Multichannel learning for training medical staff in Serbian Army Forces

Višekanalno učenje za obuku medicinskog osoblja u Vojsci Srbije

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Introduction

The implementation of distributed e-learning in the Serbian Army Forces (SAF) formally started in the beginning of 2010 and was realized through the two biannual projects (2010−2011 and 2012−2013) in cooperation with the Norway Ministry of Defense and the Jefferson Institute. As a result, two Web applications were developed: a distance learning info-portal (http://elearning.mod.gov.rs/) and a distance learning platform (http://adl.elearning.mod.gov.rs/). Military medical staff recognized the importance of such a system to meet their requirements during frequent missions abroad as part of UN and EU forces. At any moment, there are dozens of SAF nurses, medical technicians, specialists and surgeons on duty in every part of the world and they need access to E&T resources. Therefore, the first e-courses were built for their demands in order to provide efficient and effective delivery of E&T resources remotely, to provide contextualized communication and to make useful reminders available for personnel engaged in missions abroad where E&T resources have great utility [1].

Missions abroad are often in undeveloped countries with a poor Internet infrastructure especially in rural areas everywhere. It represents one of difficulties which continuously motivate us to make some improvements. Multichannel learning [2], described in this paper, was recognized as an appropriate approach: delivering the same resources in an appropriate form and manner on any platform − desktop or laptop computer as well as tablet or smart-phone. In this way, a user can access the learning content through either the regular Internet connection, or a mobile network. The description and preliminary results of implementing multichannel learning are represented here.

Motivation and solution

One of the SAF missions is to participate in building and maintaining peace in the region and across the world. The Serbian Army has been significantly engaged in missions abroad since 1956 (14,265 persons have been engaged in 22 rotations). The personnel are working in very difficult conditions, far away from home, in improvised or field facilities adapted for performing mission tasks. There have been many situations in which they must make a decision in minutes, or even worse − in seconds without any kind of expert support. Consultations through telephone calls are too expensive. The resources offered at deployment location that are usually brought along by them often cannot meet all their needs. The solution for such a situation was recognized in distribution of E&T resources to the distant locations by contemporary Internet technologies. The SAF distance learning platform as a robust and secure e-learning platform provides E&T content, communication and collaboration features to users regardless of distance and roles (instructors or trainees) [3] that motivated us for development of several medical courses. These are first aid courses, human immunodeficiency virus (HIV) protection courses and an Academy of Maritime Education and Training University (AMET) course. Some of

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them are the basic level courses accessible to every registered user. Once released, these courses proved to be very useful, as measured by to the number of users and the cumulative time spent in using their resources. Every course has hybrid structure (hierarchical and sequential). More complex content has a hierarchical structure on the upper levels while the concrete materials within one learning unit can be sequentially ordered. Its content consists of illustrated text pages, video clips and question pages for self testing.

The user can adapt the E&T pace according to his plans and time. He can also contact other persons that attend the same course by using instant messaging offered by the platform (Figure 1). In such a scenario, the user can make himself visible or not for others. For instance, if a concrete user needs help or offers help to others he/she should be visible. If he/she wants to be undisturbed during the learning time, he/she just makes him/her self hidden.

Topic forums and blogs represent another way for communicating with others. It is very useful if the user looks for specific information but does not know the appropriate person(s) that could help him/her. This is the so-called collaborative learning approach, a part of social constructivism theory [4].

Design and implementation

In rural and sparsely populated areas the 3G mobile telephony network represents the only high quality Internet connection available for multimedia and high speed communication support. That means that smart phones represent the only solution in this case. Application is available to every registered user on the e-learning platform [5].

After logging, the system delivers the list of available courses to the user. After downloading the course, if selected mobile application starts the course. The mobile course is presented in the figure below (Figure 2). One of the main principles followed in the mobile courses design is to follow the same navigation principles as in their desktop versions. In this way their exploration is easier for trainees who previously used the desktop versions. Another important design principle is to keep navigation easy throughout the content. For clarity of appearance, text descriptions and explanations are removed. Pictures are used instead. The content structure is adapted to represent a clear hierarchy of learning chunks.

Some contents are represented only by short video clips to provide the users with a quick reminder to prepare themselves immediately before executing the tasks in stressful conditions. Theoretically, considering the circumstances in which mobile learning is expected to be used, learning is regarded as an emotional process in which the content's appearance, environmental and time constraints strongly influence the perceptive abilities of the learner [6]. Based on Dales cone of experience [7] in which it is explained that people generally remember 10% of what
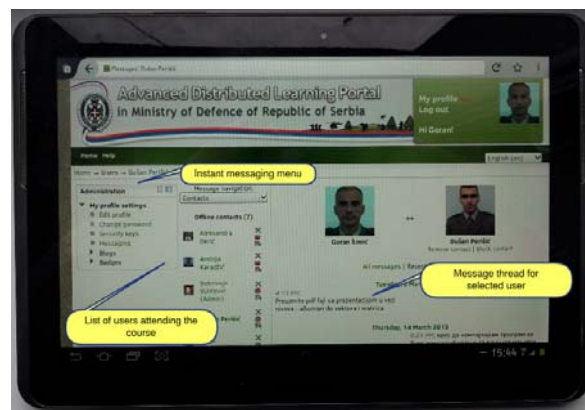

Fig. 1 – Serbian Army Forces (SAF) distance learning platform on the tablet – Instant messenger.

Fig. 2 – Keeps navigation easy through the course content.

they read, 20% of what they hear, 30% of what they see and 50% of what they hear and see at the same time, the content is redesigned to be comprised as much as possible of pictures and video materials.

Where it is possible, in order to keep the content simple and short, check lists are used instead of long text descriptions. This distilled form is especially useful as a reminder for strictly defined procedure (standard form for acting in emergency situation). When it is necessary to better explain particular steps of a certain procedure and to keep the description as simple as possible – an animated sequence of frames is well suited to the smart phone. In the next example (Figure 3), this tactic is used for describing the approaching the scene of an accident procedure. Together with the visual representation is an audio explanation for each bullet of the check list. Frames are time synchronized with the multimedia content that results in the cartoon effect. This is one way in which complex descriptions can be realized within the very limited resources of a mobile platform.

In this section, we presented the most important didactics applied in the mobile courses: simplified navigation, intensive usage of short video clips, making use of check lists as a form of distilled knowledge of procedures, and animated sequence of frames for presenting more complex content. There are other techniques that implement different pedagogical tactics for animating the users to combine the regular courses with mobile ones and to use advanced smart phone abilities. For instance, preparing themselves for assessments, arranging appointments and communicating with instructors,

and to find peers in neighborhood for help. These are beyond the scope of this paper and they are not presented in the text.

Evaluation of the distance learning quality

As mentioned, courses are designed for various types of users. Apart from medicals, more than a hundred other SAF members have been using the desktop and mobile courses since the middle of 2013. For evaluation of each course, a survey form was applied based on the Course Experience Questionnaire (CEQ) methodology [8], which has been used at universities in Australia for more than seven years to measure the quality of teaching and learning. Following this approach, we developed a survey with 24 questions in the form of single choice answers with the possibility to add comments, and questions with 5-level Likert scales [9]. The single choice type is used for questions about general information. There were 82 persons who participated in the survey. The single choice questions yielded the following facts: almost 94% of respondents had no problems to access the courses; only 5 persons out of 82 encountered access challenges; approximately 60% of respondents used courses from home, while the rest were uniformly distributed − they used courses from the workplace, during a mission abroad, or on the terrain (open field missions); wireless medium was the predominantly used internet access − in more than 80% of cases, a 3G mobile network was used in others.

Every question has a default answer. If it is selected, the user is requested to answer the conditional question to
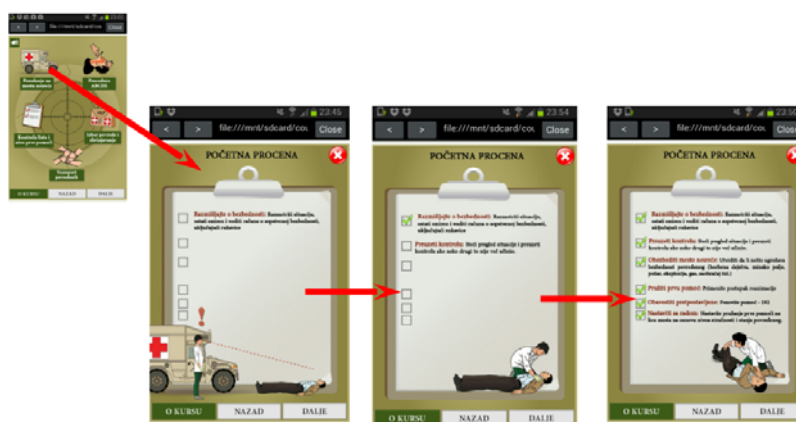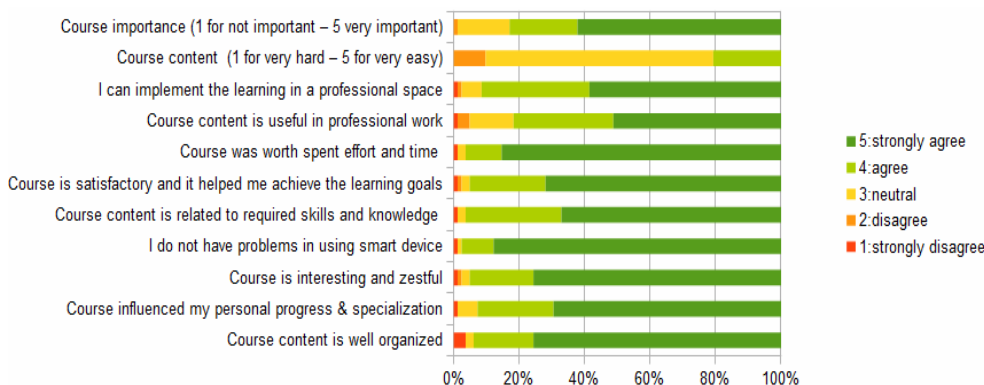

Fig. 3 – Animated sequence of frames.

Fig. 4 – Evaluation of First Aid for Soldiers mobile course.

explain his choice. Thus, we collected detailed information about environmental context in which the course resources are used. For instance, for those who answered "yes" to the first question (the user had a problem to access the course), 4 of 5 respondents mentioned lack of Internet access as a problem to use the courses.

Five-level Likert scaled questions are used for evaluating the course as a whole. The next illustration (Figure 4) shows the questions used and the user's answers. Predominant green areas show that the specified course is motivating, useful in professional work, interesting and zestful. Moreover, the users did not have problems in using smart devices. They also verified that the course content was not trivial (the 2nd question) and that it was well organized. Owing to the achieved results of survey, it is obvious that adapting medical courses and delivering them through the mobile channel is found very useful by potential users.

In the same way every particular topic in the course is evaluated with the purpose of this part of survey with the aim to collect more detailed information about quality of topical content. The questions are paired − one for clarity of the topic and the other for a topics' weight.

The subsequent conclusions follow: there is no answer pointing to strong disagreement; all of the topics are well explained; topics that consist of check lists are tackled much more easily than those without them. The survey also shows that paired questions about topics (clarity and weight) are in strong correlation and this is a welcome response because it means that weightier topics are better explained.

Conclusion

The evaluation results led us to the conclusion that the persons participating in the survey are well skilled in using smart devices and they mostly do not have any problems to access courses during the evaluation period. Check lists should be used as much as possible and in combination with other types of content. For instance, the topics ABCD procedures, Injury detection and first aid care, and Transportation of an injured person are appropriate for this change.

Likert scaled survey designed for the course evaluation and evaluation of each topic brought successful results. Regardless of the heterogeneous structure of 82 users (13.4% female, 23% higher education, medical personnel together with others from different branches and services) the results give us insight and motivation for future development. Moreover, the users think that the enhanced course accessibility (deliverable anywhere at any time) could increase their self-confidence on the terrain as both versions (desktop and mobile) are deliverable.

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