

Role of gamification at the University of Debrecen, with special regard to the Faculty of Economics

Tamás Kovács¹

INFO

Received: 23.03.2021

Accepted: 12.05.2021

Available on-line: 15.06.2021

Responsible Editor: L.

Varallyai

Keywords:

gamification, motivation,
openness, activation

ABSTRACT

With the spread of technology and Internet, the way of teaching has changed in recent decades, as opposed to traditional personal practice, with the current pandemic situation bringing to the fore various forms of distance learning that have posed increasing challenges for both educators and students at all levels of education. In many places, lecturers may experience a negative shift in the motivation and attention of university students, so that distractions in class or appearances in classes become more frequent than technical problems. At the same time, there is a huge increase in the amount of time spent on individual video games among young people. Gamification seeks to promote the connection between the fun experience of games and learning in education. Research has highlighted that some elements of games effectively contribute to learning, and the method can also have a number of positive benefits for higher education too. Nevertheless, many higher education institutions have not introduced gamification into their programs, nor are they included in the individual recommendations. The aim of the study is to explore the assessment of the method of gamification among the students and lecturers at the University of Debrecen, on the spot of the Faculty of Economics and Business. As results of the research, it can be stated that the students of the Faculty are on average less familiar with the method compared to the lecturers, however in general perception of gamification among the two groups can be said to be positive.

1. Introduction

Gamification is a modern way of arousing certain intrinsic motivations in the fields of education, human resources and marketing. The point is that we use certain playful elements and mechanics in a non-playful environment (Deterding et al. 2011). Throughout their lives, more and more children are using digital devices to relax at home, so these young children already have a good level of proficiency in handling various ICT devices. With these capabilities, game elements can be easily adapted in primary education, either digitally or offline. Of the offline solutions, most use the PBL (points, badges, levels) system, for example, to measure diligence by collecting “diligent bees” or to display behavioural measurements by collecting “suns” and “stormy rain clouds” on the wall board. With these solutions, teachers can also facilitate the transition between kindergarten and school for students. Mikó examined the storyline-based approach to this in art and drama courses among lower grade students (Mikó 2018). Applying a narrative known from gamification can create a learning environment through young people’s imaginations that can motivate them to work together (Mitchell 2016). It is also used in many ways to overcome learning difficulties. YanFi and co-authors presented a playful method used in elementary schools to help computer use for visually impaired students (Yanfi et al. 2017), but Gooch and co-authors used it in motivating dyslexic youth (Gooch et al. 2016). Among the domestic aspirations, the development of the music island application is outstanding in the field of art, where they try to help students learn with the help of the music application using ICT tools (Szabó 2018).

Among technology-based knowledge transfer, the potential of smartphones has also been explored in education. Su and Ching’s findings support Gabrielle’s findings (Gabrielle 2002) that there is a

¹ Tamás Kovács

Doctoral School of Management and Business,
University of Debrecen
kovacs.tamas@econ.unideb.hu

positive relationship between students' motivation and outcomes (Su and Ching 2015). Carvalho and colleagues have put together a kind of framework for gamification in high school, where they have sought to promote student activity, motivation, and easier understanding, among other things (Carvalho et al. 2015). Huizenga and colleagues (Huizenga et al. 2009) developed a game-based learning activity for secondary education on mobile phones that combined situational and active learning with fun. They found that gamification is a huge opportunity to increase student engagement and to move motivation and learning in a positive direction, which Schwabe and Goth also highlighted as a result of previous research (Schwabe and Goth 2005). In addition to this, a number of studies cover the use in foreign language education (Garcia 2013; Huynh et al. 2016). Several studies have already demonstrated (Soboleva 2018; Trajkovik et al. 2018) that games play a key role in our personality development in both childhood and adulthood, as this is when we can self-forgetfully acquire cognitive and affective skills (Frost et al. 2012; Pásztor 2013). It strengthens our belonging to the community, supports our moral development, improves our ability to communicate, and also makes us happy in addition to many other physiological effects. In terms of gender, several authors have examined the question of who spends more time playing. Several authors have argued that men play more and at the same time have a more positive relationship with technology than women (Greenberg 2010; Funk and Buchman 1996; Lucas and Sherry 2004; Hartmann and Klimmt 2006). One of my goals is to map the possibility of gamification, especially based on its role in higher education according to the domestic and international literature. My specific goal is that, as a result of my research, the Faculty of Economics of the University of Debrecen should improve the perception and awareness of gamification among lecturers and students. To that effect, I conducted a questionnaire survey as a quantitative method. In line with the literature and the objectives of the research, I formulated the following hypotheses:

H1: The gamification method is less known among students studying at the Faculty of Economics of the University of Debrecen than among faculty members.

H2: The general perception of gamification among students and lecturers is positive at the UD-Faculty of Economics.

H3: Those who say gaming would increase interest would find the lessons more enjoyable and would be more motivated.

2. Methodology

In terms of material, I chose the questionnaire from the quantitative methods during the primary data collection. The target group of the questionnaire is primarily students and lecturers participating in Hungarian higher education. Within this, students in vocational, secondary, or grammar schools who plan to continue their studies in a higher education institution, as well as undergraduate students at BsC and MsC level. On the faculty side, I measured the opinions of PhD students and faculty involved in teaching, regardless of status. Due to the appropriate segmentation, I examined the research questions from the two sides, so I asked the questions from two different perspectives (teachers, students), but with the same content elements. In addition to descriptive statistics, I used the Mann-Whitney test from the non-parametric tests for the analysis, as most of the variables are not normally distributed due to the Likert scale (1-5). I also used logistic regression analysis to perform each estimate and to fully support the hypotheses. The reason for using it is that the prerequisites for the method are less strict. Of these, it is important that multicollinearity between variables is not allowed and that independent variables should refer linearly to the dependent variable. One of its advantages is that it does not require a normal distribution (Hosmer et al. 2013). Its use is most often encountered in predicting events and in measuring dependent effects for dependent and independent variables. We distinguish three types: binary (dichotomous), multinomial, and ordinal, which must be selected according to the given measurement level (Gasso 2019). From the regression coefficient we can calculate the odds ratio, which is the odds of the occurrence of something in the examined groups that is many times higher than those in the reference group. Parameters are estimated iteratively with the maximum likelihood method instead of the least squares method compared to the linear regression (Bartus 2003).

The primary research was carried out using CAWI (Computer Assisted Web Interviewing), an online query method, for which I used the service of Google Forms. In preparing the questionnaire, I took into account the applicable GDPR and data management laws, and did not collect sensitive data on the respondents. The questionnaire was anonymous, in which participation was voluntary, and I used its results only in aggregate. In addition to sociodemographic issues, the range of questions includes knowledge of gamification as well as knowledge of applications that use gamification. Statistical analysis was performed with the SPSS 22.0 software, while path analysis was performed with the SmartPLS software. In addition, Microsoft Office Excel 2016 was also used to create the figures and perform some calculations.

3. Results

3.1. Demographic presentation of the studied sample

The following table illustrates the demographic results of the two surveys. The most important demographic characteristics of the questionnaire are detailed in Table 1. Due to the segmentation along the narrowed target group, the results cannot be considered representative. The number of items in the two studies was $N = 401$. The gender ratio for the student questionnaire was 60% male and 40% female (N^H), while the proportion for men in the instructor questionnaire was 47% compared to 53% for the female instructor (N^O). The average age of the respondents was 20.9 years for the students and 40 for the lecturers. The teaching experience was on average 13 years among the respondents, which is due to the high proportion (28.4%) of PhD student completion.

Table 1. Characteristics of the respondents (sociodemographic)

<i>Item</i>	<i>Category</i>	<i>Student</i>		<i>Instructor</i>		<i>Sum</i>
		N^H	(%)	N^O	(%)	N
Gender	Men	137	60.9	27	47.1	164
	Women	213	39.1	24	52.9	237
	Sum	350	100	51	100	401
Avg. Age		20.9	-	40	-	
Avg. teaching experience (years)		-	-	13	-	
Education						
	Primary schools	7	2	-	-	
	High school	278	79.4	-	-	
	BSc/ College degree	52	14.9	-	-	
	MSc/ University degree	12	3.4	-	-	
	PhD or more	-	-	52	-	
	Sum	350	100	51	100	401
Residence						
	Capital	6	1.7	2	2	
	City with county rights	95	27.1	34	66.7	
	City	159	45.4	13	25.6	
	Village	90	25.7	2	5.9	
	Sum	350	100	51	100	401

N^H notes the student questionnaire, while instructors are presented by N^O .

Source: Own resource, 2021

In terms of educational attainment, the majority of graduates have a secondary education (79.4%) and 14.9% had a BSc or college degree. This suggests that a significant proportion of respondents are undergraduate students with no tertiary education, which may result from the snowball method. By type of residence, it can be said that those living in a city with a county status and those living in a city together make up 72.5% of the student sample (N^H), while those in the capital and village account for

only 27.4%. In the case of educators ($N = 0$), cities and towns with county status together account for 92.3% of the sample, compared with 7.8% for those living in the capital and villages.

Table 2. Responders by universities and faculties ($N = 401$)

	<i>Student</i>	<i>Instructor</i>	<i>%</i>
Faculty of Economics and Business (UD -FEB)	202	50	62.8%
Faculty of Health (UD -FH)	21		5.2%
Faculty of Science and Technology (UD -FST)	19		4.7%
Faculty of Informatics (UD -FI)	13	1	3.5%
Faculty of Medicine (UD -FM)	15		3.7%
Faculty of Agricultural and Food Sciences and Environmental Management (UD -FAFSEM)	38		9.5%
Faculty of Engineering (UD -FE)	5		1.2%
Faculty of Pharmacy (UD -FP)	2		0.5%
Faculty of Public Health (UD -FPH)	8		2.0%
Other university	13		3.2%
High school	14		3.5%
Sum	350	51	100%

Source: Own resource, 2021

Regarding the University and faculties (Table 2), 63% of the respondents were related to UD -FEB, 9% to UD -FAFSEM, while 20.9% of the other faculties of the University of Debrecen compose the complete sample ($N = 401$). Taken together, the fillings attributable to the University of Debrecen accounted for 93.3% of all fillings, other universities for 3.2%, while high school students in the process of further education accounted for 3.5% of the sample.

3.2. Preliminary gamificational knowledge of the respondents

To examine the propensity to use a particular technology, it is worth reviewing the gamification backgrounds of the fillers. The measurement of knowledge and use of gamification is detailed in Table 3, where “I don’t know” was given a value of 1 on the Likert scale, while regular use was marked with a value of 5. The following table illustrates the distribution of student and faculty responses. It is striking that 34% of students are unfamiliar with gamification, compared to only 20% on the faculty side. The second group included those who had heard of the concept but had not yet applied it or did not know it. This rate was 30% in favour of students, while 25% of faculty members marked this answer. The proportion of those who used it for teaching or learning was 21% to 29%. Surprisingly few regular users, as 2% of students marked this option, while 6% of responses from the teacher’s side.

Table 3. Gamification backgrounds (G1)

	<i>Student</i>	<i>%</i>	<i>Instructor</i>	<i>%</i>
I do not know.	118	34%	10	20%
I’ve heard it before but haven’t tried it yet or don’t know about it.	106	30%	13	25%
I have used it a few times but not for learning / teaching.	45	13%	10	20%
I have already used it for learning / teaching.	74	21%	15	29%
I use it regularly for learning / teaching.	7	2%	3	6%

350	100%	51	100%
-----	------	----	------

Source: Own resource, 2021

Based on Table 3, there is a difference in the preliminary gamification knowledge of the completing students and instructors, which is supported by the results of the Mann-Whitney test illustrated in Table 4. There is a significant difference between the ranking means ($p < 0.001$). The average knowledge of the responding students on the five-point scale was 2.274, while the prior knowledge and use values of the instructors were 2.765.

Table 4. Examination of knowledge and use of gamification

Status		N	Rang avg.	Rang sum.
G1. Gamification methodology	Student	350	195.34	68367.50
	Instructor	51	239.87	12233.50
	Sum	401		
Mann-Whitney U	6942.500			
Wilcoxon W	68367.500			
Z	-2.662			
Asymp. Sig. (2-tailed) (p-value)	.008			

Source: Own resource, 2021

Based on the results, it can be said that there is a significant difference in the prior knowledge of students and teachers about gamification. The knowledge of the instructors has a higher value in the matter compared to the students. Therefore, I found my hypothesis H1 to be statistically sound and proven, so I accept my hypothesis.

3.3. General perception of gamification

We can only talk about the possibilities of using gamification and the intention to use it if we know the general perception of the respondents. During the positive assessment, I examined the problem from three sides, openness, motivation, and necessity. Its criterion is that the average of both student and faculty responses reaches a value of 4. In the case of openness (G2), in terms of motivation (G3), I examined the variables and the need to measure the need for variables (E2), the averages of which are shown in Table 5.

Table 5. General perception of gamification among students and instructors

Variables	Average of student responses	Average of instructor responses
Openness (G2)	4.177	4.254
Motivation (G3)	4.120	4.098
Need (E2)	4.060	4.137

Source: Own resource, 2021

Table 6. The result of the general assessment of gamification by status

	Status	N	Rang avg.	Rang sum.	Mann-Whitney U	Wilcoxon W	Z	p value
G2. Openness	Student	350	199.23	69732.00				
	Instructor	51	213.12	10869.00				
	Sum	401			8307.0	69732.0	-.862	.389
G3. Motivation	Student	350	200.65	70226.50				
	Instructor	51	203.42	10374.50				
	Sum	401			8801.5	70226.5	-.172	.864
E2. Need	Student	350	198.82	69586.00				
	Instructor	51	215.98	11015.00				
	Sum	401			8161.0	69586.0	-1.050	.294

Source: Own resource, 2021

To examine this difference in the perception of students and faculty, I again performed a Mann-Whitney test for the previous three variables (G2, G3, E2) in the dimension of status (student or faculty). Looking at the results in Table 6, it can be said that no significant difference could be detected between the means of the two samples ($p > 0.05$), so it was proved that the general assessment of both students and lecturers was positive (> 4.00). The previous findings and the values in the table support my acceptance of Hypothesis H2.

Based on what has been read in previous literature, according to which gamification is an excellent method for motivation, improving enjoyment value (eg flow experience) and arousing interest in the fields of marketing, education and human resources, I examined in line with my third hypothesis that in higher education to what extent do the variables go together, do they show a significant positive correlation in the pros / cons of gamification. The results of this are presented in Table 7. Because ordinal variables were compared, the results were calculated using Spearman's rank correlation, according to which values below 0.2 are weak, values between 0.2 and 0.6 are medium, while values equal to or above 0.6 show a strong correlation between the two variables.

Table 7. Correlations between motivation, interest, and enjoyment value in pros and cons

		PRO1_interest	PRO1_motivates	PRO1_makes the courses more enjoyable
PRO1_interest	Correlation coefficient	1.000	.571**	.600**
	p- value		.000	.000
	N	412	412	412
PRO1_motivates	Correlation coefficient	.571**	1.000	.544**
	p- value	.000		.000
	N	412	412	412
PRO1_makes the courses more enjoyable	Correlation coefficient	.600**	.544**	1.000
	p- value	.000	.000	
	N	412	412	412

Source: Own resource, 2021 ** $p < 0.01$ (2-tailed)

The previous table illustrates the correlations between motivation, interest, and enjoyment value in pros and cons. We can see that for all three variables we can observe a positive correlation at the significance level of $p < 0.01$. Based on these, the arousal of interest can be considered moderate with a rank correlation value of 0.571, while they show a strong correlation with a value of 0.6 when experiencing the lesson more enjoyable. Since the results show a significantly positive correlation, I consider my hypothesis H3 to be accepted.

In the study of ordinal logistic regression, I measured the effect of openness, motivation and activation on gamification, the results of which can be seen in Table 9, where in terms of variables we can say that in one case a significant difference can be measured based on the grouping factor (status). In this sense, the activity-increasing effect of gamification is judged differently by teachers and students ($p < 0.001$). Compared to students, the log value of the odds ratio for teachers to fall into a higher category increases by 0.6912 ($p = 0.001$), which in practice means that teachers consider the activating effect of gamification to be higher than students.

Table 9. Ordinary logistic regression by status

Dependent variable	Independent variable	Coefficient	p-value
Openness (G2)	Status	0.8432	0.399
Motivation (G3)	Status	0.0024	0.992
<i>Activity (G5)</i>	<i>Status</i>	<i>0.6912</i>	<i>0.009</i>

Source: Own resource, 2021

Conclusion

Overall, it can be said that gamification can be applied in many fields based on the literature, and it can play an important role in the field of education. It can be used to increase motivation regardless of training level, to make monotonous lessons more enjoyable, but even to arouse interest. The study highlights the perceived and real differences between knowledge and use of the method among the students of the University of Debrecen, including the students of the Faculty of Economics, and the lecturers of the Faculty. As a result of the research, it can be stated that the students of the Faculty are on average less familiar with the method compared to the lecturers. One of the reasons is the active publication of the research results I have done, lectures at conferences and my lectures on the topic in professional forums. The lower knowledge and use of gamification methods by students may presumably be a lack of awareness that has not been explored in current research, so exploring the causal relationships of this may form the basis of another study.

The general perception of gamification among the students and the lecturers can be said to be positive, which I was able to prove with significant results. Among the gamification influencing factors learned during the literature review, I examined motivation, activation, necessity, and the development of interest / commitment in the dimension of status (student and teacher). As a result of these studies, a positive relationship was highlighted, so these variables go hand in hand with the assessment of gamification, and I even showed that they fall significantly into each category. In this sense, the activating effect of playfulness is rated higher by educators than by students. As a limitation of the article, it should be mentioned that the results of a non-representative survey were analyzed, however, it can serve as a kind of guideline for the leaders of the Faculty to compile training plans and make recommendations to the lecturers. Among the grouping factors, a future study could form the basis of gender and generational perceptions of gamification.

References

- Bartus, T. 2003, Logisztikus regressziós eredmények értelmezése. *Statisztikai Szemle*, 81, 328-347.
- Carvalho, A. A., Zagalo, N., & Araújo, I. 2015, From games played by secondary students to a gamification framework. In *Society for Information Technology & Teacher Education International Conference* (pp. 737-744). Association for the Advancement of Computing in Education (AACE). ISBN 978-1-939797-13-1
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. 2011, From game design elements to gamefulness: defining "gamification". In *Proceedings of the 15th international academic MindTrek conference: Envisioning future media environments* (pp. 9-15). <https://doi.org/10.1145/2181037.2181040>
- Frost, J. L., Wortham, S. C. & Reifel, S. 2012, *Play and Child Development* FOURTH EDITION. New Jersey: Pearson, 492p.
- Funk, J. B., & Buchman, D. D. 1996, Children's perceptions of gender differences in social approval for playing electronic games. *Sex Roles*, 35(3-4), 219-231.
- Gabrielle, D. M. 2002, *The Effects of Technology- Mediated Instructional Strategies on Motivation, Performance, and Self-Directed Learning (Electronic)*: U.S. Military Academy
- C- Su, H. & Cheng, C-H 2015, A mobile gamification learning system for improving the learning motivation and achievements." *Journal of Computer Assisted Learning* 31.3 268-286. doi: 10.1111/jcal.12088
- Garcia, I. 2013, Learning a Language for Free While Translating the Web. Does Duolingo Work? *International Journal of English Linguistics*, 3(1), 19–25. <http://doi.org/10.5539/ijel.v3n1p19>
- Gasso, G. 2019, Logistic regression. INSA Rouen - ASI Departement
- Gooch, D. V., Asimina, B. L., & Khaled, R. 2016, Using Gamification to Motivate Students with Dyslexia. In: *CHI 2016, 7-12 May 2016, San Jose*. <https://doi.org/10.1145/2858036.2858231>
- Greenberg, B. S., Sherry, J., Lachlan, K., Lucas, K., & Holmstrom, A. 2010, Orientations to video games among gender and age groups. *Simulation & Gaming*, 41(2), 238-259. doi: 10.1177/1046878108319930
- Hartmann, T., & Klimmt, C. 2006, Gender and computer games: Exploring females' dislikes. *Journal of Computer-Mediated Communication*, 11(4), 910-931. doi.org/10.1111/j.1083-6101.2006.00301.x
- Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. 2013, *Applied logistic regression* (Vol. 398). John Wiley & Sons. ISBN:9780470582473
- Huizenga, J., Admiraal, W., Akkerman, S., & Dam, G. 2009, Mobile game-based learning in secondary education: Engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning*, 25, 332–344. doi: 10.1111/j.1365-2729.2009.00316.x
- Huynh D., Zuo L., & Iida H. 2016, Analyzing Gamification of “Duolingo” with Focus on Its Course Structure. In: Bottino R., Jeuring J., Veltkamp R. (eds) *Games and Learning Alliance*. GALA 2016. *Lecture Notes in Computer Science*, vol 10056. Springer, Cham. https://doi.org/10.1007/978-3-319-50182-6_24
- Lucas, K., & Sherry, J. L. 2004, Sex differences in video game play: A communication-based explanation. *Communication research*, 31(5), 499-523. doi: 10.1177/0093650204267930
- Mikó, A. 2018, "Játékosítás az alsó tagozatban." *Sárospataki Pedagógiai Füzetek*: 255-264.
- Mitchell P. J., & McNaughton M. J. 2016, *Storyline: A Creative Approach to Learning and Teaching*. Cambridge: Cambridge Scholars Publishing ISBN: 1-4438-9035-9

Pásztor, A. 2013, Digitális játékok az oktatásban. *Anyanyelv-pedagógia*. v. 10, n. 1, pp. 37–48.

Schwabe, G., & Göth, C. 2005, Mobile learning with a mobile game: design and motivational effects. *Journal of computer assisted learning*, 21(3), 204-216. doi.org/10.1111/j.1365-2729.2005.00128.x

Soboleva, E. V. 2018, The possibilities of the digital gamification resources for supporting cognitive personality development. *Novosibirsk State Pedagogical University Bulletin*. v. 8, n. 5, pp. 159–175.

Su, Si H. & Cheng, C-H, 2015, A mobile gamification learning system for improving the learning motivation and achievements." *Journal of Computer Assisted Learning* 31.3 268-286. doi: 10.1111/jcal.12088

Szabó, N. 2018, "Zeneziget. Játékosítás (gamifikáció) digitális eszközökkel az ének-zene oktatásban." *Gyermeknevelés Tudományos Folyóirat* 6.2. 97-107.

YanFi, Y. U., & Azani C. S., 2017, A Gamification Interactive Typing for Primary School Visually Impaired Children in Indonesia, *Procedia Computer Science*, Volume 116, Pages 638-644, ISSN 1877-0509, doi.org/10.1016/j.procs.2017.10.032.