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Students and e-learning: a longitudinal research study into university students’ opinions on e-learning

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Abstract

The study presents the attitudes of university students towards e-learning, as one of the up-to-date forms of education, within the framework of their undergraduate studies. It presents the course and the selected results of the survey research, carried out from the year 2008 to 2012, the main objective of which was to determine the preferences and opinions of the students with respect to the form, the organization and the particular tools or elements of e-learning. Thus the present study is a contribution to the discussion about the possibilities and limits of the use of a fully electronic learning within the framework of the undergraduate and lifelong learning, based on the use of modern information and communication technologies.

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1. Introduction

The perception of e-learning is often ambivalent and inconsistent, the main reason being an inhomogeneous terminology, to a great extent influenced by various linguistic impacts and by the diversity of approaches and technologies used (Saettler, 1990). Within the transatlantic space, activities related to the supporting of the education process by ICT (i.e. e-support) are not defined as e-learning (Lowenthal, Wilson, 2009), in favor of relatively set phrases of Computer-Based Training (CBT), Internet-Based Training (IBT) or Web-Based Training (WBT) (Zounek, 2009). In Europe, a consensus was reached upon the use of a unified term of e-learning, which, according to the information at the e-learning portal for Europe Elearningeuropa.info, is understood as the application of new...
multimedia technologies and the Internet in education, in order to improve its quality by enhancing access to resources, services, the exchange of information and cooperation (Simonova, 2010).

Apart from LMS, properly structured and didactically adapted educational texts, referred to as electronic distance learning materials (Paulsen, 2003, Šedá 2010, Kopecký 2006) contribute significantly to the implementation of e-learning. To get a clear and permanent definition of the term, it is necessary to focus on the structure and the arrangement of individual elements that such a teaching material is composed of. Study materials for distance learning, in both classical form and the form of e-learning, have gradually evolved from textbooks (Möhlenbrock, 1982). In terms of the text structure, a classical textbook is composed of two basic components (Průcha, 1988): i.e. text components (‘written text’) and extra textual components (graphical components). It should nevertheless be noted that electronic distance learning materials have their own unique characteristics as they are intended for a particular form study, characterized above all by a higher level of independence and individuality (Bates, Poole, 2003). A characteristic feature of thus structured electronic study supports designed for e-learning is the fact that their nuclear structure is enhanced by various multimedia and interactive elements, i.e. animation, multimedia records, dynamic simulation, sound recordings, etc.

2. Terms and conditions of the survey research and the description of the method applied

The main objective of the survey research was to collect and to evaluate of the ideas and attitudes of the students to the training carried out through e-learning. This objective was to be achieved through particular component parts, each of them designed to seek the views and attitudes of students to the e-learning form of study as a whole as well as to its individual components, and to the very electronic structure of the electronic distance learning materials. Every single component part of the research investigation was formalized into questions, which were then put together to create an anonymous structured questionnaire (Foddy 1994, Gavora 2000), which students filled out according to the instructions supplied. At that time, the students interrogated had no pedagogical training, to which fact the terminology was adapted and their definition was simplified (e.g. instead of the term verbal component of the text, static text information was used, instead of the term visual component of the text, static image information was applied, and instead of the term dynamic element in electronic form dynamic visual information - interactive simulation and animation were included.

The validation of the research objectives set was carried out by means of the static nonparametric method of Pearson chi-square (Pearson’s chi-squared test), which helped us to determine the level of the dependence of the results on a particular feature, significant for a group of respondents, such as gender or age (Chráska 1998, Greenwood, Nikulin 1996). To determine the significance of particular groups of respondents who answered the same way, basic descriptive statistics and their visualization through tables was used. For the calculation purposes, the statistical system Statistical 9.0 (Nisbet et al., 2009) was applied.

3. Formulation of the basic research assumptions and description of the research sample

Based on previous personal experience and the study of the results brought by the researches or surveys carried out in this area, whether domestic or foreign, we concluded that in comparison with the traditional concept, the area of distance learning implemented in the form of e-learning has some distinctive characteristics, which allow to increase the efficiency of the educational process. This concerns mainly the psychomotor skills where information and communication technologies, represented by the multimedia extensions, simulations, or even virtual reality enable the creation of such tools, the replacement of which by static elements of the electronic structure of the learning materials would be very difficult.

In compliance with the above mentioned facts, we formulated such research assumptions that would respect the modernizing trends in the field of education supported by information and communication technologies. We stemmed from the following assumptions:

- students are satisfied with the education realized through e-learning because they like the fully electronic learning environment in the form of LMS. Their interest in the above mentioned is a long-term one,
- students prefer multimedia elements in interactive form. Their interest in the above mentioned is a long-term one.
The research sample (Švec, Hrbáčková 2007; Creswel 2008), selected in order to verify the above mentioned assumptions, consisted of 501 first-year students of universities, who carried out a part of their studies through e-learning. The research sample was selected to ensure a proportional representation of men and women, corresponding to the structure of students in other forms of education. An overview of the structure of the research sample is shown in the following table number 1.

### Table 1 – Research sample structure

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number of respondents in each year</th>
<th>Total number of respondents</th>
<th>Total percentage number</th>
<th>Percentage concerning the level of satisfaction with education implemented through e-learning</th>
</tr>
</thead>
</table>

Students were given the opportunity to express their views and attitudes to learning realized through e-learning with the use of electronic distance learning materials. The research questionnaire included a total of 9 questions that students anonymously answered.

### 4. Selected results of the survey research focused on the opinions of the students on distance learning

The main point of this part of the survey research was to find about students’ level of satisfaction with the arrangement of lessons via e-learning, the main form of which is not full-time teaching, but self-directed study (Vašutová 2002), using suitably prepared electronic distance learning materials, incorporated into the LMS. A research assumption was formulated that: **students ARE satisfied with the arrangement of lessons in e-learning, with electronic distance learning materials playing the role of the primary provider of educational content, and LMS systems supplying the communication, evaluation, and management aspects of the study.** This assumption was verified by analyzing the data obtained in the survey questionnaire. In addition to the general opinion on the issue, we looked at the long-term trend in this area, and we also analyzed the possible dependence of students’ views on the gender. The results of this review are given in Table n°2 and in contingency Table n°3.

Based on the analysis of the results obtained, it can be concluded that: **students ARE satisfied with the arrangement of lessons in e-learning, supposing that electronic distance learning materials play the role of the primary provider of educational content, and LMS systems supply the communication, evaluation, and management aspects of the study.** Furthermore, it is possible to say that students’ satisfaction with the arrangement of lessons via e-learning is a permanent one, the results being consistent in every particular year of the research. The level of students’ dissatisfaction with the arrangement of lessons in e-learning reached its top in 2009 with 7.8% of respondents, while the highest level of students’ satisfaction with the arrangement of lessons in e-learning was recorded in 2008, when it went up to 95.7%. Both these values are only slightly deviated from the overall outputs (2% with respect to the dissatisfied respondents and mere 1, 5% as regards the satisfied ones). Hence the allegation that that results obtained in particular years do not significantly differ, thus the trend in development of students’ opinions and attitudes of sis stable and shows no significant growth or decline. The situation is documented by Table 2.

### Table 2 – Students’ satisfaction with the organization of lessons in e-learning percentage

<table>
<thead>
<tr>
<th>Students’ satisfaction with the organization of lessons in e-learning percentage</th>
<th>year 2008</th>
<th>year 2009</th>
<th>year 2010</th>
<th>year 2011</th>
<th>year 2012</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of dissatisfied students</td>
<td>4.3</td>
<td>7.8</td>
<td>5.7</td>
<td>5.8</td>
<td>5.2</td>
<td>5.8</td>
</tr>
<tr>
<td>Percentage of satisfied students</td>
<td>95.7</td>
<td>9.2</td>
<td>94.3</td>
<td>94.2</td>
<td>94.8</td>
<td>94.2</td>
</tr>
</tbody>
</table>
The objectivity of the outputs was verified by the implementation of a further analysis, the aim of which was to determine potential dependence of the data obtained on the gender of the respondents. To achieve this, we made use of the chi-squared test, for the results see the contingency table number 3.

Table 3 – Students’ satisfaction with the organization of lessons in e-learning men versus women

<table>
<thead>
<tr>
<th>Respondents’ gender</th>
<th>Dissatisfied</th>
<th>Satisfied</th>
<th>Line sums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>18</td>
<td>202</td>
<td>220</td>
</tr>
<tr>
<td>Men</td>
<td>11</td>
<td>270</td>
<td>281</td>
</tr>
<tr>
<td>Both groups</td>
<td>29</td>
<td>472</td>
<td>501</td>
</tr>
</tbody>
</table>

Since the calculated level of significance is 0.04, as shown in Table 3, we can state that the frequency of responses given by men and women as regards the level of their satisfaction with the organization of lessons in e-learning is different, and therefore the assessment partly depends on the gender of the respondents. The interpretation of the result obtained can be such that dissatisfied women are more numerous than discontented men.

5. Selected results of the survey research focused on the opinions of the students on the contents and the structure of electronic distance learning materials

Another statement verified within the framework of the research presented was the research assumption that students’ favorite element of the teaching process implemented via electronic distance learning materials is the dynamic one, in the form of interactive educational animations. The assumption had been formulated in response to the fact that the classical approach to the evaluation of e-learning materials does not accent some contemporary trends in the implementation of e-learning, more precisely its most recent components, such as e-twinning and/or virtual reality. Being mainly based on the achievement of psychomotor and affective objectives of education, these strategies have come to the forefront of students as well as authors and tutors (Kluge, Riley, 2008). Thus we can say that in general students can choose one out of three options: a static element in the form of text, a static element in the form of visual information (pictures), and a dynamic element in the form of interactive visual information (simulations and animations).

Based on the analysis of the results obtained, it can be said that it is the dynamic element in the form of an interactive educational simulation which students regard as the best component of electronic distance learning materials’ structure, only followed by the static element if the form written text. It being a surprising finding, it nevertheless corresponds to the research assumption. On the whole, it is possible to say that a total of 43.5% of the respondents quoted the dynamic element in the form of interactive simulations or animations, followed by 34% of respondents who preferred static elements in the form of text, and 22% of the respondents valuing static elements in the form of images. It is therefore possible to say that students’ favorite elements of e-learning materials are the dynamic ones, in the form of interactive educational simulations, followed by static elements in the form of texts and images.

Based on the results presented in Table 4, showing the proportional representation of students’ views of the issues being subject to the survey research, it is possible to argue that the development trend in students' opinions on and attitudes to the abovementioned issues is stable and shows nor growth neither decline over the years.

Table 4 - Students’ opinions on the best structural element of the electronic distance learning materials expressed as a percentage

<table>
<thead>
<tr>
<th>Students’ opinions on the best structural element of the electronic distance learning materials expressed as a percentage</th>
<th>year 2008</th>
<th>year 2009</th>
<th>year 2010</th>
<th>year 2011</th>
<th>year 2012</th>
<th>average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static textual information (%)</td>
<td>36.6</td>
<td>30.4</td>
<td>37.1</td>
<td>30.8</td>
<td>39.2</td>
<td>34.7</td>
</tr>
<tr>
<td>Static visual information (%)</td>
<td>25.8</td>
<td>23.5</td>
<td>21.0</td>
<td>19.2</td>
<td>19.6</td>
<td>21.8</td>
</tr>
<tr>
<td>Dynamic visual information (%)</td>
<td>37.6</td>
<td>46.1</td>
<td>41.9</td>
<td>50.0</td>
<td>41.2</td>
<td>43.5</td>
</tr>
</tbody>
</table>
In order to check up on possible differences in perception between men and women, we subjected the partial results to further analysis, focused on the possible differences between the male and the female perceptions. This presumption was verified within the above mentioned sample of 501 respondents, using the chi-square test. For calculations, the statistical system Statistica 9.0. was applied. The outputs are given in Table No. 5.

Table 5 - Students' opinions on the best structural element of electronic distance learning materials (women versus men)

<table>
<thead>
<tr>
<th>Respondents' gender</th>
<th>Favorite element = text</th>
<th>Favorite element = pictures</th>
<th>Favorite element = animations</th>
<th>Line sums</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>72</td>
<td>47</td>
<td>101</td>
<td>220</td>
</tr>
<tr>
<td>Men</td>
<td>102</td>
<td>62</td>
<td>117</td>
<td>281</td>
</tr>
<tr>
<td>Both groups</td>
<td>174</td>
<td>109</td>
<td>218</td>
<td>501</td>
</tr>
</tbody>
</table>

Since the calculated value of significance is 0.61, as shown in Table 5, we can argue that the frequency of particular male and female responses in terms of their views on the best structural element of electronic distance learning materials are identical. This evaluation can thus be regarded as independent of the gender of the respondents.

6. Conclusions

Although the above stated results cannot be regarded as significant, they nevertheless indicate trends that should be respected by up-to-date education, making use of electronic distance learning materials and LMS. The attitudes of the students could provide us with a guideline helping to find the optimal way towards satisfied, educated and professionally prepared tertiary education graduates and graduates of lifelong learning programs. The survey research conducted shed light on some of the preferences and attitudes of the students in this field, which can be regarded as long-term. It can therefore help all those who want to design e-learning tools to meet the needs of their students or pupils the best way possible.

While considering other possible ways of designing appropriate e-learning tools, conducting surveys of attitudes and opinions of the students on the education via e-learning, or carrying out survey researches focused on the evaluation of electronic learning supports, it shall be useful to respect the recommendations stated below. They partly result from the research carried out:

- It is essential to recognize the fact that e-learning allows the use of electronic distance learning texts or electronic distance learning materials, as they are often referred to, comprising several carriers of the educational content, which are very often of multimedia character. It is therefore advisable and possible to use one of the carriers, that is to say a text, a static visual animation, a dynamic visual animation, a multimediam, an animation, a simulation and so on, in order to achieve educational goals in the cognitive, affective, and/or psychomotor field.
- It is necessary to accept the fact that simulation and/or virtual reality makes for the extension of the field of the achievement of psychomotor educational goals through e-learning by experimental activities in virtual labs and via virtual simulations. This method often makes use of virtual reality and the corresponding advantages of the use of cyberspace.
- It is very important to keep in mind that when using the above mentioned forms of education it is necessary to choose an appropriate educational strategy that reflects the possibility of using specific carriers of the educational content that should match the goals being achieved. It is necessary to take into account the fact that apart from electronic forms (e-learning, e-blending and so on) there nevertheless also exist classic printed educational materials, designed for distance learning.
References


