A MODEL OF ANALYSIS OF THE E-LEARNING SYSTEM QUALITY

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Abstract: The wide proliferation of the e-learning formation system become a true fact. The infrastructure delivered by the internet network permitted the decreases of the exploitation costs in favor of the beneficiary of formations. Like in the case of the classic system of formation a question about how to measure the its quality is raised. It is very specialized environment with the same actors like in the classic system too but with different type of interactions. Can we say that in both system the results are similar and their quality is the same. This paper reveal a model that can be used when try to evaluate the quality of this kind of system using specialized indicators for every aspect that can be measured.

JEL classification: I21, C80

Key words: e-learning system, quality, indicators, beneficiary of formation e-learning activities, e-learning materials

1. Introduction

The necessity of continuous formation was highlighted many years ago. The possibility of achieve new competences which generate important advantages become more attractive especially when the variation from work market are stronger and finding a workplace become more and more difficult. The classic way used for formation suppose some rigidity when we try to adapt to the structure of formation program. This is one of its disadvantages. To eliminate this many formation alternatives was found that assure good correlation with the present's conditions. E-learning was one of this formation alternatives. This new alternative form of training had proper conditions of development when information and communication technology permitted cheap, real time and complex communications, in other word affordable to anyone. The possibility offered to the beneficiary of formation to manage their time using a very personal and flexible manner was another advantage that convinced many to use this alternative.

The later software development had permitted the increase of assistance level accorded to the beneficiary of training, including the possibility to personalize the way of providing formation to different individual characteristics aiming the goal to increase the efficiency of learning process [1].

In the classic formation system, the transfer of knowledge is based on interaction between beneficiary of formation and a specialized personal in providing the

knowledge. The efficiency of formation process can be measured using the results of the intermediary and final evaluation tests. The same alternative exist in the e-learning system too. Beside that, because of the fact that in this kind of system there are many more types of data recorded automatically, regarding to the parameters of the formation process, that can be used to precise measure of the quality and efficiency of formation system using modern methodology from statistics and data mining for example. This analyze can reveal the best alternatives of particularization of the e-learning system to the individual characteristics of the beneficiary of formation and to increase the quality of formation process.

The evaluation of the e-learning system quality can be done by using a neutral perspective and by using the perspective of the beneficiary of formation or the perspective of formators (figure no. 1). First perspective can be used to evaluate the entire e-learning system. The second perspective can be used to evaluate the main components of the e-learning system often used by the beneficiary of formations and by the formators.

For measuring the e-learning system quality we must be focused on evaluating of the following main components:

- the e-learning infrastructure
- the e-learning formators
- the e-learning materials
- the e-learning activities

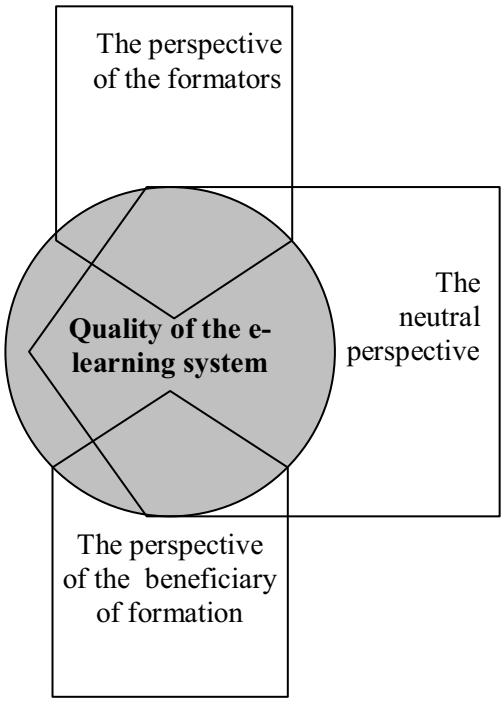

Figure 1. Perspectives used to evaluate the quality of the e-learning system.

2. The quality of e-learning infrastructure

The e-learning infrastructure include all the integrate hardware and software subcomponents which provide support for the formation services. The quality of e-

learning infrastructure is determined by the quality of both software and hardware subcomponents.

Regarding the quality of the hardware subcomponent, this can be measured using the series of the technical parameters provided by existing specialized standards, but the software subcomponent presents many peculiarities. It is not a question only about high performance of hardware but more about the connectivity and accessibility of it.

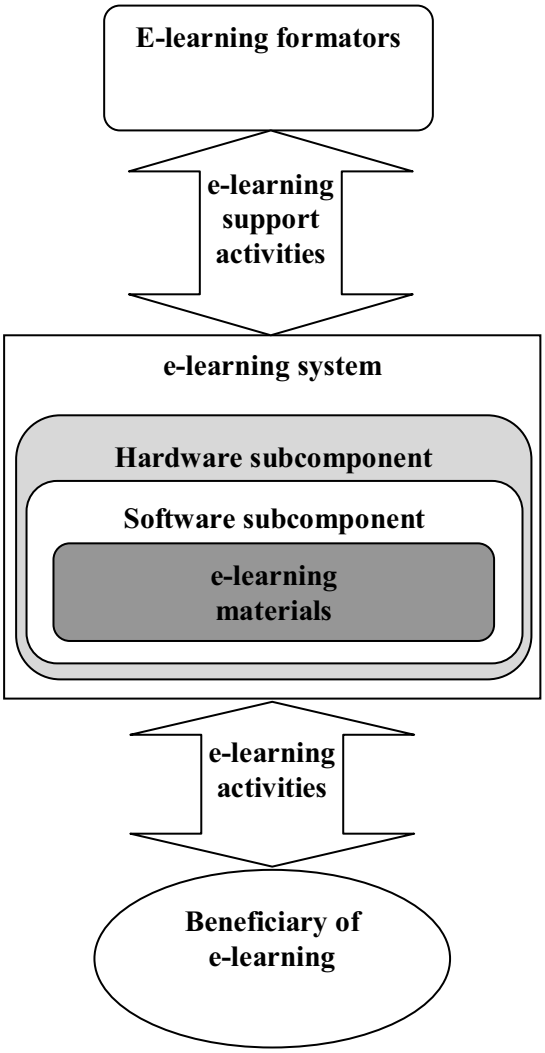

Figure 2. The structure of the e-learning system

The quality of the software subcomponent can be evaluated through the quality of the provided services and must aim the following:

- the management of the beneficiary of formation. For an evaluation of this we can use a survey which can reveal:
    - the existence of the possibility to manage the beneficiary of formation on both side activities and financial;
    - the existence of the possibility to organize the beneficiary of formation

in virtual groups at different level (individual, virtual class, virtual campus etc.);
    - the possibility of monitoring the activities of the beneficiary of formation aiming the goal to better adapt the e-learning system to the individual characteristics of them.
- the management of formation materials. For evaluating this we can use a survey that can include questions like:
    - what are the capabilities supported by the system in managing the e-learning materials?
    - what are the limits for storage the e-learning materials? It's very important because in the e-learning system, beside the journal of user activities, the learning materials is the component that will increase its size very rapidly.
    - what are the possibility to structure the documents using various criteria? A good idea would be to make the evaluation from the perspective of the formators because usually they must insert the materials in the e-learning system.
- the accessibility of the e-learning materials. This can be measured using indicators like:
    - the numbers of the e-learning materials that a beneficiary of formation can access simultaneously;
    - the minimum number of necessary operation for accessing a formation material;
    - the access speed to the formation materials (the minimum/average /maximum necessary time for all operation for viewing an e-learning material, the minimum/average /maximum necessary time to download a e-learning material)
- the availability of the formation interface. This can be evaluated by identifying the following:
    - the possibility of choosing the language – one of the most important barrier of e-learning system
    - the structure of the commands
    - the possibility of using natural input/output devices like touch screen, vocal interface.
- The number and the types of the offered services, like:
    - The existence of the communication service (critical service). This can permit the communication between beneficiaries of formation and formators, between beneficiaries of the formation. The type of the communication services is also important. It can be text only, text and audio, text, audio-video. The capabilities of this service is critical for the e-learning system. It can permit only sequential interaction or real time interaction between the users of the e-learning system.
- The existence and the type of self-evaluation service (using multiple choices questions or interactive)
- The existence and the types of providing formation materials services (critical service). This service can provide only printable content, play only multimedia content of interactive multimedia content.
- The existence and the type of the examination service (critical service). It is

similar with the self-evaluation service.

- The existence and the types of the virtualization services. It can provide for example only virtual board, virtual class, virtual campus [3] [6].
- The existence and the types of learning assistance services. This kind of service permit:
    - the identifying of the learning profile for the formation beneficiaries;
    - the adaptation of the e-learning system to the profile of formation beneficiaries;
    - the management of the learning path for the beneficiaries of the formation.

A good quality for infrastructure means:
- a hardware that can support high and complex level connection;
- a software component that can deliver all services for every actor of e-learning;
- a system with a natural interface and easy to use for everybody;
- a system with very prompt reaction to the demanding of the users;

3. The e-learning formators

In the case of e-learning system the requests that the formators must fulfill are different from the classic formation system requests. In the first case all the interaction between the beneficiaries of the formation and the formators it is realized through the e-learning system. For this reason, besides of the professional competences the formators must have the competences for using ICT and the components of e-learning system. A simple task like answering to a question or presenting a demonstration, an example can solicit the formators more that in the classic formation system. They must have also abilities in working with very heterogeneous groups of people (different geographical locations, different ages, different cultural background etc.) [2].

The quality of the formators must be evaluated by focusing on:
- the professional competences of the formators
- the pedagogical competences
- the abilities in using ICT

All of this can be evaluated by using specialized tests and by the specialists from the field.

4. The e-learning materials

Unlike the classic formation system, in the e-learning system, the formation materials have a different conception based on idea that the interaction between the formators and the beneficiary of the formation it is not a direct interaction and it is possible only through the e-learning system. Because of that the e-learning materials have a higher level of details and many practical examples to make possible the assistance of the beneficiary of formation without the presence of the formators. Taking advantages of the ICT the e-learning materials can have a various characteristics [4] like:

- level of interaction with the beneficiary of formations:
    - noninteractive (for example print format)
    - partial interactive (for example audio-video playable format)
    - highly interactive (for example multimedia interactive format)
- delivery format:
    - print only format

  - audio only
  - video only
  - multimedia interactive [7].
- specific target devices:
  - for using on personal computers
  - for using on mobile device like PDA or smart phones.
- reusability: a component of an e-learning material can be used in other e-learning materials [8].

In the e-learning system the quality of formation materials must be focused at least on:

- a specific format
- the level of assistance assured for the beneficiary of formation
- a specific educational content

For the first type of characteristics the quality of e-learning materials can be evaluated against standards for e-learning like SCORM 2004 [5].

For the second and the third type of characteristics the quality can be evaluated from the perspective of the specialists from the corresponding domain and from the perspective of beneficiary of formation [9]. Both can be evaluated by using specialized survey.

A high quality of the e-learning material can be defined by:

- a multiple and flexible levels of assistance for beneficiary of formation.
- an interactive content that can easy interact with the beneficiary of formation and active also in a sense that can provide a base to obtain informations about the learning activity realized by the beneficiary of formation. For instance, one of the possibility for obtaining informations is to have e-learning materials integrated into a concept map.
- a high level o reusability for its contents
- small storage size. When the e-learning materials are very compact it is very easy to transport them. The size of the e-learning materials can have direct influence on the performance of the e-learning system.

A survey from the perspective of beneficiary of formation can include questions like:

- How much you can understand from this material?
- What kind of the presentation form do you prefer for the e-learning materials?
- How much effort you must realize to learn the content of this e-learning material?
- How much the e-learning materials help you to pass the exams?

5. The e-learning activities

In a typical e-learning system there are two main types of activities (figure no. 2):

1. e-learning support activities
2. e-learning activities of beneficiary of formation

The first type of activities takes place between the formators and the e-learning system. This type of activities may include:

- creating the content for the e-learning materials;
- uploading the e-learning materials into e-learning system;
- assisting the beneficiary of formation in the e-learning activities;
- communicating with the beneficiary of formation
- analyzing the progress of each beneficiary of formation and adjusting the

learning path;

The second type of activities may include the following categories of activities:
- learning activities
- evaluation;
- communication between beneficiary of formation or between them and the formators

The evaluation of the e-learning activities can be done by using indicators that highlight the size the structure and the intensity of each of them.

E-learning support activities can be measured by using indicators like:
- minimum/average/maximum time for creating a component of an e-learning material
- minimum/average/maximum time for creating all component of an e-learning material
- minimum/average/maximum time for uploading a component of an e-learning material
- minimum/average/maximum time for uploading all components of an e-learning material

Learning activities of beneficiary of formation - this type of activity include all activities that involve the use of the e-learning materials (like on-line studying, downloading, interaction with the interactive e-learning materials), evaluation activities (like self-evaluation and exams), communications activities.

For evaluating learning activities we can measure for each beneficiary of formation, at level of different groups of beneficiary of formation, at level of each e-learning material or at level of e-learning material's components a series of indicators like:
- on-line session duration
- time structure of on-line session: % from session duration used for on-line studying; % from session duration used for downloading the e-learning materials.
- minimum/average/maximum time for on-line studying
- minimum/average/maximum time for downloading

For evaluating the evaluation activities we can use:
- the minimum/average/maximum number of self-evaluation at level of each beneficiary of formation and each e-learning material or each component of each e-learning material
- the minimum/average/maximum number of correct answers at level of each beneficiary of formation and each e-learning material or each component of each e-learning material
- the number of self evaluations unfinished in time
- the minimum/average/maximum time used for each question from self-evaluation at level of each beneficiary of formation and each e-learning material or each component of each e-learning material

The same indicators can be used for evaluating the exams.

For all this indicators we can study the trend too.

We can determine many correlations between them to find out more information about the e-learning system. All above indicators can be used as starting point for determining other compound indicators that can accurate and complete measure the quality and efficiency of an e-learning system.

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