games in the first years but when they learn for the final tests, games are not so much used anymore, the focus is for what's asked in the final exams*" and "*for the last year in high school you need to go back to traditional methods to be sure they really learn*" as well as "*teachers do not have enough time in a lesson to use game-based learning approach*".

What transpires is that many teachers seem wary of the disruptive nature of gamification and game-based learning when introduced in place of the traditional methods used to deliver knowledge to students. They are also worried that gamification and game-based learning cannot deliver the same results as frontal presentations by teachers. This is closely related to the issue of control in the classroom. It might be argued that any control the teachers feel they have over might be in fact an

illusion as the material taught and the material learned hardly ever overlap, yet a teacher might claim to have done their part and leave the chore of learning to the students. This is, of course, not to say that frontal presentations and facts and data have no place in school, but simply to argue that it should not be the exclusive goal of teaching.

Based on the interviews, it can be stated that one of the major stumbling blocks in teachers shifting towards gamification and game-based learning is the perceived tension between "real learning" (i.e. traditional forms of class management) and "games". This issue might be resolved if teachers stopped thinking of these two approaches as something that must work simultaneously, at the same time, and time allocated to one can only be done at the expense of the other. It is, therefore, worth exploring how to communicate the need for a paradigm shift not in assessment, nor in class management, but in methodology and lesson planning so that teachers will no longer feel that they are forced to "*find a proper balance between theory and games*". Theory and games are not exclusive concepts, gamification, and game-based learning are perfectly capable of achieving the same, if not better, results as traditional forms of knowledge transfer. Similarly, there is no guarantee that a frontal presentation has in fact achieved the goal of the lesson in terms of students understanding, learning, and being able to perform higher-level tasks (c.f. Bloom's taxonomy, 1956 and revised in 2001).

8.1.5 Teachers' reluctance to change in general.

Time is at a premium in any teachers' life, therefore, there is an understandable reluctance to jump in at the deep end and a need to clearly see what introducing gamification and game-based learning would entail for them. There are different ways of coping with these challenges; some might opt for any online tool that offers a quick fix (e.g. use Kahoot to create more engaging and livelier tests – but they are still multiple-choice tests) to do something quicker or being bit shinier than a paper-based counterpart. Other options include first creating a hybrid system where gamification and game-based learning and traditional forms of knowledge transfer and assessment go hand in hand. Besides these, many teachers would refuse this innovation, using the "*It's a great thing, but …*" structure. There is a variety of arguments quoted by teachers in order to explain why they feel reluctant to innovate, claiming "*if the materials are more readily available (something simple) I would use it*", and say "*time, you need a longer time to prepare lessons with games*" and "*if all the teachers started a point and card system, it would not be sustainable, so a system to engulf all would be handy*", "*I manage to motivate 5-6 out of 10 under-motivated students, but not all of them*". Another argument is that given the

amount of time and energy a teacher invests in designing such a system of instruction and feedback is essentially lost on students, as "*oftentimes I feel if I want to give detailed feedback, students don't really look at it, or take my advice*" and "*I invest more energy into giving feedback than students reading it*".

8.2. Statistical analysis of the questionnaire results

The questionnaire contained 22 statements in total *(see measurement tools at the end)*, and data were analysed using one-way ANOVA to compare the answers between the participants in the four countries on a five-point Likert scale.

8.2.1. Stress in the classroom

Statement: "Gamification or game-based learning helps to reduce stress for students in the classroom."

One of the most important effects of gamification and game-based learning is a reduced level of stress among students. If that alone were achieved, it would justify the implementation of these methods. Teachers in the study definitely felt this, as the average result was 4.26 (on a Likert scale of 1 to 5). Hungarian teachers agreed the most (4.61), whereas participants from Cyprus were the least (3. 90).

The comparison between the countries yielded no statistically significant results, therefore it can be stated that the effect of stress reduction was felt by all participants.

8.2.2. Gamification and game-based learning as a core activity

Statement: Games and gamification are applicable when there is less material to be learned.

This statement intended to shed light on whether teachers felt that gamification and game-based learning served a purpose only when there is less pressure to "*get on with the content material*" and teachers are more at liberty to choose how to proceed with students in the classroom. This argument was repeatedly mentioned in the interviews; therefore it seemed reasonable to expect a similar result in the questionnaire.

This was not the case, however. Participants seem to think that gamification and game-based learning might play a role as a core activity in the classroom (average = 2.67).

As for the four countries, Hungarian teachers seem most likely to design their lessons with gamification and game-based learning as a central methodological driving force (2.13), and Slovakian teachers were the least willing to do so (3.09).

8.2.3. Digital tools and innovation

There were altogether three statements, trying to tap into teachers' attitudes toward digital tools. It seemed to make sense to discuss tablets and mobile phones separately, as the use of mobile phones in the classroom seems to be a somewhat controversial issue in schools across Europe.

The results the questionnaire yielded do not support this presupposition. The averages for "*tablets and mobile phones as an innovative tool*" were very close (3.91 for tablets and 3.90 for mobile phones), which suggests that teachers perceive no significant differences in their usefulness in the classroom.

As for the comparison of the four countries, Cypriot teachers seemed the wariest of these tools (3.74 for tablets and 3.45 for mobile phones). All the other countries were within a range of 0.3 on this issue.

Another interesting finding was how teachers associate the use of digital tools with innovation. The results for the statement "*Innovative teachers use tablets and/or laptops and/or mobile phones in class*" were more divergent and less on average (3.62), with Romanian teachers associating digital tools with innovation the most (3.95) and Cypriot teachers the least (3.32).

8.2.4. Control in the classroom

One of the most worrisome aspects of gamification and game-based learning seemed to be the loss of control in the classroom by the teachers. When students use different individual learning paths, there is a level of self-regulated learning taking place, and equity, rather than equality is the purpose of education, teachers must relinquish control. There will be times they will not know what each student is doing, there has to be more trust, and reliance on students' own motivation to acquire skills and knowledge. This is in fact a vicious circle, as the more control a teacher has over the classroom, the fewer autonomy students have. As a result, their motivation will likely drop ("*I have to learn this because the teacher says so*"), which is going to force teachers to be even stricter as they feel (rightly) that they can less rely on students' motivation in doing any tasks they are required to do. Given this, it

seems reasonable to argue that learner autonomy and self-regulation will take time to catch on with students. It is not easy to change one's mindset and accept any level of control over their learning process, having been subjected to strict teacher-controlled learning activities beforehand.

In the questionnaire, there were three statements altogether that focused on the topic of control in the classroom.

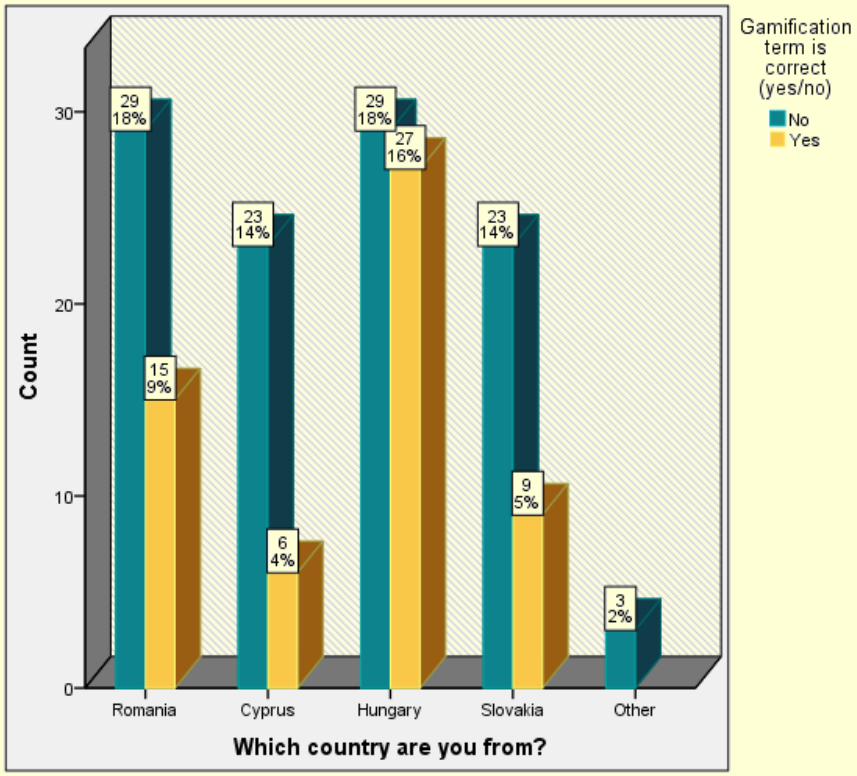
"When I use games or gamification, I have less control over the students and the lesson."

This was felt not to be the case, with the average result being 2.42, which clearly suggests that a loss of control does not accompany the implementation of these methods. It must be noted, however, that the teachers filling in the questionnaire were most experienced educators with some background in gamification and game-based learning. It works for them, clearly; however, as it transpired in the interviews, it is not a quick fix that is to be applied overnight yielding immediate results. Some caution is needed, therefore, when interpreting these results, as they reflect mostly on the success of teachers who have gone through a paradigm shift, whereby they experienced the beneficial effects of gamification and game-based learning at some later points after their introduction. Any paradigm shift will involve a pushback as it disrupts the usual classroom routines. So, if you are going through a paradigm shift with your students and everyone functions and all things seem bright right from the beginning, it is most probable that you are doing it wrong. If you experience some pushback and initial reluctance, if you have to explain to students, parents, and school administrators over and over again what it is you are doing, rest assured that these struggles are a definite sign of a new, disruptive, and innovative paradigm that all grapple with at first.

"When I have less control over the classroom it gives a negative feeling."

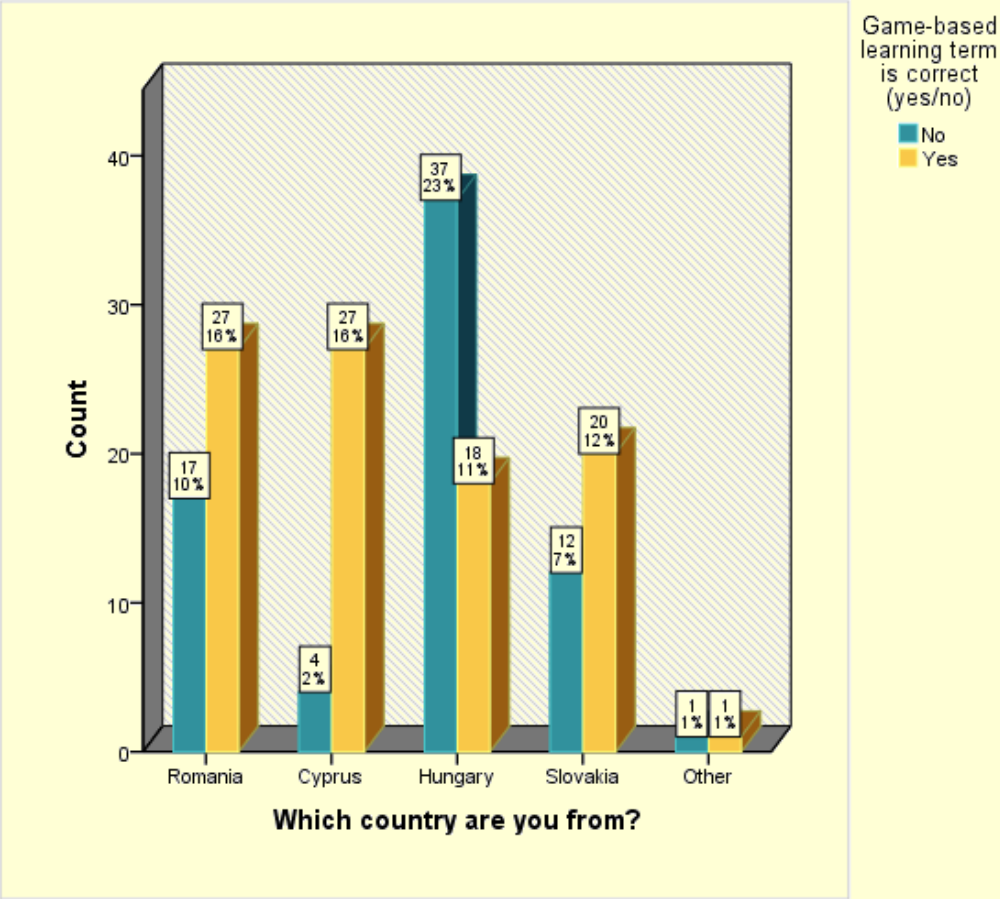
When participants were further questioned on the perception of a loss of control over their classes, they admitted to feeling a level of anxiety, which is only to be expected. The average was 2.96, significantly higher than the average result for the statement in 8.2.4.1. above. Cypriot teachers were most downtrodden about relinquishing control with 3.39 and Hungarians were the less anxious at 2.68, quite a difference. One possible explanation might be the differences between game-based learning and gamification. In defining what they meant by that, most Hungarian teachers referred to gamification as structural gamification, whereas participants from other countries were more acquainted with game-based learning. The definition of gamification seemed more challenging to

participants. Below are two graphs to illustrate that. Hungarian teachers were more focused on gamification and by far the most aware of the correct definition. It seems that the definitions for these terms blurred and for them, it meant primarily structural gamification.



5. picture: Gamification term is correct, country divided answers

As for game-based learning, there seemed to be something of a misconception among Hungarian teachers, who mistakenly thought that game-based learning is similar to or the same as structural gamification. As for the other countries, quite the reverse transpires, with game-based learning seeping into their conceptualisation of gamification.



6. picture: GBL term is correct, divided by country answers

"It is important for the teachers to be in control of the class, always knowing what the students are doing."

These third statements showed an even more willingness on the part of the teachers to retain control and were somewhat contradictory to their initial stance on classroom control. The average result was 3.58 for this, clearly indicating that their readiness to hand over control to students does have its limits, even when gamification of game-based learning is implemented. It is hard, very hard, to place trust in students' own motivation and believe that learning can take the place of teaching.

9. CONCLUSION

Having concluded the research and the analysis of the data gathered, it was felt that the most relevant findings were embedded in the interviews conducted. The questionnaire seemed to have reached those who were already progressing along the way of making gamification and game-based learning an integral part of their methodological arsenal. Therefore their responses in the questionnaire reflected a level of optimism and a positive attitude that did not necessarily transpire when participants of the interviews were given the time and space to elaborate on the more intricate details of pedagogical innovation using gamification and game-based learning. Furthermore, having administered the questionnaire to educators in four different countries did not seem to have yielded significantly different results in each country. Regardless, there are several points that not only gave a somewhat nuanced insight into an educator's use of gamification and game-based learning but also marked the way for further research and training to best accommodate those willing to embark on a journey of innovation. The following is a brief summary of these findings.

9.1. Gamification and game-based learning as a motivator

One of the main findings was that gamification and game-based learning work as a motivator for both the teachers and the students. As its primary objective is to reflect upon a student's progress (the added value of education), it works towards levelling the playing field that is giving all the students an opportunity to develop, gain points, to become better using their current state as a benchmark. The effect of not having to measure up to the "best" students in a class (ie. the shift in the baseline from being compared to others to bettering themselves), is naturally motivating for students. They were breaking up the existing class hierarchy by providing everyone an equal chance to better themselves tapping into mostly untapped sources of motivation in a student, as it shifts from equality to equity. The downside of this phenomenon is the pushback sometimes experienced by the "better" students, before sitting at the top of the class hierarchy. Their monopoly is shattered by gamification and game-based learning, therefore special care must be taken to accommodate these students and find a way to motivate them to be better.

9.2. Gamification and game-based learning as a pacifier

One of the most obvious advantages of gamification and game-based learning that transpired from all the interviews and were confirmed by the findings of the questionnaire analysis is the role of these methods as a reducer of perceived (and real) stress in the classroom. As has been illustrated in this paper before, the marking system in most countries performs a selective role, i.e., it is structured to sort the good students and the bad students. Logically, this is done by continuously raising the standard as the better students perform more and better, in order to maintain the normal distribution of results and student achievement.

With gamification and game-based learning the selective function of marking diminished, as it acknowledges the fact that in a school context trying things, experimenting with methods, and failing in producing results the first time something has been attempted is a natural part of learning. Therefore, the amount of stress at any point of assessment is significantly reduced. Both teachers and students that use gamification and game-based learning in some form claim to have experienced a decrease in the level of stress and anxiety during classes. They know that they have a second chance to correct any mistakes they might have made and being wrong or not getting something right the first time will not significantly affect their chances of succeeding. This contributes not only to a reduced level of perceived stress and anxiety but also a reduced level of willingness to cheat.

9.3. Gamification and game-based learning as a gateway

There have been countless attempts to help educators become more innovative. One of these methods is to provide training courses for them on innovative methodologies. It has been our experience that teachers very often revert to their traditional methods after a short period of experimenting with innovative methods.

Gamification and game-based learning seem to work as a successful first step toward innovation. Educators receive instruction in one of the key areas of their classroom woes – the drop in students' motivation. Furthermore, gamification and game-based learning provide a context that is easily sustainable, even without a drastic change in the way the classroom is functioning. Being given a framework, teachers don't seem to give up on innovative practices very easily, there is a tendency for them to get "stuck" with an innovative pedagogical framework.

9.4. Gamification and game-based learning as a catalyst

Having discussed gamification and game-based learning as the gateway to the implementation of innovative pedagogical methods, it must also be stressed that it provides a clear and relatable framework to most other methodological innovations.

Teachers using gamification and game-based learning have a framework that is readily available to accommodate other methods (such as project work, for instance) as its structure is flexible enough, therefore these innovations won't "stand out" from regular classroom practices.

Besides the positive outcomes outlined above, this finding must be the most significant in contemplating introducing gamification and game-based learning in the classroom. Through gamification and game-based learning a host of other methodologies will come naturally to educators.

10. FURTHER RESEARCH AND OUTLOOK

From our data, it clearly transpires that participants were mostly happy with and successful in the introduction of gamification and game-based learning in the classrooms. Having said that, there are certain areas where more instruction, help, and assistance might be welcome by them.

The first of these is hands-on training. Teachers often feel somewhat "neglected" in their attempts to innovate and a lack of support from relevant governmental agencies is often felt lacking. Another solution many prefer would be a kind of grassroots movement to share and spread ideas.

Patience is another requirement that is often missing. Educational structures are often very rigid, with methods, and materials carved in stone. It is often felt that not getting gamification and game-based learning right the first time, ironically, will often have a similar result with teachers as students. Parents, school administration, and also students will demand a flawless system to be introduced. The solution to this dilemma is two-pronged; first of all, educators must be provided with clear, efficient guidelines in introducing gamification and game-based learning, and second, all participants must be encouraged to cut the educators some slack at the start.

The perceived weight of the national curricula is definitely felt and serves as a major hindrance in introducing gamification and game-based learning. Attempts must be made to help teachers understand that developing skills is as much part of the learning process as learning facts and data. As soon as this shift in thinking has happened, teachers will find it easier to relate to gamification and

game-based learning and the material that needs to be covered. Naturally, officially giving the green light to gamification and game-based learning being implemented in school curricula would prove to be a boost in teachers' attempts.

All in all, further hands-on training, dissemination of ideas and good practices, and a community of like-minded educators along with training materials were felt to go a long way with a lot of educators to further the cause of gamification and game-based learning.

Appendices

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List of figures

Measurement tools: interview questions

1. In what ways do you motivate your students and give them feedback? (Hint: What ways of assessing students' progress do you use?)
2. Do you use games/do you play in the classroom? If yes, what? Give examples. If not, why not?
3. What advantages do you perceive in using games in the classroom?
4. What challenges do you perceive in using games in the classroom?
5. What would motivate you to use games (more) in the classroom?
6. What ways of motivating your students and giving feedback to them can you think of?
7. What advantages do you perceive in motivating and giving feedback to students in these ways?
8. What challenges do you perceive in motivating and giving feedback to students in these ways?
9. What would motivate you to use new ways of motivating and giving feedback to your students in the classroom?
10. What are the basic principles you have in teaching that drives you?

Measurement tools: questionnaire design

STATEMENTS OF THE QUESTIONNAIRE

1. Tablets are an innovative tool.
2. Mobile phones are an innovative tool.
3. Innovative teachers use tablets and/or laptops and/or mobile phones in class.
4. When I use games or gamification, I have less control over the students and the lesson.
5. When I have less control over the classroom it gives me a negative feeling.
6. It is important for the teachers to be in control of the class, always knowing what the students are doing.
7. I communicate with parents about the gamification system or game-based learning methods that I use in class and ask for the parents' feedback.
8. Games and gamification are applicable when there is less material to be learned.
9. Games and gamification are more useful for relaxation, and fun activities, rather than actual learning.
10. I would need more support from the authorities to use new, innovative methodologies, such as gamification or game-based learning.
11. I do not have a supportive environment in my school when it comes to new, innovative methodologies and tools.
12. Gamification or game-based learning is easy to explain to students, and the positive change in their attitude shows right away.
13. I would use more innovative methodology (e.g. game-based learning or gamification), but our national curriculum does not allow too much space for it.
14. I don't like to introduce new methodologies in the classroom as there is no time for that.
15. Students are more motivated to learn when I use game-based learning or gamification.
16. Gamification or game-based learning helps to reduce stress for students in the classroom.
17. Game-based learning and gamification make the lessons more effective. Students learn more and more easily.
18. Game-based learning and gamification can be used to teach content but also life skills, values, and mind-sets.
19. I feel confident about introducing new methods (e.g. game-based learning or gamification) in the classroom.

20. I feel confident about using new tools and technology (e.g. a new application or tablets) in the classroom.
21. Using game-based learning or gamification helps me get a better, clearer picture of any student's progress and learning.
22. Games and gamification are only useful to help motivate students to learn the content of the lessons and nothing more.

The final questionnaire is reachable at: https://forms.gle/W9hgbP6GAkKkeWTcA.