Open Data and E-learning

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There is no doubt that attention is moving from traditional learning to a modern way of learning, that of e-learning, who becomes more and more appreciated and whose benefits are getting acknowledged globally. The phenomenon of making data accessible to everyone is one of great importance to the process of gaining knowledge through information. The purpose of the paper is to present aspects regarding the concepts mentioned above and to analyze the behavior and needs of students based on a quantitative survey.
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1 Introduction

In a world where money is a constant preoccupation for people, the existence of open data can be seen as a blessing. As its main attribute is the free availability, the only limit against its usage is the imagination. The Open Knowledge International, formerly known as Open Knowledge Foundation [1], considers that "A piece of data is open if anyone is free to use, reuse, and redistribute it – subject only, at most, to the requirement to attribute and/or share-alike."

Data can be found at the base of the Data-Information-Knowledge pyramid and it is the first requirement to obtain knowledge. While local governments, researchers or other organizations are a source of open data by making it available, it is due to pedagogical context that these datasets become Open Education Resources used to gain knowledge.

The permanent progress observed in communication technologies and information results in the evolution of educational system and in the exponential development of e-learning. A part of e-learning that is rapidly growing in popularity is mobile learning whose defining attribute, mobility, is beyond dispute. The number of mobile learning applications is increasing with a high rate: by the end of 2012, the iTunes App store listed 259,763 mobile applications having the primary category "Education", accounting for 8.47% of all applications available [2].

The fact that people find themselves in a lack of time and the society that we are part of is one of speed and movement lead to mobile devices becoming the modern human being's "best" friend. The availability and access of open data together with the progress of mobile technologies make the development of educational mobile applications an aspect of e-learning worth paying a big importance to.

Data provided by our government on its website data.gov.ro can be easily integrated into a mobile application focusing on subjects like statistics and economics. There are more than 900 datasets to be found in formats like xls, xml or cvs that can be used as a source of information to create a mobile designed course. The project team believes that students would find it easier to understand the principles of these domains by having permanent access to an interactive application that logically presents formulas and interpretations of real data such as the evolution of population or sales. Not only would it be more comfortable to open the app and study a little wherever they are, but students can also become more aware of what is happing to the society they are part of.

Therefore, the purpose of the present article is to analyze the benefits of open data and e-learning and how students' needs and opinions regarding the act of teaching and learning can be taken into account by providing them with mobile applications that use open data in order to obtain information and knowledge by giving interpretations and value to this data.

2 Literature Review

In the attempt to define the meaning of openness, researchers undertook different approaches. Wiley, in his review "Openness as catalyst for an educational reformation", suggests that the cost and the copyright licensing and related permissions are the primary aspects of this term. He sees an open resource as one that enables users to engage in the "4R" activities: *Reuse, revise, remix* and *redistribute* the content [3].

However, Wenk, in his article "Open educational resources (OER) inspire teaching and learning" [4], borrows the definition that FreedomDefined.org is putting forward which implies that "works of authorship should be free, and by freedom we mean:

- the freedom to use the work and enjoy the benefits of using it;
- the freedom to study the work and to apply knowledge acquired from it;
- the freedom to make and redistribute copies, in whole or in part, of the information or expression;
- the freedom to make changes and improvements, and to distribute derivative works."

No matter the angle, both authors' approaches emphasize the fact that open licenses are a critical component of open educational resources.

Although there is no doubt that the benefits of open data are countless, Ariel Smilowitz, who is a Global Health Consultant, observes a lack of interest in this subject among people caused either because the institutional distrust, either because they do not entirely understand what open data represents and how it can be made use of it. In her article "Unlocking the Benefits of Open Data", the author suggests that involving young people in "open data youth hubs" would increase the knowledge about open data and make this notion more user-friendly [5]. This way of thinking is similar to that of Javiera Atenas & Leo Havemann who believe that by making students part of case studies where they use the data provided by the governments, they can analyze, review and evaluate the information, thus becoming engaged citizens, contributing to the society and more aware of the surroundings.

Regarding the concept of e-learning, in 1998, McKenzie noted that machineries and computers will change the way teaching and learning take place. He points out that not accepting the evolution of technology would be a big disadvantage for both students and teachers [6]. In another train of thoughts, Hall and Snider are defining e-learning as the process of learning via computers [7]. However, in the same year, Urdan and Weggen claimed that online learning is just one part of e-Learning and to deepen the studies, the internet should be blended with classrooms [8]. Similarly, Carry and Willis state that the terminology of e-learning is closely related to all types of learning that uses a technological network or computer for collaboration, intercommunication or delivery [9].

Some people would think that e-Learning will damage the original and traditional path towards research and study, but it certainly brings lots of benefits. The understanding of this type of learning can be easy, because nowadays, everybody has internet access. It reduces costs, it saves time and it can be encountered not only on a personal computer, but also on a smartphone or tablet. For example, according to www.kineo.com, the M&S chain store saved £500k in just a year and improved customer service by 22% by using e-Learning [10].

An advantage is that online learning assures that you are in sync with everything and you receive the content you want, whenever you want. According to M.J Rosenberg [11] and Brandon Hall [12] e-Learning reduces the study time by 25-60%, compared to the traditional learning. Therefore, there is no doubt that the quality of teaching and learning can be enormously augmented by adopting technology and make use of open data.

3 Research Method and Instrument. Findings.

In order to see whether implementations of mobile learning would be appropriate and welcomed among students studying at the Bucharest University of Economic Studies, a

quantitative online survey was developed. Its purpose is to provide the project team with information about the usage of devices such as computers or telephones, what students' opinion on the way teaching is done is and how an ideal educational environment would look like.

The final sample of participants consisted of 50 students, 40 on-campus students and 10 students involved in distance learning, more females than males, the age range between 20 and 28 with a mean age of 24.5. Most of the students that responded to the survey are employed, working at least 4 hours a day. The characteristics of the sample are presented graphically in Figure 1.

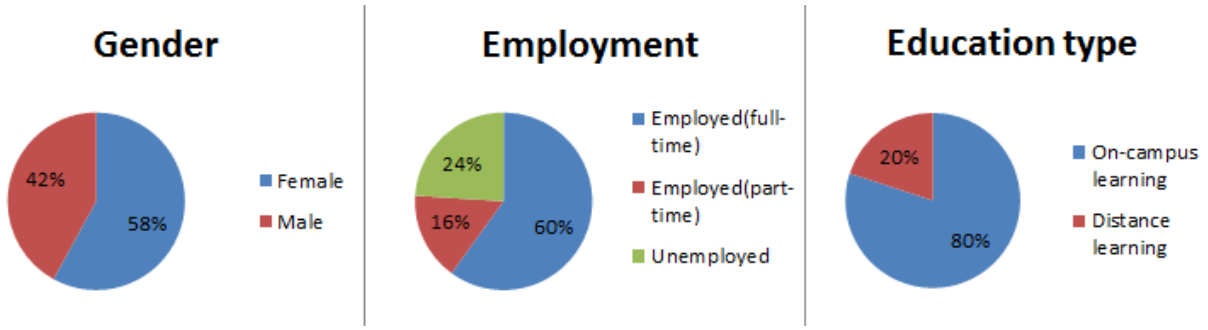

Fig 1. Characteristics of survey participants

The current research project identified that all students own at least one smartphone, some of them own a tablet too (40%) and just a small percentage do not hold a computer or have one but with restricted or no internet connection (10%).

Asked how much time they spend on using the devices enumerated at the previous question, more than half of the participants (53%) responded that more than three hours a day are spent doing activities other than those related to the place of work (if it was the case). Very few of them are involved in these activities less than one hour a day (<10%), while the remaining students usually spend 1-3 hours using these devices.

The question asked to see what are the activities smartphones, tablets and computers are used for grouped these activities in eight categories: socializing, listening to music and watching movies, reading, extracurricular courses, regular scholar courses, searching for extra learning resources, exercising for school and other activities. Each participant had to give a value from 1 to 8 to each type of activity, where 1 means the activity the most time is spent on doing it. The answers generated a classification of these activities (the final score is the sum of the values assigned to that activity by each of the students), which can be seen in Figure 2.

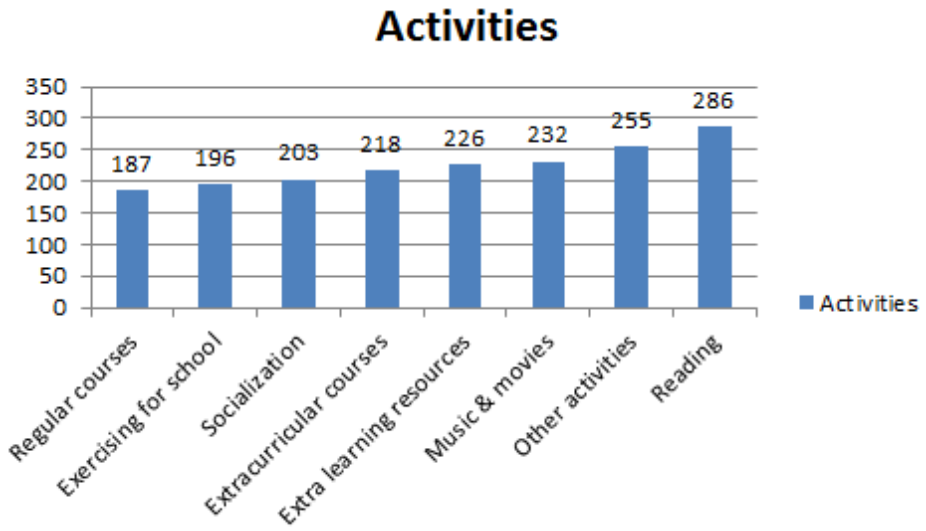

Fig 2. Activities classification

Asked whether they are pleased with the way courses and laboratory classes are organized, more than 55% of the students replied that this is not the case, 25% say that they cannot decide, while the rest of them are ok with it. Furthermore, the next question was designed to understand what are the main complaints regarding the act of teaching. Figure 3 displays the main aspects that bother the respondents: too much theoretical information presented during classes, which most of the time is old and does not keep the pace with the newest technologies on the market.

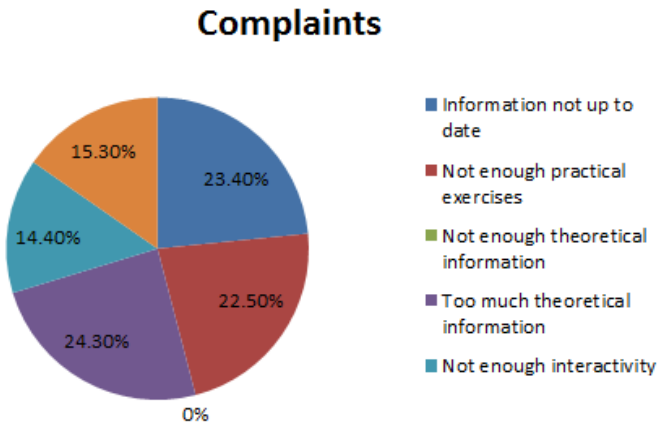

Fig 3. Complaints regarding courses/laboratory classes

Almost 40% of the students are aware of educational mobile applications, most of them giving examples such as: Duolingo, Sololearn, Photomath and Moodle. An impressive percentage of 92% of the survey respondents believe that introducing mobile applications in college in order to facilitate students' access to courses materials would bring benefits to learning process, while 2% of them are not sure about the idea and 2% do not agree with this aspect.

When asked whether or not they are familiar with the concept of "open data", 30% of the participants consider that they know the characteristics of this notion and that it could be useful when integrating it in different applications; 24% of the students are aware of the websites where such data can be found, giving the example of "http://data.gov.ro/".

4 Interpretation

The fact that more than 80% of the respondents work at least 4 hours a day and 80% are involved in on-campus learning highlights a problem raised in the beginning of the present article, that of time being a limited resource nowadays. Therefor this aspect is in correspondence with the project team's belief that an educational mobile application would help especially those who need to find a balance between being a student and being an employee.

Smartphones are part of all the participants' lives so there is no doubt that such an application would target all of those who want to study. Although working and a student life are time consuming, more than half of the students spend over 3 hours a day on using devices such as smartphones, tablets or computers. The fact that these are mainly used for regular courses shows the behavior of the modern students who migrate to e-learning from the traditional studying involving books. A dissatisfaction with the way teaching is done in college can be observed among students, who find it unpleasant that teachers are bombing them with too much theory and too less practice. This is the reason why the application the team has in mind is designed to make use of open data related to nowadays society facts in order to present interesting aspects of our lives while using formulas and algorithms taught in school. It is designed to come with a mixture of theory, practice and real data, which responds to the need of education and the need of civic awareness. Most of the survey respondents consider that an educational mobile application would be welcomed in the learning process and they already are aware of this kind of applications on the market, aspects that increase the belief that designing an application using open data addressed to students would really facilitate their work. Although open data is an extremely important concept that can bring a lot of benefits when it is smartly used, the project team can draw the conclusion that a better marketing should be done in order to rise its popularity among students.

5 Conclusions

As the society is changing together with its students who have different activities and needs than those from even a few years ago, the act of teaching and learning has to embrace these changings. It becomes easier and easier to access free data so why not make use of it? Open data can be an important source of input data to courses such as statistics or economics, which can be designed to be interactive, to make it easier for students to understand how theory can be applied on raw data in order to obtain information and then knowledge. The best way to address this idea is to create an educational mobile application as the results of the survey reveal a proper environment for developing mobile learning.

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