

DIDACTIC GAME IN VOCATIONAL SUBJECTS

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Abstract

The aim of the study was to determine the effect of the didactic game on students' knowledge and opinions by using the experiment and questionnaire survey. We deal with the didactical game created for the purposes of our examination, which was conducted at the secondary vocational school SOŠ Potravinárska in Nitra. The experimental sample consisted of the students of the 1st grade in the Food Inspector field of study. The game was applied in the lesson of Professional practice. Our task was to examine the difference in the level of knowledge of students in the experimental and a control group. Experiment did not approve a statistically significant difference between the experimental and control group. In spite of that, we can in accordance with the basic statistical indicators conclude, that the level of knowledge in the experimental group increased, which, however, was not statistically significant. The positive effect of the lesson where the game was applied, was proved only in the opinions of the pupils. They expressed positive attitudes to the game and to the overall structure of the lesson. This was examined using the questionnaire.

Keywords:

Teaching methods
Didactic Games
Vocational education
Effectiveness
Knowledge
Food inspector field of study

Schlüsselwörter:

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1 Introduction

According to the quickly changing demands of the society we can register the increasing requirements on quality and effectiveness of education. Education is that field which is much influenced by the transformation tendencies to find the new, better and more effective ways and forms of human personality development and also the traditional approaches to education are re-valued. Because it is necessary to permanently innovate the teaching process in accordance with the latest knowledge from the field of pedagogy, psychology and other sciences, there is also a tendency to use the "newer" teaching methods. From this point of view, these "newer" methods should be understood also as some result of evaluative processes in schools. Teaching methods are the crucial point of the school education and they influence the overall quality of the school.

A complex and multifaceted nature of teaching – learning requires a rich repertoire of teaching methods. The essence of modern understanding of methods is the evocation of action, development of thinking and creativity (Kruszewski 2005; Król 2007). Vocational pedagogy involves blending methods in the light of a number of factors (Lucas, Spencer, Glaxton, 2012).

The most important role of teaching method is to achieve effectively and if it is possible also the permanent change in pupils' education. The efficacy of teaching method can be mostly seen from the aspect of quality and persistence of gained knowledge. On the other hand we must remember also its' other functions. For example other often cited attributes of pedagogically effective teaching method are as follows bearer of information, formatively efficient, educative efficiency, economic aspect, natural by its' realization and results, usable in practice, in balance with the system of science and knowledge, motivating, adequate to student, adequate to teacher, hygienic. Besides these functions we have to remember also other roles, which have

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teaching methods to accomplish in education. Teaching method should also *enhance the students' independence* and guide them to develop their own learning style under influence of the method. It is important to remember the *cognitive and emotional influence of the method*. Another necessary condition in the process of education is active approach of students. *Activating function of method* expects students' participation in this process (Začková, 2014).

When we judge methods, then we have to emphasize that the effectiveness of method or method evaluation from the aspect of its' complex influence on instruction and finally on the student and his knowledge, is from the aspect of evaluative procedures really complicated. The matter is not the transmission of information or knowledge by the method, but its' influence on the whole personality. The previous text results into conclusion that evaluation of teaching methods efficacy is not simple because the effectiveness is not only the active use of time in lesson, developing the new knowledge or fulfilment of didactic functions, but there are also important such aspects that are not measurable like affective influence, emotionality, attitudes of learners etc. and these finally significantly influence the final effect of education. From the variety of existing methods didactic game is one of the "newer methods" that are considered to be more activating and they have influence on the whole personality of the learner such as on the cognitive, affective and the psychomotor area.

Didactic games are currently dealt with in a number of scientific publications and studies, and a large number of didactic games have been developed, for example, for lessons in mathematics, chemistry, languages, geography, history, economics, and many other subjects also in the vocational education and training. The authors of these games recommend didactic game to be used during the lesson, as it allows students to keep their knowledge longer and is a good means of fighting formalism in education. Compared with other teaching methods, its' advantage is that the learning process takes place in form of play and entertainment. This process is accompanied by positive emotions that are the important conditions for the acquiring knowledge (Vašková, 2008, Hvozdovič et al., 2003, Vankúš, 2013).

The game is a higher form of play based on respecting strictly set rules by at least two students (Grzesiak, 1984). The literature includes many definitions and classifications of games as well although most authors use the term of didactic game directly. Wincenty Okoń characterises the game as a form of play where set rules are observed. In this case an important aspect of the game is to achieve a strictly defined score. He also underscores the educating functions of the game: respect for norms, possibility to compete, teaching how to win and how to lose. On the other hand, the didactic game is a game with a certain didactic purpose, a teaching tool (Okoń, 2007). Similarly according to Ulicsak and Wright (2010, p. 77) the game should have a learning curve – easy to learn at the start and increasing. Relevant educational content – including having: Clear objectives; Clear progression; Appropriate feedback; Opportunities for collaboration and group work; Assessment and follow-up; Opportunities for creativity; and A help section.

As with all the methods, playing games need to be linked to other approaches – for example, personal reflection, when learners might debrief after a game to see how what they have experienced could be applied in the workplace. A particular benefit of playing games is that they make light of making mistakes: 'They can act as a safe introduction to various vocational careers – failure is not an issue, in fact it is expected, when learning a game' (Squire, 2005).

Competences acquired when playing didactic games, e.g. persistence, critical thinking or readiness to run risk, facilitate the development of various skills. (Kaskowiak, 2017)

Games offer a unique structure to complement traditional teaching strategies and infuse teaching with energy, spark innovative thinking and provide diversity in teaching methods.

Games make learning concepts more palatable for students and supply learners with a platform for their creative thoughts to bounce around. Games encourage creative behaviour and divergent thought

(Fuszard, 2001) and are excellent ice breakers. Games will often act as learning triggers inducing lively discussion on learning concepts amongst students following game play. As pedagogical devices, games are extremely useful - they can enliven teaching topics

and are especially effective for dealing with problem solving and key concepts. Research shows that "games have a special role in building students' selfconfidence" and "they can reduce the gap between quicker and slower learners" (Fuszard, 2001).

2 Measuring the effectiveness of the selected didactic game

The aim of the empirical part of our study was to examine the effectiveness of the didactic game in the subject of Professional Practice and to determine the impact of didactic game on the level of acquired knowledge from a particular content and to survey the opinions of students. The partial tasks were:

- to create and apply a didactic game in the fixation phase of the lesson with students in the first year of study at the Secondary Vocational School of Food in Nitra (Stredná odborná škola Potravinárska v Nitre), in the study field Food Inspector (2958 K).
- to identify and compare the students' level of knowledge in the experimental and control group,
- to examine the students' views on the use of didactic games in teaching and their interest in the lesson taught through didactic game.

Qualitative and quantitative methodology was used. As the main research methods were experiment and questionnaire. From the point of view of the game methodology, a didactic game in the topic of Laboratory glass – taught in 1st year of study in the Food inspector field of study was created, by editing the popular board game "Brain Box". Didactic game effectiveness was verified by experiment using the experimental and control group with pre-test and post-test. After the experimental examination the questionnaire method was used.

"Brain Box" is originally a social game for memory training. The aim of the game is to remember as much as possible in time of 10 seconds. Game is intended for 2 or more players. Various thematic variants of this game are available on the market, e.g. Brain Box - World; Brain Box - Inventions; Brain Box - History, Brain Box - Animals etc. (<http://www.brainbox.co.uk/brainbox-range>). Our adaptation of the game consisted of 40 cards with the particular types of chemical glass. Each card contains picture and text. Based on the classification of particular types of chemical glass into groups, the cards differ in colour. On the other side of the card there are six questions connected to the picture. Goal of the game is to achieve the maximum score of correct answers (points).

Rules of Brain Box – Laboratory glass:

1. Each student prepares a sheet of paper and a pen.
2. The playing cards are given by the teacher among all students so that each student has the same number of cards (if there are more cards, they will be put off by the side).
3. Students turn one card with the side where the chemical glass is displayed. The teacher sets the clock for 30 seconds and during that time students individually examine the image with the text. After the time has elapsed, the students turn the cards to the other side with questions.
4. The teacher throws a cube, the student has to answer a question with the same number as the one on the cube. For example, if the teacher throws number two, the student answers question number two on the card.
5. If the student has answered correctly, he keeps the card and writes the point for the correct answer on their sheet of paper. This is the case for each card and each student, unless there are answered all the cards the student has. If a student does not answer correctly, does not get a point for answer. The given card is shown to other students who have the opportunity to answer and to get point for the correct answer.
6. If all cards have been dealt, the game is over.
7. The game continues only if there remained unmatched cards from the beginning of the game: The teacher takes one card of those cards that remained, showing a picture to students and reading the text. After that, teacher throws the cube and the student who knows the answer can respond. If the answers is correct, student gets the point. If more pupils know the correct answer each of them will score a point.
8. After completing the game, the students count points. Whoever has the highest number of points can be classified.

The Didactic Test consisted of twenty-four questions (tasks). The tasks were of several types: with a brief answer - complementary, closed selection (polytomic) and assignment tasks. Test time was 10 minutes. Didactic test had one variation. The particular tasks in the test had the weights of 1 to 4. The didactic test maximum score was 35 points. Used mathematical-statistic methods were arithmetic mean, median and the Mann - Whitney U.

On the basis of the set partial tasks and methodology, we formulated the following hypotheses:

H 1: The implementation of didactic game will raise the level of students' knowledge at the end of the experiment. (There is a difference between the values of the control and experimental groups.)

H2: Students will evaluate lesson with didactic games more positive than traditional lesson.

2.1 Results and discussion

In the experimental group (8 students), teaching was conducted by applying the didactic game, while the control group (8 students) was taught in a traditional standard way (verbal teaching methods). We expected statistically significant differences in the knowledge tests that pupils wrote before and after the fixation phase of the lesson. Tests were applied both in experimental and control groups. Table 1 shows how the test scores in the experimental group varied during the experiment.

Table 1 Results of the experiment with non-random selection of subjects in the experimental group and control group

	N	AP Pretest	AP Posttest	Difference pretest – posttest	P
Experimental group	8	20	27,5625	7,5625	0,003525
Control group	8	22,6875	28	6,6875	0,021468

The table shows that the difference in knowledge level between the experimental and the control group, in the arithmetic average obtained in the pre-test is 1.2 points. During the experiment, the scores in both groups increased. In the pre-test, the control group leads in the number of points achieved. Even in the post-test difference in score average was 0.88 points. The higher score was achieved in the control group. However, the difference in the obtained score in the pre-test and post-test in the experimental group is slightly higher than in the control group.

We can conclude that the experiment did not confirm a statistically significant difference between the experimental and the control group. However, according to the basic statistical indicators, it is possible to conclude that during the experiment the level of knowledge was increased in the experimental group, but it was not statistically significant. On the basis of the all tested variables, we draw the following conclusion: Experimental verification of the didactic game did not have a statistically significant effect on the increase of the level of knowledge compared to the control group where the didactic games were not applied. By this finding, we consider the H1 hypothesis as unconfirmed.

For the limited extent of the study, we provide only brief findings of the questionnaire survey (more In Šeben Začková & Janičová, 2017).

Questionnaire results in the experimental group show that 50% of the respondents prefer traditional teaching and other half not. To the traditional teaching with writing notes more incline girls. Despite this finding, regardless of gender in the experimental group, all the students answered that they enjoyed teaching using the brain box didactic game.

The students in the control group stated in the questionnaires that 75% of the respondents do not prefer traditional teaching, and only 25% of the respondents prefer traditional lessons with the writing of the notes. Even in the control group, girls prefer the traditional methods more than boys.

In summary, students expressed positive feedback on didactic games. The answers indicate that the game we implemented in the teaching process contributed to the interest and motivation of students. We can prove the H2 that students evaluate lesson with didactic games more positive than traditional lesson.

We agree that the question of using games for many remains unclear and is associated with increased workload and unclear learning outcomes (Schmitz & Felicia & Bignami, 2015). However, studies show that the interest in using games in teaching is high, and that most teachers recognize and even value the motivational potential of the game in teaching, which is increasingly difficult to achieve in traditional education, especially in high-risk youth. They often encounter "obstacles in learning" that are difficult to overcome, such as low motivation and behavioral problems (Simmons & Thompson, 2011). However, the results of the studies provide evidence that game-based learning approaches meet their needs and provide effective means of returning students to learning (Mitchell & Savill-Smith, 2004).

Although didactic games are considered effective and useful in terms of motivational aspects, it appears that the integration and expansion of the use of game based learning faces several problems associated with technical, institutional and organizational factors (Schmitz & Felicia & Bignami, 2015). The fact that didactic games should be applied more frequently in teaching support also the findings of Pecina (2012). Author in his examination identified that the majority of his respondents - teachers of practical vocational

training use games once per month or less (27.5%) or not at all (42 %). In his opinion, this is not a positive finding because it is a suitable motivational method applicable to training in vocational education as well.

Didactic game provides many advantages for teachers as for example:

- getting to know the student in various situations – games make it possible to see character traits that are usually not visible. They allow to assess the student's lacks and deficiencies in situations which are not connected with stress;
- presentation of issues related to various phenomena, technical processes included in the curriculum – games develop interest in the topic of class and positively influence the relation of the student to the subject (Gulińska, 2008);
- more effective educational impact of the teacher during the game – games allow to shift the centre of gravity from the teacher and their teachings to the student and their independent action. (Kaskowiak, 2017)

3 Conclusion

We can conclude that we did not confirm statistically significant differences in improving students' knowledge through didactic games. The results of the experiment in relation to the first hypothesis are consistent with the results of Vankúš (2006) and Tvrda (2010), who also did not confirmed the statistical results that teaching using didactic games provided pupils with more knowledge than teaching without games. We also agree with their opinion that research results cannot be generalized for a small scale of research sample. Nevertheless, they recommend the inclusion of didactic games in the teaching process. As stated below, "didactic games have proven to be beneficial for teaching, their use has been beneficial to students' attitudes towards the subject." Team of Colombian authors González, Y. M., Barrera, J.O.M, Riaño, H.H. and Pereira, J.M.L. (2011) have also found that the game has no significant impact on the learning outcomes, but they have come to the conclusion from their research that the game has a positive impact on the development of "comprehension" competence. These authors believe that the impact of didactic games on different competencies may depend on other factors such as: subject content, socio-economic characteristics, learning styles, and even perceptions of the methodologies by students.

Investigating the pupils' views on the use of didactic games in teaching and their interest in the lesson taught through didactic game showed that our students clearly stated in the questionnaires that they enjoyed didactic game teaching. Even in the mutual (joint) re-evaluation of the lesson, the teaching lesson and the didactic game itself were positively evaluated by students. The same result also concluded Vankúš (2006, p. 14), who states: "Based on the collected data can be argued that students are interested in educational games incorporated into the lesson." He also points out that the didactic game activates the whole class, motivates students competitiveness, students control each other, it develops their communication skills. To the positive assessment of teaching with games contribute also older works where, for example Onslow (1990) examined and found positive effects of social interaction between students during the didactic games. Building on the work of authors Bright, Harvey and Wheeler (1985), who found that the discussion between pupils and between students and teachers are necessary during the game in order to clarify inconsistencies. Petty (1996) also states that games can students engage very intensively to learning and to induce them in a concentration that cannot be achieved by any other method. Due to the increased interest and motivation generated by the game, pupils can also develop a positive relationship to the subject (to the teacher), which lasts for weeks. A number scholars dealing with didactic games agree that games have a number of positive effects and can be effective in learning (Vankúš, 2013). Teaching, which includes didactic games, is, in our opinion, more effective than traditional teaching, as a self-contained, active, playful activity enhances the cognitive ability of students and increases their motivation.

Game based teaching in our case did not have a statistically confirmed more positive effect on raising the level of knowledge in comparison to traditional teaching. Nevertheless, we recommend using didactic games in the teaching process, as our didactic game had a positive response in students' views and attitudes. On the other hand we proved by a questionnaire that work with didactic game improves the attitudes of pupils to learning, which is important in terms of their motivation. Systematic evaluation of the teaching methods could help to eliminate the failures in pedagogical work. Finally, improving learner achievement through the effective teaching method leads to quality improvement and the school culture reinforcement.

References

- Bright, G. & Harvey, J. & Wheeler, M. (1985). *Learning and mathematical games*. The National Council on Teachers of Mathematics. Reston
- Fuszard, B. (2001) Gaming. IN LOWENSTEIN, A. J., BRADSHAW, M. J. & FUSZARD, B. (Eds.) Fuszard's innovative teaching strategies in nursing. 3rd ed. Gaithersburg, MD, Aspen Publishers.
- González, Y. M. & Barrera, J. O. M. & Riaño, H. H. & Pereira, J. M. L. (2011) *Didactic games, a methodological tool evaluated by competences in teaching of the systematic layout planning* [online]. In *SEFI 2011*. [cited 23-3-2017]. Retrieved from: <<http://www.sefi.be/wp-content/papers2011/T7/179.pdf>>.
- Grzesiak J. (1984). *Gry i zabawy matematyczne – zadania dla dzieci w młodszym wieku szkolnym*. Życie szkoły, 4/1984.
- Gulińska, H. (2008). Gry edukacyjne w nauczaniu chemii. In: *Homo communicativus* red. Surdyk, A., Szeja, J.Z., 2(4)/2008. Poznań: UAM.
- Hvozdovič et al. (2003). *Celodenné výchovné pôsobenie*. 1.vyd. Prešov : Metodicko-pedagogické centrum. ISBN 80-8045-296-2
- Kaskowiak, N. (2017). Games as teaching method. [cited 23-10-2018]. Retrieved from: <http://cometaresearch.org/educationvet/didactic-games-as-teaching-method/>
- Król R. (2007). Efektywność gier dydaktycznych w procesie kształcenia. Kraków: Oficyna Wydawnicza Impuls.
- Kruszewski, K. (2005). *Gry dydaktyczne*. In: *Kruszewski K. (ed.) Sztuka nauczania. Czynności nauczyciela. Podręcznik akademicki*. Warsaw: Wydawnictwo Naukowe PWN.
- Lucas, B. & Spencer, E. & Glaxton, G. (2012). *How to teach vocational education: A theory of vocational pedagogy*. City & Guilds Centre for Skills Development, London.
- Mitchell & Savill-Smith (2004). *The Use of Computer and Video Games for Learning*. London : Learning and Skills Development Agency. ISBN 1-85338-904-8
- Okoń, W. (2007). *Nowy słownik pedagogiczny*. Warsaw: Wydawnictwo Akademickie Żak.
- Petty, G. (1996). *Moderní vyučování*. Praha : Portál, ISBN 80-7178-978-X.
- Pecina, P. (2012). Pojetí, struktura a výzkum didaktiky praktického vyučování v rámci doplňujícího pedagogického studia učitelství praktického vyučování na Pedagogické fakultě Masarykovy univerzity. In *lifelong Learning – celoživotní vzdělávání*, roč. 2, č. 3, pp. 74–96. DOI: <http://dx.doi.org/10.11118/lifele2012020374>.
- Schmitz, B. & Felicia P. & Bignami, F. (2015). Acceptance and Use of Game-Based Learning in Vocational Education and Training: An International Survey. In: *International Journal of Game-Based Learning (IJGBL)* 5(4). DOI: 10.4018/IJGBL.2015100104
- Squire, K. (2005). Changing the Game: What happens when video games enter the classroom. [Online]. [Cited 24-9-2012]. Retrieved from <http://www.innovateonline.info/index.php?view=article&id=82>
- Šeben Začková, T. & Janičová, M. (2017) Využitie didaktickej hry v odbornom predmete študijného odboru kontrolór potravín. In *Výzkum v přípravě učitelů přírodovědných a příbuzných oborů*. Praha Česká zemědělská univerzita.
- Ulicsak, M. & Wright, M. (2010). *Games in Education: Serious Games – a Futurelab literature review*. Bristol: Futurelab.
- Vankúš, P. (2006). *Efektívnosť vyučovania predmetu matematika metódou didaktických hier* [online]. Bratislava. 2006. [cited 23-11-2016]. Retrieved from: <<http://www.ddm.fmph.uniba.sk/files/min-rig/rigVankus.pdf>>.
- Vankúš, P. (2013). *Didactic games in mathematics*. Bratislava : Comenius University, ISBN 978-80-8147-007-3.
- Vasková, V. (2008). *Matematický futbal* [online]. Nitra: UKF.[cited 18-11-2016]. Retrieved from: <http://www.km.fpv.ukf.sk/upload_publikacie/20110629_95206__1.pdf>.
- Začková, T. (2014). Efficacy of teaching methods as tool to quality improvement and development of school culture. In *School quality and culture*. Torun: Adam Marszałek