Design and Development of Efficient E-learning Courses

Veselina Nedeva[1], Snejana Dineva[1]

(1) Trakia University, Faculty of Engineering and Technology of Yambol, Gr.Ignatiev str. 38, Yambol, Bulgaria
veselina.nedeva@gmail.com, sbdineva@abv.bg

Abstract

The following article presents the stages of the designing and development of e-learning courses and their content. The factors, influencing the efficiency of the e-learning courses in the process of their development, are also shown. The good practices in the developmental process for efficient e-courses are presented, and are supported with examples driven form the authors's own experience. Keyword: e-learning, design course, development course, efficient e-course.

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1. Introduction

The new technologies in the education play a bigger and more important role in the education system in the today's culture and help form the transition into an educated society. Both e-learning and distance learning stand out among these new technologies in the educational system, as they require the use of the newest information and communication technologies for their successful implementation. Internet gives one unlimited access to any kind of information, but there is a big difference between receiving information and gaining knowledge.

The aim of the e-course is to present the information in the best possible way, taking into account few factors, in order for the students to gain the necessary knowledge and abilities. The available information in an e-course does not automatically turn into knowledge without the presence of an effective e-course and the help of a lecturer, who can play a different role in the different courses.

2. Design of e-learning courses

E-learning is a standard term, used to describe the different forms of learning, in which the students and the lecturers and separated from each other, both in time and space, and communicate with each other using the available information technologies and devices. The main power behind the improvement in the e-learning is the successful internet and multimedia technologies development. That is why they are presented as some of the main characteristics, and are specified in the definition of e-learning, proposed by other authors.

According to Clark and Mayer (2008) e-learning is any instruction that is delivered on a computer which has the following characteristics:

- Includes content relevant to the learning feature.;
- Uses instructional methods such as examples or practice exercises to help learning.;
- Uses a variety of media elements to deliver the content and methods.;
- Builds new knowledge and skills which are linked to improved organizational
- performance.

Thus, the goal of e-learning is to build transferable skills and abilities.

E-learning can be defined as instruction delivered via a computer that is intended to promote teach (Clark&Mayer, 2008). This definition can be broken down into the what, how, and why of e-learning:

What. Instruction refers to content (e.g., words and pictures describing how lightning storms develop) and instructional methods (e.g., presenting words in spoken form rather than printed form). E-learning depends on instructional material being presented using effective instructional methods.

How. Delivered via a computerrefers to presenting material via a computer by way of internet, intranet, CDROM, or related means. Instructional output includes images and printed words that appear on a screen, and sounds and spoken words from a speaker or headphones; learner input includes spoken words through a microphone, characters entered on a keyboard, and screen items clicked with a mouse. Thus, e-learning uses the output and input channels of computers and their peripheral devices.

Why. Intended to promote learning refers to the goal of helping to foster changes in learners' knowledge, which is reflected in changes in their performance. Thus, e-learning is intended to help people achieve learning objectives.

The following definitions better capture the essence of e-Learning:

- E-Learning is a vibrant, dynamic, and exciting way to learn new skills and concepts.;
- E-Learning is all about learners – capturing their attention with content specifically.;
- Designed to meet their immediate needs in a self-paced and comfortable environment.]
- E-Learning is interactive, holding learners' attention by involving them in the learning process every step of the way.;
- E-Learning allows learners to learn by doing, by being involved, by receiving immediate feedback, and by allowing them to monitor their progress with quizzes, tests, and handson activities.;
- E-Learning uses learners' senses – appealing to their auditory, visual, and tactile senses.

The designing of e-courses should begin with the determining of the *educational goals* – knowledge, abilities and habits, by taking into account the additional opportunities provided by the technologies that are used in the e-course design and development. When the educational goals are determined, one starts formulating the *course content*. The learning material should be presented as modules and themes. The appropriated educational method is selected, and the modules and work scenarios are designed. The design, that has to turn the methodological ideas into an interface, is being decided at the technological stage of the development. At this stage every course is looked at as an individual entity and no ready-made environment for e-course design is used. The next step is the design and development of the functional structure of the e-course. No matter of the chosen method for design and development, the e-course has to ensure a comprehensive presentation of the specific subject area, has to provide an effective use of the pedagogical and methodological principles, it also has to be an adequate system for knowledge control and sustain a differentiated approach to the organization of the students' independent work on assignments.

3. Efficient of E-learning cources

Traditional classroom learning can be effective or ineffective - depending very much on how it is presented by the teacher. E-Learning is no different – it too can be good or bad, depending on the skills of the designer/developer (Steen, 2008). In order to be ssuccesful one e-course, important role play as the desiner thus the teacher, i.e. those that must to proect and develope together the e-course. The e-training is not effective by itself. From one side, its effectiveness depended from the proper management, instructions and advices given from the teacher during the entire learning process (Ступин&Ступин, 2012). From another side, the main role of teacher confirms from the

useless of the e-material developed in professional centers without the active involvement of the teacher that construct the lessons and apply these e-materials.

Organizations have a need for effective training (Steen, 2008). Training designers have to be able to design effective eLearning to meet those needs. This is difficult because designing successful eLearning is part art and part science, involving the use of learning and training theory and an understanding of the knowledge and/or skills to be taught. The design also has to be completed within the constraints involved in all phases of the training design and implementation. Further complicating the process is the diversity of equipment, tools, and techniques involved. A final complication is the fact that there is no one-size-fits-all approach to the design of eLearning. Each course is unique. However, there is a general process whereby the designer balances the elements involved. If the designer does everything correctly, there is a greatly improved chance that the result will be effective eLearning.

To be effective, eLearning must meet certain criteria. As noted by Angeliki, Asimina, and Eleni (2005), in general effective eLearning has the following characteristics:

- *Successful in reaching learning objectives;*
- *Easy accessibility;*
- *Consistent and accurate message;*
- *Easy to use;*
- *Entertaining;*
- *Memorable;*
- *Relevant;*
- *Reduced training costs.*

When start construct e-learning course, first step should be to build a development plan for the following reasons (Steen, 2008):

- A Course Development plan can be shared with all those involved in the project so that individuals know exactly what the expectations are, and what their own role is in the overall process.;
- A well planned process leaves little room for the misunderstanding of objectives.;
- Developing a plan allows for time, resources, and cost management factors to be worked into the big-picture.;
- If management approval needs to be petitioned, a good development plan will permit you to submit a clear and valid proposal.

Successful e-Learning development begins with a well-designed course development plan. While many of the factors of a development plan may vary according to organization size and extent of work, the following stages should always be implemented (fig.1):

- ***Design*** – Design stage will be conducted by one or more Instructional Designers, and maybe a Project Manager. The first stage of the development plan's process should include: *Analysis of content* – breaking it up (mapping) into logical course structure objects; *Creating a Design Document* and/or Storyboard; Creating and distributing *Standards Guidelines*; Creating *Master Pages*, *Page Templates* and *Course Templates*;
- ***Develop*** – The Development stage of the process would include *Instructional Designers*, *Course Developers*, *Graphic Designers*, and *Reviewers*. Some of the activities involved with this stage may be: - *Content input;- Page layout;- Multi-media development;- Interactive content design and development;- Standards checklists;- Quiz and Test development.*
- ***Review*** – The Review stage should be conducted by Editorial, Instructional Design, and Subject Matter Expert (SME) Reviewers. These roles can often be taken on by one or two people. After content has been reviewed, courses may have to go through a second stage of development, depending on the Review outcomes. Final content approval should come from a lead Instructional Designer.

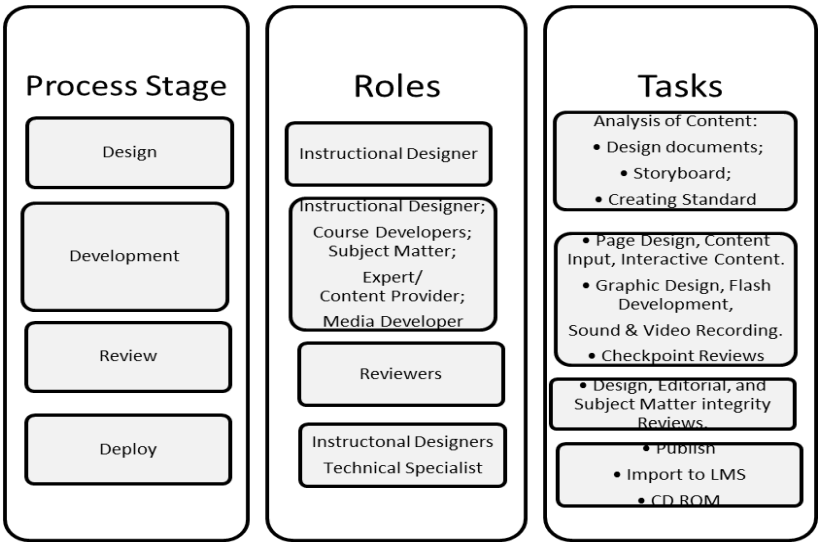

Figure 1 Main stages in development of e-courses

- ***Deploy*** – The Deployment stage involves the packaging and delivery of content to the location at which learners access the course. This may be a CD-ROM, Learning Management System (LMS), an Internet website, or an internal network.

The Figure 2, below shows a typical Pass Cycle (Group), and some of the major tasks involved in each pass.

Pass Major Tasks

Pass 0 Content Analysis; Design Document; Internal project plan; Instructional Design Model; Templates; Mapping; etc.

Pass 1 Mapping; Content Development; Graphics, animations, slideshows design & development.

Pass 2 Design & development of interactions; Design & development of assessments; Initial internal review and editing/QA; Beta testing.

Pass 3 External Review.

Pass 4 Review comment implementations, Revisions.

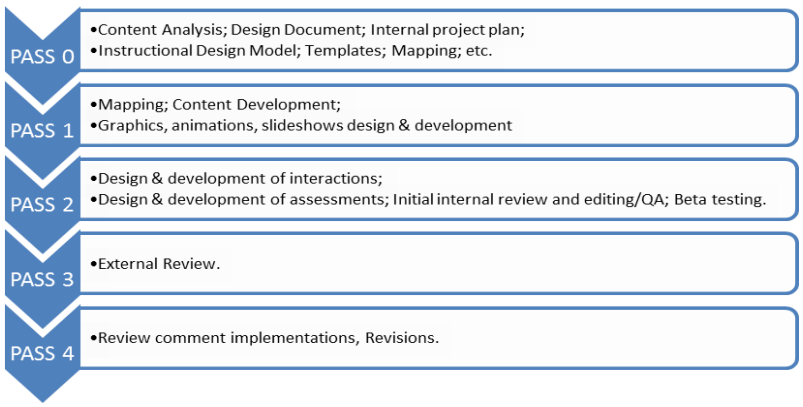

Figure 2 A typical Pass Cycle (Group), and some of the major tasks involved in each pass

Instructional theorist Robert Gagne (2013) developed nine events of instruction that when put together, make up a practical process for effective learning. Most instructional design is based on these events and the process is widely used in teaching practices. These principles of instruction should also apply in any design of e-Learning.

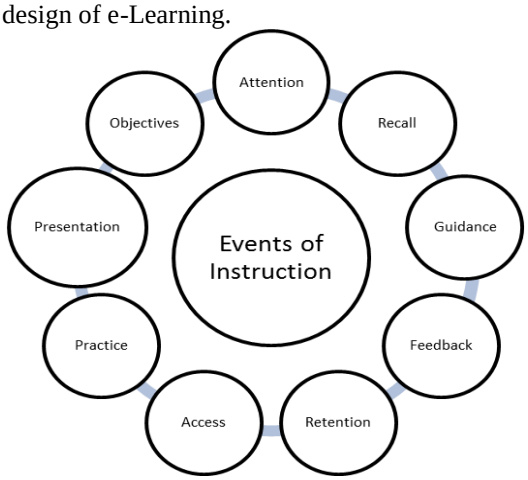

Figure 3. Gagne's Nine Events of Instruction

These best practices address each of the Events of Instruction in a way that will provide guidelines for applying sound instructional principles to e-Learning.

• ***Gaining Attention*** – While using effective means of gaining and holding learners' attention is important throughout a course, it is particularly so at the beginning of a course. "Startling" a learner is a good way of grabbing their attention, and should occur on one of the first pages of a lesson. This can be achieved by using the learner's auditory and/or visual senses, or with a statement that is immediately thought-provoking or relevant to their learning needs. Instructional designers will often use a *Flash presentation* as it can provide all the components mentioned.

• ***Objectives*** - Well constructed and presented learning objectives provide both guidance and motivation. Learning Objectives in e-Learning are no different than for traditional instructor-led training. The most important things to remember are:

- Learners should be informed of the objectives before the lesson begins. Ideally objectives would accompany the lesson/course outline.;

- Learning content presented should provide all the information needed to meet the objectives.;

- Assessment questions should be based on and test against the learning objectives.;

- With e-Learning, prescriptive learning can be constructed based on the learning objectives.

• ***Stimulate Recall*** – Stimulating recall of prior learning provides the learner with a sense of personal relevance and stimulates motivation. With e-Learning, this can be achieved in a variety of ways:

- Providing prerequisites helps to remind the learner of prior learning in the subject matter.;

- Pre-tests can test for and stimulate prior knowledge and experience.;

- Assumptions of prior knowledge can be made clear in the lesson/course overview.;

- Lesson content may contain references and questions to necessitate recall of prior knowledge and experience. With e-Learning, learners can obtain immediate feedback on their recall.

• ***Presenting Content*** - Presentation of content (subject matter) is where traditional Instructor-Led Training (ILT) and e-Learning differ greatly. In the absence of an instructor, e-Learning designers must rely heavily on the content presentation of their lessons. The way in which content is presented in e-learning, and especially with a "*Page-Based*" development application such as Trainer is of prime importance and can "make or break" a course.

• ***Learning Guidance*** - Wherever possible, additional guidance should be provided to the learner to facilitate recall. E-Learning is perfect for providing any of the learning guidance strategies, especially anything of an interactive nature. Strategies used for this guidance can include the following: *Examples and Non-examples; Analogies; Simulations; Case Studies; Graphical Representations*.

•***Elicit Performance*** **–** It is important to elicit learner performance by providing the opportunity to practice new skills and confirm understanding. This should happen at the end of each section/topic/lesson, before going on to a new one. E-Learning enables a variety of dynamic, interactive, and "hands-on" practice opportunities, such as: *Interactive Questions; Controlled Simulations; Real on-the-job Activities.*

• ***Feedback*** **-** Providing *formative feedback* to learners within the context of practicing new skills and behaviors is crucial to confirming understanding. This is even more important within e-Learning in the absence of instructor feedback, which is largely dependent on the practice activity involved.

• ***Assessment*** –e-Learning should give learners the opportunity to assess their knowledge. It is important to remember the following points: *Test questions must be used to test against the objectives set for the lesson/course. Test results should include remediation to guide the learners in areas where they may need to reinforce or review their knowledge. Tests should provide the learner with their resulting scores. Scoring can trigger the delivery of a certificate for print, if appropriate.*

• ***Enhance Retention*** **-** To enhance a learner's retention so that they may transfer new knowledge and skills to their jobs can be achieved in a variety of ways in e-Learning. For example, repetition of content can be achieved in creative ways, such as simulations/activities that first show the learner, then let them try for themselves. Learners can be provided with "Job Aids" to take away from training. These job aids can be made available to learners by providing opportunities to print or download items such as cheat-sheets, procedure tables, and training guides and materials.

Giving learners further information in the form of textual references, related websites, or further training recommendations can also serve to enhance their retention.

As with any page-based course development application, great attention must be paid to the overall look and feel of every single page of the course. Pages should not be boring, yet they should not be so busy that they confuse the learner. Learners should always be comfortable within a course, yet not so comfortable that their attention wanders. Pages should always present a good balance of vibrancy and instruction.

4. Conclusion

A differentiated approach, taking into account a few factors that influence the courses, is being used in the development of e-courses. The subjective preferences of the students and their requirements are also taken into account. The platform, used for their development, allows the creation of a coherent structure of the learning materials and supports the use of instruments for easier navigation among those learning materials.

The system for blended learning, which is used at the Faculty of Engineering and Technology http://tk.uni-sz.bg/edutk/, is convenient and easy to use. Worthy of mentioning is also the fact that it is an open source platform that is under development at all times and new activities are being added to it, as well as it gives the opportunity to use additional resources. With the latest actualizations and additions it allows for a web conference and a new addition is the possibility to check for plagiarism in the students' work assignments, which are saved in the e-learning system. All new developments and activities in the platform are taken into account in the design and development of e-courses.

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