

CREATIVE LEARNING OF FINANCE AND ECONOMICS THROUGH GAMIFICATION

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Abstract This paper shows good practices of using gamification for better learning of financial and economics courses at Chernihiv National University of Technology (Ukraine). In the paper, the authors present the application of different financial and economics games for developing students' creativity and problem solving as well as for activating their engagement into real-life social activities that are aimed at increasing financial literacy in local communities. Several gamification strategies applied while organizing students' *Volunteer Camp and FinCultural Marathon* in Chernihiv region local communities are presented. The main types of games used are described with reference to their educational aims, their level of complicity, the target group and the achieved results. The authors also summarize the application of the selected creativity development methods used in the game creation stage, game adoption to the selected target audience and during reflection.

Keywords:
creative learning, gamification, finance and economics, financial literacy, teaching methods.

Introduction

In the context of the Ukrainian course for the integration into the European educational environment, there is a great need for changing both teaching and learning of finance and economics in higher education institutions (HEIs) to move from the old authoritarian pedagogy to a student-centred model adequate for modern challenges of the 21st century. Student-centred learning is based on a new educational paradigm aimed at the humanistic development of the individual with the respect for his/her opinion and creative potential for further development and problem solving. Moreover, the new model significantly transforms both the role of teacher and the role of the student. Thus, in particular, a teacher who used to be the central figure of the educational process with a monopoly of knowledge in the old educational system nowadays has to become a mentor, a facilitator and a wise manager capable of organizing the creative educational environment, of providing reasonable advices for students and of effectively supervising economics and finance courses. At the same time, in a new educational model, a student should be actively involved in the studying process by gaining knowledge from various sources through communication and interaction with other students.

Thus, high dynamics of the global economic environment and the rapid development of the Internet make it topical to address the need for changing the stereotypes about learning as well as for providing further modernization of the educational process and the creation of up-to-date forms of educational environment in HEIs through the use of different creative learning technologies, including game-based techniques. The interest in this topic is explained by a great potential of gamification in enabling creativity learning in the changing environment.

The popularity of interactive games based on learning while playing is evident if we take into account the peculiarities of memorizing new information. According to the study by Tkachenko (2015), a person is able to remember almost 80 percent of the information through visual perception and practical usage, 20 percent while reading and only 10 percent through listening. For that reason, traditional teaching methods should be gradually supplemented and replaced by interactive ones, which involves studying the new material through a certain gaming action and applying the acquired knowledge to real situations. By using interactive game-based teaching and learning methods, students can learn new information much more easily due to enjoying an

exciting experience. Also, they can solve problems by simulating real conditions in a more simple and attractive way. At the same time, interactive games allow students to develop both general competencies and additional soft skills which are very useful nowadays in any profession.

According to the authorial approach of Werbach and Hunter (2012), gamification is defined as “*the use of game elements and game-design techniques in nongame contexts*” (Werbach & Hunter, 2012). Another and more detailed definition was given by Kapp (2012), who stresses that gamification assumes “*using game-based mechanics, aesthetics, and game-thinking to engage people, motivate action, promote learning and solve problems*” (Kapp, 2012). At the same time, it is worth mentioning the linkage between gamification and creativity development. That is, according to existing studies (e.g. Shabalina et al., 2016), game-based learning is the bright example of tripartite creative process including the teacher, the student and the technology, while the game itself is regarded as a didactic idea used to stimulate creative learning.

Despite continuous discussions on whether it is really possible to develop creativity via game-based technologies, the existing experience of HEIs in using various educational games proves their great potential in enhancing creative thinking skills while playing. For instance, good practices of using gamification for better learning of finance and economics courses have been introduced at the Chernihiv National University of Technology (Ukraine). Moreover, under the financial support of British Council, the university successfully implemented *FinCultural Marathon* social project in February-April 2019. The project was aimed at increasing financial culture and literacy of school youth, residents and local authorities of united territorial communities (UTCs) by involving them into interactive financial games that help the formation of prudent behaviour in managing both personal finances and financial resources of local communities.

The main aim of the article is to present the results of a research conducted at Chernihiv National University of Technology (CNUT), Ukraine, that was aimed to test the hypotheses regarding:

1. the usefulness of creative learning and game-based learning of finance and economics courses (Finance, Basics of Business, Marketing, Budget System, Local Finance, Tax System, Insurance),

2. the positive influence of game-based methods used for increasing financial literacy in local communities,
3. the usefulness of simulation strategy board games for increasing financial literacy, improving communication skills and teambuilding in local communities, and
4. the positive influence of *FinCultural Marathon* social project on increasing students-volunteers' motivation for and involvement in the educational process.

Data and methodology

The paper presents the data collected via a questionnaire and interviews.

The questionnaire was aimed at the assessment of the gaming methods used during the courses Basic of Business, Finance, Marketing, Budget System, Local Finance, Insurance, Tax System, and Investment Management. The data were gathered from the bachelor and master's degree students studying at the Faculty of Finance and Economics of the Chernihiv National University of Technology (CNUT) in Ukraine. The sample consisted of 160 respondents.

The questionnaire included open-ended and closed-ended questions such as: “*Do you like interactive methods of teaching the course?*”, “*Was it useful for you to play interactive games during classes?*”, “*Which skills did you develop thanks to using educational games within the course?*”, “*Which interactive methods did you like most of all during studying the discipline and why?*” etc.

The interview was used for gathering information about students' attitudes towards game-based creative learning techniques and the qualitative evaluation of the achieved results. Interviews were used as an appropriate method for collecting in-depth information on people's opinions, thoughts, experiences, and feelings (Easwaramoorthy & Zarinpoush, 2006) and evaluating the usage of gamification within *FinCultural Marathon* social project aimed at increasing financial literacy in local communities by using games that were created and conducted by students-volunteers. The questions for interviews were selected with the aim to find out respondents' personal opinions.

In the framework of *FinCultural Marathon* social project, 29 students-volunteers of the Chernihiv National University of Technology were engaged in the implementation of the project. 78 pupils of one rural unified territorial community and 10 representatives of local self-government bodies were interviewed.

Main findings

The paper aims to conceptualize the main principles of using gamification for creative learning of economics and finance courses at the Chernihiv National University of Technology (Ukraine) based on the existing research and practical experience.

The conducted survey shows that during the past two years, university teachers have started to actively use different game-based teaching methods and have started to introduce game elements into students' assignments within economics and finance courses more often in order to stimulate their motivation, to increase their interest in the subject matter, and to provide full engagement and learning control.

Experience of using gamification during finance and economics courses at Chernihiv National University of Technology

By using on-line methods for checking off-line knowledge, game-based techniques help conduct effective mixed learning. In particular, online platforms Kahoot and Mentimeter are used actively for the assessment of students' level of knowledge about a certain course-related topic. The usage of these gaming tools means that the teacher creates his or her own online game prior to its use in class. To participate in the game during classes, students need to have smart phones with Internet access. The teacher provides an electronic link to which each student or a team of students must register on-line and log in. After that, questions appear one by one on the screen and the students are to select the correct answer in a given, limited time. Depending on learning goals, it is possible to use different combinations of games available on the above mentioned platforms. The most important element of this is that students have a choice to participate in the game either individually or in a team. Moreover, they can not only solve the games given by the teacher but can create their own game and demonstrate it for their classmates. In the latter case, they are

not only game consumers but also game creators, which is more important both for soft and hard skills development.

Furthermore, it is impossible to underestimate the opportunities for interactive learning games enabled by Moodle course management system. In addition to standard games aimed at checking the knowledge and understanding of discipline-related specific terms (e.g. crossword puzzles, Sudoku, “Who Wants to Be a Millionaire” type of game), gaming elements can be used as an indicator of progress (i.e. to determine the student's stage within the course), as a ranking block (i.e. to determine the student’s rank among others), and as an experience and levels block (i.e. to accumulate experience by performing individual tasks (i.e. the student completes the tasks and moves from one level to another)) (Polovin, 2015).

According to the student survey conducted after teaching the courses Basics of Business, Finance, Marketing, Budget System, Local Finance, Insurance, Tax System, and Investment Management to bachelor and master’s degree students at the Faculty of Finance and Economics of the Chernihiv National University of Technology, the hypothesis on the usefulness of creative learning and game-based learning of finance and economics courses was confirmed based on the results of 160 respondents. That is, 97% of students indicated that they enjoyed the use of creative learning methods based on the principles of democratic exchange of ideas and mutual enrichment during lectures and practical classes (Figure 1). At the same time, 90% of respondents stressed that the game-based techniques had greatly motivated them to study the course (Figure 2).

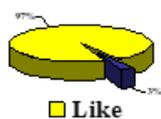


Figure 1: Students' attitude towards creative learning methods used during the course



Figure 2: Usefulness of game-based learning techniques for students

Based on our research results, we can extract three main strategies for using gamification while teaching finance and economics courses at CNUT:

- introduction of gaming elements into open-ended assignments and occasional usage of gaming tasks for awakening students' competition and for increasing their involvement in learning;
- learning of separate or interlinked course-related topics by playing educational board games constructed by the teacher or worked out by professionals and bought by HEI for educational needs (including game simulators that enable the modelling of a real-life activity in the class); and
- deep learning of course material by involving students in creative game construction – here, students receive a task to create their own group or individual games, test them on their classmates, analyse their strong and weak points and later improve the game and take part in it in the role of a facilitator for other participants.

The answers to open-ended questions revealed that students like gaming methods because of:

- increasing their motivation and engagement in the learning process;
- developing creative thinking;
- increasing their initial interest in subject matter;
- creating a specific environment for developing natural capacity to learn quickly and generate new ideas;
- receiving useful experience in a creative manner; and
- providing self-control for learning results, etc.

At the same time, students did not have just external motivation but also deep internal motivation for their joint educational activities connected with knowledge assessment. Their creative abilities were better revealed in the simulation of practical problem situations when they had to find a creative joint decision in small research groups.

Gamification strategies applied within FinCultural Marathon social project for increasing financial literacy in local communities

FinCultural Marathon social project was implemented by the Chernihiv National University of Technology (Ukraine) in February-April 2019 under the financial support of British Council and was aimed at increasing financial culture and literacy of school youth, residents and local authorities of united territorial communities (UTCs) by involving them into interactive financial games that help provide the formation on prudent behaviour in managing both personal finances and financial resources of local communities.

The project comprised the following main stages with different goals:

1. *“EdCamp for the Training of Volunteers on Financial Education”* – to train student-volunteers for further processing of interactive games and cognitive activities within the framework of an interactive financial literacy marathon in the Ivanivka united territorial community.
2. *Financial game room “Steps to Success”* – to conduct interactive games for increasing financial literacy for pupils within several thematic modules (i.e. the familiarization of participants with the main principles of the functioning of the financial market, banking and tax system, etc.; raising students’ awareness regarding the main financial categories and the raising their interest in financial education).
3. *Intellectual tournament “Daddy, mum and me – a financially competent family”* – to teach how to plan and control the use of family budget funds.
4. *Workshop on common ideas and actions “Smart Finance”* – to unify local governments and residents of the Ivanivka UTC in order to develop ideas for community-based projects and to find sources of funding for them.
5. *Simulation board game-training “World of the Community”* – to develop critical thinking, creativity, communication skills, teamwork skills; to make financial calculations, to control the use of common funds, to make conscious financial choices.

The conducted research showed a great efficiency of using a gaming format for increasing financial literacy in local communities. However, the most important result was that students-volunteers were game creators and game facilitators at the same time. This combination gave them a chance to use new knowledge obtained

within different finance courses in a new, unknown environment. Thus, they had to go through the following stages of creative learning: searching, selecting and analysing information on the topic (understanding of main problems), applying the gained knowledge for game creation and implementation, i.e. game testing – reflecting– mastering – facilitating. That process is very similar to creating innovation and provides students with very useful experience and skills development.

One of the games created within the project *FinCultural Marathon* was *Playground "Financial Erudit"*. The purpose of the game is to increase financial culture of schoolchildren and to raise interest in financial education, which is the key to making sensible financial decisions.

Playground "Financial Erudit" players (up to 3 players) roll a dice one by one and get a card with a question related to finance and economics. If the player answers the question correctly, he or she moves the circle according to the number on the dice. Also, game provides virtual currency called MaF!ns. There are three types of coins valued at 30, 20, and 10 units. All three types of coins are placed on each circle. The first player who moves to the circle takes 30 MaF!ns; if the second player moves the same circle, he or she picks up 20 MaF!ns, and the third one picks up 10 MaF!ns. In this way, the players, besides giving correct answers and increasing their financial literacy, are also strongly motivated by earning game money. There are also special circles with pictures (6, 9, 13, and 17), which are valued at 50 MaF!ns. For instance, circles 6 and 13 are a special bonus (i.e. circle 6 – “you have a deposit in the bank, it is time to take interest”; circle 13 – “you borrowed money from your friend, it is time to return it”). Circles 9 and 17 provide some expenses (i.e. circle 9 – “you took a loan to buy a house, you need to pay it back”, 17 – “this is your travel expenses and something else”). Finally, the player who gained the most coins is a winner.

The hypothesis regarding a positive influence of game-based methods used for increasing financial literacy in local communities was confirmed based on the results of interviewing 78 pupils of one rural unified territorial community in Chernihiv region, Ukraine. The conducted interview showed that playing the games not only helped participants to remember new economic terms but also to deeply understand their meaning as a result of gaming situations and unforgettable emotions. Moreover, the game helped develop entrepreneurial thinking of young people, it

inspired them to learn finance deeply and become successful business people in the future.

Apart from that, the experience of using the simulation strategy board game *The World of Communities* (bought during *FinCultural Marathon* social project) was very useful for the development of financial literacy and engagement of students and members of local communities in real-life social activities and problem solving. *The World of Communities* is the first Ukrainian multiplayer co-operation strategy board game which closely models real life and real decision-making, conflict-resolution and community development. This tool is able to change the way of human being's thinking, interaction and co-operation. It is extremely useful because it helps its participants to develop critical thinking, creativity, communicative skills and the ability to work in a team; to carry out financial calculations, control the use of common funds and make informed financial choices; to understand the importance of entrepreneurial activity for the city/state budget; to understand the significance of each participant (his contribution and influence) for community development (Worldofcommunities.org, 2019).

The World of Communities gives the possibility to up to 6 players to build their community based on game scenarios. Each player has a personal social role such as entrepreneur, farmer, school teacher, an unemployed person, etc. To win the game, the players need to cooperate and develop the community by extending public infrastructure, managing community assets wisely and launching new businesses, developing professional skills, increasing level of health and happiness of community members. Furthermore, during the game, each player faces different life circumstances and makes important life choices. In this way, he learns how to effectively manage financial resources, balance life and work and personal interests as well as the welfare of the community as a whole.

After the game, the coordinators of the project reflected on some aspects of the game process and the participants of the game were interviewed. The list of the questions was the following:

1. What did you like mostly about the game?
2. What did you learn during the game?

3. What kind of relationship did you have with your money during the game? How does it relate to your relationship with money in real life?
4. What new thoughts or ideas arose during the game to improve your own well-being?
5. What experiences can you use in the real life of the next week? What steps should you take?

According to the survey, about 75.3% of respondents who used *The World of Communities* game noted a positive influence of the game on their professional activities (Worldofcommunities.org, 2019).

Interview results regarding the use of gamification for increasing financial literacy in local communities

The reflection of community members taking part in the co-operation simulation strategy board game *The World of Communities* has made it possible to confirm the hypothesis on the usefulness of simulation strategy board games for increasing financial literacy, improving communication skills and teambuilding in local communities.

One community member stated: *“At the beginning of the game, I chose the role of an entrepreneur because I know from the real life that they earn a lot. That is, at first my purpose was self-enrichment, but after several rounds, I realized that we should focus our efforts on making important decisions together to achieve the common goal of the community due to the gaming scenario.”*

Another interviewed person stressed: *“During the second part of the game, I began to work a lot and earned more money not for self-enrichment, but in order to fill the community budget and accumulate enough money for building the infrastructure object necessary for common welfare. The game helped us to join efforts and increase the attractiveness of our community.”*

Furthermore, most interviewees pointed out that the simulation strategy board game *The World of Communities* helped them to understand their own significant influence on community development, to increase their financial literacy, and to improve their communication skills and their ability to work as a team.

The study thus confirmed the hypothesis on positive influence of *FinCultural Marathon* social project on increasing motivation and on the involvement of students-volunteers in the education process. The main findings of the conducted interviews with 29 students-volunteers who processed educational games within *FinCultural Marathon* social project could be summarized in the following way:

- Most students highly appreciated their participation at the Camp for the Training of Volunteers on Financial Education and especially their involvement in the game creation process. That was new and challenging for them and it helped to deepen and systemize their knowledge in finance and economic courses greatly.
- The interviewed students-volunteers identified the following main results of using game-based learning for increasing financial literacy in local communities: fruitful collaboration, creative environment that stimulated the thinking process and helped to find interesting non-standard ideas, teamwork and positive emotions.
- Students-volunteers fulfilled their responsibility as facilitators; from one game to another, they tried to master the way to explain the rules of the game and the main financial concepts to players in order to make the rules more understandable and adoptable to real-life situations.
- Games helped students-volunteers to develop communication skills and their emotional intelligence when they collaborated with school youth in a shared language; they could witness quick transformation results and could observe how interested and happy the children were to play games under their coordination.
- The participation in the game-based social project helped students to demonstrate their civic position.

Therefore, in spite of using a non-serious format, such financial literacy activities are very important for children from local rural communities because educational games stimulate them to think about the welfare of their local communities and to generate new ideas for their own small business; further, they enable better financial inclusion. Also, the participation of students-volunteers in such projects enabled them to transfer their knowledge of finance and economics into practice and to take part in creating new useful gaming products within *FinCultural Marathon* social project,

which will contribute to the increase of financial literacy of different age groups in the future.

Conclusion

The results of the conducted research on the use of educational games within economics and finance courses (Finance, Basics of Business, Marketing, Budget System, Local Finance, Tax System, and Insurance) for students of the Faculty of Finance and Economics of the Chernihiv national University of Technology proved that educational games are a very effective teaching method. It has proven helpful in increasing students' motivation and engagement in the learning process; in developing students' creative thinking; in increasing students' initial interest in subject matter; in creating a specific environment for developing natural capacity to learn quickly and generate new ideas; in receiving useful experience in a creative manner; in providing self-control for learning results, etc. At the same time, the conducted study has shown that the effectiveness of game-based creative learning greatly depends on how learning content is integrated into the gameplay. The main point to be stressed concerning this dimension is that a successful educational game should not be simply a joy but should be a useful learning experience that participants go through in a creative manner. The necessary reward for performing tasks which stimulate motivation of the students involved and which support their interest in achieving learning results are among the most important features of the gamification strategy. The practice of using educational games shows that different types of incentives such as points, odds, levels, progress indicators, virtual currencies, chips, etc., can be used.

Based on the results obtained from interviewing 160 respondents at the Faculty of Finance and Economics of CNUT, educational games should be regarded as an effective instrument for the development of both hard and soft skills needed for students' future professional activity in the changing environment. The development of students' hard skills is provided via special gaming content which helps them to acquire professional knowledge and skills based on using specific instructions, algorithms and methods for solving real-life problems. Focusing on soft skills, we should mention that educational games help students to become more persuasive, sociable, and creative. They also develop leadership skills and learn how to manage time more effectively.

Our study has proven a strong positive influence of *FinCultural Marathon* social project carried out by the Faculty of Finance and Economics of CNUT both on the 29 students-volunteers as well as on 78 pupils of one rural unified territorial community in Chernihiv region, Ukraine, who participated in the project. The best results were reached when students were actively engaged in the process of creating their own games on the given topic for increasing financial literacy in local communities. Here, the students had to use creativity while constructing the educational game, testing it and using it for teaching others. Thus, *learning by playing educational games was combined with learning by game construction* in order to increase a positive influence of gamification. Based on the systemized experience at Chernihiv National University of Technology gained in this project, we can conclude that the proactive learning approach implemented within the project turns a game not only into a tool for student engagement and into a source of their motivation and excitement but also into a form of innovative creative development. Thus, it is useful to combine learning by playing educational games with learning by game construction.

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