

Motivation with Game Elements in Education Mediated by E-Learning Resources

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Jan Miškov deals with the topics of e-learning, educational games, media effects and teaching models. Besides the educational potential of digital games, he is fascinated by their visual culture, functioning, structure and shared traits with previous media types. He is currently completing his dissertation at the Faculty of Education of Masaryk University where he teaches gamification in education. He previously received a master's degree in the field of media studies and journalism at Faculty of Social Studies. He had published findings on the utilisation of game principles in online teaching from educators' perspectives and outlined his approach to the simulation of an editorial content management system as part of the education model for a game journalism course. In accordance with his professional interest in play culture and aesthetics, he contributed to a collection of essays on contemporary Japanese pop culture of video games and an article on the genealogy of interactive drama. He helped to organize international conferences on game studies.



ABSTRACT:

We present a report from our preliminary research, which focused on the possibilities of implementing game elements into e-learning at university. We were interested in the attitudes and preferences of the students on the introductory course for the study of culture, where a questionnaire survey was conducted. We asked students what potential they see in the application of digital technologies in e-learning, what motivates them to study online and what advantages and limits of the educational principles of games they see in e-learning. Here we offer a description of the preliminary results that led to our next research steps. The questionnaire was distributed among students of two runs of the Introduction to the Study of Culture course at the Faculty of Social Studies of Masaryk University, who completed it after the final test. A total of 188 students submitted a completed form. These were bachelor students, usually in the first year of study, mostly women. We chose a freely available online tool for the analysis, our approach to data processing was non-mathematical at this stage. Nevertheless, we believe that it has enabled us to gain a direct and unmediated insight into the subject of our research. Mixed methods pragmatic rationalization of the research process traditionally refers to the complementarity of datasets and greater validity. Based on the findings, we recommend to educators and developers of the online learning environment how they could improve the design of e-learning in accordance with the needs and different learning styles of students.

KEY WORDS:

digital games, e-learning, flow, game-based educational principles, gamification, learning objectives, motivation and self-determination theory, online learning systems, teaching model.

Introduction

Universities are pioneers of e-learning but the process of teaching and learning online has been innovated only partially. This study suggests a shift from the instructive (linear or passive) approach to game-based teaching. It aims to uncover what place games hold in schooling, how they affect people and what students take away from them. The aim is to find out what potential students see in the application of game principles in e-learning, and thus recognize the possibilities and limits of their implementation from the perspective of key participants in the education process. This work researches and analyses new opportunities that modern information and communication technologies open up in the field of education and lifelong learning. Educators possessing knowledge on how to direct the transmission of information in class can design e-courses accordingly, so they can exploit digital games' inherent educational potential in teaching mediated by e-learning resources. Based on the findings, we offer recommendations about how to achieve a qualitative change in online learning.

The idea of the role of the teacher as a designer of online learning leads us to the fact that in order to have a holistic understanding of the educational process, it is necessary to know the attitudes of its key participants, i.e. not only educators and e-learning experts, but also students themselves. With the intention of a deeper understanding of the given issue, we conducted a questionnaire survey as part of the preliminary research

among students to better understand their preferences in relation to an alternative teaching model based on educational game principles. In this study, we focus on gamification in an educational context. First, we should better explore how interaction with a gamified system can develop in education, than address the question of whether gamification works. As such, our contribution provides guidance for researchers, educators, designers and software developers in building a new generation of gamified systems that reflect both theory-based and empirical design.

Theoretical Frame

Satisfaction of e-learning users depends on their having good experiences. Research of users of the online learning environment focuses on understanding their behaviour, needs and motivation through interviews, analysis of surveys and other methods of feedback. Studies of the motivational potential of educational game principles are still somewhat limited by the development of learning systems. However, it is necessary to start gaining insight into the preferences and needs of key participants in the online learning process in order to contribute to the development of e-learning, not only at Masaryk University but elsewhere. We hope to provide educators with the inspiration to create an e-course and developers with the incentives to expand the functions of the online learning systems.

User Experience from E-learning

With e-learning, universities strive to achieve goals and effects, such as a high degree of satisfaction, motivation, efficiency and performance of students. Research on information systems clearly shows that user satisfaction is one of the most important factors in evaluating the success of system implementation.¹ However, we do not have enough knowledge about why people stop learning online after their initial experience with e-learning.² There are several reasons for the poor performance, efficiency, satisfaction and motivation of students in e-learning, some of which are: poorly managed projects ignoring the main stages of e-learning development (i.e., analysis, planning, development, implementation and evaluation), use of inappropriate motivational techniques, insufficient technical and technological implementation of e-learning, improperly selected staff, incorrect data on demographic and other characteristics of students and poor graphical interfaces.³ Insufficient analysis of the user profile, inappropriate design methods and gamification schemes that are too simple can lead to applications not achieving the expected results.⁴

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- 1 DELON, W., McLEAN, E.: Information Systems Success: The Quest for the Dependent Variable. In *Information Systems Research*, 1992, Vol. 3, No. 1, p. 61-94.
 - 2 SUN, P. C. et al.: What Drives a Successful E-Learning? An Empirical Investigation of the Critical Factors Influencing Learner Satisfaction. In *Computers & Education*, 2008, Vol. 50, No. 4, p. 1184-1201.
 - 3 URH, M. et al.: The Model for Introduction of Gamification into E-Learning in Higher Education. In *Procedia – Social and Behavioral Sciences*, 2015, Vol. 197, No. 1, p. 389.
 - 4 PEDREIRA, O. et al.: Gamification in Software Engineering – A Systematic Mapping. In *Information and Software Technology*, 2015, Vol. 57, No. 1, p. 158-167.

According to P. J. Shea, A. Pickett and W. E. Pelz, an effective online learning environment should support: contact between students and faculty members, reciprocity and cooperation between students, quick feedback, time to task, active learning techniques, communication of high expectations and respect for the diversity and learning patterns of each student.⁵ There are recommendations for teachers and institutions to organize the content in the instructions for the platform: quick and positive feedback, adapting tasks to skill levels, experimenting and repeating tasks, the main task is divided into smaller subtasks, different paths to the goal, the use of different game mechanics and encouraging activities despite current failures. The main goal of e-learning, i.e., high performance, efficiency, commitment, satisfaction and motivation of students, could be achieved using game mechanics and gamification.⁶

Urh et al. proposed an e-learning model introducing gamification into higher education adapted to the characteristics of users. It consists of the following elements: administration of important factors of e-learning, elements of user experience, development phases, game mechanics, game dynamics, and gamification elements in e-learning and their effects on students. "Proper management of e-learning means organizing, planning, staffing, leading and managing all important elements of e-learning". The authors include pedagogical, technological, design, administrative, human, financial and gamification elements.⁷ Gamification emphasizes the visible display of goals that motivate students. It must be clear to them what they will gain through e-learning and how this knowledge can be put into practice. The main goal of e-learning should be divided into smaller tasks, which are easier and can gradually result in increased motivation and satisfaction. "The progress and current status of student activities must be clearly displayed graphically. The feeling of progress provides students with motivation for further work. The balance of study materials and students' abilities can lead to a state of *flow*, which is the most effective and rewarding way of learning". M. Urh et al. further recommend that any student success that results from the activities be appropriately rewarded in the form of positive feedback. "Positive feedback as a basis for gamification increases users' self-confidence and motivation". The purpose of gamification in e-learning is to encourage students to continue working despite failure.⁸

To design an e-learning model with gamification elements, we must know who our users are and what their needs are. "Gamification must be integrated into the model in a way that reinforces students' understanding of the importance of education for their future. By gamification, we can connect students' personal goals with those of e-learning, which should be clear and unambiguous. The goals of e-learning must be presented very precisely, as well as the rules, guidelines, time frames, requirements and its limitations". E-learning evaluation is the process of setting the achieved goals of e-learning. "Through evaluation, we obtain information about student satisfaction, motivation, performance and effectiveness. Generally speaking, e-learning is a type of web application and usability is a very important element of web applications". According to Nielsen, usability can be defined using five components: learnability, usefulness, memorability, error rate, and satisfaction.⁹

5 SHEA, P. J., PICKETT, A. M., PELZ, W. E.: A Follow-Up Investigation of Teaching Presence in the SUNY Learning Network. In *Journal of Asynchronous Learning Networks*, 2003, Vol. 7, No. 2, p. 62-79.

6 LEE, J., HAMMER, J.: Gamification in Education: What, How, Why Bother?. In *Academic Exchange Quarterly*, 2011, Vol. 15, No. 2, p. 2-4.; SIMÕES, J., REDONDO, R. D., VILAS, A. F.: A Social Gamification Framework for a K-6 Learning Platform. In *Computers in Human Behavior*, 2013, Vol. 29, No. 2, p. 346-352.

7 URH, M. et al.: The Model for Introduction of Gamification into E-Learning in Higher Education. In *Procedia – Social and Behavioral Sciences*, 2015, Vol. 197, No. 1, p. 391-392.

8 Ibidem, p. 394-395.

9 NIELSEN, J.: *Usability 101: Introduction to Usability*. Released on 3rd January 2012. [online]. [2021-05-31]. Available at: <<http://www.nngroup.com/articles/usability-101-introduction-to-usability/>>.

Game-based Learning

We describe digital games in terms of their interactivity – they constantly provide feedback, either as scores or as changes in the virtual world, so that players can monitor their progress towards the goal.¹⁰ They are based on a set of agreed rules and constraints,¹¹ aimed at a clear goal that is often set by the challenge.¹² Immediate feedback provides players with information about the correctness of their actions and decisions.¹³ According to K. Maroney, games can be defined as a “game form with goals and structure”.¹⁴ T. K. Grünberg defines a game as a system based on rules specifying what is in it, how everything behaves and how players can communicate with the game world. He talks about game mechanics, which are factors, objects, elements and their relationships in the game. The dynamics of the game are the emergent behaviour that arises from the game when the mechanics are put into operation. Aesthetics is the emotional reaction of players to the game.¹⁵ Well-known elements of game mechanics are: points, levels, badges, achievements, virtual goods, leader boards and virtual gifts. Some elements of game dynamics are: rewards, status, competition, self-expression, etc.¹⁶ Digital games also include competitive activity, but it is not their defining characteristic as along with the narrative or story development in a game.¹⁷

The term game-based learning or game-based education is defined as the use of digital game as a resource to support a teacher who uses a framework of game rules for a specific learning purpose.¹⁸ A clear framework of rules given by the digital system makes the game, where the player must get acquainted with these rules and accept them during the game itself.¹⁹ Among the principles of engagement and immersion in the education process online, R. Conrad and A. Donaldson include learning by solving problems in a group together with constructivist principles of acquiring and creating one’s own knowledge.²⁰ It is the direct involvement of students in decision-making processes and learning from the consequences of these decisions; exploring various aspects of the problem in a secure environment that relate to the real world; acquiring knowledge from a new perspective; setting goals and tasks, role playing, etc. In addition, digital games simulate tasks in such a way that their execution in the game involves the same cognitive processes

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- 10 See also: PRENSKY, M.: *Digital Game-Based Learning*. New York : McGraw-Hill, 2011.
 - 11 GARRIS, R., AHLERS, R., DRISKELL, J. E.: Games, Motivation, and Learning: A Research and Practice Model. In *Simulation & Gaming*, 2002, Vol. 33, No. 4, p. 442-466.
 - 12 MALONE, T. W.: Toward a Theory of Intrinsically Motivating Instruction. In *Cognitive Science*, 1981, Vol. 5, No. 4, p. 334-368.
 - 13 CAMERON, B., DWYER, F.: The Effect of Online Gaming, Cognition and Feedback Type in Facilitating Delayed Achievement of Different Learning Objectives. In *Journal of Interactive Learning Research*, 2005, Vol. 16, No. 3, p. 244-257.; MORENO, R., MAYER, R. E.: Role of Guidance, Reflection, and Interactivity in an Agent-Based Multimedia Game. In *Journal of Educational Psychology*, 2005, Vol. 97, No. 1, p. 118-127.
 - 14 MARONEY, K.: *My Entire Waking Life*. 2001. [online]. [2021-05-31]. Available at: <<http://www.thegamesjournal.com/articles/MyEntireWakingLife.shtml>>.
 - 15 GRÜNBERG, T. K.: *What’s the Difference between Game Mechanics and Game Dynamics?*. [online]. [2021-05-31]. Available at: <<http://www.quora.com/Whats-the-difference-between-game-mechanics-and-game-dynamics>>.
 - 16 *Gamification 101: An Introduction to the Use of Game Dynamics to Influence Behaviour*. 2010. [online]. [2021-05-31]. Available at: <<http://jndglobal.com/wp-content/uploads/2011/05/gamification1011.pdf>>.
 - 17 WOUTERS, P. et al.: A Meta-Analysis of the Cognitive and Motivational Effects of Serious Games. In *Journal of Educational Psychology*, 2013, Vol. 105, No. 2, p. 250.
 - 18 For more information, see: PRENSKY, M.: *Digital Game-Based Learning*. New York : McGraw-Hill, 2011.
 - 19 See also: WASTIAU, P., KEARNEY, C., BERGHE, W.: *How Are Digital Games Used in Schools? Complete Results of the Study*. Brussels : European Schoolnet, 2009. [online]. [2021-05-31]. Available at: <http://games.eun.org/upload/gis-full_report_en.pdf>.
 - 20 See: CONRAD, R., DONALDSON, A. J.: *Engaging the Online Learner: Activities and Resources for Creative Instruction*. San Francisco : Jossey-Bass, 2004.

that are needed to perform tasks in the real world.²¹ T. W. Malone considers challenge, curiosity and imagination to be the most important factors that make playing a digital game intrinsically motivating.²² Two essential factors related to digital games, autonomy (choice) and competence (the challenge is experienced as challenging but not too difficult, see the concept of flow), come from the theory of self-determination and are known to positively influence motivation.²³

Gee's Typology of Learning Principles in Games

Digital games more or less successfully apply functional learning principles, J. P. Gee argues that digital games are quite intricate learning experiences that have a great deal to teach us about how learning and literacy are changing in the modern world. Considering how the games are designed and how they are played, the author outlines several learning principles that are built into 'good' digital games, principles supported by current research on human learning in cognitive science.²⁴ Widening the scope of this argument through examples, Gee compares learning and literacy in digital games to the functioning of both effective and non-effective classrooms (and e-courses in our context). For him digital games are the forerunners of instructional tools that will determine how we learn in the future.

We understand the learning principles of games applied in e-learning as a way of satisfying the basic psychological needs of autonomy, competence and relatedness according to self-determination theory.²⁵ Autonomy in e-learning is supported by such principles as active, critical learning, meta-level thinking, identity formation, the ability to choose from several pathways, to explore and discover. Competence can be strengthened by self-reflection from feedback, trial and error in a safe environment that does not unnecessarily frustrate or bore users because they are in their "regime of competence" or in the flow channel,²⁶ which allows students to achieve reasonable learning outcomes, which are appropriately rewarded, then repeat basic lessons, gradually add to what they already know and solve more complex problems by generalizing previous solutions, transferring this experience to more difficult cases and to real life. We attribute the need for relatedness to the principles of distributed knowledge in the study group and their dispersal outside of it, the distinction between insider-outsider knowledge, the positioning of meanings within affinity groups sharing cultural models of the world and education, as well as to team play, simulation of work scenarios, and role playing in projects. Students' participation

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- 21 TOBIAS, S. et al.: Review of Research on Computer Games. In TOBIAS, S., FLETCHER, J. D. (eds.): *Computer Games and Instruction*. Charlotte : Information Age, 2011, p. 128-220.; SITZMANN, T.: A Meta-Analytic Examination of the Instructional Effectiveness of Computer-Based Simulation Games. In *Personnel Psychology*, 2011, Vol. 64, No. 2, p. 490-527.
 - 22 MALONE, T. W.: Toward a Theory of Intrinsically Motivating Instruction. In *Cognitive Science*, 1981, Vol. 5, No. 4, p. 334-368.
 - 23 PRZYBYLSKI, A. K., RIGBY, C. S., RYAN, R. M.: A Motivational Model of Video Game Engagement. In *Review of General Psychology*, 2010, Vol. 14, No. 2, p. 155-166.; RYAN, R. M., RIGBY, C. S., PRZYBYLSKI, A.: The Motivational Pull of Video Games: A Self-Determination Theory Approach. In *Motivation and Emotion*, 2006, Vol. 30, No. 4, p. 348-364.
 - 24 For more information, see: GEE, J. P.: *What Video Games Have to Teach Us about Learning and Literacy*. New York : Palgrave, 2003.
 - 25 See also: REEVE, J.: Self-Determination Theory Applied to Educational Settings. In DECI, E. L., RYAN, R. M. (eds.): *Handbook of Self-Determination Research*. Rochester : University of Rochester Press, 2004, p. 2-183.
 - 26 See: CSIKSZENTMIHÁLYI, M.: *Flow: The Psychology of Optimal Experience*. New York : Harper and Row, 1990.

in groups, for example on social networks, has proved its worth, and at the same time they do not feel supervised. They gather there because people in their circle have the same problems, interests and responsibilities, groups support them and offer them a sense of belonging. The educational objective is the transfer of experience into real work. Thus in the hands of a modern educator, there are new opportunities for designing e-learning experiences.

Learner-centered Psychological Principles

The American Psychological Association proposed several learner-centred psychological principles focusing on factors that are primarily internal to and under the control of the learner. The principles also acknowledge the external environment or contextual factors that interact with these internal factors and are divided into those referring to cognitive and metacognitive, motivational and affective, developmental and social, and individual difference factors influencing learners and learning. They are intended to apply to all learners involved in the educational system. For the purpose of the study, we focus on motivational factors.²⁷ They are: 1) motivational and emotional effects on learning (what and how much is learned is influenced by motivation); 2) intrinsic motivation to learn (pupil creativity, higher order thinking, and natural curiosity contribute to motivation to learn); 3) effects of motivation on effort (acquiring complex knowledge and skills requires student effort and guided practice).

Flow

A playfully conceived design of e-courses should ideally correspond to the state of flow, which was described by M. Csikszentmihályi.²⁸ It is a term used in positive psychology where it relates to the optimal experience and inner motivation (in contrast to outer motives for behaviour of a person). The author describes flow as the mental state of operation in which a person performing an activity is fully immersed in a feeling of energized focus, full involvement, and enjoyment in the process of the activity. True satisfaction is associated with activities that push the boundaries of an individual's skill-set without pushing them too far (see Picture 1). A key point of Csikszentmihályi's work is that almost any task or experience can be converted into a flow experience. The use of flow in games helps foster an enjoyable experience which increases motivation and encourages players to continue playing.

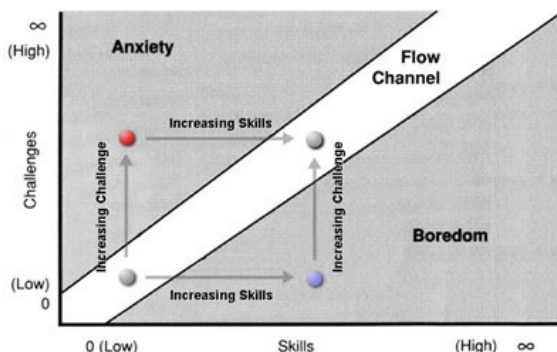
By creating opportunities for feedback and setting achievable goals within a task, it is possible to achieve flow in online instruction, a sport, a game, or even a seemingly boring job.²⁹ According to S. A. Jackson and R. C. Eklund, flow is an important part of challenging activities, where a person's concentration and abilities are important to achieve

27 *Learner-Centred Psychological Principles: A Framework for School Reform & Redesign*. 1997. [online]. [2021-05-31]. Available at: <<http://www.apa.org/ed/governance/bea/learner-centered.pdf>>.

28 See also: CSÍKSZENTMIHÁLYI, M.: *Flow: The Psychology of Optimal Experience*. New York : Harper and Row, 1990.

29 VOISKOUNSKY, A. E.: Flow Experience in Cyberspace: Current Studies and Perspectives. In BARAK, A. (ed.): *Psychological Aspects of Cyberspace: Theory, Research, Applications*. New York : Cambridge University Press, 2008, p. 71-100.

the desired results.³⁰ According to J. McGonigal, the feeling of flow is evoked by four elements that good games have in common: goals, rules, feedback and voluntary participation.³¹ Educational design should understand how to achieve it, so that students continue learning. From these motivational principles of games are also derived the motivational outputs of gamification, which are supported by an environment with clear goals, fun challenges that meet the needs of the student and ensure that he or she can choose from the new.



Picture 1: Flow channel

Source: LORINCE, J.: *The Origins of Flow*. Released on 11th September 2012. [online]. [2021-05-31]. Available at: <<http://www.motivateplay.com/2012/09/the-origins-of-flow/>>.

Game Elements in Education

Gamification is a design technique generally defined as “the use of game design elements in non-game contexts”.³² It uses the motivational elements of games and is increasingly utilized as a possible solution to the dropping levels of motivation observed in learners.³³ The context of a learning environment presupposes clear evaluation rules, scoring, competition, rewards etc. Applications of the gamification approach are based on the need to arouse students’ interest in learning and to involve them so that they can have fun, encouraging them to achieve more ambitious goals and comply with the rules. Gamification scenarios can be divided into three categories: dynamics, mechanics and components.³⁴ Dynamics represents the highest conceptual level in a gamified system. It contains limitations, emotions, narration, progress and relationships. A mechanic is a set of rules dictating the outcome of interactions within a system, while dynamics are

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- 30 JACKSON, S. A., EKLUND, R. C.: Assessing Flow in Physical Activity: The Flow State Scale-2 and Dispositional Flow Scale-2. In *Journal of Sport & Exercise Psychology*, 2002, Vol. 24, No. 2, p. 134-149.
- 31 For more information, see: MCGONIGAL, J.: *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*. 1st Edition. New York: Penguin Press, 2011.
- 32 DETERDING, S. et al.: From Game Design Elements to Gamefulness: Defining “Gamification”. In LUGMAYR, A. (ed.): *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*. New York: ACM, 2011, p. 10-14.
- 33 BUSSE, V., WALTER, C.: Foreign Language Learning Motivation in Higher Education: A Longitudinal Study of Motivational Changes and Their Causes. In *Modern Language Journal*, 2013, Vol. 97, No. 2, p. 435.; DARBY, A. et al.: Students’ Motivation in Academic Service-Learning over the Course of the Semester. In *College Student Journal*, 2013, Vol. 47, No. 1, p. 185.; LEPPER, M. R., CORPUS, J. H., IYENGAR, S. S.: Intrinsic and Extrinsic Motivational Orientations in the Classroom: Age Differences and Academic Correlates. In *Journal of Educational Psychology*, 2005, Vol. 97, No. 2, p. 185-195.; PAN, Y., GAUVAIN, M.: The Continuity of College Students’ Autonomous Learning Motivation and Its Predictors: A 3-Year Longitudinal Study. In *Learning and Individual Differences*, 2012, Vol. 22, No. 1, p. 93-98.
- 34 See also: WERBACH, K., HUNTER, D.: *For the Win: How Game Thinking Can Revolutionize Your Business*. Philadelphia: Wharton Digital Press, 2012.

responses of users to a set of these mechanics. Mechanics refers to the game elements that drive action forward. These are challenges, coincidences, competition, cooperation, feedback, resource gathering and rewards. The components form the basic level of the gamification process. They include achievements, avatars, badges, collections, content unlocks, progress bars, donations, leader boards, levels, virtual goods, etc. For example, points (components) provide rewards (mechanics) and create the impression of progress (dynamics).

S. Apostol et al. identify eight elements of games that are used to gamify lessons, such as: rules, goals and outcomes, feedback and rewards, problem solving, story, player(s), safe environment, sense of mastery.³⁵ K. M. Kapp further distinguishes between those qualities that can only lead to a superficial level of student involvement and those that are most valuable for education.³⁶ The first group consists of those which can only serve as a source of external motivation, such as rewards, points and badges. In addition, S. de Sousa Borges et al. note that "in gamification approaches, these elements are not at the heart of the system, but aim to motivate users to use it".³⁷ Others make up the story, the challenge, the decision, the sense of control and mastery. Kapp considers it acceptable to give students a sense of autonomy and competence if they voluntarily perform tasks for their own improvement. He believes that "in order for a game to become an effective learning experience, it requires a combination of several elements that make it an effective means of education".³⁸ Apostol et al. concluded that "the best way for an educational designer or teacher to choose elements of the game is to consider the learning objectives and the desired outcomes of the learning process".³⁹ The recommendation is linked to the course compilation. Other researchers believe that it is important to use an expanded inventory of techniques that balance external with internal motivators⁴⁰ and to design a gamification system that can be adapted to ensure that all students in the classroom can enjoy the benefits of gamification.⁴¹

Gamification and Motivation

In education in particular, gamification techniques are being welcomed as a promising strategy to enhance motivation⁴² which is found to be one of the most important

35 APOSTOL, S., ZAHARESCU, L., ALEXE, I.: Gamification of Learning and Educational Games. In *Conference Proceedings of eLearning and Software for Education*. Bucharest : Carol I, 2013, p. 68-71.

36 For more information, see: KAPP, K. M.: *The Gamification of Learning and Instruction*. Hoboken : Pfeiffer Publishing, 2012.

37 DE SOUSA BORGES, S. et al.: A Systematic Mapping on Gamification Applied to Education. In CHO Y., SHIN, S. Y. (eds.): *Proceedings of the 29th Annual ACM Symposium on Applied Computing*. New York : ACM, 2014, p. 217.

38 KAPP, K. M.: *The Gamification of Learning and Instruction*. Hoboken : Pfeiffer Publishing, 2012, p. 50; 98.

39 APOSTOL, S., ZAHARESCU, L., ALEXE, I.: Gamification of Learning and Educational Games. In *Conference Proceedings of eLearning and Software for Education*. Bucharest : Carol I, 2013, p. 68-69.

40 DICHEV, C. et al.: From Gamification to Gameful Design and Gameful Experience in Learning. In *Cybernetics and Information Technologies*, 2014, Vol. 14, No. 4, p. 81-99.

41 HAMARI, J.: Transforming Homo Economicus into Homo Ludens: A Field Experiment on Gamification in a Utilitarian P2P Trading Service. In *Electronic Commerce Research and Applications*, 2013, Vol. 12, No. 4, p. 237-244.; HAMARI, J., KOIVISTO, J.: Social Motivations to Use Gamification: An Empirical Study of Gamifying Exercise. In AVITAL, M., LEIMEISTER, J. M., SCHULTZE, U. (eds.): *Proceedings of 21st European Conference on Information Systems*. Utrecht : AIS, 2013, p. 2-11.; EICKHOFF, C., HARRIS, C. G., VRIES, A. P.: Quality through Flow and Immersion: Gamifying Crowdsourced Relevance Assessments. In HERSH, W., CALLAN, J., MAAREK, Y., SANDERSON, M. (eds.): *Proceedings of the 35th International ACM SIGIR Conference on Research & Development in Information Retrieval*. New York : ACM, 2012, p. 872-879.

42 RAMIREZ, D., SQUIRE, K.: Gamification and Learning. In WALZ, S. P., DETERDING, S. (eds.): *The Gameful World. Approaches, Issues, Applications*. Cambridge : The MIT Press, 2015, p. 630-651.

determinants of educational success.⁴³ Motivation describes the psychological processes that direct and energize behaviour.⁴⁴ It is motivation that steers people's actions; as such being one of the essential driving factors of the effort learners put into study activities.⁴⁵ When designing gamified systems, this requires a user-centred approach, characterized by a focus on the needs and wishes of students. "Because digital games are specifically designed for entertainment, they can create states of desired experiences [similar to flow] and motivate users to stay in activities of unparalleled intensity and duration".⁴⁶ Studying online usually requires stronger motivation, which makes it a promising area for gamification. Only when they make boring activities interesting can the game elements increase the level of inner motivation. There is an indirect relationship between rewards and intrinsic motivation. Gamification focuses on external motivators, and its effects on motivation are not the same for all in the class.⁴⁷ There is a broad consensus on the need to adapt gamified learning and consider how gamification affects different students and what the effects of gamification are on the different personality profiles that make up a class.⁴⁸

The effects of gamification are highly dependent on the users who use the gamified systems. Experience from practice emphasizes equal access to students and the possibility of adapting the system to their learning styles. Game elements are easy to implement, as they resemble the traditional classroom assessment model, which often leads to their overuse, which is not justified by learning objectives. One of the goals is to increase student involvement. Engagement can be defined as student attention and immersion in the task.

Gamified Systems and Meeting User Needs

Gamified systems that provide feelings of autonomy, competence and belonging are likely to strengthen students' autonomous motivation, both by causing and explaining the pleasant, motivating and engaging experiences earned within them.⁴⁹ For the same reason, any "future intervention effort that seeks to take advantage of the motivational pull of video games should effectively include gameplay features that have the potential to increase satisfaction".⁵⁰ According to R. van Roy and B. Zaman, "the design practice

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- 43 ABRAMOVICH, S., SCHUNN, C., HIGASHI, R. M.: Are Badges Useful in Education? It Depends upon the Type of Badge and Expertise of Learner. In *Educational Technology Research and Development*, 2013, Vol. 61, No. 2, p. 218-231.; BUCKLEY, P., DOYLE, E.: Gamification and Student Motivation. In *Interactive Learning Environments*, 2014, Vol. 22, No. 6, p. 2-13.; TAYLOR, G. et al.: A Self-Determination Theory Approach to Predicting School Achievement over Time: The Unique Role of Intrinsic Motivation. In *Contemporary Educational Psychology*, 2014, Vol. 39, No. 4, p. 342.
- 44 See also: REEVE, J.: Self-Determination Theory Applied to Educational Settings. In DECI, E. L., RYAN, R. M. (eds.): *Handbook of Self-Determination Research*. Rochester : University of Rochester Press, 2004, p. 3-182.
- 45 VAN ROY, R., ZAMAN, B.: Why Gamification Fails in Education and How to Make It Successful: Introducing Nine Gamification Heuristics Based on Self-Determination Theory. In MA, M., OIKONOMOU, A. (eds.): *Serious Games and Edutainment Applications, Volume II*. Cham : Springer, 2017, p. 488.
- 46 DICHEV, C., DICHEVA, D.: Gamifying Education: What Is Known, What Is Believed and What Remains Uncertain: A Critical Review. In *International Journal of Educational Technology in Higher Education*, 2017, Vol. 14, No. 9, p. 5; 12.
- 47 VAN ROY, R., ZAMAN, B.: Why Gamification Fails in Education and How to Make It Successful: Introducing Nine Gamification Heuristics Based on Self-Determination Theory. In MA, M., OIKONOMOU, A. (eds.): *Serious Games and Edutainment Applications, Volume II*. Cham : Springer, 2017, p. 501.
- 48 BARATA, G. et al.: Identifying Student Types in a Gamified Learning Experience. In KHOSROW-POUR, M. (ed.): *Gamification: Concepts, Methodologies, Tools, and Applications*. Hershey : IGI Global, 2015, p. 542-557.
- 49 DECI, E. L., RYAN, R. M.: Self-Determination Theory: A Macrotheory of Human Motivation, Development, and Health. In *Canadian Psychology*, 2008, Vol. 49, No. 3, p. 183-184.
- 50 PENG, W. et al.: Need Satisfaction Supportive Game Features as Motivational Determinants: An Experimental Study of a Self-Determination Theory Guided Exergame. In *Media Psychology*, 2012, Vol. 15, No. 2, p. 192.

of gamified systems generally shows excessive dependence on external motivational regulations".⁵¹ When designing gamification as an implementation of external regulation, SDT helps us understand unwanted side effects. When students are forced to exert external leverage as a way of managing their learning behaviour, they are more likely to feel diminished autonomy and perform study activities primarily to receive promised external rewards (e.g., bonus points). In such a situation, controlled motivation can undermine any pre-existing autonomous motivation.⁵² Students can then begin to attribute their motivation to added external regulations that reduce or even eliminate any initial, internal motivation. As a result, feelings of autonomy can be further reduced, which at the same time reduces any internal impulse, so that the student's motivation eventually changes from one's own to a controlled motivation.⁵³

When originally external motivational stimuli appeal to the basic psychological needs of the participant, external regulations are thoroughly internalized all the more so, which leads to autonomous motivation. External regulation, and by broadening the scope also the typical implementation of gamification, has the potential to intensify feelings of autonomous motivation, provided that people perceive them as desirable for their psychological needs. In the educational context, it is associated with various positive educational consequences, such as improved grades and a better understanding of the subject materials.⁵⁴ In addition to remuneration and feedback, gamified systems should provide a secure learning environment where students can gain experience without being judged or punished for failure.⁵⁵

Methodology

The chapter reveals our research strategy influenced by specific features and assumptions of mixed research design, which was, due to the holistic nature of our research subject, considered to be the most appropriate for two-way interaction between students and their teachers. Here we publish the results of a questionnaire survey completed by students, which preceded interviews with educators and guided us in our subsequent questioning. A detailed analysis is an impetus for a qualitatively deeper elaboration of the theoretical challenges of game studies, pedagogy, sociology, psychology and computer science, which are generally associated with teaching and learning in e-courses. The research design of the user-centered study thus utilises questionnaire surveys among students.

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- 51 VAN ROY, R., ZAMAN, B.: Why Gamification Fails in Education and How to Make It Successful: Introducing Nine Gamification Heuristics Based on Self-Determination Theory. In MA, M., OIKONOMOU, A. (eds.): *Serious Games and Edutainment Applications, Volume II*. Cham : Springer, 2017, p. 495.
 - 52 CAMERON, B., DWYER, F.: The Effect of Online Gaming, Cognition and Feedback Type in Facilitating Delayed Achievement of Different Learning Objectives. In *Journal of Interactive Learning Research*, 2005, Vol. 16, No. 3, p. 244-257.; FILSECKER, M., HICKEY, D. T.: A Multilevel Analysis of the Effects of External Rewards on Elementary Students' Motivation, Engagement and Learning in an Educational Game. In *Computers & Education*, 2014, Vol. 75, No. 1, p. 137-147.
 - 53 GLOVER, I.: Play as You Learn: Gamification as a Technique for Motivating Learners. In HERRINGTON, J., COUROS, A., IRVINE, V. (eds.): *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2013*. Chesapeake : AACE, 2013, p. 2000-2007.; TOHIDI, H., JABBAR, M. M.: The Effects of Motivation in Education. In *Procedia – Social and Behavioral Sciences*, 2012, Vol. 31, No. 1, p. 821-823.
 - 54 DECI, E. L., RYAN, R. M.: Self-Determination Theory. In WRIGHT, J. D. (ed.): *International Encyclopedia of the Social & Behavioral Sciences*. 2nd Edition. Amsterdam : Elsevier, p. 486.; RYAN, R. M., DECI, E. L.: Promoting Self-Determined School Engagement. Motivation, Learning, and Well-Being. In WENTZEL, K., WIGFIELD, A., MIELE, D. (eds.): *Handbook of Motivation at School*. New York : Routledge, 2009, p. 172-195.
 - 55 HAKULINEN, L., AUVINEN, T., KORHONEN, A.: The Effect of Achievement Badges on Students' Behavior: An Empirical Study in a University-Level Computer Science Course. In *International Journal of Emerging Technologies in Learning*, 2015, Vol. 10, No. 1, p. 19-28.; LEHTONEN, T. et al.: On the Role of Gamification and Localization in an Open Online Learning Environment: Javala Experiences. In KINNUNEN, P., SHEARD, J. (eds.): *15th Koli Calling Conference on Computing Education Research*. New York : ACM, 2015, p. 51-58.

The conceptual framework appeared to us as the most suitable for connecting the pedagogical aspect of work with the theory and research goal, question and chosen method. The terms we want to illuminate or substantiate empirically determine what is highlighted. The effort to answer the question about the nature of a certain phenomenon determines from which concepts we draw and with which other concepts they are connected.

A summary of the partial findings from the analysis of the questionnaires will help us to deepen our understanding of the role that game principles can effectively play in teaching. Several thematically similar questions highlight one central category of student motivation towards e-learning. A presentation of the results of the questionnaire survey among students and their subsequent discussion conclude this phase of the research. We want to present the perspectives of key participants in the educational process.

Objective and Research Questions

The main goal was to find out what potential students see in the application of game principles in teaching with an e-learning component and to identify the possibilities and limits of the application of learning game principles in the education process. We also asked what motivates students to study online. In order not to anticipate differences in the perception of this process by its key participants (i.e. students, educators and e-learning experts), we decided to conduct a separate analysis of subject surveys and questionnaires among students, knowing that their results may show some similarities and differences in attitudes and preferences of groups of respondents. However, we publish partial findings separately due to the consistency and sequence of the research process, the inhomogeneous type of data and also due to the lack of space. We discuss the results in the work with selected research conducted in the field of games and education. In our research, we asked the following research questions.

- *What benefits/negatives of educational principles of games do students see in e-learning?*
- *What motivates students to study online?*
- *What educational potential does the application of digital technologies in teaching have from the students' point of view?*

Research Design

We do not primarily achieve the preliminary results using statistical procedures or other methods of quantification, although by simply describing the data from a questionnaire survey among students conducted in the pre-research phase, we create a basis for discussion of the findings before semi-structured interviews with educators and experts in a dominantly qualitative study. Our analytical procedure is therefore non-mathematical in nature. In the preliminary research, we conducted a questionnaire survey among students of the blended learning course Introduction to the Study of Culture. They were bachelors in the first or second year, especially Czechs and Slovaks, while women were most often represented among the course participants. A total of 188 people completed the questionnaire. The questions covered game principles, preferences of students, their

attitudes, learning styles, priorities, etc. J. Hendl states that it is possible to mix different approaches to data collection by including closed questions (e.g., yes/no) and open questions in the questionnaire (what is your opinion on this type of teaching?).⁵⁶ We include an analysis of subject surveys and findings from the questionnaire, which serves as a pilot study, in an effort to gradually offer views of both sides of the interactive teaching process. Various aspects of the teaching system or its elements are sequentially examined by different methods and with differently situated respondents in an institutionalized framework of education mediated by e-learning resources.

That some good qualitative research works with simple quantitative measurement tools shows we can doubt the 'qualitative/quantitative' dichotomy. D. Silverman considers most of these dichotomies or polarities in the social sciences to be very dangerous. They are a reason not to have to think about what groups scientists into 'armed camps' unwilling to learn from each other.⁵⁷ As M. Hammersley puts it: "The process of research in science is the same no matter what method is used, and moving to paradigms effectively blunts discussion and hampers progress".⁵⁸

Data Collection Methods

To collect answers for the questionnaire survey, we used the free online tool Google Forms, which provided us with a clear summary of results, from which we draw when describing the data from the 188 respondents who completed the form. The questionnaire contained both closed and open questions, where students had the opportunity to comment in more detail on some topics. Unless otherwise stated, we work with data from all participants in the preliminary research, i.e. $N = 188$. For some open one-word answers (e.g., age), we excluded blank fields and expressions such as "I do not wish to mention", "others", "various", "what is possible", "still anonymous?", etc., which lacked analytical value. For example, we quantified the answers from the open question on the preferred teaching methods according to their frequency for the graph. In these cases, we also report a reduced sample size (e.g., $N = 100$).

For better comprehensibility and reduction of numerical data, we combined some ordinal, semantically close answers by simply expressing the overall inclination, direction of thinking, tendency or position of respondents within a wider range of graded attitudes, e.g., we combine agree "yes" and "rather agree" in the description. We proceed similarly with rather negative or negative answers. When describing the data, we offer the reader qualitative examples, excerpts and quotations, so that they can form their own idea of their content and meaning. We provide a summary of the answers at the end of the section of the analytical chapter devoted to the results of the preliminary research.

Turnover

We sent a call for voluntary completion of the questionnaire to 273 email addresses of students present at the final exam, which took place in the form of a test in the computer

56 HENDL, J.: *Kvalitativní výzkum: Základní teorie, metody a aplikace*. 4th Edition. Prague : Portál, 2016, p. 57.

57 SILVERMAN, D.: *Ako robiť kvalitatívny výskum: Praktická príručka*. Bratislava : Ikar, 2005, p. 23.

58 HAMMERSLEY, M.: *What's Wrong with Ethnography? Methodological Explorations*. London, New York : Routledge, 1992, p. 182.

room at the faculty. Students had the opportunity to complete the questionnaire anonymously on a computer on the spot after the test, or from remote access to the network via a link provided in the email. To increase the return, we sent the incentive to participate in the questionnaire survey several times. A total of 188 students from the two spring runs of the ZUR138 Introduction to the Study of Culture course in 2016 and 2017 filled in the electronic form. The return was over two thirds of the classified students, namely 68.9% (an above-average result).

Description of the Target Group

The target group of respondents to the questionnaire consisted of bachelor's degree students at the Department of Media Studies and Journalism of Faculty of Social Studies of Masaryk University, who were mostly in the 1st year (89.4%), the remainder in the second (8.5%) and third year (2.1%). From the few optional answers regarding the age of the respondents and according to their matriculation year, we can roughly estimate that they usually ranged from 18 to 22 years of age when completing the questionnaire. Women make up 69.1% of the research sample, while men make up 30.9% (which, according to the annual reports of the faculty, is given by the gender composition of students in general). Over three quarters of respondents (76.1%) commute to study, mostly from the Czech Republic (85.7%) and the Slovak Republic (13.3%). Almost three-fifths of them (58%) work while studying.

Overcoming the Limits of the Research Approach

Blended research is a research paradigm of educational research where a specific research problem and the need to gather information on it from multiple perspectives justifies the use of blending techniques.⁵⁹ Other benefits besides complementarity and expansion include convergence, validation and agreement of results from different methods.⁶⁰ Such a rationalization of the process traditionally refers to triangulation and greater validity. Different perspectives generate a more complete and informative picture of what is happening. Such images are more rounded, finer and more valid than those created by a single method.⁶¹ The diversity of perspectives contributes to the balance of the study and its elevation to a higher level. Their combination can also be more useful for practitioners and innovators. The important question is how what we have learned in one context can be used in another. According to Morgan, it is important to assess the factors that affect whether the acquired knowledge can be transferred to another place or to another environment.⁶²

59 MERTENS, D. M., HESSE-BIBER, S.: Triangulation and Mixed Methods Research: Provocative Positions. In *Journal of Mixed Methods Research*, 2012, Vol. 6, No. 2, p. 76-78.

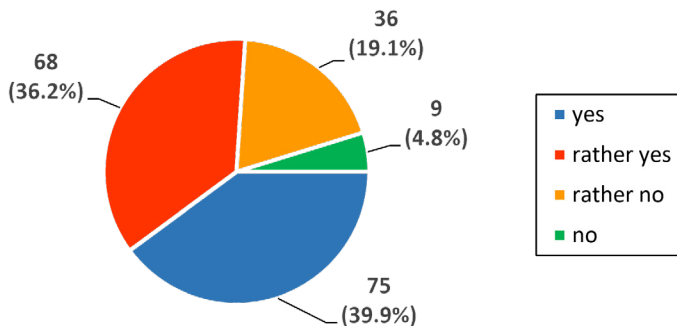
60 GREENE, J. C., CARACELLI, V. J., GRAHAM, W. F.: Toward Conceptual Framework for Mixed-Method Evaluation Designs. In *Educational Evaluation and Policy Analysis*, 1989, Vol. 11, No. 3, p. 256-273.

61 TORRENCE, H.: Triangulation and Mixed Methods Research: Provocative Positions. In *Journal of Mixed Methods Research*, 2012, Vol. 6, No. 2, p. 113.

62 MORGAN, D. L.: Paradigms Lost and Pragmatism Regained: Methodological Implications of Combining Qualitative and Quantitative Methods. In *Journal of Mixed Methods Research*, 2007, Vol. 1, No. 1, p. 49-75.

Results

To reflect our findings from the preliminary research, it is necessary to emphasize the role of the educator, who accompanies students through the study, encourages active, critical thinking, and motivates them to work and learn. We see educational game principles as one of the means to achieve this. However, we cannot do without the internal motivation of students. We see cooperative teaching as a possible way to motivate students. Our findings shed light on students' attitudes to e-learning. According to them, we can conclude that rather than pure frontal teaching (42.6%) or pure e-learning online (5.9%), students prefer a combination of both (51.6%), which corresponds with the definition of blended learning combining full-time teaching in lectures with e-learning support. However, almost three quarters of students (57.5%) would rather welcome a shift to automate their study in terms of formalized, standardized online learning processes along the lines of some foreign universities. In relation to what the e-learning of the course should contain, students spoke in favour of the introduction of a larger number of audio-visual and interactive elements in electronic study materials (63.3% and 75%, respectively). In their opinion, it is also attractive and meaningful (75% and 76.1%, respectively, see Graph 1) to include game elements in e-learning, such as mini-games, quizzes, side quests, trophies, avatars, plus points, levels, bonuses, puzzles, badges, scores, leader boards, team games, social ties, reputation system, etc.



Graph 1: In your opinion, does the involvement of game elements in e-learning make sense?

Source: own processing

- *What benefits/negatives of educational principles of games do students see in e-learning?*

In an open-ended question, students commented on why they did (not) consider game elements in teaching meaningful. The arguments for their introduction conceive of game elements as diversifications of teaching, which can revive, specialize and bring change to the current education system. Students consider game elements to be more fun ("I will always learn through fun rather than reading a script"), a non-directive form of learning that can ease teaching in the sense of Comenius "school by play". According to students, game elements can complement full-time lectures and offer added value, such as bonus points for preparation "beyond the mandatory framework". In addition to the cooperative principles of games, they often mentioned ability to evoke, promote and increase competition among people, which students consider to be an innate quality of humans ("Every person is competitive by nature, if they see their position in the rankings up"). In connection with the effort to achieve a better score, they also talk about the fact

that cleverly designed games would lead them to study repeatedly (“Game elements can make a person re-read the topic to improve their result”). If the teacher promotes competition among students with rewards, they can arouse them for better performance and more frequent preparation. “If these game elements were also a way to ‘improve’ the final evaluation at the end of the course, they would certainly attract more students”. With the help of game principles, it is possible to stimulate students to practice the curriculum.

They also reported being more likely immersed in a game that helps them concentrate on a problem “if the topic is boring”. According to them, it is a way to make teaching more attractive, engaging and to keep attention longer. They themselves admit that “sometimes it’s hard to keep your attention”. Better than “mechanically crushing notes from a sheet” it is more acceptable, “when we enjoy it and when we can be active”. Learning through play is an interesting opportunity for them to take an active part and, apparently, by really trying things out and by developing a certain emotional activity, they find it easier to remember the issue. Games allow you to look at things from different angles and think about them in a broader (e.g., historical, socio-cultural) context. “When playing games or performing various tasks, one learns things that one did not intend to learn, and it is often a more effective form of learning than when one tries to learn things, for example by memorizing”. Let us present a few responses:

“There are many reasons why people enjoy playing video games, and if we put some of this medium into learning, I think it can have a positive impact when you learn in this form, you don’t feel the seriousness, tension and pressure you can experience from classic learning.”

“If the game had an idea, was catchy, and at the same time it was able to interpret in some way a substance that we would otherwise have to read from books without understanding, then it would be ideal because it’s a fun way to learn”.

“Because I enjoy learning more, I’m looking forward to it, I like puzzles. It’s a challenge for me”.

“I’m a competitive person, and if I saw that I was doing something, I would do it rather than just see the bare results of the work. There are more ways to do something, which is great in the long run”.

“It’s usually easier for me to remember things with the help of gameplay elements. It also makes us often think about the problem in a broader context”.

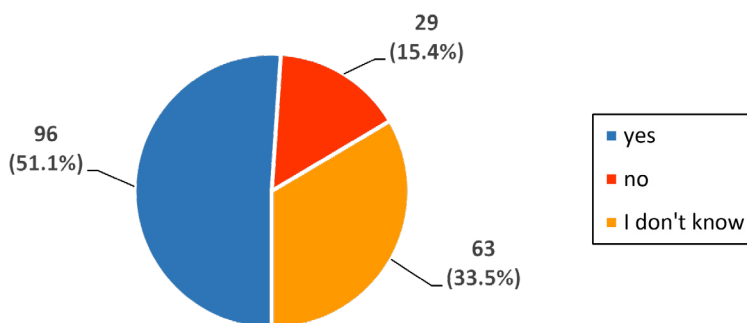
Negative counter-arguments were that competitiveness may not suit everyone. “I don’t think competing with each other in terms of learning knowledge will find a sufficient response among students. They prefer to spend their time on ‘real’ games or other fun/educational activities”. Other students do not like to do “group things” for team games or role-playing. Some just do not enjoy playing digital games on a computer on a regular basis and do not think it makes sense in class, they may find it unnecessarily lengthy, distracting, even though they admit it depends on the specific form. One student generally says about games: “They seem unnecessarily simplistic; I like to learn things in context – it helps me remember them better and put them in context faster” Learning in context through situational experience is exactly what well designed educational games should offer.

Thus, there are students who are still not convinced of the benefits of educational game principles in e-learning. For them school is “no birdhouse” and the fun follows only

after duties. “When I learn, I learn and I only care about the quality of the information”. There are also individuals who consider the game elements in teaching to be the “degradation of today”: “Yes, it’s interesting and maybe effective, but books are books”. Other negative attitudes describe gameplay elements as “childish” and “unnecessary” for college students. “They seem childish to me. I’m not studying for the game, but for myself. If I want to learn and have knowledge, I will study. If I don’t want to, some game elements won’t force me”.

- *What motivates students to study online?*

The most frequently mentioned potential of educational game principles is their ability to motivate students. “They would motivate me in the ongoing preparation due to their attractiveness. If I could get any bonus points, compare myself to others, I would only welcome it”. There are those who are more motivated by competitive gaming principles and the reward and balance system can motivate them if they really want to be the best, or at least achieve a satisfactory result for themselves. A significant force in motivating students are various incentives, as one of the respondents says, “it would have to bring me benefits”, by which they mean, for example, points in addition to the final evaluation in order to achieve a better grade. In this way, the educator can motivate students who do not play digital games or have not yet encountered educational game principles in their learning and have no experience with them. For example, if at the end of each interactive syllabus they try a sample test to get a better idea of what to expect in the final one, or practice in the subject matter, it can non-directively help them to prepare regularly and continuously. Our results show that 51.1% of students would be motivated by game elements in this way (see Graph 2).



Graph 2: *Would the game elements motivate you to prepare regularly and continuously?*

Source: own processing

It is important for them to get feedback on whether they are familiar with the curriculum. Thus, games can prompt more activity, stimulate students’ interest, and help to approach less digestible subject matter. Project and simulation teaching also suitably shows the real conditions of practice, which already during the study form the expectations of students and the certainty with which they will perform their future profession. According to the respondents, team play support team spirit, creativity and group dynamics, where project team members encourage each other to perform best, learn to cooperate and respond to stimuli from others, which is one of the basic skills for the 21st century. “The game draws students more into the education, they have to get involved and, as we know, it arouses one to perform”. It’s a challenge for students. The reward they imagine for quality work and for their study performance at school is also motivating, although everyone

perceives it in different ways, such as their own good feeling (67.6%); credits (66%); or as written feedback and praise from the teacher (55.3%); final grade (52.1%); merit scholarship (37.8%); bonus points (35.1%) or academic degree / diploma (34%).

On the other hand, the student says in the following answer: "If I'm interested in the subject, I'll do it without getting virtual points and trophies, if it doesn't make sense to me, game elements will not motivate me". Results indicate that students are motivated for enrolment in an optional course by subject topics (88.8%), classmates' recommendations (67.6%), difficulty and requirements for completing the course (53.2%) and by teachers (38.3%). See a few reactions below:

"I consider the motto 'school by play' long overdue, and if it works, then for pre-school children. If someone decides to motivate me with games, they should be quite intelligent and sophisticated, which in 90% of cases they are not and are rather childish and embarrassing. In that case, such a game rather demotivates me".

"I can motivate myself to study and I enjoy it without game elements".

"My experience with 'game elements' is such that it rarely serves its purpose and, in most cases, a fun quiz is not fun, badges/trophies are loose, etc. If the 'game elements' were as described by the teacher/assignment/syllabus, I would certainly be a little more interested and probably motivated".

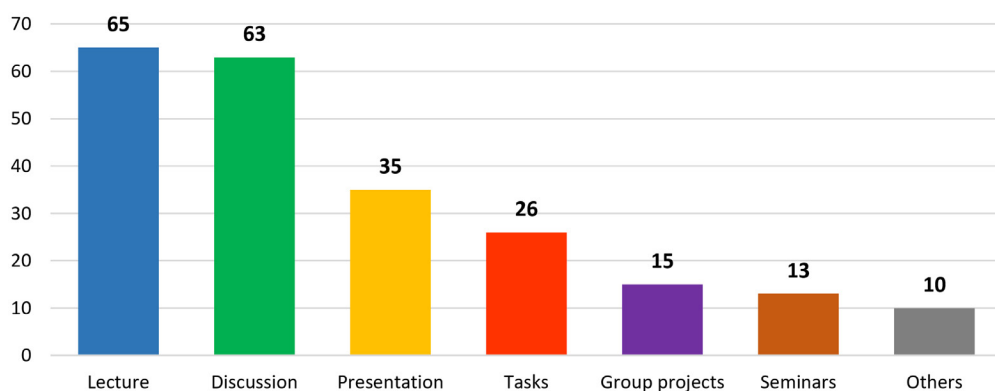
"Although this idea seems interesting, I assume that in college, they are all advanced and intelligent enough not to require such things. Personally, I really like games, but they are only suitable for studying in certain subjects, and especially in the case of journalism, I really can't imagine it".

- *What educational potential does the application of digital technologies in teaching have from the students' point of view?*

Among 188 Bachelor's students in the sample, where women predominated in a ratio of 7:3, most of them almost always use a computer for work and study, just as often as they see fit. They like to work with computers and consider themselves to be relatively experienced users. They most often connect to the Internet from home (or from a private flat or dormitory) and with their mobile device to school and public networks. They mainly use a laptop and a smartphone for this.

The vast majority of students are inclined to believe that using computers in education is an advantage, but it is not necessary in all circumstances. They still prefer printed sources over electronic ones. Classmates often share study materials with each other, for example on social networks, download various other resources from the Internet and modify them as needed. Students' relationships to electronic resources vary between acceptance and rejection. A surprisingly small part of the respondents are motivated to enrol in the course by the availability of study materials (8.5%), the form of e-learning of the full-time course (4.3%) or its teaching methods (26.6%).⁶³ Rather, they monitor its complexity and requirements (53.2%) or the number of credits (47.9%), while they get advice from older classmates who completed the course (67.6%). Above all, however, the topic of the subject must be as interesting (88.8%) as the teacher (38.3%).

63 Remark by the author: In addition to the frontal lecture (65%, N = 100, see Graph 3), students want to discuss topics (63%), preferring interactive, contact teaching (13% mentions seminars and workshops), where the teacher works with students and where they present (35%) the outputs of group projects (15%).



Graph 3: What teaching methods do you prefer? (N=100)

Source: own processing

Most students participate in interest groups on social networks to varying degrees (88.3%), while using information from these circles (90.9%). On social networks, when assigning a group task, it seems to be easier to organize and arrange work groups than in the school information system. Almost three-fifths of respondents prefer independent work in combination with teamwork as needed (59.6%), but their attitude to assigning a group task is rather that they would have to overcome it (55.8%). Groups work only when everyone is actively involved and contributing. Students would agree to introduce more audio-visual (63.3%) and interactive elements (75%) to e-learning on the course. In the same way, they find it attractive (75%) and meaningful (76.1%) to introduce game elements into electronic study materials, which, according to some responses, could bring a breath of fresh air into the “absurd” and “outdated” educational system of today.

Specific excerpts from open-ended answers speak of the reasons why people do not feel as under pressure with playful forms of teaching, they can relax from the tension of serious lectures, where they usually have to listen to the teacher’s explanation (i.e., if it attracts their attention), or they are just as seriously tested. Many of them consider it ideal if the educational game has a good idea, is engaging and at the same time able to interpret the material they are discussing in a clear and non-directive way, which is also fun. Some say they would be more willing to learn what they need to complete the course. Such learning for them is “more fun”, they are “looking forward to it”, and they “like challenges”. Competitive types are motivated by the effort to improve, when they see progress made and they are getting better, they want to work on themselves. With game elements, they remember more and more easily, especially if educational games can evoke emotions in a person. In addition, players are prompted to think about the problem in context in order to overcome it.

Students seem to perceive positively the chance to write a test on a computer (85.1%). Continuous tests, but also quizzes and puzzles, e.g. at the end of the lesson, help with the practice of the material and the verification of knowledge, which, however, should be somewhat voluntary if they are responsible for their results and should enjoy it. Such an opportunity, not an obligation, can prompt them to prepare regularly and continuously on their own. Students who are not convinced of the educational potential of game principles say that if they are to motivate them to learn, they should be “quite intelligent and sophisticated”, not childish and immature, which would rather “demotivate” them. Game elements often do not fulfil their purpose due to the way they are implemented and the quality of execution. According to other opinions, it is only suitable for certain subjects and fields. We were also interested in the possibility of transferring competencies, knowledge and skills from school to the real world. Students consider game elements to be rather meaningful if they are

introduced effectively for the needs of practice. They believe that they can motivate them to perform better and try things for themselves. They consider cooperation in a team to be an important skill in a work team, the productivity of which the game principles could increase. Role-playing requires students to see the world from a new perspective in the roles they play within a work team. They increase the demands on their activity, commitment and reliability within the group, which leads to faster acquisition of work habits.

On the other hand, the self-serving and unfinished introduction of game elements at school or in the workplace can bore students and employees and even demotivate or annoy them. The approach of some colleagues can disgust others, even if they are interested. Therefore, a well-thought-out implementation of game principles, taking into account the feedback and character of the target group, seems to be essential. Among the students are those who prefer traditional teaching methods as informal discussions on various topics from practice and the field. Others have a "specific comfort zone" and may not be comfortable with such an approach (e.g., introverts in team building or role-playing). Some doubt the potential to simulate a work environment and fear the creation of "false expectations".

Discussion

Our study points to a trend towards linking gamification with practical education. T. Sitzmann found out that simulation games increased individuals' self-confidence by 20% in performing the task in which they were trained.⁶⁴ According to the author, the level of learning is highest when the simulation makes the apprentice active in deciding and verifying his or her training. Gamification determines the emotional transformation, because there is not so much at stake in the event of a failure—repeated failure allows us to learn something more and new. In the simulation, the consequences of failure in the training environment are not real, which, according to P. Buckley and E. Doyle, may lead to a feeling of less responsibility for the result of the exercise.⁶⁵ It is therefore necessary to take into account learning objectives and the context in which the acquired abilities and skills will be practically applied (e.g., hospitals). Courses based on group work during their studies are accepted lukewarmly among students (11.2%), three-fifths (59.6%) prefer a combination of standalone and group work as needed. However, the rather negative attitude of students (55.8%) towards the assignment of the group task is surprising. Respondents talk about black sheep being inactive, which can have a negative impact on the learning process. This is a possible reason why many of them do not want to be involved much in group tasks. For example, a student's reputation system could be applied according to their performance in group work, when they automatically receive peer feedback at the end of the course. In particular, A. Domínguez et al. suggest that frequent, meaningful, and quick feedback can improve student outcomes as well as motivation.⁶⁶

It seems that teaching based on game principles is more suitable for smaller groups than for whole classes, to which the teacher cannot pay as much attention individually. Higher demands are placed on educators and the study group. Students' attitudes towards group work are generally more negative than teachers expect. On social networks,

64 SITZMANN, T.: A Meta-Analytic Examination of the Instructional Effectiveness of Computer-Based Simulation Games. In *Personnel Psychology*, 2011, Vol. 64, No. 2, p. 490-527.

65 BUCKLEY, P., DOYLE, E.: Gamification and Student Motivation. In *Interactive Learning Environments*, 2014, Vol. 22, No. 6, p. 2-13.

66 DOMÍNGUEZ, A. et al.: Gamifying Learning Experiences: Practical Implications and Outcomes. In *Computers & Education*, 2013, Vol. 63, No. 1, p. 381-391.

it seems easier to organize and arrange work groups when assigning a collaborative task. Students gather there because people in their circle have the same problems, interests and responsibilities, groups support them and satisfy the basic need for belonging. Given the possibility of transferring the experience gained at school to the future professions of students, it is also essential that students verbalize their knowledge, as it allows them to integrate new knowledge with their previous knowledge, leading to better retention and higher learning transfer.⁶⁷ In relation to play elements such as team games and role-playing, students spoke in favour of their involvement in education by increasing social and communication skills and preparing them for practical situations. They make it possible to simulate practice, for example, by setting up a project and learning to work on it in a team, train cooperation and the art of discussion (e.g. simulation of an editorial environment).

According to three quarters of students, it is also attractive (75%) and meaningful (76.1%) to include game elements in e-learning. In relation to what the e-learning of the course should contain, students were generally positive about the introduction of more audio-visual and interactive elements in electronic study materials (63.3% and 75%, respectively), although their relationship to electronic resources is impartial. They generally seem to prefer the teaching form of blended learning, i.e., lectures supplemented by e-learning aids (51.6%). Studies report positive effects of gamification on student performance, like better grades⁶⁸ and learning behaviour, e.g., in terms of task effort.⁶⁹ Adding badges to P. Denny's online learning tool⁷⁰ led students to contribute more and be more involved than when no badges were collected. However, a maximum of 41.5% of the 188 students participating in our survey imagine bonus points, badges, trophies or a higher level of avatar on their study profile as a reward for their performance at school. Most prefer their own good feeling (67.6%), credits (66%), written feedback or praise from the teacher (55.3%) and the final grade (52.1%). Surprisingly, gaining an academic title motivates them less than bonus points.

From the answers of our respondents, it may seem that if a student does not have their own motivation to study, or a relationship to the profession, then no game elements will help. We cannot do without our inner motivation. Students value the praise of a teacher or colleague. J. Lee and J. Hammer insist on the social dimension of the gamified environment, which allows students to identify themselves publicly, strengthen social credibility, and gain recognition for achievements that might otherwise remain invisible.⁷¹ According to some, competition can make aspiring employees in competitive sectors strive and prepare for the real conditions of the profession. We are talking, for example, about ambitious and competitive students looking for challenges and comparisons with others. Competitive types are motivated by the effort to improve, when they see progress made and that they are getting better, they want to work on themselves. Competition does not have to suit everyone; it rather demotivates and annoys some students.

Competitiveness in gamification⁷² as opposed to cooperation, encourages the struggle to be the best, even by cheating. If victory automatically means loss for someone else,

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- 67 WOUTERS, P., PAAS, F., MERRIËNBOER, J. J. M.: How to Optimize Learning from Animated Models: A Review of Guidelines Base on Cognitive Load. In *Review of Educational Research*, 2008, Vol. 78, No. 3, p. 646-674.
- 68 SUA, C. H., CHENG, C. H.: A Mobile Game-Based Insect Learning System for Improving the Learning Achievements. In *Procedia – Social and Behavioral Sciences*, 2013, Vol. 103, No. 1, p. 43-49.
- 69 BARATA, G. et al.: Engaging Engineering Students with Gamification. In GATZIDIS, Ch., ZHANG, J. (eds.): *Proceedings of the 5th International Conference on Games and Virtual Worlds for Serious Applications*. Poole : IEEE, 2013, p. 25-30.
- 70 DENNY, P.: The Effect of Virtual Achievements on Student Engagement. In MACKAY, W. E. (ed.): *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York : ACM, 2013, p. 764-771.
- 71 LEE, J., HAMMER, J.: Gamification in Education: What, How, Why Bother?. In *Academic Exchange Quarterly*, 2011, Vol. 15, No. 2, p. 2-4.
- 72 GLOVER, I.: Play as You Learn: Gamification as a Technique for Motivating Learners. In HERRINGTON, J., COUROS, A., IRVINE, V. (eds.): *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2013*. Chesapeake : ACE, 2013, p. 2000-2007.

it can promote a more self-centred society⁷³ and discourage admirable qualities such as volunteering or doing good for other people. Although losers may set higher goals for the future, research has shown that they will ultimately be systematically worse than their “winning” counterparts, regardless of their competencies.⁷⁴ Although the implementation of external motivation can encourage people in the short term, it has the potential to deprive them of internal motivation⁷⁵ and teach them that they should only work if they are rewarded.⁷⁶ Most gamified systems still rely on external incentives to reward activity badges or promote competition. Replacing existing higher-order internal motivation with its external counterpart can potentially harm highly motivated people.⁷⁷ Examples show that gamification thus obscures its goal and can have far-reaching negative effects on those who perform the worst and on the least motivated. K. R. Christy and J. Fox concluded that the use of rankings in educational environments leads to a stereotypical threat (the belief that someone can be judged on the basis of a negative stereotype).⁷⁸

The use of scoreboards in the academic environment affects the academic performance of different demographic groups differently and it is the educator’s responsibility to consider the predispositions of individuals. J. Koivisto and J. Hamari have shown that women experience a stronger effect when gamification contains social aspects and men when it contains some kind of competition.⁷⁹ Teaching with game principles is suitable for those with insufficient internal motivation who are not satisfied with traditional forms of teaching; it also suits competitive types, students with special needs and students who study remotely. Cooperative game principles and team games may not be pleasant for introverts. Still there is a hope that game principles could potentially help alleviate academic failure.

University is an environment where students can fully satisfy the basic psychological need for autonomy. An approach based on self-determination theory assumes that autonomy supports internal motivation.⁸⁰ As a result, conditions that restrict a sense of control or freedom of action may undermine intrinsic motivation.⁸¹ It is relevant to examine whether variations in the level of control that games allow moderate intrinsic motivation. In the context of teaching, it is possible that a lack of control over decisions such as the choice of game and playing time weakens its motivational potential for students who are unable to influence the choice. From an educational point of view, for example, focusing students on an aspect of the game can bring learning, but it is also likely that the intervention will disrupt the flow state, thus undermining its fun nature. Several dimensions of this issue need to be addressed in order to create truly engaging educational games, issues

73 See also: SIMON, R. L., TORRES, C. R., HAGER, P. F.: *Fair Play: The Ethics of Sport*. Boulder : Westview Press, 2014.

74 For more information, see: BUSER, T.: *The Impact of Losing in a Competition on the Willingness to Seek Further Challenges*. Rochester : Social Science Research Network, 2014.

75 DECI, E. L., KOESTNER, R., RYAN, R. M.: Extrinsic Rewards and Intrinsic Motivation in Education: Reconsidered Once Again. In *Review of Educational Research*, 2001, Vol. 71, No. 1, p. 2-26.; TOHIDI, H., JABBARI, M. M.: The Effects of Motivation in Education. In *Procedia – Social and Behavioral Sciences*, 2012, Vol. 31, No. 1, p. 821-823.

76 MUNTEAN, C. I.: Raising Engagement in E-Learning through Gamification. In POGONARIU, M. (ed.): *Proceedings of the 6th International Conference on Virtual Learning*. Cluj : ISLS, 2011, p. 324-328.

77 HANUS, M. D., FOX, J.: Assessing the Effects of Gamification in the Classroom: A Longitudinal Study on Intrinsic Motivation, Social Comparison, Satisfaction, Effort, and Academic Performance. In *Computers & Education*, 2015, Vol. 80, No. 1, p. 153-160.

78 CHRISTY, K. R., FOX, J.: Leaderboards in a Virtual Classroom: A Test of Stereotype Threat and Social Comparison Explanations for Women’s Math Performance. In *Computers & Education*, 2014, Vol. 78, No. 1, p. 67-76.

79 KOIVISTO, J., HAMARI, J.: Demographic Differences in Perceived Benefit from Gamification. In *Computers in Human Behavior*, 2014, Vol. 35, No. 1, p. 180-187.

80 RYAN, R. M., RIGBY, C. S., PRZYBYLSKI, A.: The Motivational Pull of Video Games: A Self-Determination Theory Approach. In *Motivation and Emotion*, 2006, Vol. 30, No. 4, p. 348-364.

81 DECI, E. L., KOESTNER, R., RYAN, R. M.: A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation. In *Psychological Bulletin*, 1999, Vol. 125, No. 1, p. 628-667.

such as the opposition of learning and playing or freedom versus control.⁸² According to a meta-analysis of research on games and education,⁸³ there is untapped potential for improving learning if games are well designed for this purpose. This naturally also applies to the design of e-courses by modern educators.

Conclusion

This preliminary research aimed to present the potential of educational principles contained in modern digital games, which could be used as a supplement to teaching in an imaginary, model environment of a virtual classroom, where the content is adequately complemented by game elements as components of the teaching method. Such a mini-game is only one of the parts of the education system, which also includes interactive curricula, various forms of study materials and tasks, submissions, discussion forums, polls, etc. We are talking about a holistic approach focused on the functioning of the whole and on the relationships between the elements of the system, which works on the basis of game rules and mechanics. Any gamification of online education should reflect needs, motivations and goals of students. Satisfying the basic psychological needs in the design of a gamified system focused on the user experience is perceived as one of the ways to more effective e-learning. Gamified system designers should not look at rankings and online comparisons to encourage users to compete with each other, but rather use them as a personal reference and create an environment of challenges and guidance for users on how to get better. Consider designing courses towards the cooperation of classmates, who are otherwise exposed to rather competitive patterns and tendencies in the culture and society that surrounds them. Such a design is personalized, accessible and develops the literacy of students and educators with practical use. Over time, students create their own activities and choose where to go during their studies.

Limits, on the other hand, represent higher demands on teachers and the whole group. The proposed method appears to be more suitable for smaller seminars that support interactive, contact teaching. However, not everyone likes certain game principles and it very much depends on the personality characteristics of the target group. By simply adding points and rankings to the system, gamification is limited to self-serving scoring without any or, conversely, adverse effects. Focusing on points and rewards rather than play and internal engagement may not always meet the goal of the desired behaviour change by adapting to students' intrinsic values. With a creative approach, gamification could be applied in a number of areas. However, it depends on the technologies used and requires a high initial input from educators or their parent institution. When designing, we should always consider that the game primarily meets the learning objectives that we initially set and that it really engages the students. From using commercial games to support learning activities in game-based learning to using elements from games in non-game contexts or simulating work scenarios and developing serious games with learning purposes, it is important to differentiate between these approaches and the learning outcomes that can be achieved with them.

82 CASTELL, S., JENSON, J.: *Serious Play*. In *Journal of Curriculum Studies*, 2003, Vol. 35, No. 6, p. 650-664.; WOUTERS, P. et al.: *The Role of Game Discourse Analysis and Curiosity in Creating Engaging and Effective Serious Games by Implementing a Back Story and Foreshadowing*. In *Interacting with Computers*, 2011, Vol. 23, No. 4, p. 330-335.

83 CLARK, D. B., TANNER-SMITH, E. E., KILLINGSWORTH, S.: *Digital Games for Learning: A Systematic Review and Meta-Analysis*. [online]. [2021-05-31]. Available at: <<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.405.4312&rep=rep1&type=pdf>>.

Hopefully, our work will serve as a forerunner of more extensive research that will develop the educational potential of game principles in e-learning. Future research should isolate game elements and evaluate their effectiveness in the education process to better understand how they work in a given context. It should also clarify how individual game elements relate to behavioural and motivational outcomes and how to design a gamification system to support and increase intrinsic motivation.⁸⁴ It should set out the conditions under which gamification affects the performance and scores of individual course participants. The evidence supports the need to create an environment with clear goals, challenges, and authentic stories in which team spirit is strengthened through game mechanics and discussions. In addition, these gamified environments should meet the needs of the student and add an aspect of fun or novelty. Voluntary participation must also be ensured, as research has shown that the effectiveness of gamification is greater when a student can choose.⁸⁵

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