OVERVIEW OF MULTIMEDIA E-LEARNING MATERIALS

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Abstract. Nowadays, with the development of IT technologies, electronic e-learning materials provide better access to education, therefore e-learning materials are used more widely. The demand for high quality and individualized study environment, which allows you to stimulate the learning process and learn the subject more effectively, is increasing. Many researches confirm that not all participants can learn successfully in the same pace, same environment, same style and manner. However, currently available e-learning materials are created assuming that all learners have the same background and needs. The aim of this research was to explore the ways of creating personalized learning environment. During the research in 2014 there were 50 respondents who are using e-learning materials interviewed. The results showed that 58 % of e-learning users are choosing materials that suit their form of perception. The form of information delivery is dependent on the type of the used material. The research results showed that personalized learning environment provided information in accordance with the type of the learner's perception, learning style and interest.

Keywords: e-learning, personalized learning.

Introduction

With the development of information technology, the possibility of using the wide range of multimedia technology that helps visualize the material is increasing. Learning content delivery online gives learners the opportunity to control their own learning process [1]. Multimedia uses two or more media, such as text, graphics, animation, audio, or video, to create more interesting content that the learners access via computer. Blended learning is a relatively new term in education, but the concept of it is familiar to most of the teachers. It is an approach that combines e-learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by an online tutorial [2].

After Richard Mayer, multimedia learning is related with the potential arising from the use of words and images together, that is, people learn better from words and pictures than just words [3; 4]. Mayers's cognitive theory of multimedia learning has united the concepts of Paivio [5] dual-coding theory and Baddeley [6] working memory model. It is based on the fact that the information is received in accordance with the sensor in the corresponding channel (person has various mental representations of verbal and pictorial information), stating, that the human working memory has limited ability to process information [7]. Learning is an individual process, and the concept of it has changed in recent years: from the ability to remember and repeat, using the content of teaching and focusing, to the understanding of the learned content and applying what they have learned [3; 8]. The term cognitive refers to perceiving and knowing. Cognitive science can provide powerful insight into the human nature, and also it has the potential for humans to develop more efficient methods using educational technology [5]. When cognitive overload occurs and the working memory capacity is exceeded, the learning process is slowed down [10].

The learner's style of learning can be viewed from different angles [11]. The preferred type of information presentation depends on both the human psychological and social characteristics (see Fig. 1). Figure 1 shows the relationship of the learning style with both the selected media type in the learning process and the desired way to learn the information. These are several combinations that complicate the teaching material in a manner that it can be used repeatedly in different combinations. H.Srimathi and S.K.Srivatsa also point to the main challenge in this matter – How to integrate separate parts of the teaching subject in order to provide a personalized environment according to the learner's needs?

Personalized learning is learning where every student's strengths, needs and interests are adjusted – including the provision of the student voice and choice in what, how, when and where they learn – in order to provide flexibility and to ensure the highest standards possible [12]. With e-learning technologies learners can control their study pace, time, content, sequence and select the appropriate media to achieve their personal learning objectives [2; 13].
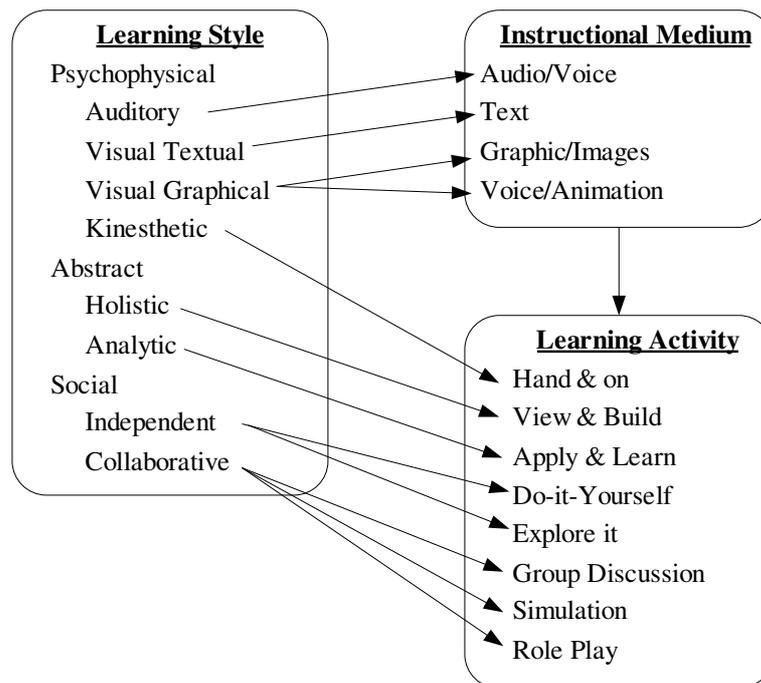
Fig. 1. **Learning style mapped with other components** (adopted from [11])

Currently available e-learning materials are being developed on the assumption that all learners have the same background and needs. However, people differ in the types of information perception – some perceive information better with vision, others by hearing, while still some are kinesthetic learners. They bind to the prevailing data types: static (text, image, graphics) and dynamic (audio data/ audio signal/animation/video). There are many researches on content personalization [1; 14], especially in e-learning system development, but no one is addressing the existing e-system solutions. It is essential to the existing e-learning systems to offer students theteaching material contents in a form that would be most appropriate for them.

The aim of the research was to find ways to present electronic materials that suit the user's needs. In order to achieve the objective of this work, studies have been carried out in the offered opportunities by multimedia technology, basic parameters of personalized teaching and most typical styles of e-learning among the users.

Materials and methods

Overall 50 respondents were interviewed for this study. In May 2014 there were 30 students from the Faculty of Information Technology from the Latvia University of Agriculture (LLU) and in October 2014 – 20 students from the Latvia Centre for Distance Learning Professional (LPTC) interviewed, who are using e-learning materials. These two groups of respondents differ in the type of learning and by use of e-environment. The LLU students are undergraduate full-time students (Bachelor programme), who are using e-environment as a helper for the study course. The LPTC students use e-environment to acquire the professional distance learning programs. The learning process of these students is based on the use of electronic materials in e-environment. The teacher only plays the role of a consultant, because there are smaller proportions of full-time classes.

All participants were given the questionnaire and all were returned completed. The questionnaire included 10 questions about e-materials and use of the e-learning process. The questions are closed questions with multiple-choice options. The pilot study participants were emailed and requested their input about the online survey. The main questions in the checklist were:

- What is the influencing factor in the choice of materials?
- What form of information presentation would you have preferred?
- What determines the choice of the material?

Results and discussion

All respondents (100 %, n = 50) use e-learning materials published on the e-learning environment. The users responded that the existing materials are uniform (89 %), mostly online texts or pdf files. In the LLU materials there are mostly presentations from lectures, but the LPTC – electronic textbooks. This shows that there is no diversity in the material types. This can also be explained by the fact, that preparation of teaching materials is a laborious process and the teaching staff does not have enough time to make the same topic in audio or video format. The students are provided with educational materials, however they are lacking the diversity of format, and that is why students are not able to choose the most appropriate format for themselves.

The results showed that learning materials have diverse roles between the groups of respondents. The data summarized from the questionnaires show that 50 % of the LPTC respondents ($n1$ = 20) consider (see Fig. 2) that e-material helps acquire the topic, while of the LLU respondents' group ($n2$ = 30) the focus is to consolidate the acquired knowledge (37 %). The difference of opinion can be explained by the fact, that there are diverse learning studies and different learning motivations. The LPTC students work and learn at the same time. They learn distance education, in order to obtain professional qualification, that is why they are more motivated to learn.
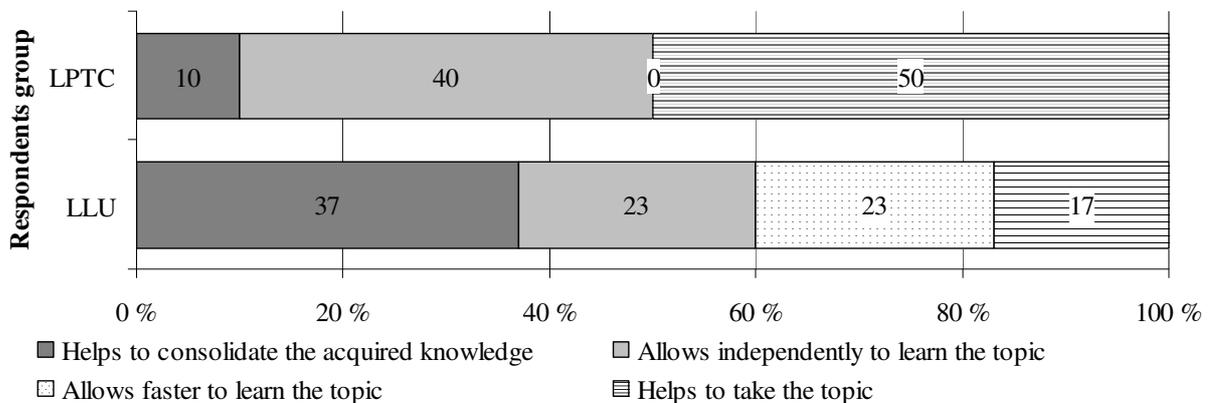

Fig. 2. **Role of learning materials**

There is also a diversity of opinions in the preferred presentation form of the learning material (see Fig. 3). The members of the LPTC group are learning the topics without assistance, because they prefer video lectures (45 %). It is important for them to learn and understand specific topics. On the contrary, the members of the LLU group choose slideshow presentations or texts for lecture revision. It is typical for them to practice mixed learning, when a lecture is combined with e-learning materials [2].
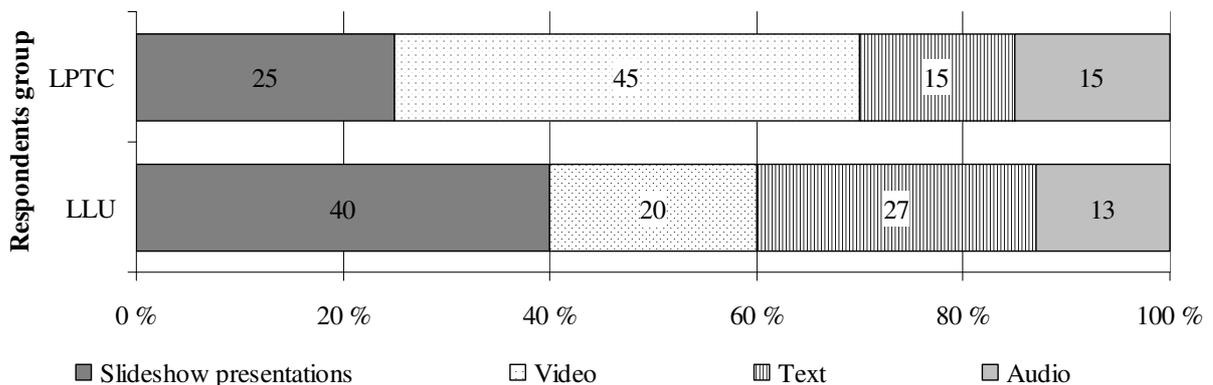

Fig. 3. **Preferred presentation form of learning material**

All respondents (n = 50) were asked to note the types of e-learning materials which they would prefer. Responses to the question about technical implementation of e-learning materials show that the respondents prefer handouts, followed by video lectures, presentation with accompanying text or interactivity elements (see Fig. 4). The respondents indicated willingness to use training materials in different combinations. For example, presentations with textual themes combined with individual

fragments of a video demonstration. This means, that students want to use variety of learning materials, in order not to overload one perceptual channel. According to R. Mayer – people learn better from words and pictures than from words alone [4]. Preference is given to such learning material as audio materials. The learning material technical implementation is highly dependent on the content.
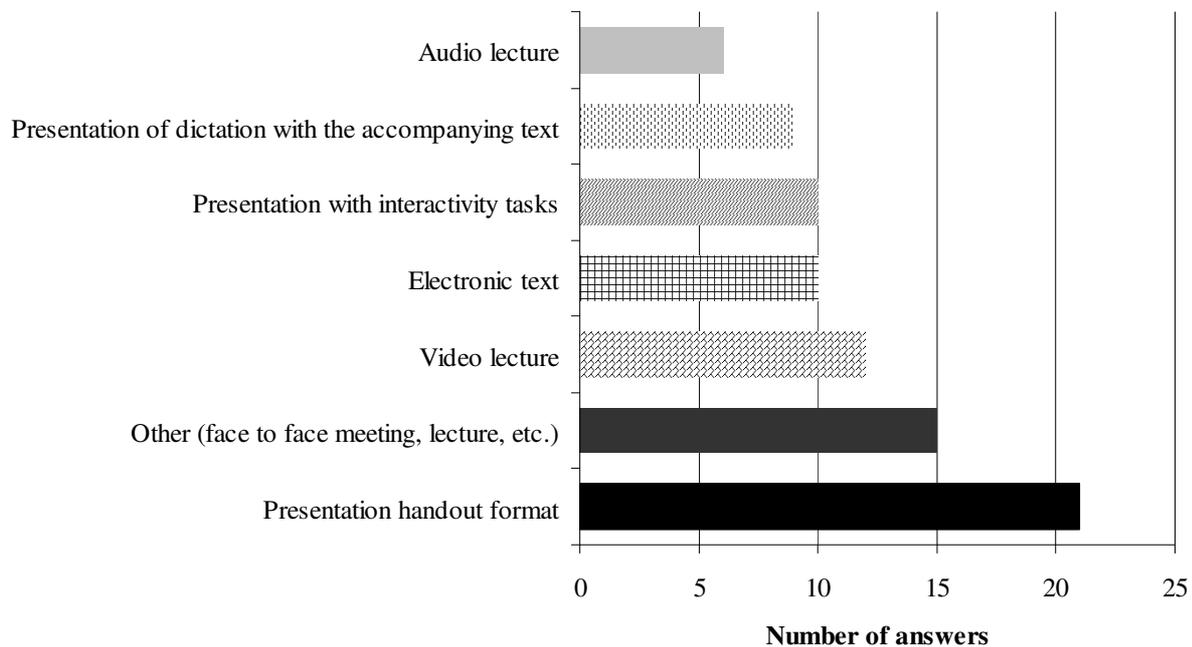

Fig. 4. **Desirable e-learning material type**

However, if there are different types of learning materials available (see Fig. 5), the main factor for compliance is with the predominant form of perception (58 %). Respondent opinions in this study confirm the conclusions of previously made studies, that students want to customize the e-environment, or at least use the part closest to their learning style [1; 12]. The obtained results confirm the fact, that the learning styles affect human psychological characteristics [11].
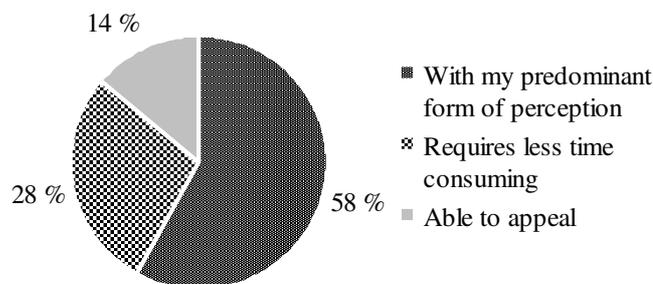

Fig. 5. **Choice of learning material**

The results of this study have confirmed the fact that e-learning users have different learning styles. Consequently, there is a demand for materials that are more relevant to the user predominant form of perception. The aim of this research is achieved – the users want to learn subjects using various materials, including video and audio format. As the group of the respondents was not large and limited to two educational institutions, more extensive study is required. One aspect still should be ascertained – if users would be offered the opportunity to use learning materials with different technical realization, would they use it.

Conclusions

1. In information processing people mostly use visual and audio channels. Media can reflect any of these resources.
2. Personalized learning environment provides presentation of information in accordance with the type of the learner's perception, learning style and interest.

3. Learning materials in e-learning environment should be offered in different forms, so that the user could choose the most appropriate way, it is evident from the results of the questionnaire.
4. Further studies are needed offering students materials which are designed based on the cognitive theory of multimedia learning and evaluating their efficiency.

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