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Effectiveness of using game-based techniques in the context of supporting distance learning

Summary

The role of distance learning in increasing competences and acquiring new skills seems to be constantly growing. Distance education allows not only to develop competences through access to valuable educational materials, but also to obtain education or certificates required at work. One of the tasks of distance learning is to support lifelong education. The need to constantly improve competences or learn new skills is related to the rapid obsolescence of knowledge and the requirements of the labor market. In recent years, the role of distance learning has expanded significantly – during the COVID-19 pandemic, it has become a necessity for all Polish students. This situation forcefully demonstrated the importance and the need for research into the field of distance learning. Distance learning is a challenge for its participants. It requires learners to have a highly developed ability to learn independently, to cope with many responsibilities and to continue learning despite adversity of fate. The benefits of distance learning (including access to valuable educational courses anytime, anywhere) comes with a high dropout rate. Designers of e-learning courses and educational processes researchers debate what is the key factor influencing the high dropout rate and what actions can be taken to ensure that as many people as possible will persist in the course.

The idea of gaining knowledge and practicing certain skills with games is not new. Games were used to perfect war tactics (from the 7th century), to make society aware of how the economy works (18th century and later), or to teach children through play (which is a natural stage of their development). As environments that allow you to fail without feeling its consequences, games become a safe space for to practice certain scenarios in a simulated reality. Nowadays, games or game elements are often incorporated into formal and informal educational processes. Popular science articles claim that games can positively influence the intellectual performance of players, their concentration, and even their emotional health. The promise of the above effects encourages people to invest in educational games and explore the topic of linking games with education. Scientific research conducted on the use of games in education, however, does not provide unambiguous conclusions. It turns out that games and gamification can bring positive benefits to learners, but only under favorable conditions. All contexts supporting the effectiveness of game-based learning are not yet well understood. However, we can assume that games as immersive tools can positively influence the involvement of learners and make them complete the educational courses in full and with good results. Therefore, we can ask the following question: *Can a remote educational process being a game or containing game elements be more effective than a standard e-learning course?*

The aim of this dissertation was to check whether educational tools that are games or use their elements are more effective than a tool that does not have such elements in the context of remote education. To achieve this goal, I conducted an experiment in which the participants were divided into three test conditions. In each of them they learned how to use Microsoft Excel software: 1) in the serious game condition, the subjects learned by playing a game, 2) in the gamification condition, the subjects learned by using an e-learning course containing game elements, 3) in the e-learning condition, the subjects learned using an e-learning course, which did not contain game elements and thus it was treated as a control condition. Designing such an experiment involved systematizing and clarifying many concepts in the remote education and game-based learning field. Based on the literature, I proposed a method of organizing the learning process of the educational course I have prepared, methods of measuring the effectiveness of the educational tools used in the experiment, and I chose the remaining research tools. I measured the effectiveness of educational tools in two dimensions – as the increase in knowledge (measured with knowledge tests) and as the increase in student engagement (the declared one, measured with a questionnaire and the objective one described by the number of tasks performed by the student and the indicators of the student's engagement time).

The results of my research are unique when compared to those carried out so far. The experiment I designed was one of the few that concerned the use of games and their elements in remote education (which I showed in comparison with source literature). Moreover, my research is characterized by high ecological validity because it was conducted on a large group of people who came from various social groups. The results of the experiment confirmed the difficulties of remote education. The educational course included in the experiment had a high dropout rate regardless of the study condition. The students gave up learning not because of the educational tools' features, but because of unforeseen duties and the lack of ability to manage their own time in such a way that they would still have enough of it to continue their educational activity. Thus, dropouts were frequent regardless of the condition of the study. However, my experiment has shown that using games and elements of games in remote education is not necessarily a good idea. This conclusion was especially true for people who were in the older age groups (aged 23 or older). These people more often dropped out of the education course in the serious game condition (this was the case for people aged 23 or older) and gamification (this was the case for people aged 36 or older), compared to their younger colleagues. Importantly, younger people showed no preference for the educational tool – they behaved quite similar in each study condition. The serious game was characterized by the highest dropout rate, but people who persevered in learning in this study condition rated their satisfaction with the course slightly higher than those who learned using other educational tools. On the other hand, the gamification condition was the only one in which the immersion felt by the students deepened. However, this fact did not significantly affect the students' behavior in this test condition. It is also worth mentioning that all the educational tools used in the experiment were effective in providing learners with new knowledge and skills. Knowledge tests showed that the level of students' knowledge and skills in using the software was higher after completing the course. However, none of the educational tools taught better than the others – the increase in knowledge and skills was similar in each study condition. It turns out that games and tools using their elements can be engaging and rewarding, but this is not necessarily the case in distance education. Offering students more immersive educational tools than the standard e-learning course will not take away their responsibilities and will not help them manage their time. Further research should explore the fact that age is a variable that influences the decision to withdraw from a remote learning course if it is a game (or uses its elements). Perhaps the older students made such a decision because of their clearly defined preferences and habits. It is also possible that decisions to drop out of the course were related to inaccurate estimates of the amount of time it takes to learn with the game, or because of certain game-related opinions and stereotypes. And while my experiment does not fully explain

the behavior of older students, it certainly constitutes a good starting point for future research that may help explain it.

Keywords

distance learning, game-based learning, educational effectiveness, serious games, gamification, flow, presence, immersion, cognitive absorption