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# DETERMINANTS OF THE USE OF COMPUTER GAMES IN THE TEACHING PROCESS

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**Abstract:**
The major goal of this article is to analyse behaviour of e-gamers and their opinion regarding possibility to use computer games in didactic process at the university or other higher education institutions. The research was done randomly in an academic environment, using questionnaires, distributed via internet. This article is to continue the set of articles dedicated to analysis of e-gamers profile and environment that he belongs to. Current research is focused on behavioural patterns of e-gamers and possibility to use computer games to support didactic process at universities. After gathering results of questionnaires the authors leaded the discussion about those results and accompanied conclusions.

*Keywords: computer games, e-gamers, e-gamers behaviour, didactic process*

## 1. INTRODUCTION

The main goal of following article is to analyse behaviour of e-gamers and their opinion regarding possibility to use existing games in didactic process at high school. To determine the profile of discussed high school research was limited to subjects provided at Management Faculties. The respondents of the research represent students of University of Warsaw, Faculty of Management.
Poland in 2013 indicates the number of gamers amounted to 13.4 million according to the statistics of Newzoo (Newzoo 2016a) 98% players used their PCs to play computer games (together with other platforms). Poland takes the second position in Europe among the examined countries. The market of computer games is rapidly growing every year – in the end of 2014 in Poland it was estimated of about 280 million dollars and it will be growing by 3.8% a year, thus increasing the value of the entire market over 430 million dollars as expected at the end of 2016 (PB, (2016), Newzoo, (2016b)). Hence, undoubtedly the subject matter is worthy of attention.
The phenomenon of computer games is elusive from the perspective of formalized scientific analysis (Chmielarz, W., & Szumski, O. (2016a)). There is no single definition of computer gaming (Chmielarz W., (2015b); IT-pomoc.pl 2016; wiedzaiedukacja.eu 2016; jestemgraczem.com 2016; Marketing-news.pl 2016, PB.pl 2016; Zając, J., (2014)) and in a narrow approach computer games are seen as software played at equipment of computer and in wider it also includes console or mobile devices.
For this particular purpose it was decided to use term – computer games as a generic term (object hypernonym) with respect to an entire class of different kinds of games treated as a homogeneous phenomenon.
Secondly there is no commonly used definition of computer game player (e-gamer). And again in a narrow meaning e-gamer is person that plays solitaire or multiplayer computer games every day or several times a week. Sometimes the statement is limited to persons that play MMO type games or who treat games as type of sport and play games almost professionally (Chmielarz, W., & Szumski, O. (2016b)).
It is observed more and more common approach to transfer this naming convention to all people that play any type of games, treating games as sort of one or another type of entertainment .This article also treats e-gamers similarly to above statement.
Thirdly there is no single and divided classification of computer games, there are only many different typologies based on different criteria, mostly type of action executed in a game (e.g. logical games, strategical, adventure, RPG), that have many other subtypes.

Although computer gaming phenomenon deserved to numerous studies including mass surveys (Żywiczyńska, E., (2014b)), and focused surveys (Chmielarz, W., & Szumski, O. (2016c), Chmielarz, W., & Szumski, O. (2017), Mijal, M., & Szumski, O. (2013), Żywiczyńska, E., (2014a)), most of those were conducted before the most dynamic use of mobile applications implemented on moble devices and tablets. Authors focused on identification of major implications related to this new phenomenon that influence development direction of computer games. This is the reason why authors decided to do the research, where major target is to analyse such type of computer applications among users. Presented below results is a condensed report covering aspects of the third phase of the research executed in October 2016 within chosen group of students of University of Warsaw, Faculty of Management.

## 2. GOAL AND THE METHODOLOGY OF THE RESEARCH

Considering limited and fragmentary research in Polish and foreign literature, related to the use of computer games as well as e-games from the perspective of individual and group customers, research was based on own approach (Chmielarz W., (2015a)) consisting following phases:

- Analysis of defined group of e-gamers on the basis of qualitative and quantitative survey, divided into three parts:
    - Characteristics of computer player and identification of his/her preferences in computer games
    - Specification of possible gaming effects and results for an e-gamer
    - Identification of behavioural patterns during and post-game and opinion related to possibility to extend use of different computer games to support didactic process at Faculty of Management
- Placement of online version of a survey on servers of Faculty of Management of the University of Warsaw, conducting functionality test and its verification,
- Distribution of the survey between respondents, analysis and discussion of results
- Drawing conclusions from the obtained results concerning current status and directions for future development of computer games based on user feedback.

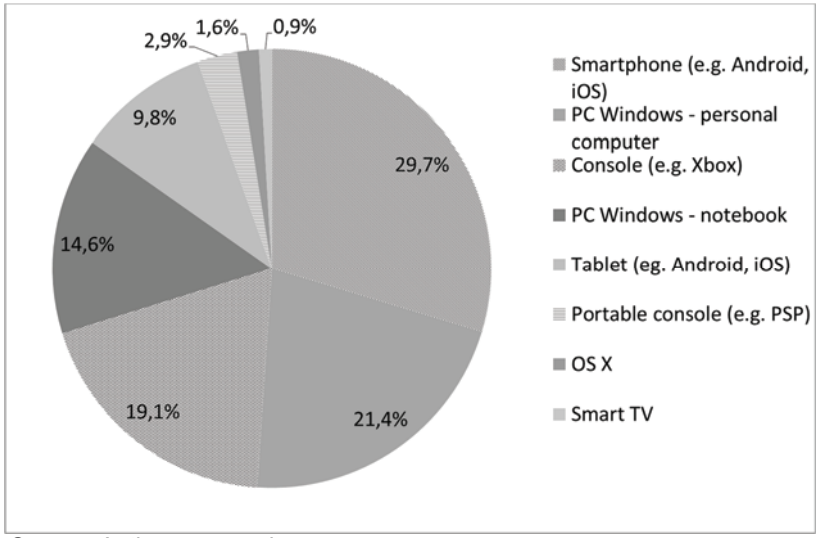
Following article presents results of the survey executed by third part of the questionnaire.
First part allowed defining profile of a computer gamer at the university and his/her preferences to particular types of games. Second part of the survey allowed to identify effects and results of participation in computer games by e-gamer. It leaded to the third part that is dedicated to psychological predispositions of e-gamers and usability of existing games in didactic process at university.
The survey was executed at the beginning of November 2016. Identification of the respondent group was not accidental, and it belongs to the convenience sampling, where respondents were mainly students of full-time and part-time BA, BSc and MA studies at Faculty of Management at University of Warsaw. Questionnaire was distributed electronically. Participants submitted over 90% of correctly completed questionnaires that proves that students seem to be a group particularly open to any kind of innovation, especially concerning the facilitation of private life and entertainment.
The limitation of the research was expected number of people who own smartphones, tablets, laptops and mobile phones – not of high quality but with a long duration of use. The survey was completed by 444 people, out of which 401 participants submitted correctly completed questionnaires (which constitutes 92,32 % of the sample). Among the respondents there were 68,08% of women and 31,92% of men. An average age of the respondent was 19,9 years, and the medium value was 19 years. The age is typical of students of the first years of BA and BSc students and the first years of the studies. Among the survey participants there were 71,32% of students, 28,68% working students. 78,80% indicated secondary level education and 15,71% post-secondary education, 5,24% engineering education and 0,25% full higher education – the survey was primarily conducted among the students of BA studies. Over 32% of survey participants indicated that they are inhabitants of cities with over 500,000 residents, almost 14% came from cities with 100,000-500,000 of inhabitants, over 28% from towns with 10,000-100,000 residents, over 3% from towns up to 10,000 residents, and 22,19% declared that they come from rural areas. The simplicity of the survey did not cause many distortions during its completion (43 partially completed questionnaires); and many respondents (over 130) completed also additional sections of the survey.

## 3. ANALYSIS AND DISCUSSION OF COLLECTED RESULTS

Respondents answered thirty two substantive questions. First part of the questionnaire had introductory character (duration and frequency of game playing, gaming platforms, owned specialized equipment, place and sources of games). Second part was dedicated to behaviour and emotions of e-gamers that

companion the games during and after the game. Third part – their views regarding usability of different types of games in didactic process at university.
Over 72% of participants of the survey play computer games, the most of them –almost 48% since primary school, and almost 15% from pre-school age. Only less than 10% began playing at later age, with nearly 7% in gymnasium. It seems to be a very popular activity that starts at a very young age.
Among the computer games prevail (almost 33%) of those who play occasionally - a few times a year. Little more - almost 38% play every day and a couple of times a week. Over a quarter of the gamers play a few times a month, and a small percentage (almost 4%) has not played in a long time.
However, when we refer to results of the survey regarding frequency of game playing, expressed in hours played a week, we might conclude that above data is somehow underestimated. As so, 41% participants play less than hour a week. If we take the standard time for such a game as 20 minutes, it would mean playing more than 13 hours a month, which casts doubt about playing occasionally. Equally large proportions (over 41%) are the players who play on average 1-6 hours per week. More than 7 hours per week for the gaming granted 11% of the respondents, and more than 13 hours a week (therefore almost compulsively) 7%.
As per results smartphone is seen as major equipment for gaming (almost 30%), personal computer and console states for around 20% each, fourth position is given to notebook – with result of 15%, fifth tablet – almost 10%. Very seldom respondents use smartphone, portable console or OS X platform (figure 1).

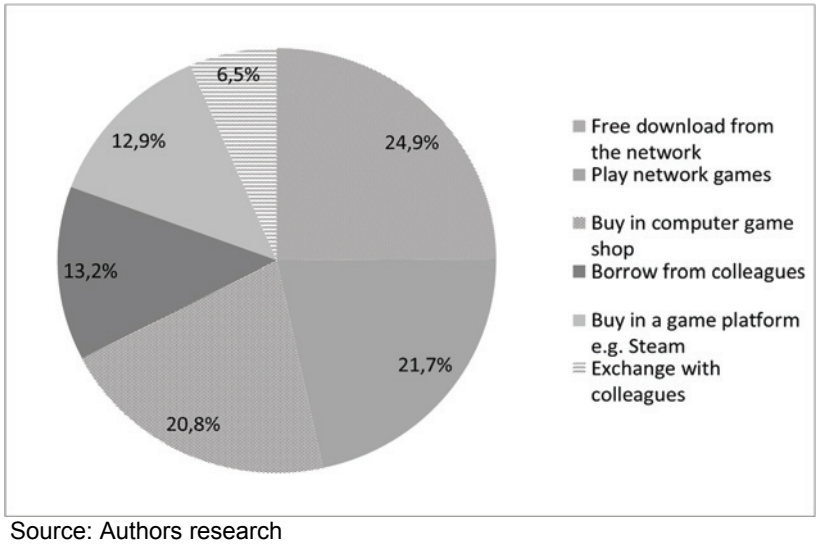
**Picture 1:** The platforms which were most frequently used as e-games platforms




Source: Authors research

Respondents don't use dedicated equipment during game (33%). If so, than it's mostly mouse for gamers (22%), special joystick (11%) or standard joystick (9%) or speaker phones with microphone (almost 10%)
Most of students (25%) download free games from the internet, almost the same amount (almost 22%) play network games. Almost 21% buy in computer games shop. Almost 20% borrow from colleagues or exchanges with colleagues. It seems that purchasing games in game platforms such as Steam gathers more and more popularity – 13% (figure 2).

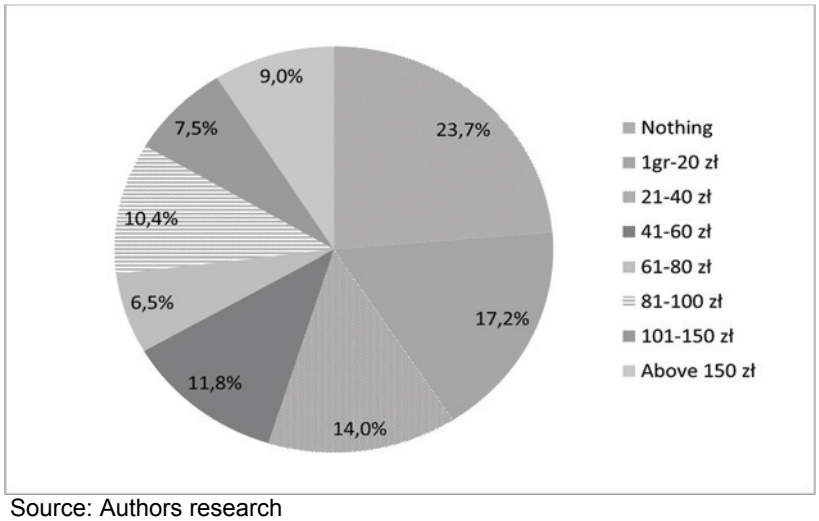
**Figure 2:** Sources of games




Source: Authors research

Almost identical amount of respondents, as ones that download freely games from the network is not interested in paying for games even one PLN (24%). At the other side - people that might be willing to spend over 100 PLN a month – as per survey – states for over 16%. 31% of participants declare spending on games in minimal scope of 1-40 PLN; the remaining 29% spend between 40-100 PLN a month (figure 3).

**Figure 3:** Willingness to spend money on computer games




Source: Authors research

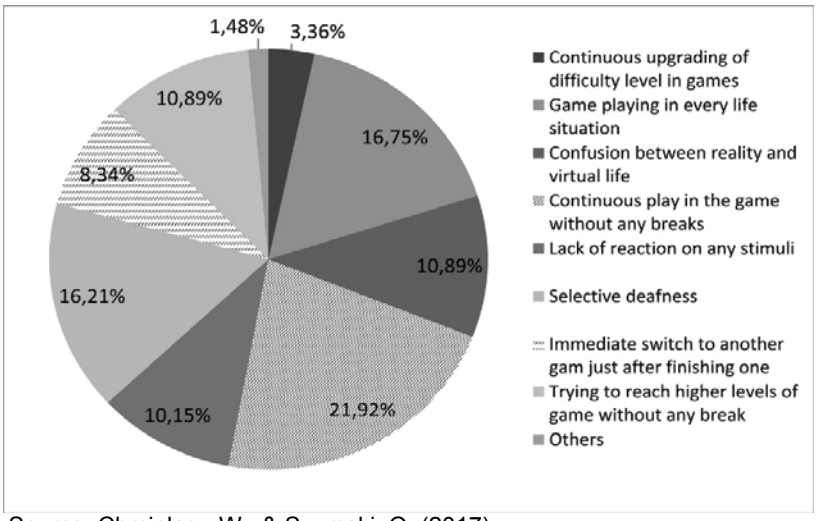
Next phases of the research were related to e-gamers' psychical presispositions and usefulness of those in didactic process supported by computer games at university, at faculty of Economy and/or Management.

Comforting is the fact that despite all, 81.5% of the respondents answered that they prefer social life, and only about 2.5% of the virtual world of computer games. However, nearly 16% of respondents treat equally real and a virtual life. Nevertheless, they want to or not want; computer games affect e-players. Firstly - in different ways games are addictive. It is indicated by almost 74% of all respondents, and taking into account also the expression "rather yes" – it makes 95% of all participants.

The addiction to game is manifested mostly by uninterrupted gaming for many hours (22%) playing in every life situation (17%) selective deafness – where player is not able to hear what others say to him (16%). Smaller significance factors are as follow: the mistaken reality with virtual reality (11%) and continuous attempt to reach to the next levels of the game (11%) and lack of response to any stimuli (10%). Lesser meaning to such behaviours is moving to another game just after finishing the played one, and increasing the difficulty level of game that the player plays. Among other symptoms of

addiction, respondents give also: forgetting about physiological needs, gambit nights, spending money on extra movement in game, breaking up relationship with friends, projection of ones ambitions to virtual life and continuous talking about games (figure 4).

**Figure 4:** Manifestation of computer game addition




Source: Chmielarz, W., & Szumski, O. (2017)

Another aspect that was investigated are methods that participants use to interrupt e-gamers from addiction to computer games, they mainly use such methods as: trying to get someone's attention (29%), offering of alternative entertainment (24%) appeal to reason (17%). %). Other options mentioned are sound related (clapping hands, singing), switching off computer, overturning a chair with a e-gamer. Respondents asked about feelings accompanied when their game is interrupted in the first place list nervousness (37.5%) and failure (16%), and 10% feel of anger. At the same time 31% do not feel anything related to game.

During the game e-gamers different set of emotions accompany a gamer, while lack of emotion is signalised only by 3,37% participants. The most dominating emotions are enthusiasm, exultation and satisfaction (almost 75%). Opposite feelings - stress, anger, sadness state for 21% of answers.

After a winning game, players signalize such behaviour as: scream of enjoyment (33%), dance of victory (almost 20%), opposite to that, almost 30% say that they do nothing. This indicates perhaps increasing dichotomy between players playing just for pleasure, and enthusiastic or even professional players, sometimes - as the statistics show - addicted to games. Among other behaviours, after winning the game are mentioned such actions as analysis of errors, which prevented e-gamer from winning, praising a friend about winning game, complaining about producers and errors in the game.

More than 61% of respondents try not to transfer feelings associated with the game on social and family life. And nearly 48% respondents indicate that don't neglect their duties to play, and the answer "probably not" was given by 38%. Only slightly more than 4% admit to abandon responsibility for the games.

Since over 75% of respondents claimed that the games are not just used for entertainment, and can be used for other purposes, it was decided to extend the survey questions on the possibility to apply them to education, which in the case of a research sample (students) seemed quite natural. Especially when the question – 'whether computer games can have educational value?' – authors received 94% answers of Yes and Rather yes, where votes against have only 6%. For comparison – the sport values of gaming sees only 59% of respondents.

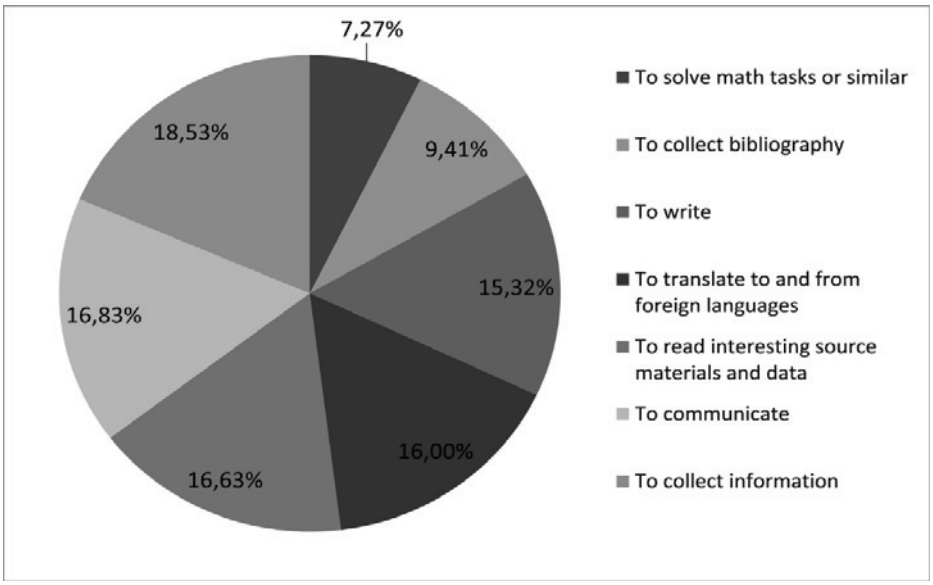
To evaluate usefulness of computer games for educational purposes the authors bring again into play previously used division into different groups of games (Chmielarz, W., & Szumski, O. (2017)): Massively Multiplayer Online, Adventure games, action-adventure games, RPG, strategic games, survival horror, simulation games, and arcade games (shooting, fighting) . From the other hand – it was made standardized set of major subjects provided to students on faculties of economy and/or management, where games can be used for educational processes. Subjects that can benefit from computer gaming as part of educational process are: economics, information technology, foreign languages, logistics, marketing, mathematics, negotiations, law, psychology, accounting, sociology, management.

According to provided answers, following results were gathered (Chmielarz, W., & Szumski, O. (2017)):

- the most frequent answer was indicating possibility to learn foreign languages via gaming of following games: first rank - Massively Multiplayer Online (32% of all responses), second rank – adventure games- 23%, third rank action-adventure games – 19%, forth rank arcade games (shooting, fighting) - 18% and RPG – 16%,
- the most suitable for management teaching are strategy games (29%) and simulation games (23%),
- the most suitable to support psychology are games type horror survival (39%),
- to support educational process of economics – similarly as for management (alt-hough in smaller scope) are strategic games (13%) and simulation games (12%),
- as research shows also logistics can be supported by games, where the most suitable are strategic (24%) and action adventure games (16%),
- sociology can benefit from simulation games (12%) and adventure games (10%),
- negotiations can be best supported by Massive Multiplayer Online (12%),
- according to the respondents, in a very low scope, mathematics, information tech-nology, accounting, law and marketing are not seem as a good target for game support in the educational process (responses ranged between 0-7%),
- the whole research shown that according to participants of the research, the most suitable to support didactic process are games of type Massively Multiplayer Online (31%) and strategic games (23%) the less suitable are games of type RPG,
- subjects that can benefit the most from use of computer games are foreign lan-guages, psychology, logistics and management.

During last six months respondents the most often used computer games to learn foreign languages (30%) management (15%), economics (9%) the most rerely computer games wer used to suport learning of accountancy (3%) and law (3%).
Based on current research 96% (response “Yes” and “Rather Yes”) of students use computer for learning purposes. Computer is used mainly for searching and collecting information (19%), communication (17%), viewing of source materials (17%) and to translate to and from foreign languages (16%). Computer is not treated by participants as popular tool to solve math tasks and similar (7%) and to create bibliography (9%) (figure 5).

**Figure 5:** Scientific domains where computer can be used

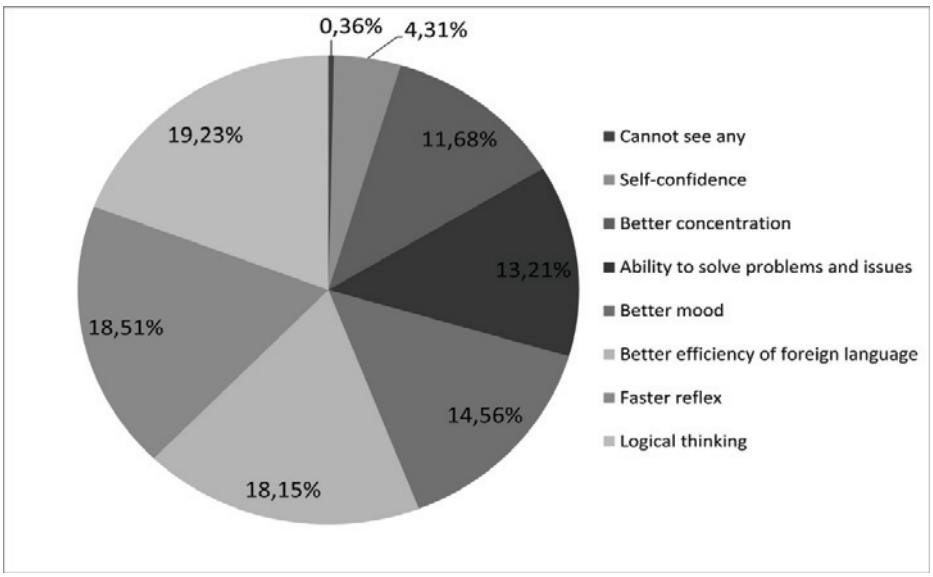



Source: Chmielarz, W., & Szumski, O. (2017)

According to previous surveys (Chmielarz, W., & Szumski, O. (2017)), 94% of participants believe that computer gaming improves creative thinking and also other positive features, mostly associated with logical thinking (19%), faster reflex and better efficiency in foreign language (18%). The substantial part of these characteristics are ability to solve problems and issues (13%), better concentration (13%). All together with better mood (15%) those characteristics might help didactic process from the psychological side of learning. In particular as further research proves in learning foreign languages (18%),

management (15%), logistics (9%), and psychology (8%). Over 71% students indicate that computer games can verify information gathered during lectures (figure 6).

**Figure 6:** Positive features extended by computer games




Source: Chmielarz, W., & Szumski, O. (2017)

In respondents' view (19%), lecturers should use computer games during their lectures. Over 40% of respondents answered "Rather yes" to questions related to possibility of use games during lectures. Only 8% of participants don't see such a need.

Interesting part of the survey is related to open opinions of respondents. The majority of views had positive note highlighting general role of computer games in didactic process although in aspects of shaping personality and positive characterological traits *(…. it develops personality at many layers…. We can benefit from every type of computer games…, it [games] can teach new skills and logical thinking...*). In opposition to positive views spome negative statements were raised highlighting detrimental effect of computer games, leading to addictions, being alienated from real life and living virtual life *(...games might be dangerous media tool…., should not be used at universities...*). Respondents also expressed their anxiety in relation to use computer games to support didactic process as there are better methods of teaching than computer games.

All above testifies the absence of an explicit approach to use of computer games in didactic process at the university.

## 4. SUMMARY

The most essential conclusions coming from the whole research are presented below:

- the results from the third stage of survey confirm the thesis saying that computer games are considered not only as entertainment but also to some extent can be seen as a tool for teaching,
- student community represents high level of opinion differentiation related to games and possibility to use computer games to support didactic process. There is awareness of both advantages and disadvantages of positive characteristics influenced by games in people life and in didactic process, as well as negative ones, leading to addiction,
- participants believe that computer gaming improves creative thinking and also other positive features, mostly associated with logical thinking (19%), faster reflex and better efficiency in foreign language (18%) and university subjects related to those areas might benefit the most from computer games,
- respondents are aware of positive and negative influence of computer games, where the most risky are different addictions,
- gamers are convinced, that computer games can support with success didactic process, especially to support learning of foreign languages at faculties of economics and/or management. Those faculties can also benefit from computer games to support also psychology, logistics, management and economics,

- according to the research the most suitable to support didactic process are games of type Massively Multiplayer Online and simulation games,
- students highlight the need to create dedicated computer games supporting didactic process by lecturers, who should lead the initiative to create such games,
- participanrs raised also demand to create special computer games, supporting particular subiects specific for the university,
- computer is used by students to search and collect information, communication between people and viewing interesting source dataas well as as translating tool. In this situation computer games can be used mostly to develop and enhance specific attributes used in didactic process,
- e-gamers and people from their surroundings notice problems related to potential addiction to computer games and try to counteract, even though people that prefer virtual reality state for only 2,5 % of tested e-gamers,
- people that play computer games are divided into two groups. First group consist of engaged players, that strongly feel emotions related to winning and losing of games, second group – are represented by people who treat gaming as one form of entertainment, and don't show emotions that may accompany gaming,

To support teaching at the university level it is needed to start making games for teaching purposes, specified on the individual, taught in the type of school subjects. Nevertheless, the students decided that a new approach to teaching in the form of computer games could diversify the teaching process and to allow for learning features that facilitate learning. This opens up a new field of research over the content and scenarios of games that are planned to support specific content of planned teaching at the different types of universities.

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