The Integration of New Technologies in the Geography Lessons

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Abstract: The new technologies have become indispensable in the pupils' lives, influencing their development at academic and personal levels. It is evident that their use in education is going to change the way of teaching, learning, and assessment. Geography lessons are much more interactive when new technologies are integrated into the curriculum. In this article, we describe a study regarding the integration of new technologies in geography lessons. In the study 250 people - 73 teachers and 177 pupils, from schools and high schools in Romania, both rural and urban areas participated. The research is based on the application of questionnaires and interviews with teachers as well as to pupils from different schools. As a result of this research, it was concluded that the use of new technologies in geography lessons is important because it helps the formation and consolidation of the knowledge of the children; pupils understand the information more quickly and easily; lessons are interactive and pupils' motivation for learning is higher.

Keywords: *New technologies, Integration of new technologies in learning, Geography, school, motivation.*

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1. Introduction

In recent decades, we have witnessed an accelerated pace of progress that has transformed an industrial society into a predominantly IT one. The evolution of technology has left its mark on all subsystems of society, including education. The new technologies have become indispensable in the pupils' lives, influencing not only their development at the academic level but also at the personal level, being evident that their use in education is about to change the way of teaching, learning, and assessment. The use of new technologies in teaching activities, in general, and in the geography lesson, in particular, is a preferred means of education for children because it is much more lively, creative, interactive, and much more attractive than teaching with the help of classical means.

The purpose of this study is to investigate the perceptions of the teachers and pupils on new technologies could be better used in Geography lessons in several schools and high schools in Dâmbovită County, România. The emphasis is on describing how pupils can be motivated in learning due to the use of new technologies in geography classes.

2. Literature review

New technologies are the main pawns of education. This does not mean that technology taken separately will improve learning. The important thing is the way of integrating them into the educational process, according to the strategies used, the learning objectives, and the methods necessary for quality education (Chicu, 2018).

Digital natives (Prensky, 2001) who belong to the current generation of students perceive information much better if new technologies are used in the educational process (Chicu, 2018). Thus, in order to facilitate learning and access to information, most teaching-learning-assessment activities need to be based on the use of new technologies. The studies highlight that, although pupils use new technologies to be informed, they do not really have the skills and abilities needed to process and evaluate information (Ferreira et al., 2015). Among the eight key competencies defined by the European Framework of Reference for Lifelong Key Competencies (European Commission, 2018) is digital competence, which has become indispensable for the personal development of young people and professional progress in order to successfully integrate into society.

At the European level (European Commission, 2011; European Parliament, 2015) the new technologies are promoted as a teaching and

learning tool, helping to increase pupils' motivation for learning, with multiple benefits on personalized learning and a real benefit in acquiring specific key competencies across disciplines, cross-curricular or transversal. The same document highlights the fact that there are problems related to the infrastructure of new technologies in certain countries in Europe including Romania, which indicates that access to education is different.

New technologies are an integral part of geography lessons and in the opinion of specialists in the field are excellent means of learning very helpful for both teachers and pupils (UNESCO, 2014). In teaching geography lessons, teachers are the key factor in choosing the best resources at the most appropriate times of the lesson, both in teaching and in learning or assessment (Wakhungu & Omoro, 2013).

At international level there are some studies similar with ours (Nikolopoulou & Gialamas, 2016). However, there are not many researches similar with ours, being place for more research in this domain. This is even more true in Romania. Below we outline some similar research from Romania.

In a study conducted on teachers and students in Romania, on the integration of ICT in education (Făt et al., 2009) were highlighted some information that are relevant to our study. Thus, Geography is one of the disciplines in which new technologies are used (50%) and the computer is welcome in the classroom because it contributes to a better understanding of the surrounding reality. Last but not least, pupils have only benefits in learning: the interest in learning increases; increase the frequency per hour; teamwork is stimulated; school results are improved.

It is already a well-known fact that training with the help of new technologies is interactive and allows differentiated work with all categories of pupils, respecting their learning pace and age peculiarities (Logofătu, 2008). In general, learning activities based on new technologies have a higher degree of visual attraction for students, especially at geography lessons, the amount of information presented in a short time is much higher, and the monitoring and evaluation of learning outcomes are fast. Computer games can be used as an ICT tool in formal learning environments to support students in effective geography learning (Tüzün et al., 2009). Also, in geography, video games or online applications, which represent people, places, and concepts, are useful means for successful learning, both for middle school and high school (Ash & Gallacher, 2011).

As we see above there are some international studies regarding the use of new technologies in education. However, in Romania, there are not so many studies. Through the current article, we fill this gap by presenting a

study regarding the use of new technologies in the Romanian educational process.

3. Problem Statement

In the Romanian education system, there are many steps taken in the right direction in terms of introducing new technologies and implementing them in the educational process (Balica et al., 2018). Thus, the Law of National Education (Romanian Parliament, 2011) considers it necessary to develop digital skills for both teachers and pupils. Also, the framework plan for secondary education (Ministry of National Education and Scientific Research (2016) from 2016, consists of two compulsory subjects (ICT and Informatics) and teachers participate in training courses with transferable credits in the field of digital literacy.

Although there are well-defined measures, at the national level, in order to integrate new technologies in the educational process, there are some dysfunctions (Balica et al., 2018; Onofrei, 2016). Thus, the main problem is the unequal distribution of resources needed to integrate new technologies in the classroom. The differences between rural and urban schools are still quite significant. Some schools do not yet have such equipment. For example, in urban areas, 20% of classes are equipped with video projectors, while only 3% of classes in rural areas have such equipment (Onofrei, 2016). Also, approximately 40% of schools in Romania have insufficient income to optimize learning (Balica et al., 2018). These differences present serious difficulties in providing equal opportunities for students. Even though the European Union considers ICT to be an important source for poverty reduction (European Parliament, 2015), in countries such as Romania, the discrepancy between urban and rural areas is very large when it comes to acquiring new technologies and using them in the classroom, including geography classes.

There is no clear monitoring of how to implement new technologies in the classroom (Balica et al., 2018). The lack of monitoring results in differences in the quality implementation of new technologies in rural and urban areas. Moreover, the examples of good practices in the integration of new technologies are limited, which is why the present research is intended to be a novelty in this field.

Teachers participate in training courses, in principle, for digital literacy but less for techno-pedagogical training (Onofrei, 2016). Both in secondary and high schools, teachers in Romania, use, in geography lessons, different technologies such as computer, online applications, AeL Platform,

Intuitext interactive lessons or various dictionaries, and encyclopedias such as Encarta. Students are the beneficiaries of these resources that make the lessons attractive and creative (Miron, 2013).

4. Research questions/Aims of the research

The purpose of this study is to investigate how teachers and pupils capitalize on new technologies in Geography lessons in several schools and high schools in Dâmbovița County, România. The emphasis is on describing how pupils can be motivated in learning due to the use of new technologies in geography classes. Also, the study aims to examine the degree of new technologies used in both urban and rural schools. In this study we have used some objectives: to examine how teachers integrate new technologies in geography classes; to highlight the main technologies used by teachers in geography classes, both in middle school and high school, rural and urban areas; to describe the main advantages and disadvantages of using new technologies in geography lessons, elements that can be taken into account when designing lessons or evaluating student results.

5. Research Methods

In this research, we used both quantitative and qualitative methods. The research tools were: two questionnaires surveys and two semi-structured individual interviews. The questionnaires surveys were applied both to teachers and pupils from secondary and high schools, in Dâmbovița county. Also, the two semi-structured individual interviews were applied both to teachers and pupils from secondary and high schools.

One of the tools used in this research was a questionnaire addressed to geography teachers with items related to the types of educational technologies used by teachers in their classes; the advantages and disadvantages of using new technologies in the educational process; ways and situations in which teachers use new technologies in the classroom and personal study; the infrastructure of schools regarding new technologies. Another tool was the questionnaire addressed to pupils with their specific items, such as ways to use new technologies in geography classroom but also to prepare their homework; their points of view on how teachers manage, through new technologies, to motivate them in learning.

In addition to questionnaires, we developed two interview guides, one for teachers and one for pupils. We used the interview where the teachers and pupils could express their personal opinions regarding the integrating of new technologies in geography lessons. The interview

addressed to the pupils deepened and detailed the questions from the pupils' questionnaire. In the interview addressed to the teachers, some ideas were followed, namely: the new technologies and online resources that teachers use to inform themselves when preparing for teaching/evaluation; software/games used in geography classroom; participation of teachers in training courses in the field of new technologies; motivating pupils in learning through new technologies.

The research was done from January to May 2019.

6. Sampling

The sample consisted of **250 respondents** from high schools and secondary schools, from rural and urban areas in Dâmbovița county, Romania. We used *snowball sampling*. There were 73 teachers and 177 pupils, both from rural and urban areas.

The research participants gave their consent to participate in the study being informed about the possibility of withdrawal, without other consequences on their status. They were also informed about the confidentiality of their answers through a message written in the first part of the questionnaire and the interview. We mentioned in the research tools that at the end of the personal data processing operations, the answers will be transformed into anonymous data and stored exclusively for statistical purposes of scientific research.

7. Findings and discussions

7.1. Advantages and disadvantages of using ICT in Geography lessons

According to the opinions of the teachers from the survey and interview, there are some advantages and disadvantages of using ICT in the activities carried out for Geography lessons:

- ❖ The new technologies facilitate the understanding of new notions - which pupils usually find more difficult to understand. This is possible, in particular, because new technologies offer both visual and auditory support in learning and make possible more interactivity in the discipline of Geography. Pupils listen not only to the information they need to remember but through certain educational software they have the opportunity to discover some aspects for themselves and to intervene in the learning process;
- ❖ New technologies used in learning help to consolidate information in geography. Theoretical information is not enough for learning, and pupils need situations in which to apply the knowledge they have

learned. For example, software such as SeTerra can be used very well to acquire knowledge about countries and capitals or different forms of relief and climate. Therefore, most educational games, specific to the Geography discipline, contain a whole series of exercises through which pupils fix their knowledge;

- ❖ The use of new technologies in the classroom makes it possible to model and simulate phenomena that cannot be observed in reality. The new technologies can make it easier to understand processes or phenomena that cannot be viewed in real-time. Also, pupils can redo anytime and whenever they want Geography-specific activities or view multimedia animations and simulate various natural phenomena.

The use of new technologies in Geography lessons also has disadvantages:

- ❖ Participants in our research believe that excessive use of new technologies can make somebody to be dependent on Internet sources. Pupils tend to use a computer for each activity they have to do for Geography and, sometimes, to use the new technologies information, without going through the filter of their thinking;
- ❖ Another possible disadvantage is the decrease of interest in consulting sources of information in physical format - the hours in which Geography lessons can be made in nature, for example;
- ❖ Teachers pointed out that pupils in research schools have a certain passivity in thinking, determined by the fact that, through new technologies, information is only provided to pupils and that they are no longer challenged to discover it themselves. The interviewed teachers consider that this, however, is not a real disadvantage but rather depends on the ability of teachers to make the teaching method (use of technology in the class) a success. Any material, regardless of the way it is taught to pupils, can be assimilated by them as a theoretical content "beautifully packaged" or as a first step towards discovering new information.

Thus, in the opinions of teachers and pupils, new technologies are very useful for teaching aids for both educators and educated persons, with their advantages and disadvantages. Their use must be done in such a way to qualitatively improve the educational process.

7.2. The use of new technologies in the educational process in the discipline of Geography

New technologies can be used both in geography lesson design activities, in the teaching process, and learning and assessment activities. Thus, the surveyed teachers use ICT in a proportion of over 80%, in the teaching-evaluation process but also during the preparation of new lessons.

It was found that 78% of the surveyed teachers constantly use new technologies in the classroom while 22% do not use it or use it rarely. Although schools or high schools in urban areas are equipped with new technologies, some teachers prefer the traditional way of teaching the subject of Geography. There is still a lot of reluctance, especially among older teachers regarding the modern approach to learning content even if there are technologies that could be used.

Pupils, on the other hand, use the computer/Internet/ educational software frequently when looking for information on various topics (61%) and when preparing for the next lesson (26%). Pupils who use computers, the Internet, and/or educational software are almost unanimously from the urban environment. In rural areas, however, students (50%) do not have enough computerized technologies to be used for learning. Again, we notice the differences in infrastructure between the two environments, the urban and the rural. We found that neither schools nor families offer all children the new technologies necessary for learning, in all subjects, including Geography lessons.

The surveyed teachers (98%) consider that the success of an activity is conditioned by the means used. The efficiency of teaching aids in Geography classes depends on how they are related to the operational objectives, to the content that is transmitted to the pupils, and, last but not least, to the methods and procedures used in the learning activities.

Thus, among the teachers surveyed, 89% agree that any information, introduced and/or consolidated with the help of new technologies, in Geography class, is more easily accessible to pupils and makes the educational process much more efficient (Figure 1).

Figure 1. Teachers' feedback considering on how effective new technologies are in geography lessons

7.3. Motivation of pupils regarding the use of new technologies

The use of new technologies in teaching activities is appreciated by pupils: 77% being more interested in school because of this, 68% of pupils discover learning differently and 60% believe that they have better school results. Thus, it is found that new technologies are more than beneficial to pupils in their learning and they are very necessary. Pupils are involved in classroom activities and the motivation to have good school performance is increased. The use of educational software for learning geography helps pupils to get better results; geography classes are more interesting and pupils more easily retain the information taught by the teacher. The pupils' answers show that they consider the use of new technologies are more suited for geography lessons (66%), history (44%), mathematics (50%), physics, and chemistry (40%). Lower percentages are given for the rest of the disciplines (Figure 2).

Figure 2. Pupils' feedback considering how appropriate are the new technologies for certain disciplines

The interviewed teachers think that the use of new technologies (educational software, online learning platforms, teaching games) in geography classes stimulates pupils' creativity, increases the interest in the understanding of the studied phenomena but, on the other hand, decreases the appetite for observations and field trips. Also, new technologies, used in appropriate conditions, develop all the psychic mechanisms involved in the act of knowledge: develop the skills and habits of the intellectual work. It is an important means of cognitive development that trains and enhances intellectual abilities.

7.4. Software and online resources used by teachers and pupils, in the Geography lessons

Regarding the educational software used by teachers in the instructional-educational process and online resources necessary for information for new geography lessons, it was found that 80% of teachers surveyed use educational software in Geography class. This shows us that the offer of educational software in Romania has sufficient resources for middle and high school education, and it is suitable for geography.

Analyzing the respondents' answers, it was found that the most used educational software and online resources, in Geography class, in middle school or high school is: Google Earth, Kahoot!, Seterra, Geografika, Intuitext geography lessons, OmniQuiz, Prezi, Geogra, HotPotatoes, Winschool, AEL, ArcGis, Encarta, etc. From these, for pupils, the most used for knowledge memorizing and assessment are Kahoot! (74%), Seterra (29%), Google Earth (27%), Intuitext (8%), and OmniQuiz (5%). Teachers have a similar opinion as to the pupils: they highlight the role and importance of new technologies in Geography lessons (Figure 3).

Figure 3. *Teachers' and pupils' feedback regarding the most used online software/applications in geography lessons*

Other applications used in geography classes are Toporopa, HotPotatoes, Prezi, AEL, PowerPoint, YouTube, Storybird, Google Maps, ArcGis, Winschool, Geophorya, Qgis, Encarta, etc. Also, teachers and pupils use the necessary links for the documentation but also teaching or evaluation. Of these, the most accessed sites are Didactic.ro, Youtube, Geogra.ro, Geophorya.weebly.com, Profudegeogra.ro, Descopera.ro, Terramagazin.ro.

To conclude, we can say that, in Geography classes (in middle school or high school), teachers and pupils alike are willing to use new technologies in all stages of a lesson.

7.5. Teacher training in the field of using new technologies for geography lessons

We considered it useful to know the opinions of teachers related to their training in the field of using new technologies for geography lessons. It was found that the interviewed teachers participated in various training courses in the field of new technologies use, such as INSAM, IntelTeach, AEL, Integration of new technologies in teaching-evaluation. The teachers consider that these courses responded to the training needs they had. The courses attended by the teachers were of real use. As a result, the teachers used more new technologies in their teaching activities. The teachers need courses based more on pedagogical elements that are used in integrating the new technologies into the educational process.

Conclusions

The use of new technologies and online resources in geography classes, both in middle school and high school, is influenced by their desire to make the lesson as attractive as possible but also depended on one's teaching experience. Similar studies emphasize this aspect (Nikolopoulou & Gialamas, 2016). The research indicated that teachers use new technologies and online resources both to search for information in order to prepare lessons and also to carry out other activities.

New technologies must be used in the classroom for the acquisition of knowledge and the formation of skills that allow the students to adapt to the requirements of a society in constant evolution. To achieve a quality education but also to obtain better results, it is necessary to use both the classical methods of teaching, learning, evaluation, and modern methods.

The use of new technologies in geography lessons is important because it helps to form and strengthen pupils' knowledge of reality; pupils

see geographical objects and phenomena with the help of teaching aids and understand them easier and faster; it creates a pleasant atmosphere in the classroom, the lessons become more dynamic. The students' interest in the lesson and for the geography discipline higher, because they are more motivated for learning. Last but not least, the use of new technologies in geography lessons contributes to the development of thinking and observation.

There are few studies related to the integration of new technologies in teaching geography lessons in Romania. This article made a brief x-ray of how new technologies are or could be integrated into geography lessons. Therefore, the results from this research reinforce the idea that new technologies exist in classrooms in geography class but mainly in urban areas. Some teachers make good use of these technologies, others are reluctant to do anything called technology and rural teachers would like to use such technologies but still can not talk about equal opportunities when compared to those from the urban environment.

However, the present research revealed that there are still differences between rural schools compared to urban ones. Students living in the city are more likely to use new technologies at home to prepare lessons as opposed to those in rural areas. It was found that 80% of teachers use educational software in the educational process which shows us that the offer of educational software is sufficient for middle and high school education. Similar results are founded in other countries (Zenelaj, 2013).

Most geography teachers had training regarding the use and integration of new technologies tools in the educational process. Although Romanian schools are equipped with computers, they should be used as often as possible in lessons (computers are still under-used). Teachers who do not know how to use the computer should have training courses such that they can use computers and educational software as often as possible in daily activities, thus facilitating the educational process. International studies show similar results, for example, some that highlight the usefulness of training geography teachers to use new technologies in the classroom (Mlambo et al., 2020; Latcha & Muniandyb, 2010).

Through the current article we presented a research regarding the use of new technologies in education, especially in geography lesson for secondary and high schools. As we mentioned in the problem statement section, the examples of good practices in the integration of new technologies are limited, which is why the present research is intended to be a novelty in this field. As noted there is some reported research in the existing literature regarding this topic at the international level, although

there is place for more, in Romania being few studies of this kind. We compared our findings with the ones from international community. As further work we intend to extend such studies to extra domains than literature, especially in the current context of Covid when work is going mostly online.

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