THE POSSIBILITIES OF GAMIFIED KNOWLEDGE TRANSFER IN HUNGARIAN SECONDARY EDUCATION

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Abstract

Successful knowledge transfer plays an important role in organizations and education, as gamification offers an effective approach. The aim of the study is to explore the playful form of knowledge transfer within knowledge management, presenting the concept of gamification and the Probst model. We posed three primary research questions. What subjects are taught in Hungarian high schools using the playful method? How popular are commonly used methods among respondents? Do preferences for different playful methods differ depending on students' ambitions? To answer these questions, we analysed 171 questionnaires and 3 professional interviews. The teachers provided insight into their teaching techniques, experiences and opinions. The results show that history stands out as the subject that uses playful methods the most, while mathematics lags behind significantly ($p<0.01$). Computer games became the second most popular method. A key observation is that students with higher academic goals clearly prefer certain methods, especially computer games, compared to their peers with milder ambitions. This difference is statistically significant ($p<0.05$). In conclusion, proposals were made that could contribute to a more efficient and beneficial education for students by investing in human capital.

Keywords: Knowledge management, gamification, innovative knowledge transfer, gamified education, competence development

JEL Code: D83, I20, I21

Introduction

Our publication deals with a forward-looking chapter in the history of education, playful education. It should be mentioned that there is also an economic approach to the phenomenon that is the subject of the investigation, namely through knowledge management. The goal of gamified training (similar to traditional training) is to produce graduates with skills that match their workplace needs. Nowadays, the value of an employee is no longer determined by his material knowledge, but by his ability to learn. Up-to-date education is important, as we want today's young people to do work with high added value. In Eastern and Central Europe,

unfortunately, there are still many factory jobs that do not require special skills and are underpaid. It is in the interest of all the states of the region to get out of the "assembling country" category. It would contribute to this if, through gamification, students with outstanding competencies and lifelong learning skills would leave school (Ruvolo-Eaton, 2013).

Gamified education is often considered by the public to be suitable for school age or even younger generations. Meanwhile, programming, which requires complex mathematical and logical knowledge, is taught using gamified methods (Bucchiarone et al., 2023). Play has long been an important player in the Finnish education system. Three key factors can be highlighted, which are the basic conditions of Finnish education. The occurrence of certain social and historical events, the good relationship between education and the public sector, and the characteristics of Finnish culture (Sahlberg, 2013). The repertoire of the highly respected and professional teaching staff is constantly expanding, and there are many professional innovations. The lessons reflect the unique needs and wants of the students. They support self-regulated learning and students' individual commitment (Medovarszki, 2021). Teaching programming is also a timely task for them, which is why they develop creative and skill-building games for pre-schoolers. Education for independent time management, student goals, and the lack of coercion develop competencies that are expected of today's employees.

For Central European countries, it is almost unimaginable that pre-schoolers in Finland are already learning to code. 5-6-year-olds can work with two toy robots and, after solving the programming problem, they can compete with their two robots and play tricks (Heljakka et. al, 2019). Digital tools offer many playful educational programs: In the Philippines, their impact on children's development is already being investigated.

1   Theoretical background

If games or certain elements of them are used in non-game areas of life, it is called gamification, or gamification. The purpose of the procedure is to make processes and activities more effective and interesting. Its application can result in quality improvement at different levels of education, health care, and culture. However, careful planning is necessary to avoid loss of performance (Toda, A.T., Valle, P, H, D., & Isotani, S, 2018). If we examine the components of the system, its behavioural structure, as well as the range of necessary elements and rules, we can formulate the various properties of the system. The aesthetics of the system, i.e., the resulting experience. Its dynamics, i.e., the totality of forms of action. Its mechanics, i.e., the elements of the game. (Fromann-Damsa, 2016, Zainuddin, 2020).

If a computer or video game is used in education, the three factors that produce an engaging and sustained effect must be taken into account. The load must be optimal, because this will make the player's position ideal. Tasks and challenges are balanced with your skills and competencies. The toolbox and room for movement are related to this, in which case we can talk about the flow effect, i.e., the experience of current. The individual receives experiences of success and the joy of the game. The ideal reward system provides a positive experience. We don't always get that in life. The aspiring person studies for the baccalaureate, receives his reward, completes his bachelor's studies, receives his diploma, and after his master's studies, he may find his ideal job. There, climbing the ranks, he finally reaches the level he dreamed of and provides him with a decent income. Although when the concept of gamification is mentioned, most people think of digital solutions, but the gamification sometimes takes place outside the virtual world, in which case elements used for online games are also used.

Among the properties of the gamified system, we can highlight its aesthetics (the experience generated in the game), its dynamics (the totality of the player's forms of action) and the practical elements of the game - its mechanics (Fromann-Damsa, 2016). The mechanics mean they exist, leader boards, feedback and cooperation work, there are 24 tasks while competing and randomness is common. These games are also driven by psychological dynamics (Michels, Ötting, Langrock, 2023). Figure 1 serves to illustrate the dynamics.

**Fig. 1: The dynamics that drive the game**

Source: Own edition based on doplay.eu

If individuals are active in a gamified system, they feel better and are more persistent. They are capable of greater performance because they experience the experience of achieving a meaningful goal voluntarily undertaken. If we observe this last sentence more closely, we can notice that it harmonizes with the principles of the transformed and exemplary Finnish educational method.

Corporate knowledge management starts in schools. They prefer to employ a young person whose school was aimed at knowledge (Al Amiri et al., 2023). In the case of a role-playing game popular with students, a certain affinity can be shown with training organized by companies, where the goal is for the participants to become good salespeople (Kuruczleki, 2014). One of the goals of player education is the development of player competencies. Varga et al. (2017) listed 33 possibilities. We can highlight the competences required to apply: load capacity, flexibility, self-development, communication skills endurance.

In the following, the generally accepted Probst (2006) model of knowledge transfer is presented, since the knowledge goal that is the starting point in this chapter appeared as a portfolio of competencies. Knowledge management has gone through a long path of development, and nowadays it can also enjoy the support of artificial intelligence (Bencsik, 2021).

Fig. 2: Probst model
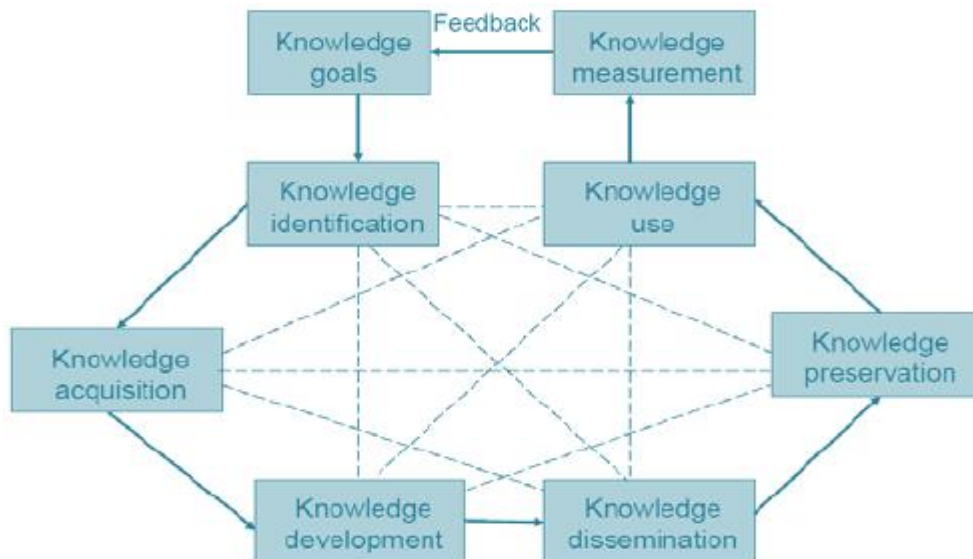
Source: Bencsik and Juhász, 2018

In relation to gamified education, it also makes sense to talk about knowledge management according to the Probst model. The identification of knowledge goals involves ensuring that all members of the teaching team are aware of procedures that can be used to make the not-so-easy

high school curriculum into a game. The identification of knowledge means that it is about tried and successful methods already in practice. It is possible for novice colleagues to acquire knowledge through an oral presentation or the use of a database. Sharing knowledge is the moral duty of all team members who have achieved success with it. The development of knowledge is continuous; all methods can be enriched with new aspects. Preservation of knowledge is definitely necessary in written or electronic form. The use of knowledge acquired by more experienced people is not stealing ideas, but a characteristic of a well-functioning organization. Measuring knowledge is keeping track of the use of procedures.

We did not find any description in the literature that categorizes educational gamification methods, analyzing the works of several authors, including classics (Albori, et al., 2011), as well as talking to the relevant age group, we came up with the following we compiled: MEME, comic book creation, hours of teamwork, computer educational game, collection of badges and seals, collecting points,word cloud analysis, contests, role play, filmmaking, costume classes. Emphasis was placed on the listed activities when compiling the questionnaire and setting up the hypotheses.

2   Aim, methodology and sample

The aim of the thesis is to examine the spread of gamified education in Hungarian secondary schools. We would like to find out what kind of link exists between the gamification of education and the more effective acquisition of employer competencies expected by employers in the 21st century. There is no doubt that employers expect professionals who are able to work in a team, have a high level of language skills, and learn new things to come out of education. The traditional system of education is not always capable of training such employees; however, it is a great help if young people are educated using gamified methods. The sub-goal is to map whether playful methods are used in the study of the baccalaureate subjects in the examined geographically defined area.

The second sub-goal is how gender and the intention to further study influence the acceptance of individual procedures. We first resorted to qualitative in-depth interviews for practical knowledge. The subjects of the study are therefore experts in the first part. We asked for the opinion of two Hungarian high school teachers, and as a contrast, we also provided the opinion of a teacher who is currently teaching in Germany but has 10 years of experience in Hungary. Our quantitative research took place in a geographically limited area in the western Hungarian region. The subjects of the study were high school students. Data collection lasted from March to early November 2022. We managed to collect 171 responses, in which the

gender distribution is realistic, all school types and all age groups are present, but the sample cannot be considered representative. A two-sample t-test was conducted to test the second hypothesis, while the third hypothesis was tested using a one-factor analysis of variance F-test.

3 Research results

We highlight the most important information for us from our three professional interviews. Our language teacher respondent cannot even imagine teaching lessons without playful methods. According to the math teacher's opinion, gamification can be used to make the world of numbers more familiar and appealing to students. Currently teaching in Germany, but previously working in a Hungarian school, he tried to teach the course material in a playful manner, but was hindered by the fact that there was too much material to be covered. We can hear the following important statements from him: Gamification is needed at all levels of education. Unfortunately, there are more and more young children with problems. You can still see the principles of the Prussian system in education. Parents should be taught responsible behaviour. The demographic distribution of our sample is summarized in Table 1.

Tab. 2: Demographic distribution

| The demographic distribution (N=171)			
Gender		Type of school	
Boy	47%	High school	48%
Girl	49%	Technical school	15%
no answer	4%	Vocational secondary school	22%
Completed year of life		Vocational school	15%
14	5%	Intention to further study	
15	8%	Yes	45%
16	17%	No	25%
17	29%	No answer	30%
18	26%		
More than 18	18%		

Source: Own edition

We set up 3 hypotheses for the qualitative research, the examination of which is now described.

.H1: Among the examined high school graduation subjects, in the sample from the Western Transdanubia region, mathematics education lacks playful procedures the most.

The Likert scale question (Which subjects, to what extent are you currently studying in a playful way?) based on the students' opinions, we also calculated average values for the subject-related question.

The trained average reflects that history (average 2.03) and foreign language (average 2.00) are mostly taught using gamification methods. Here we would refer back to the in-depth interview in which it was said that teaching languages (2.0) is almost unthinkable without a certain degree of playfulness. The Figure 3 shows that there is only a slight lag in Hungarian language and literature (1.98), since young people like to act out the most exciting scenes of the compulsory readings.

Fig. 3: Frequency of gamified education (means)
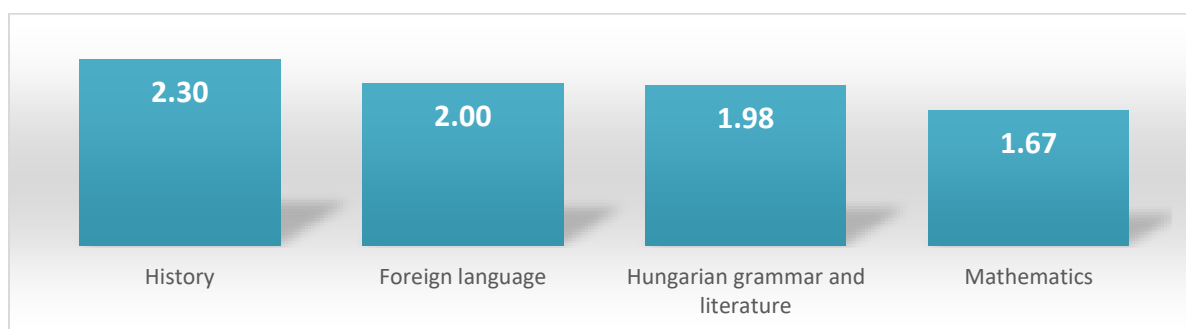
Source: Own edition

As expected, the subject of mathematics (1.67) is in the last place (Figure 3). The value of 1.67 for mathematics ($p<0.01$) is significantly lower than for the other subjects. Our calculations were performed with the t-test for matching averages, using a calculator. Our rain hypothesis was fulfilled.

H2: Among the first 5 most popular methods, we can surely find computer educational games and competitions that are natural for the age group. The most popular playful teaching method among students is team work in class, closely followed by computer-based educational games. Slightly behind in the third place are contests, which proves the competitive spirit of high school students. The most unpopular procedures for the age group are costume watches and collecting badges and seals (Figure 4).

Regarding the perceived usefulness of role-playing games and quizzes, a striking phenomenon is that many people felt indecisive about the issue. With a minimal majority, it was considered useful rather than useless. In the quizzes, 33 people (18%) chose the extremely useful answer and 33 people (19%) chose the more useful answer. On the other hand, only 16 (9%) thought it rather useless, 21 (12%) absolutely useless and 71 (42%) found it difficult to make a decision. In the case of role-playing games, 32 people (19%) chose the answer extremely useful and 24 people (14%) rather useful. On the other hand, only 16 (9%) thought it rather useless, 26 (15%) absolutely useless, and 43% of 73 found it difficult to make a decision.

(Figure 4).Our second hypothesis concerns the popularity of computer educational games and quizzes. Based on the second and third places in the row, we consider this hypothesis to be accepted as well.

H3: The more demanding a school the interviewed student attend, the more he likes the computer-based educational game. Table 3 presents the analysis of variance analysis of the relationship between the school type and the variables of liking computer games. We can see that a significant relationship can be demonstrated ($p<0.05$). This also fulfilled our third hypothesis.

Fig. 4: The popularity of the methods
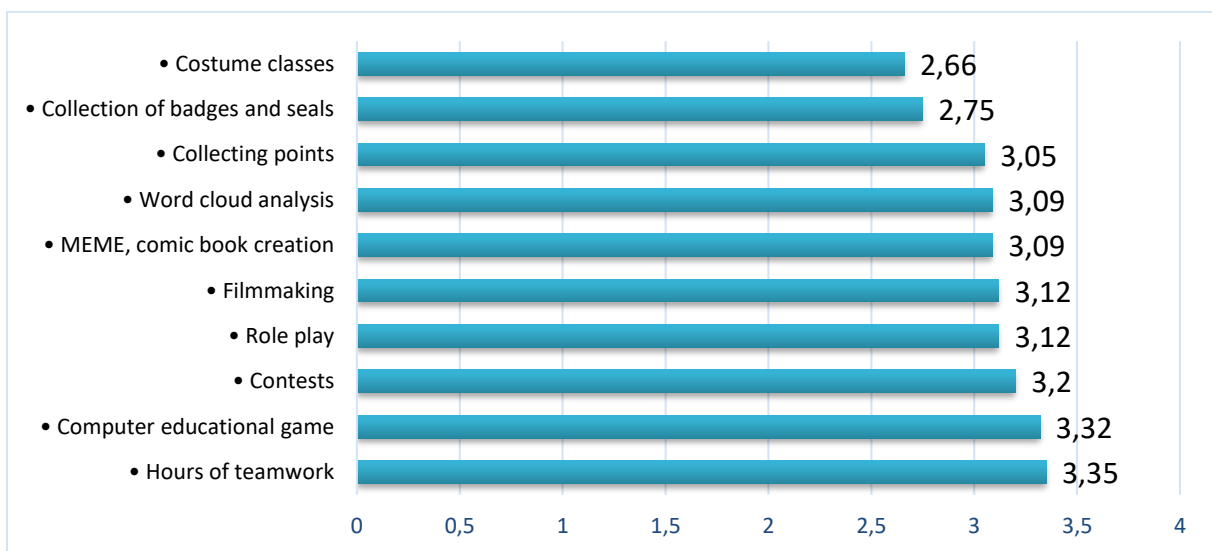
Source: Own edition

Tab. 3: Analysis of variance for the third hypothesis

School type and computer game (stronger school preferred)				
	df	SS	MS	F	The significance of F
Regression	1	6,49722	6,49722	4,68441506	**0,0319**
Remainder	162	224,6918	1,386986		
TOTAL	163	231,189			

Source: Own edition

Conclusion

In our opinion, if we want to achieve qualities that meet the expectations of the labor market in high school graduates (such as flexibility, decision-making ability), then we must give space to playful education. With the help of gamified methods, important knowledge is recorded for a longer time and more deeply. If the curricula provide greater freedom beyond the requirements of basic knowledge to the faculty and to the teachers who live up to their profession despite the circumstances, then the end result will be more positive. This can bring success to the country in international knowledge measurements and in the world of work.

The importance of the measures is justified by the fact that the international literature considers playful education extremely important and attributes special benefits to it. We also have a specific proposal to promote playful education. countries' governments constantly strive to evaluate the performance of teachers. A new element of this could be the announcement of tenders with monetary prizes. If creative educators develop some new gamified teaching method, they would receive a significant reward if submitted in a suitable format and sufficiently supported by documents. The established foundation would publish the submitted successful applications in the form of a book. Based on this, further training could even be organized for teachers, at the end of which they would receive a certificate of completion.

In addition, it is necessary to provide a forum for sharing good practices and methods. Nowadays, social media can also be used for this. In our examination, we place great emphasis on the opinions of the students. We did the right thing, as Dichev and Dicheva (2017) established that the effective gamification of the learning activity is only possible if we understand the behaviour of the target population of the gamified system. In addition to the needs and preferences of the student groups, the relevant learning goals according to the curriculum must be taken into account.

Recently, more and more research has been devoted to the learning opportunities inherent in game-based learning. Developers and researchers are working with all kinds of gamified education, and these are becoming more and more goal-oriented. There are not only online solutions, but the importance of role-playing in developing problem-solving skills can be highlighted (Johnson, L. - Adams, S. – Cummins, M. 2012). In our research, Papanastasiou et. al. (2016) and his colleagues showed that playful education brings additional benefits to students participating in 12th grade education. It helps people with learning difficulties maintain their self-esteem, and their motivation and independence increase.

We consider the topic to be relevant and timely, so it would be worthwhile to continue the work with a representative closer sample, it would be worthwhile to make a comparison within the regions of Hungary, where differences between the central region and peripheral areas could be observed. International comparisons would also produce interesting results, which would reflect the innovativeness, workload and commitment of the faculty members.

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