

Impact of the gamification methodology on adult students of Economics in Poland

Impacto de la metodología de gamificación en estudiantes adultos de Economía en Polonia

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ABSTRACT. This article shows the impact of games and simulations on the development of knowledge, skills and abilities of Economics students. Thus, the research describes the educational experiences developed during the academic years 2020 and 2021 at the Polish Ignacy Mościcki University of Applied Sciences in Ciechanow. The study follows a descriptive methodology on a sample of 103 students who try two economic management board games, Vineyard-Winnica and CashFlow. The results highlight the appeal of these resources that combine serious and toilsome matters with fun. They also highlight the advances in the knowledge of the specific terminology, the improvement in decision-making, and the adaptation to the change of the economic environment. One of the main findings is the reflection that the student makes on the development of their identity and personal success, in conjunction with their group relationships and the complexity of these scenarios.

RESUMEN. Este artículo muestra el impacto de la simulación y los juegos en conocimiento, las habilidades y destrezas de los estudiantes de Economía. La investigación describe las experiencias educativas desarrolladas durante los años 2020 y 2021 en la Universidad de Ciencias Aplicadas Ignacy Mościcki en Ciechanow, Polonia. El estudio sigue una metodología descriptiva sobre una muestra de 103 alumnos que prueban dos juegos de mesa sobre gestión económica, Vineyard-Winnica y CashFlow. Los resultados destacan el atractivo de estos recursos que combinan lo serio y fatigoso con lo divertido. También resaltan los avances en el conocimiento terminológico, la mejora en la capacidad de tomar decisiones y la adaptación al cambio, propio del entorno económico dinámico. Uno de los principales hallazgos es la reflexión que hace el estudiante sobre el desarrollo de su identidad y el camino hacia el éxito personal, junto a las interacciones grupales y la complejidad del contexto económico.

KEYWORDS: Adult education, Economics study, VET, Educational methodologies, Gamification.

PALABRAS CLAVE: Educación para adultos, Estudios de economía, Formación profesional, Metodologías educativas, Gamificación.

1. Introduction

The COVID-19 has driven multiple changes in the citizens' way of life of developed countries. One of the sectors especially affected is education by its systematic concentration of people. Thus, most of the educational strategies and methodologies were modified because this pandemic. However, this has also driven innovation at all educational levels. Depending on the severity of the epidemic, online, hybrid or in-person classroom learning was limited or reintroduced multiple times. This had impact on both the organisation of the teaching and learning processes and their participants, but in any case, priority was given to distance learning (Eurydice, 2022).

Adult education and vocational training have a high impact on the day to day of societies, therefore, a European goal for the year 2030 is that at least 60% of graduates in Vocational Training find employment, as well as that at least 47% of adults between 25 and 64 years old participate in learning activities (European Commission, 2021). The environment of education in Poland is especially interesting, it is a relatively young country where the rate of employment of VET graduates, 20-34 years old, is around the 78% (European Commission, 2021). Here, education and training are potentially aimed at the population over 18 years of age, which is 38.41 million, and the working age population, from 25 to 64 years of age, is 60% of the total. In this sense, and due to the requirements of the demographic and economic changes, Poland cannot afford "lost generations" and simply wait until all the adults are replaced by the better-educated youth of today (OECD, 2005), thus, adult education is oriented towards practical training on the job (European Commission, 2022). The system of the Vocational Education and Training is being opened to all adults, who may use it to obtain a vocational qualification. Some higher education institutions, such as this case, focus their activity on Vocational Education and Training, and they provide tertiary-level graduates with post-diploma studies aimed at completing or upgrading adults' qualifications and knowledge necessary to perform a given occupation (e.g. managerial studies), to acquire qualifications in a profession or for doctoral studies (CEDEFOP, 2011).

Improvements and innovations in teaching methodology must reach all educational levels, and adult learners too. The use of games and simulations in the classroom has promoted research on their pedagogical benefits, they contribute to decision-making and provide cognitive benefits in students (Zapalska & Brozik, 2008). High efficiency in academic results has been proven when virtualization is combined with gamification (Sáez López, Vazquez-Cano, Fombona & López-Meneses, 2022).

In Poland, the importance of games in the teaching process has been recognized by the Ministry of Education and Science, which is calling for innovative teaching methods at every level (Ministerstwa Edukacji i Nauki, 2022). Thus, this government came up with a project to introduce games into the basic education with recommended content for school education wanting to stimulate students' curiosity, make it easier for them and make teaching more attractive. Nowadays, in Polish schools, students and teachers are using the games such as This War Of Mine and Cipher games, and the list of games used in teaching is expanding. Looking for the attractive learning process teachers include virtual laboratories and online apprenticeship simulations in the form of, for example, running a virtual enterprise. Thus, polish students of the Kadra Zespołu Szkół Ekonomiczno – Turystycznych Im. Unii Europejskiej W Jeleniej Górze (European Union Economic and Tourism School Complex) in Jelenia Góra are doing virtual internships in 4 different professions: Hotel Management Technician, for event company; Economy technician, for accounting office; Technician of tourism organization, for travel office; and Technician of port and terminal operations, for transport company. In this sense, a suggestion from the Łódź Center for Teacher Training and Practical Education also addressed the recommendation to pass virtual online internships https://www.wckp.lodz.pl/199_19. And, in the pandemic year, such recommendations were also implemented by other teaching centers, e.g., the Center for Teacher Education in Suwałki. All these examples tell us that the education market is evolving to match the surrounding reality, and employees undergo refresher courses during their working life, adapt methods of acquiring customers, forms of promotion, markets, etc. to the current reality.



2. Games and simulation in education

Teachers have always been obliged to teach based on stories, citing economic examples, court decisions, precedents, previous experiments. Making classes more attractive involves the use of technology, and this helps develop technological adult skills. The simulation is closely related to the game. Young people use simulation devices mainly for fun, and this can be a beneficial feature for the educational field. Sports activities are tasks performed by young people habitually, thus, the first simulation software was related to games and sports (Donovan, 2010). In this sense, car races simulators are closely related to learning how to drive cars.

Institutions teaching adults begin to use games and simulations that immerse the student in a realistic work context, where real situations are simulated, the assimilation of abstract theoretical models is facilitated, the effects of the actions carried out are shown, and costs are reduced.

Since the late 1950s, the use of games has become an element of education, and together with simulations can be found in language, science education and corporate training (Gredler, 1992; Jones, 1982, 1987; McGuire 1975). In recent years, digital or online methodologies have increasingly supported the learning process, they are effective, interesting, explore selected issues in depth, allow for more engaging learning and practice (Polcyn-Matuszewska, 2017), and a key feature is the increased levels of realism and plausibility of current simulations. Knowledge transferred through these techniques is based on stimuli and repetition of activities or interaction with specific created environments. This learning process aims to stimulate creativity, curiosity, making each session a unique experience where the user is the protagonist (Taraszkiewicz, 2022). Modern teaching methods with games and simulations allow students to feel more confident, make more informed decisions, avoid setbacks, see the consequences of actions taken, develop skills and teach them to cope with failures (Fombona-Pascual, Fombona & Vázquez-Cano, 2022). On the other hand, simulations and games seem to open up great potential to improve the individualized learning, adapting it to the pace, interests and abilities of each participant, improving access to quality learning experiences for urban and rural students.

The methodology of the game has aspects related to simulation. Games are tools with great pedagogical attraction (Sauve, 2007); they contain conflict, rules and predetermined goals based on competition, the most important thing is to win, thus players must apply knowledge of the subject. Simulations, on the other hand, are open-ended, realistic, evolving situations with many interacting unforeseen variables. The simulation runs in a "player versus specific environment/conditions" or a "player versus player. The goal for all participants is for each to assume a specific role, deal with the issues, challenges, threats or problems that arise in the situation and experience the consequences of their decisions (Gredler, 2004).

Technology is a fundamental component in educational methodological changes, but it becomes more important in current environment where distance learning is developing. Textbooks and traditional methodologies are being supplemented, or displaced, by digital information and software with educational utility. Real-world practical tasks are especially engaging for students, and the digitally recreated worlds are become interesting practical activities too. Augmented Reality and completely virtual workplaces, or Virtual Reality, are important in this sense (Fombona, Pascual & Vázquez-Cano, 2020).

Currently in many places, simulation is used both in the training machines and complex situations, as well as in the training of soft skills. In some training courses, in addition to the general mechanisms of games, Virtual Reality, VR. This device is a Head-Mounted Display, HMD, and it imitates standard and atypical situations with total immersion of the user in the virtual environment. Sometimes it is extended with tools that expand the possibilities of movement and interaction, such as joysticks, steering wheels, throttles or pedals guarantees plausibility of training in an almost real environment. VR is used in the training of operators of complex machinery, teaching actions with precision, developing the right habits, minimizing the risk of errors in the daily rhythm of work, and taming occupational stress.

Simulation experiences in recreated scenarios are being used by many institutions whose students need to

do complex practices. Three particularly significant cases are medicine, flight practices and military engineering. VR technology is being used in medicine and patient care, and these simulations reproduce the working conditions of a real hospital or doctor, make it possible to use medical equipment in simulated conditions and under the supervision of specialists, showing rooms with patients that allow future medics to get acquainted with the specific order of performing tasks, observing the effects of decisions made without exposing them and the patients to stress related to the clinical situation. Moreover, which is important - there is a possibility of improving and repeating the action without any side effects for the people; and the risk of making an irretrievable medical error is eliminated. On the other hand, the aviation industry uses simulators for pilot training. Each pilot, after acquiring basic theoretical knowledge, is assigned a specially adapted simulator of an aircraft to control with accuracy comparable to the original cockpit interior, with a system of actuators mimicking the sensation of movement, equipped with instruments to control and steer the machine. Learning in simulators does not generate risk and stress for the trainee. Simulators also allow to repeat, control, analyze and improve achieved results. The military industry uses simulators to visualize and guarantee realism, and at the same time do not entail the risk of negative consequences of mistakes made during traditional training that can cause irreparable damage (Korzeniowski, 2011). Simulations, challenges, war games, and combat strategies have always been present in both young and old (Allen, 1987). The first information on the games dates back to around 3000 BC and concerns the game WEI-CHI, developed by the Chinese leader and theorist of the art of war Sun-Tzu. The game was played on a plastic table and the warring sides, armies, were symbolized by different colored stones. The players try to encircle the opponent, and victory was claimed by the side that managed to do it (Caffrey, 2019). Games emerged to assess one's own forces, establish their position, and analyze and predict the intentions and actions of the opponent (Świątnicki & Podgórný, 2021).

VR technology is also used in soft skills training. It can be used, for example, by human resources in onboarding forming standards for introducing new hires to the company, i.e. VR shows a virtual walk through the office, a meeting with the company's founder who talks about the history of the organization, etc. This technology can also be used in raising customer service standards. The American chain of stores (Walmart) is using Virtual Reality to develop employees' soft skills through simulations of situations that might happen in everyday work, i.e. a rowdy customer, locating products left out of place or working at the most intense times (Szczęsny, 2022).

3. Simulation and game, examples for economics studies

Companies and governments have seen simulators as a way to train their employees saving money and time (Bogacki, 2015). The Center for Promotion and Development of Civic Initiatives OPUS, within the framework of the Lodz Social Economy Support Centre in Poland (Łódzki Ośrodek Wsparcia Ekonomii Społecznej) project, conducted free of charge trainings on the simulation game Business Play, it is a simulation in which groups ran businesses in accordance with applicable Polish law and business realities (Fijałkowski, 2019). Business PLAY replicates events from the everyday life of an entrepreneur, it allows to play the role of a company owner/management board member, to experience setting up a business in any organizational and legal form, simplified accounting and labor law. It shows the entrepreneur's obligations to a state-funded Social Insurance organization (for example ZUS in Poland), tax obligations (including settlements with the US), recruitment and personnel management, sales, negotiations or marketing activities. In similar sense, start-up simulator Entrepreneur teaches the practical basics of management, allows to develop managerial skills and experience in creating a business (Vitronomics, 2022).

The methodology of the game is being introduced in the educational context and, more specifically, simulation has become an effective tool in vocational training. Its specific goal is to prepare future professionals for the market. To achieve this goal, university teachers need a high control over the choice of program and teaching methods, thus, they often use simulations and games for the process of shaping students' skills (Honey & Hilton, 2011). Similarly, these teachers need to be aware of the latest technological advances, and the growing expansion of technology in various areas of life is influencing interest in introducing innovative technological tools such as video games, virtual worlds and Massively Multiplayer Online Role-Playing Games



MMORPG (Buckless & Krawczyk, 2014; Gómez, 2014). However, there is a gap in the literature regarding their use in academic programs. As a result, the question of how to introduce games and simulations into the educational process is often at the discretion of the classroom teacher.

There are several games that have been tested at the Ignacy Mościcki University of Applied Sciences in Ciechanow, a Polish Vocational Training center. We can highlight the following games: *Expresso* to manage virtually dispersed teams; and *Revas* to make appropriate business decisions, show financial results, make conditions for competition, e.g. with sales results, allow to plan activities, make calculations or strive to achieve the goal. *Revas* also has a quality certificate issued by the Finnish institution assessing the features of educational tools, the Education Alliance Finland, and was recommended by the Polish Ministry of Education and Science as a tool to pass apprenticeship in high schools and universities during the lockdown pandemic. Finally, we mention *Cashflow* and *Vineyard*, and this article describes the case at the Ignacy Mościcki University where the teachers are using both games and simulations teaching in Economics studies. However, there is a lack of accessible, well-designed research on their integration into teaching and learning (Honey & Hilton, 2011).

4. Methodology

The research was conducted among students of two courses of Economics and Management, they studied in two modes, full-time during the all the week, and part-time at the weekend. Game was tasted on December and January 2020/2021 in the Economy course, and May and July 2021 in the Management course.

The participants of the research were 103 students of the Ignacy Mościcki University of Applied Sciences in Ciechanow - 41 studying economics (2nd and 3rd year students) and 62 studying management (2nd year students). The ages of the students ranged from 18 to 50 years (Table 1).

Age of students	Female (n)		Male (n)		Total	
	Stationary mode, full-time mode	Non-stationary mode, part-time mode	Stationary mode, full-time mode	Non-stationary mode, part-time mode	F	M
Economics						
18-25	18	5	4	3	23	7
25-30		3	2	2	3	4
35-40		2			2	2
					TOTAL 41	
Management						
18-25	12	14	5	6	26	1
25-30		10	2	4	10	6
35-40		5		2	5	2
45-50		1		1	1	1
					TOTAL 62	

Table 1. Students profile. Source: Self-made.

STATIONARY MODE (full-time mode), students attend classes each semester for fifteen weeks from Monday to Friday. **NON-STATIONARY MODE** (part-time mode), classes are held in nine weekend sessions, and the study program takes into account 60% of the curriculum content of the full-time mode.

Students use games as a systematic methodology during their studies of master. They gain basic economic and management knowledge, understand the interrelationships that exist in companies, and can predict the consequences of decisions. Second-year economics students tested the educational potential of the game *CashFlow*. Also second-year management students evaluated the *CashFlow* and *Vineyard* games, and the online simulation games *Expresso* and *Industry Business Simulations*.

Cashflow was one of the game used and tested over the course of bachelor studies. It shows the possibilities of investing and breaks down the previously learned thinking frameworks developed by students about investments and risk taking. *CashFlow* was a game used as an educational tool on other occasions with

positive results in student results (Maryanto, Suyanto & Al Fatta, 2017). It is a teaching medium that focuses on introducing topics related to money, such as learning how to earn and use it, consumption and investment (Sofia Fittiasari et al., 2021). This game is especially important, for several reasons. First, the role of the game establishing definitions and the associated slang. Second, the use of calculative tools. Third, players' work and their interactions, through which they explore what might favor or limit their chances of financial success. Finally, the work done by players to fit the game with reality, which allows the game to be used in different international economic contexts (Fridman, 2010).

Other board game examined was Vineyard-Winnica. It was used to support strategic thinking, process management or team integration. This game allows to develop the following skills: Leading, managing and adapting decisions to the employee's level of readiness and use the right tools to develop employees; strategic management and investing in the development of the company to achieve long-term effects; change management and adequate response to emerging tasks and random events, making the necessary adjustments to the action plan; making decisions, analysis of the situation, analysis of possible solutions, selection of the optimal solution to the situation, evaluation of the solution taken, and implementation of proposals. The tool allows long-term actions, enhancing specific skills and motivating users (Pietraszko, 2022).

5. Procedure

The assignment of games to a group of students was determined by the level of knowledge and skills of the students, and the material from the syllabus. The analysis of academic results consisted of evaluating the students' verbal richness, the demonstration of knowledge from different economic fields, and the analysis of relations between group members.

Students proceeded to play the game in the exercises and workshops, having been introduced to the rules of the games in advance. They had to read the instructions previously in order to play smoothly and effectively. They played board games in groups of 4-6 people, according to the manufacturer's recommendations in combination with the module's theme.

The Vineyard game was played for 120 minutes, the CashFlow game for 180 minutes. Students' perceptions and opinions on the educational value of the games were recorded immediately after the game, using a survey questionnaire consisting of two parts. Part one allowed for the characteristics of the students: the field of study, gender, personal predispositions, individual or group nature of the activity. Part two focused on the educational potential of the games. Students were scheduled 30 minutes to complete a specific questionnaire, and the length of time to complete it depended on students' perception and reading speed.

6. Results

Considering the activities carried out, the question arises to determine the importance of games and simulations as teaching methods compared to traditional classroom teaching and practices. Students had the option of selecting from one of three potential responses: traditional text-based classroom instruction, hands-on activities, and case studies; internship training; and training through games and simulations. To show the responses, a matrix was created (Table 2).

Students highlighted the games and simulations as an effective learning tool. They noted that they remembered concepts related to the topics of the game, understood the constructs of the issues discussed in class previously, and saw the consequences of the decisions made. More specifically, they highlighted the development of the following skills in the business field and knowledge of the economy, after play simulations and games as teaching methods.

- Ability to make risky and quick decisions.
- Directly visible effects of decisions and actions taken.
- Combination of theoretical aspects with practical activity.



- Global view of a whole issue.
- Self-assessment of one's own skills.
- Slang learning for specific business industry.
- Knowledge of a wide variety of issues related to the topic.
- Developing correct habits, initiative, and reducing the number of mistakes.

	Classroom training		Intership		Games and simulations	
	n	%	n	%	n	%
Ability to make risky and quick decisions.	15	14,56	67	65,05	101	98,06
Directly visible effects of decisions and actions taken.	16	15,53	103	100,00	102	99,03
Global view of a whole issue.	95	92,23	102	99,03	96	93,20
Knowledge of issues related to the main topic.	90	87,38	102	99,03	98	95,15
Self-assessment of one's own skills.	57	55,34	92	89,32	103	100,00
Developing correct habits, and reducing the number of mistakes.	24	23,30	48	46,60	93	90,29
Slang learning for specific business industry.	68	66,02	103	100,00	95	92,23
Combination of theoretical aspects with practical activity.	96	93,20	102	99,03	99	96,12

Table 2. Matrix of learning developed and methodology used. Source: Self-made.

CLASSROOM TRAINING is the traditional training where the students are guided directly by the teacher. INTERSHIP is a training in the workplace. The student does not become a worker, but he/she experiences the real conditions of the work environment. GAME AND SIMULATION is the training based on example situations and funny activities as tools to analyze situations, make decisions and face the consequences.

Analyzing Table 2, we can see Games and Simulations have the highest number of indications of teaching advantages, next are Intership, and finally Classroom Training. Students, as players, specified that the starting point for the game is to have a certain level of knowledge to understand the economic phenomena occurring in the game or simulation. The inconvenience that was pointed out were that the game the manual game to play on the table is not very attractive because it is static, it is quite long, and it covers few specific issues from the subject program, in other words, it contains little information for learners.

The combination of games and simulation in the context of acquiring specific skills and competencies is shown in Table 3, where is grouped the benefits of introducing games into learning according to these categories.

Generic skills	Specific skills (Economy and management)
<ul style="list-style-type: none"> • Ability to apply theoretical knowledge and content to practice in simulated phenomena; • Knowledge about himself, strengths, weaknesses and the predisposition to practice this profession; • Ability to cooperate and work as a team; • Ability to apply theoretical content; • Ability to analyze and evaluate phenomena; • Ability to identify and solve problems and danger areas; • Ability to make decisions and choose alternatives; • Personal development of creativity and entrepreneurial initiative; • Assess the accuracy of the decisions made; • Optimizing paths to solve problems to make conclusions; • Assume responsibility for one's own decisions and actions; • Development of assertiveness. 	<ul style="list-style-type: none"> • Knowledge of industry-specific language and terminology; • knowledge of procedures to relate people and economic processes; • Acquisition of habits to work and make decisions under the pressure of time; • Knowledge of techniques to cope with stress; • Ability to do social negotiation; • Ability to identify relationships that occur in a business environment; • Ability to adapt to the mutability of the economic environment.

Table 3. Skills developed after play simulations and educational games. Source: Self-made.

7. Discussion and conclusion

The results indicate that the Game and the Simulation seem instruments well accepted by the students, and can be a useful tool, not only for educational institutions, but also for training in companies. Games and Simulations help users to gain the necessary knowledge and experience without exposing the company to production stagnation or the danger of damaging working machinery. An added value is the feedback on the effectiveness of the decisions and actions taken, which allows verifying the individual experience, skills and knowledge. In addition, these methodologies allow the collection of preliminary information for analysis. This suggests that these tools can be used when one wants to deeply understand the global rules, values, terms and regulatory conditions.

The Organization for Economic Cooperation and Development (2005) has highlighted several important features for the progress of Poland, and countries in general, based on this kind of training. Thus, the quality of training should therefore be improved in order to guarantee that any investment by employees or employers in training is corresponding productivity gains in productivity, and the cost-effectiveness of training increase through measures that reduce costs for learners and firms. It can also be expected that, derived from this profitability, the demand for education in the adult sector will be stimulated, although certain subgroups of the population may need an additional stimulus to enter the educational system. In this sense, incentive campaigns, the creation of a more learner-friendly environment, the reduction of barriers to accessing educational institutions and other creative measures will be needed to induce those who have had an unsuccessful educational biography to participate in education (OECD, 2005).

More specifically, and especially for adults, it is necessary to introduce content related to the economy into education, and to do this in a friendly and attractive way. We agree with Kiyosaki (2021) stating that business was never taught in school, and this lack of financial education is why so many people work all their lives trying to find the best way to get money.

Among the advantages of incorporating the game CashFlow, we agree with Fridman (2016) in affirming that the players not only learn what being financially successful is and the technical skills that such a mission requires, but this game also helps to determine your profile, to find what may be fostering or limiting their chances of success. In this sense, the ethnographic research on practices, like this game, shows that financial activity is a social process, and not an individual one. Thus, CashFlow combines variables that act together to set goals, use accounting calculation tools, work on activities typical of the free market and mercantilism. Users willingly engage in activities, reshape their calculating abilities, challenges and personal character, change their conceptions of financial success. Players may joke and have fun during the games, but it is nevertheless serious and difficult business. Real world simulations are good vehicles for encouraging deep learning and improving student appreciation of the complexity of business (Zapalska & Brozik, 2008). In this sense, it raises questions about the economic identity, not only about social roles such as entrepreneur or consumer, but also about the relationships between players, the various work environments, and the extent to which they may be entangled with particularistic ethnic, religious, national identities and so on (Gross, 2010).

Some of the challenges related to games and simulations include time constraints in the working time in the classroom, and the academical evaluation of the exercise. Respondents also noted the lack of industry games relevant to each content of the classes, and it can be confirmed that it is difficult to practice the transferred and specific subject content only through games.

We agree with Falcon, Castelar, Ortega y Pradas (2020) saying that the games generate well-being among the students, but adding a game or simulation to a class does not guarantee its usefulness (Zapalska & Brozik, 2008), and the instructor is responsible for making the activity a genuine learning experience. Educational departments should incorporate games into their courses with an eye toward curriculum delivery. Of particular importance is the strong relationship between the degree of perceived realism and the level of learning implemented.



Adult education, like other educational levels, also requires the use of attractive and innovative tools that make the learning process more effective. There is a rich research that describes the advantages and disadvantages of introducing games and simulations into curricula, but the scientific literature on the use of these teaching tools in economy education is limited. These methodologies can be introduced in the study programs and the curriculum practice as an effective and complementary tool, but, there is a lack of research results on their effectiveness in specific educational experiences in terms of shaping students' knowledge and skills on these topics.

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