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Benefits and Difficulties of Integrating Mobile Technologies in the Academic Learning

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Abstract: Exploring students' perceptions of the advantages and disadvantages of mobile technologies (MT) is necessary in the dynamic context of their increasing use in learning. The data obtained from 532 students from a state university were analyzed. The students mentioned three advantages and three disadvantages of using mobile technology in the learning activity. Based on the content analysis, the main categories referring to the benefits and difficulties of using MT were identified. The main categories in terms of benefits are: technological advantages, information using mobile technologies, efficient communication, opportunities for educational process, personal development, facilities at the economic and environmental level. Referring to the difficulties of MT, there was identified: negative influence on personal development, technological difficulties, damaged information, diminishing communication and socialization abilities, the negative effects on the educational process, economic, ecological and ethical disadvantages. The novelty of the study consists in highlighting the importance of MT integration in achieving academic learning activity.

Keywords: *benefits; content analysis; difficulties; mobile technology; learning; students;*

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1. Introduction

Mobile learning has penetrated the lives of teachers and students so quickly that there was no time to investigate the implications of using it. The subject of our research is a relatively recent branch of pedagogical sciences. It has long been considered that students can learn anything anyway as they are in adulthood and have achieved a very good degree of intellectual capacity development. It is an environment that contains a blend of Internet and mobile technologies which enhance student-tutor and student-student communication through multiple media channels, providing responsiveness, customizability and flexibility to adapt and be adapted to the students' needs (Andone et al., 2007, p. 41). Only in this way can we sketch more clearly how a learning environment for students should be constructed and used.

For Jeng et al. (2010, p. 6), mobile learning includes portable technologies and mobile contexts in a mobile learning society. In relation to education, the concepts of the mobile and ubiquitous learning appeared strongly interconnected. McConatha & Praul (2008) has defined M-learning as the learning that is employed using small computing mobile devices. A number of specialists have already come to some findings on Mobile Learning. Different researchers (Gikas & Grant, 2013; Jeng et al., 2010; Ozdamli & Cavus, 2011) have identified the traits of mobile learning: distributed and ubiquitous mobility (the students can be both in formal and informal contexts, both in class/school and elsewhere), context aware and authentic (it takes place in the environment corresponding to the learning materials, providing students with very relevant examples), blended, private, interactive, spontaneous, collaborative.

In Romania, educational technology has been and still is locked in the computer lab. Students arrive there only if they have classes, especially at certain disciplines (Informatics and Information and Communication Technologies). By contrast, mobile technology is quickly accessible to all, so there can be no teacher's monopoly on this communication and learning tool. Knowing the students' perception of MT's benefits and obstacles is particularly useful on several levels: on the development of the educational software for higher education, at the level of the didactic design, and the student assessment.

A very strong reason for addressing such a topic comes from the need for a fundamental change related to the methodology of teaching in universities (Averina & Hlebova, 2022). Romanian teachers in higher education use magister-centered strategies, where students are passive

recipients. It seems, however, that also in other cultural spaces the researchers support the same thing. Despite efforts for methodological renewal, didactic lecture or teacher-centered presentation is still the standard method of teaching in higher education (Senge et al., 2000; Wang et al., 2009). Mobile technologies have the potential to offer this innovation in terms of teaching methodology in the academic environment. The students expect more innovative ways of interacting with teachers in classes in this knowledge society. It is necessary for the teacher to move from his traditional role of transmitter of knowledge to a role according to the society of knowledge, that of manager of learning (Badley & Habeshaw, 1991). In this quality, the university teacher must become computer literate himself, because he must have some understanding of the new technology not in a technical sense but as someone who will be able to manage it comfortably as a resource for learning and teaching.

Given the increasing interest in using new technologies in higher education, there have been carried out different studies on students' perceptions toward mobile learning. Research has highlighted both the positive and negative facets of mobile technology use in higher education. Andone et al. (2007) used online survey, focus groups, interviews and observations of students in universities from the UK, Romania, Finland and Hungary, in traditional and online learning environments. They identified "the digitally-minded students" who have a strong need for control over the digital environment. Wang et al. (2009) present the results of some researchers from China who developed a cutting-edge mobile learning system that can deliver live broadcasts of real-time classroom teaching to students. In this case, students changed from passive learners to truly engaged learners who are intellectually, emotionally involved in their tasks. A survey achieved by the Educause Centre for Applied Research (2012) on the usage of mobile technology in the higher educational environments indicated that students are currently leading the implementation of mobile technological devices into their classrooms.

In Romania there are few pedagogical researches aimed at mobile learning in universities (Danciu & Grosseck, 2011; Teodorescu, 2015), even though as everywhere in the world students make full use of this resource. According to the study results (Teodorescu, 2015), 65% of Romanian students mentioned that they possess more than one mobile device, laptops and smartphones being the most popular (laptop - 76%; smartphone - 70%; tablet - 25%; and other devices - 9%), and 80% of respondents have an internet connection for the devices they use. The main purpose of using mobile devices is to access and share information (95%). The empirical part is limited

to Romanian universities, but observations are probably valid for other countries as well.

Many studies on mobile technologies have emphasized their function of rapidly disseminating information between students and teachers (transmission model of teaching). Referring to this aspect, Pimmer et al. (2016) claim that mobile learning projects predominantly take instructionist approaches, they are non-transformatory in nature. We want to go beyond this stage, insisting on the use of mobile technologies in support of authentic learning, in which the teacher and students are an integral part of a significant social and cognitive exchange. To achieve this, it is important to have a realistic and balanced picture of what mobile learning offers for higher education.

The following research questions were developed to address the purpose of the research: a) What are the benefits of mobile technologies in learning?; b) What are the problems that you have encountered while using mobile technologies for studying?.

2. Methodology

2.1. Participants

The research group consists of 575 students from the "Vasile Alecsandri" University of Bacau from Romania. The students who participated in the research were the ones who agreed to complete the questionnaire. Out of the total participants, 43 did not complete the questionnaire with the answers to the two open questions. Therefore, the questionnaires of the respondents were excluded and there was interpreted the data from the 532 students who completed the questionnaire.

Depending on the independent variables, the lot is divided into different categories (Table 1).

Table 1. Distribution of participants according to independent variables

Independent variables	Categories
gender	423 female and 152 male
residence environment	359 from urban environment and 216 from rural environment
year of study	305 from the first year, 210 from the second year and 60 from the third year

age	471 with ages between 19 and 34 years and 104 with ages between 35 and 50 years	
specialization	99 - Philology 115 - Education Science 62 – Engineering 79 - Physical Education 38 - Physical Therapy	39 - Mathematics 33 -Informatics 65 - Biology 45 - Economics
level of education	376 undergraduate students, 185 masters and 14 PhD students	

Source: authors own conception

2.2. Research instrument

The method used to explore the students' perceptions regarding the benefits and obstacles of mobile technologies was the questionnaire. The questionnaire was structured into two sections: the first part which includes 10 closed items after Al-Emran et al. (2016) to investigate the students' attitudes towards the use of mobile learning in higher education, and the second part which is based on the open questions to identify the students' perceptions regarding their benefits and obstacles. In this study, there are presented only the results from the second part of the questionnaire.

2.3. Data collection

The implementation of the questionnaire consisted of completing the headings for each item. Participants were given the time to complete the scale because of their detailed analysis.

2.4. Data Analysis

All statistical analyses were conducted using the SPSS version 21.0 for Windows (IBM SPSS Statistics). The frequencies on student responses addressing the benefits and obstacles of mobile technologies have been summarized using descriptive statistics. The responses were analysed by using content analysis. The specific steps used are the following (Schreier, 2014): data preparation, building coding frame, segmentation, trial coding, evaluating and modifying the coding frame, main analysis, presenting the findings. In the data interpretation, there was exploited a complex model of the content analysis developed by Square and Denizli (2018). The model provides clear milestones for carrying out a pertinent analysis.

2.5. Ethical considerations

Students' consent was required to complete the questionnaire. They read all the information at the beginning of the questionnaire, after which they agreed to continue. Students were informed of their right to withdraw from the survey at any time.

3. Results

3.1. Benefits of mobile technologies

The results are presented in close connection with the two components of the study: on the one hand, the main categories on the benefits of mobile technologies are analysed and, on the other hand, those related to the obstacles they pose. The content analysis of the study indicated six main categories in terms of benefits of mobile technologies (Table 2): technological advantages, information using mobile technologies, efficient communication, opportunities for educational process, personal development, facilities at the economic and environmental level.

Table 2. The categories, themes, codes, and frequencies for the component the benefits of MT

Categories, themes, codes	Respondents
A. Technological advantages	*458*
- fast access	172
- accessibility of use	171
- easy access to information	58
- technological utilities	57
B. Efficient communication and interaction	*284*
- communication opportunities	77
- transmission and distribution of information	69
- communicating with group members	66
- fast communication	26
- communication with teachers	24
- communicating with people at a distance	21
- initiating international partnerships	1
C. Information using MT	*274*
- access to information	172
- variety of information	54
- up-to-date information	20
- quality information	15
- large amount of information	8
- accessibility of information	5

D. Opportunities for educational process	*220*
- effective learning	163
- interactive teaching	45
- assessing knowledge and feedback	12
E. Personal development	*91*
- optimizing personal time	40
- moral and social development	29
- development of cognitive processes	13
- development of regulatory processes	7
- opportunities to present the personal experience	2
- respect for private life	1
F. Facilities at the economic and environmental level	*20*
- economic advantages	18
- ecological advantages	2

Source: authors own conception

A. Technological advantages

Four themes resulted to describe the technological advantages. Most students (n=172) believe that mobile technologies provide quick access to information, namely accessing resources in a short time. The accessibility of use is another topic frequently mentioned by many students (n=171). This refers to accessing study materials from anywhere and at any time, in a simple, practical, friendly and accessible way to anyone at any age, with little effort. Easy access to information was indicated by students (n=58) to highlight MT's usefulness to provide resources for study, access to the internet for explanation of unknown terms, facilitating access to courses, discovery of necessary information. Technological utilities are multiple in the students' perspective (n=57): accessing PDF materials, portability, finding electronic courses, using video, accessing the Internet, storing information quickly, accessing multiple pages at once, providing a large storage space, reading an online book, then, application management, portability, information sharing, quick connection to information, application usability, successful computer replacement, unlimited access, on-line courses, easier materials maintenance, variety of websites information, multifunctionality (audio, video, writing), quick search for information, installation of various useful alliances, safe keeping of information, electronic library, user-friendly technology towards classic books.

B. Efficient communication and interaction

At the level of this category, seven priority themes were identified. The theme that has been the most frequent among participants' answers (n=77) was communication opportunities, with a focus on the development

of communication skills. Also, a common theme indicated by students (n=69) was the transmission and distribution of information as a result of the efficiency of the MT in the exchange of materials and the correspondence. Communicating with group members represents another theme relevant at the level of students' perception (n=66). This facilitates communication with members of a study group, with colleagues. Other topics mentioned by students in terms of effective communication with mobile technologies are: development of social relations (n=28), fast communication (n=26), communication with teachers (n=24), communicating with people at a distance (n=21), initiating international partnerships (n=1).

C. Information using mobile technologies

Six themes have been included at the level of this category. Most students (n=172) consider that mobile technologies provide access to information. The variety of information is another topic frequently mentioned by many students (n=54). Along with these themes, there are others with lower frequency in terms of information using mobile technologies: up-to-date information (n=20), quality information (n=15), large amount of information (n=8), accessibility of information (n=5).

D. Opportunities for educational process

Three basic themes have been established within this category, depending on the elements of the learning process: learning, teaching, evaluation. Effective learning with MT is a theme with frequent occurrence among student responses (n=163). Learning opportunities are diverse: intensive training, assimilation of useful information, understanding new concepts, developing learning abilities, applying knowledge, quick learning with forms, images, individual study, attractive learning, learning flexibility, learning through the game, collaborative learning, conscious learning with the help of explanations and images, increasing the efficiency of learning activity, access to solving methods, the usefulness of updating information, deepening of knowledge, providing visual demonstrations. Another topic found in the students' answers (n=45) is interactive teaching, which refers to the interactive approach of content, the rapid activation of students, interactive lessons, interactive and educational games and applications, the access to modern methods. The third theme is found less frequently in student responses (n=12), namely assessing knowledge and feedback.

E. Personal development

At the level of this category, six priority themes were included. Optimizing personal time represents an important theme in the perception of students (n=40), as MT ensures efficient capitalization and efficient use of

time. Also, the students consider that MT contribute to the cognitive development (n=13), motivation development (n=7) and moral development (n=1). Other opportunities for personal development of TH are opportunities to present the personal experience (n=2) and respect for private life (n=1).

F. Facilities at the economic and environmental level

Two themes have been integrated at the level of this category. The first is about economic advantages (n=18), which aim at reducing the cost of courses, facilitating e-commerce, free access to resources, saving financial resources. The second theme refers to the ecological benefits (n=2), which consists in saving paper and nature, in general.

3.2. Difficulties of integrating mobile technologies

The content analysis of the study indicated six main categories related to the obstacles of mobile technologies: negative influence on personal development, technological difficulties, damaged information, diminishing communication and socialization abilities, the negative effects on the educational process, economic, ecological and ethical disadvantages. The categories, themes, codes, and frequencies of the study are presented in Table 3.

Table 3. The categories, themes, codes, and frequencies for the component the difficulties of MT

Categories, themes, codes	Respondents
A. Negative influence on personal development	*308*
- health problems	104
- distraction	69
- lack of time organization	69
- lack of effort and guidance	20
- affecting cognitive development	16
- virtual character	12
- affecting the development of creativity	9
- sedentarism	7
- negative attitudes	8
- affecting the development of affectivity and motivation	6
B. Technological difficulties	*230*
- dependence on technology	136
- different technological issues	77
- lack of access to modern technology for some people	6
- lack of the skill to operate with mobile technology	6
- the existence of disturbing factors and some prejudices about MT	5
C. Damaged information	*184*
- poor quality of information	167

- large amount of information	12
- the low level of information usefulness	5
D. Negative effects on the educational process	*138*
- affecting the learning process	118
- affecting the teaching activity	19
- affecting the evaluation	1
E. Diminishing communication and socialization abilities	*83*
- affecting social relations	50
- communication problems	34
F. Economic, ecological and ethical disadvantages	*61*
- ethical issues	30
- economic disadvantages	25
- ecological problems	6

Source: authors own conception

A. Negative influence on personal development

At the level of this category, nine themes were identified. The theme that has been the most frequent among participants' answers (n=104) was health problems. The use of MT can cause eye problems, physical and mental fatigue, mental exhaustion, impairment of brain activity, radiation on the body, nervousness, stress, spine disorders, altered articulation in the wrong position, insomnia, headache. Distraction is a frequent theme indicated by students (n=69), as well as lack of time organization (n=69). Other topics mentioned by students in terms of negative influence on personal development are: lack of effort and guidance (n=20), negative impact on cognitive development (n=16), virtual character (n=12), affecting the development of creativity (n=9), sedentary (n=7), negative attitudes (n=8) and affecting the development of affectivity and motivation (n=6).

B. Technological difficulties

Five themes have been integrated at the level of this category. Most students (n=136) consider that M-learning determine dependence on technology, characterized by excessive use and exaggerated exposure to the virtual environment. Another theme indicated by students refers to different technological issues (n=73): internet connection, contacting viruses, limited device battery, lack of permanent connection, loss of data storage device, dependence on power supplies, access blocking, fast mobile technology aging, loss of materials, technology failure, small storage space, device degradation, hardware incompatibility, low screen size, fragility. The students have also mentioned such topics as lack of access to modern technology for some people (n=6), lack of the skill to operate with mobile technology (n=6) and the existence of disturbing factors and some prejudices about MT (5).

C. Damaged information

At the level of this category, three themes were included. The theme that has been the most frequent among participants' answers (n=167) was poor quality of information. The use of MT implies access to erroneous, invalid, scientific, false, vague, general, distorted, incomplete, unclear, summarised information, from unverified and unsafe sources. Other topics found in the students' answers are the large amount of information (n=12) and the low level of information usefulness (n=5).

D. Negative effects on the educational process

Three basic themes have been established within this category. Affecting the learning process is a theme with frequent occurrence at student replies (n=118). This is reflected by aspects such as: distracting from the study, encouraging superficiality in the study, allocating more time to using technology than to learning, lowering one's learning capacity, mechanically taking information, less interest in learning, diminishing the ability to apply information, diminishing the ability to search for information in books, failure to study, loss of motivation for individual study, deviation of learning to loisir, lack of rigor in the use of sources. Unlike the negative effects on learning, the topics related to affecting the teaching activity (n=19) and affecting the evaluation (n=1) are less common.

E. Diminishing communication and socialization abilities

Two themes have been integrated at the level of this category. The first refers to affecting social relations (n=49), which is reproduced by such aspects as isolation from the world, virtual autism, internalization, diminishing human and social relationships, depression, lack of collaboration, self-closing, technology of social life, internalization, diminishing human interaction, negative influences, relationships with unknown people, indirect socialization, contact with dangerous people, incitement to violence. The second theme refers to communication problems (n=34), namely lack of communication with others, superficial communication, lack of communication between colleagues.

F. Economic, ecological and ethical disadvantages

At the level of this category, three themes were included. Ethical issues represent an important obstacle of using MT in the perception of students (n=30), alongside ecological problems (n=26) and economic difficulties (n=6).

4. Discussions

The purpose of this study was to examine students' perceptions regarding the benefits and obstacles of mobile learning technologies. The results of the research have led to highlighting some main categories of themes at the level of the two components. Within each category, concrete themes are integrated that allow a detailed understanding of how new technologies can be successfully integrated into higher education. The novelty elements of the study are highlighted by the concrete topics resulting from the research on the benefits and difficulties of using mobile technologies by students.

Referring to the benefits of mobile technologies, there are studies that have reached similar results to those in the present study. The studies based on determining the technological advantages of these tools obtained the same results (Jones & Issroff, 2007; Blackwell, 2014). Efficient communication with MT has often been highlighted in studies in this field (Mehdipour & Zerehkafi, 2013; Pimmer et al., 2013). Also, information using mobile technologies constitutes another important benefit in different studies (Montrieux et al., 2015). A part of the research is also centred on opportunities for mobile technologies for the educational process (Cochrane, 2010; Mu & Paparas, 2015). Even though in the present study, the benefits of personal development are less indicated by students, these are found in other studies (Morris et al., 2016; Montrieux et al., 2015). Finally, economic benefits are highlighted in other studies in relation to mobile technologies (Asabere, 2013). Capturing MT benefits is appropriate for knowing the needs of academic education recipients. According with the results of qualitative research achieved by Khan et al. (2019), university students perceived five qualitatively different ways of using mobile devices in their learning: for communication, for management of learning materials, for effective learning, for collaborative learning and for development of new ideas.

In terms of the obstacles involved in the use of M learning, there are studies with results similar to those in the present study. Other studies have resulted in findings on the technological difficulties related to MT (Asabere, 2013; Montrieux et al., 2015). At the same time, much of the research has revealed the implications of various issues of using MT upon educational process (Blackwell, 2014; Dias & Victor, 2017). The economic difficulties are highlighted in other studies on mobile technologies (Mehdipour & Zerehkafi, 2013). Studying obstacles at the level of students' perceptions helps teachers from higher education know the problems they can prevent when using mobile technology in the teaching-learning activity.

5. Conclusions

The present study represents a new theoretical and methodological approach regarding the students' perception of the use of mobile technologies in academic activities. Unlike previous studies, the present one provides a qualitative analysis of the data obtained through the open questionnaire. The novelty element consists in grouping the benefits and obstacles of MT into thematic categories. Therefore, there is a systematized vision of the advantages and disadvantages it poses to mobile technologies. Based on the content analysis, the main categories referring to the benefits and obstacles of using M-learning were identified. In terms of benefits of mobile technologies, there were established the following categories: technological advantages, information on using mobile technologies, efficient communication, opportunities for the educational process, personal development, facilities at the economic and environmental level. Regarding the obstacles of mobile technologies, there were found the categories: negative influence on personal development, technological difficulties, damaged information, diminishing communication and socialization abilities, the negative effects on the educational process, economic, ecological and ethical disadvantages. Exploring students' perceptions towards the advantages and disadvantages of mobile technologies is necessary in the dynamic context of increasingly frequent use by students in the learning activity.

6. Limitations and future work

The results should be viewed considering some limitations. The sample size in this study is relatively small and includes students at a small state university. Students' perceptions at "Vasile Alecsandri" University of Bacău may differ from those of other students who study at other state/private universities in Romania or in other countries. Consequently, the results may not be identical if generalized beyond a similar situation. The future research may extend the study to integrate comparative analysis between perception of students from different universities at international level.

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