Can We Use Electronic Performance Support Systems as Learning/Teaching Materials?

Baris Sezer,
Faculty of Medicine,
Hacettepe University, Turkey.
E-mail: barissezer@hacettepe.edu.tr

Abstract

Electronic Performance Support Systems (EPSSs) can be defined as integrated electronic environments with the goal of providing instant and easy access to information, advice and experiences to improve individuals’ performance. In this context, the purpose of this research is to inform about what Electronic Performance Support Systems are being used frequently as a source of information and to explain the two systems developed at Hacettepe University, Faculty of Medicine in Turkey. These systems were designed and used in Basic Life Support and Scientific Research Methods. It has contributed to students in terms of academic achievement and performance.

Key Words: Performance support, medical students, information sources, academic achievement.
1. Introduction

EPSSs have an effective interface that provides step-by-step task instructions, designed in line with the needs of the target audience and experts in order to increase the task performance of the target audience, and allow online or offline access to the database, teaching system, advisory system and assistive tools (Sezer, 2016). In recent years, EPSSs are one of the most effective ways to address human performance and learning problems (Barker, Schaik and Famakinwa, 2007; Gery, 2002; Kert, Uz and Gecu, 2014). Literature shows that EPSSs have positive effects on users' knowledge and skills acquisitions (Alparslan, 2009; Barker, Schaik and Famakinwa, 2007; Gal and Nachmias, 2011; Kert, 2008; Kert, Uz and Gecu, 2014; Miller et al, 2007; Nguyen and Klein, 2008; Phillips, 2013).

2. Literature Review

The EPSSs, which was first mentioned by Gloria Gery in 1991, has shown rapid development since then. Although the EPSS concept is interpreted differently in different disciplines (McKay and Wager, 2007), there is a general consensus on the fact that these systems need to make improvements in the performance of individuals in real jobs. The main goal of these systems is to provide support to users to complete their tasks in the best possible way (at least with minimal error) at the time of need. It is emphasized that a well-designed EPSS should provide this support at a noticeable level immediately after the first day (Gery, 1991).

Design/development models can facilitate the works of the designer/developer team when developing an EPSS. One of these models is the EPSS development model called the D4M2, developed by Brown (1996). This model comprises of Diagnosis, Design, Distribution and Management/Evaluation stages. It is seen that three different development approaches are taken as reference when developing an EPSS (Sleight, 1993). These are: Basic-Level (Minimal) EPSS: It is reported that such systems should have some of the features that should be in an EPDS (developing according to requirements, not including unnecessary information, working in electronic/computer environment). Such EPSSs are generally static and are developed as structures that offer modular information. Mid-level EPSS: This type of system to provide an individual for the performance of an optimal level (optimal level of support (different levels / types of information, taking into account different learning styles, artificial intelligence, etc.). It is reported that it should provide sufficient support (step-by-step task guidance, easy updating, quick access to information, providing functional assistance, providing the task at the moment it is realized, and reaching the environment, etc.). High-level EPDS: These systems are that provide the most appropriate level of support to the individual in task performance (including artificial intelligence, providing information in different ways, providing a high level of user-content interaction, monitoring user behavior, etc.). These systems can only be
developed by a team (instructional designer, graphic designer, program developer, software engineer, subject matter expert).

In this study, two systems developed as mid-level-EPSS were introduced.

3. Methodology

Mid-level EPSSs, which were developed by researcher and used during an academic year in Hacettepe University, Faculty of Medicine, were also included. The first one was developed within the scope of Scientific Research Methods course. Within the scope of the Good Medical Practices Program, determining the session they need the most, determining the difficulties encountered in the session, discussing the solution proposals, determining the usage standards and capacity of the system, taking into consideration the EPSS development conditions mentioned in the literature and evaluating them by making them available in the real environment.

System has been developed as semi-interactive, modular and internet-based (html 5 framework). It is aimed to improve the performances of the as a basic scientific research. The students carried out their duties in the system as a whole by presenting the subjects they need in the selection, execution and finalization of their assignments. In the system, the help and advisory sections are presented in each module. The system is provided with the direct communication channel (communication module) with the administrator, the questions asked about the most frequently asked content and system usage are listed under the Frequently Asked Questions module. Moodle was used to integrate the system and to increase the capacity of the system. As a result of the usage, it was determined that the instructional performance of the students improved and they were satisfied with the use. However, it is reported that they are in the expectation of using an EPSS which is more interactive (artificial intelligence applications, automatic warning / reminder mechanism is employed, video-based help).

Another application example has been developed for Basic Life Support. The development cycle used in the research is as follows:

1st Phase - Analysis: At this stage, the opinions of the health science experts on determining what the requirements are, what the architecture of the system should be and updating the evaluation forms have been consulted. Nevertheless, the problems experienced in the BLS identified and the educational materials analyzed. In this direction, an analysis document was formed.

2nd Phase- Design: At this stage, firstly the analysis document was analyzed. Material pool was formed by discussing the suitability of BLS materials with experts. However, the usage scenarios, the appropriate platform, interface and evaluation forms to develop the product have been determined together with the experts.
3rd Phase - Development: At this stage a prototype of the system has been created and presented to the evaluation of the experts. The evaluation forms were prepared in printed and electronic form.

4th Phase - Implementation: At this stage, the prototype was presented (see Figure 1) to the use of physician candidates and opinions and suggestions of health experts. After the revisions, in the actual application, it was presented to the use of dentistry and medical students, and the traditional achievements and performances of the students using EPSS were determined.

5th Phase - Evaluation: In the last stage, revisions were made considering the information obtained in the previous stage, the system was improved and the final product was obtained.

Figure 1: Main Screen

When the results of the research are examined, it was seen that the academic success and performance of the students have increased. This result shows that EPSSs was developed as a user friendly and meets the requirements of the users.

4. Results and Discussion

The most important features of EPSSs have been reported as short-term and easy access of users to the information they need. In this direction; in the first system, scientific research methods have been developed in a separate categories/modules, directing multiple presentations of information. The second system was designed in three categories: adult, child and infant, in a structure that provides step-by-step task instructions following multiple presentations of theoretical knowledge. During the development phase of these researches, significant improvements have been made in the effective interface and content especially in the direction of the opinions of the experts. This situation reveals how valuable the teamwork (interdisciplinary study) is. On the other hand, in line with the necessity of an EPSS to be in interaction with other sources of information, Youtube videos, Guides, Training Videos etc. were provided to the students who need the information that the system may not be sufficient.
for some students. Another reason of this positive result obtained in the researches was that students do not encounter any technical problems while accessing and using the systems. Because, the technical problems encountered were found to decrease the satisfaction and frequency of use of EPSS. It has been determined in many studies that EPDSs, in which users have no access problems, improve their academic success and performance.

5. Conclusions and Recommendations

The developed EPSSs increased the academic achievement and performance of the participants related to their work. Without any cost, these web-based mid-level EPSSs can be used in all educational environments.

References


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