

## The Role of Business Analysis Techniques in e-Learning Process Development

Stojan Košti, Bojan Cestnik

**Abstract:** *Business Analysis is a modern discipline that is involved in most projects where efficiency is to be improved. The tendency of Business Analysis is to improve value for a customer, which in turn brings more revenue to an organization [1]. Historically, business analysis share common roots with system analysis. For example, business analysts are typically hired to investigate, analyze, design, and evaluate organization's business needs. However, business requirements are elicited and analyzed at a much more detailed level than traditionally done during systems analysis. Business analysis also puts more emphasis on understanding user groups and business environments and designing highly usable applications. The discipline of business analysis is useful for solving business problems and taking advantage of opportunities by helping business people design procedures, structures, and technology to support and enhance their work. Similar requirements and needs are well known within effective and innovative approaches to e-learning. Therefore, the principles of business analysis can become a valuable asset in developing effective, user-friendly models and processes of e-learning.*

**Key words:** *Business Analysis, Model, Usability, Process.*

### INTRODUCTION

The International Institute of Business Analysis (IIBA™) defines business analysis as “a set of tasks and techniques used to work as a liaison among stakeholders in order to understand the structure, policies, and operations of an organization, and recommend solutions that enable the organization to achieve its goals” [1]. From this point of view, business analysis involves identification of business problems and opportunities, elicitation of needs and constraints from stakeholders, analysis of stakeholder needs to define requirements for a solution, assessment and validation of potential and actual solutions and finally management of the product or requirements scope.

Most of the projects which involve business analysis, include a software or IT solution, but the profession and role are not limited to software development. The focus of business analysis is on helping to elicit, analyze, document, and validate requirements and implement solutions to business problems. The same skills that are useful within software development projects often translate well to other types of business solutions. Frequently, an effective solution to a business problem involves a software component along with procedure changes. Rarely we can find a business unit that is not using software technology to perform its work. Business Analysis helps design solutions, not just software [2]. The profession and the IIBA are working to use the word *solution* when possible instead of limiting discussions to only software systems.

A comparison of goals that an organization wants to achieve through the establishment of various models of e-learning (which are typically closely related to the Internet and information technology) with a typical organization objectives, reveals that they are very similar across all organizations. High quality education and good user experience carry a high value for both, the user and the organization. Typical and common goals are lower costs and more efficient time components (faster, as soon as possible).

Similarly to any project, establishing e-learning model consists of a sequence of steps in the project life cycle. The time and thinking invested during initiation lay the groundwork for all the project work that follows.

However, numerous other activities are also vital to getting the project off to a good start. At the beginning of a project stakeholders often confuse and understand differently project objectives [3]. Take, for example, the objective "quality". Everyone takes quality seriously and wants to serve high-quality e-learning services. However, there's no universal definition of what "quality" means. To help steer our e-learning project toward success, we should spend some time working with domain stakeholders and especially our potential customers to understand what quality means to them.

The main purpose of this article is to provide an overview of how useful methods and techniques of Business Analysis are in assisting the construction of e-learning processes and usability evaluation. First, we describe key factors affecting successful realization of e-learning projects throughout their life cycle; we are primarily concerned with the factors that fall within business analyst's domain of interests. Then, we describe the potential methodologies and techniques related to role of Business Analytics. We evaluate the findings from the viewpoint of their potential use for Business Analysis activities. Finally, we conclude by pointing out the most important findings in the paper.

### **KEY RESEARCH ISSUES**

In this article we focus mainly on areas where practical role of business analytics in the project is often neglected, which in practice leads to a large number of failed e-learning projects. For example, the results of a research study in Slovenia [4] show that such e-learning materials in primary school are used on average by only 15% of teachers. In addition, out of ten prepared e-learning materials only five of them are really used in practice. All this facts were revealed just after the completion of implementation e-learning materials project, in which Slovenia has invested 22 million Euros. Three main reasons for the poor results of the project are listed below as potential research issues.

(1) Standardized learning solutions and personalization: The fact is that such solutions are usually not well received among users, as well as undermine their further development, upgrading and integration. Especially for reusability and technical integration aspects the interoperability of learning content is essential. The standardization of learning content and content engineering processes today is the basis for personalized services of tomorrow. Standardized descriptions and the possibility to search learning object repositories therefore need to be extended and closely interrelated with methods for personalized learning support [5]. In practice, it is clear that the final settlement is mostly only in domain of developers. Lack of communication and close cooperation between all stakeholders brings solutions to end badly.

(2) User interface: The delivery of e-learning content on different target devices and into different learning contexts is a highly challenging task. Corporate e-learning scenarios give a rich and realistic chance to learn about the real added value of mobile services and situated learning tools. Based on pedagogical models of situated learning and cognition a wide application field can be defined to adapt the selection of learning tools and the customization of learning content to individuals. To allow the learner to take control of the personalization process in a responsible, flexible and empowering way we want to investigate the use of information visualization. Expert and expertise locators should support personalized discovery.

(3) Evaluation of personalization and adaptation methods: Evaluation and return on investment analysis are an important factor for the introduction of e-learning solutions at the workplace. This includes the identification of enterprises requirements and of the main success factors for e-learning in corporate environments. Other questions are to determine the real impact of technology-enhanced learning on individual and organizational levels, how to measure this impact, and how organizational issues and community culture influence the success of e-learning in different environments.

e-learning initiatives require a serious analysis of alignment before they are pursued and integrated into the organization. This is because in the new knowledge era, a time where reliance is on the ability to regenerate knowledge for product or service improvement, e-learning becomes a means to sustain the competitive advantage – but only if properly aligned. In the following contribution we will present more in detail how to choice of appropriate business analytical approaches to motivate teachers to greater use of e-learning materials and also engage them into the process of continuing improvement of the design of e-learning processes and models.

### POTENTIAL METODOLOGIES AND TECHNIQUES

There are a number of methods related to the Business Analytics that might be especially adaptable to the study of the implementation and outcomes of e-learning. Because e-learning is a relatively young and emerging instructional medium, it would be premature to look only at its outcomes. Much valuable formative information can be obtained from the examination of how programs are being implemented and the processes by which they are delivered.

First, we have to collect detailed knowledge of the requirements of all stakeholders. The method called Requirements Management and Communication describes the activities and considerations for managing and expressing requirements to a broad and diverse audience [1]. These tasks are performed to ensure that stakeholders have a shared understanding of the nature of a solution ant to ensure that those stakeholders with approval authority are in agreement as to the requirements that the solution shall meet. Management of requirements assists with understanding the affects of change and linking business (e-learning) goals and objectives to the actual solution that is constructed and delivered. Inputs and outputs of requirements management and Communication, recommended by BABOK™ [1] are shown on figure 1.

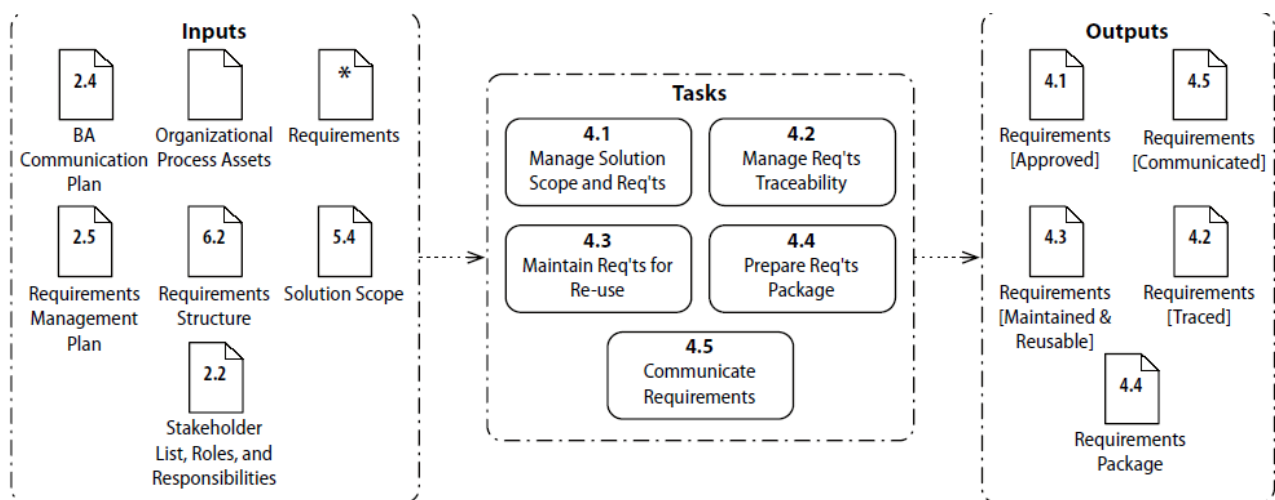


Figure 1: Requirements Management and Communication Input/Output diagram (Source: BABOK, 2009)

Another potential technique that seems to be particularly informative for some e-learning evaluative questions is implementation analysis [6]. A goal of this method is to bridge the gap between process and outcome analyses by examining key elements of a program in an attempt to understand what variables affect implementation. Information gained from implementation analysis can be used to improve the functioning of the program during and after implementation.

One of the useful methods is formative experiment. The objective of a formative experiment is to observe how the technology is being implemented, given the specified goals of its use. Instead of the technology as the unit of analysis, the focus is on the

environment, including the instruction, roles of the lecturers and participants of the course, the institution as an organization, and the technological infrastructure [7]. Once an understanding of the phenomenon has been gained through the formative experiment, systematic research then can be planned and carried out to examine specific factors that contribute to successful or unsuccessful educational practices.

After each course held, another evaluation approach, an econometric modeling can yield informative data about the effectiveness of a program. Data can be collected to describe the characteristics and outcomes of a program using economic measures. It is important, however, to recognize the limitations to econometric modeling, as well as the limitations to any particular evaluation method. Such a technique can be a valuable inclusion in a multiple-methodology approach to evaluate e-learning. There are different ways of looking at evaluation and analysis, many of which are sufficiently compatible to form a multi-method approach to research. It is recommended that methods basis on the architectural model for e-learning (figure 2).

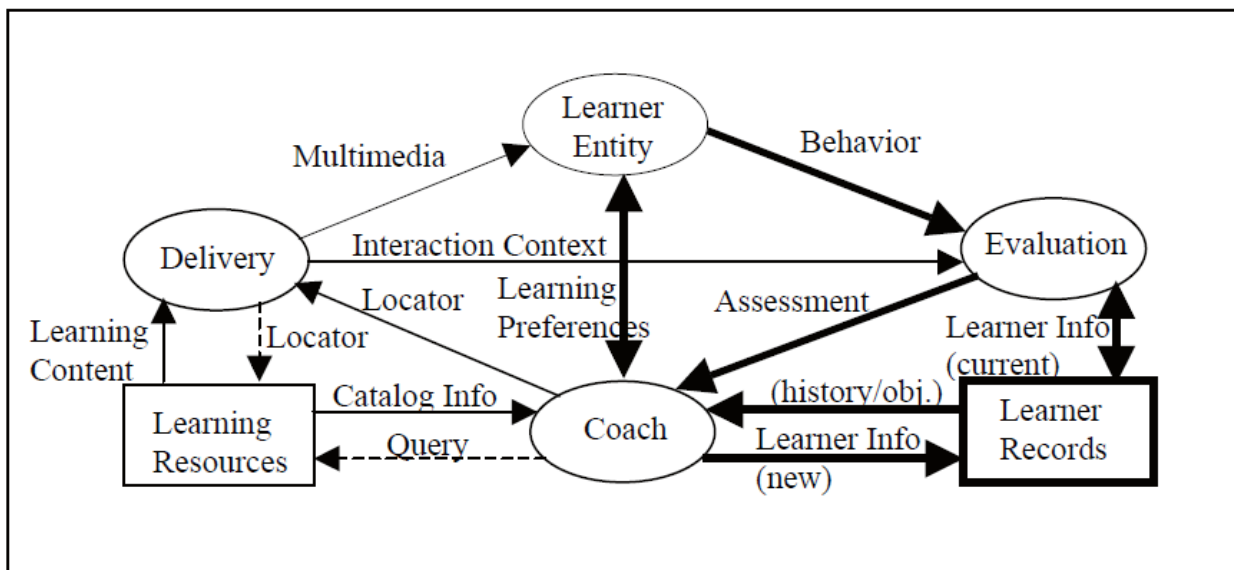


Figure 2: LSTA System components (Source: El-Khatib et al., 2003)

The Learning Technology Systems Architecture (LTSA) prescribes processes, storage areas, and information flows for e-learning [8]. Although approaches have merit independently in their ability to answer different types of questions, strength often is found in merging their capabilities to examine phenomena from different but complementary perspectives. The selection of a method or multiple methods will depend on the nature of the e-learning program, the relevant questions, and the needs of the all stakeholders and participants.

### APPLYING BUSINESS ANALYTICS TO E-LEARNING PROCESS

Before we perform an in-depth analysis of how to assess the readiness of the organization and individuals within the organization, one of the first parts is to determine the objective or purpose of the e-learning venture [9]. Without this basis of reference, it would be impractical to determine readiness since one must have the purpose stated first to make any meaningful assessment. Secondly, it is important to understand that as with any change initiative the emphasis should be on evolution not revolution. Adopting this incremental approach will significantly improve the chances of the e-learning success and simultaneously reduce stress about the new initiative. Figure 3 is provided as a visual means to the e-learning implementation continuum. If we want to achieve this goal, teachers should be well motivated for the use of e-learning materials. They must be

immediately engage in a process of developing e-learning model. We must not ignore detailed requirement analysis to obtain key information from teachers of how e-learning model should look like and which e-learning materials are relevant, if we want to achieve that e-learning content will be useful for both teachers and participants.

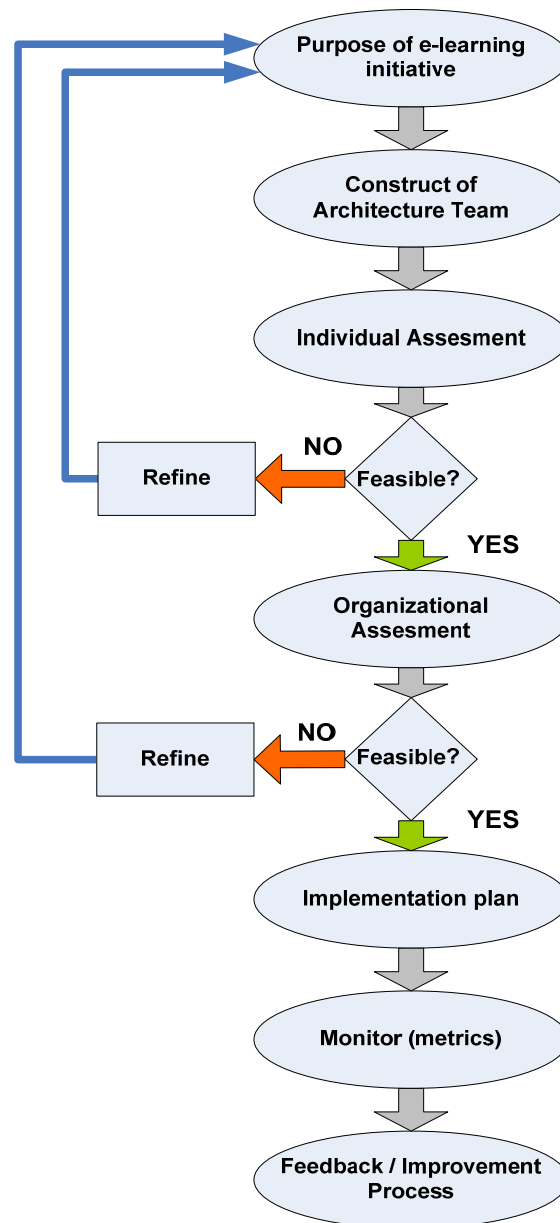


Figure 3: e-learning Importance Continuum (Hebenstreit, 2009)

### Readiness for e-learning

This individual assessment serves as a means for teachers to provide input directly into the learning initiative that the organization is contemplating. The results of this assessment will serve two very important functions. First, it will provide a self-reflection opportunity on teacher's level of preparedness towards the learning initiative being pursued. Secondly, through an anonymous means it will provide valuable feedback back to the architecture project team who will incorporate their input into the development and deployment process. The need for honest and fair responses is critical given how important their input is to the overall success of our organization's e-learning initiative.

In order to do the individual assessment, a few specific areas should be explored:

- Individual alliances: The individual assessment speaks to how well the teachers feel they are a team with the other department(s) and even within their own department. This is very valuable information in making sure that organizational and individual issues can be addressed that are hampering teamwork prior to the initiative and also processes can be designed in the deployment of e-learning that will improve teamwork if it is determined a problem exists.
- Individual alignment: Teachers (and other individuals) must first understand what the initiative is and how they can contribute to the success before they can feel aligned with an initiative. To achieve alignment, the reward and recognition system must reward the organizational goals. If there is a general feeling that there is a continuous shift of focus on goals, lack of knowledge of how success is measured [10], and awards don't exist for teams and they are not focused on organizational success, then the architecture team needs to know this. If this is the case, then deploying e-learning may be met with resistance by the affected staff and many of the items necessary to cause the organization to embrace e-learning will need to be carefully analyzed from the organizational perspective.
- Communication assessment: It is critical for successful of e-learning project. How positive does this individual feel management is embracing e-learning? Has the individual heard personally from management, why e-learning has chosen to be implemented at their organization and what is in it for the individual? Does the individual know the members of the architecture team and those who will be working specifically with them? The key will be for senior leadership to be facilitative and not directive in nature to achieve the greatest benefits from e-learning. This is the opportunity to get feedback on if in fact the perception is that the e-learning initiative is being implemented through a facilitative process. One of the best ways to assess communication is to ask about past change initiatives and how well management assisted with the pre/post implementation stages.

### **Standardization**

We have mentioned the problems of standardization. There must be an increasing emphasis on ensuring access to high-quality education and training materials that can be tailored to individual learner needs and made available whenever and wherever they are required. From technology point of view, to achieve the best possible value, the management must ensure that e-learning instruction is accessible, interoperable, reusable, and affordable through the application of technical specifications and guidelines. To create one unified e-learning content model, specifications enable the reuse of Web-based learning content across multiple environments, products and technological platforms. It is important to keep in mind that whatever technology or IT product is selected, it must be used in the right manner to ensure that e-learning is effective. The mere use of IT in a learning environment does not spell success. IT plays a major role in learners' learning experience and this experience can be both positive and negative. For example, collaboration tools that allow more reticent participants to ask an anonymous question may be seen as a great boon to that participant [9], [10]. On the other hand, a video or animation that is either irrelevant or a drain on system resources can be a distraction or nuisance (or both).

Taking into account the principle that we can not manage the process which could not be measured, well-designed metrics process will provide invaluable insight into how the e-learning project is performing for the organization's people, business processes, and programs. Metrics and other key performance indicators provide several important benefits, including making a business case, refining the implementation process with feedback data, establishing clear objectives and developing lessons learned and benchmarks. As discussed in the opening chapter, e-learning is closely related to other

enterprise Business Analytics improvement methods such as knowledge management and information literacy. To identify the business purpose of the project and have an understanding how the project will enhance our objectives, we should follow the decision model steps shown on figure 4. As we identify the measures that we will use, we will also need to identify a process for collecting these measures. The important element is to structure information gathering and to probe deep enough to understand how decisions are made and the information that measures can provide to help decisions.

### System Measures

For system measures like output and outcome measures, we may end up relying on manual counts, estimates, or surveys. Surveys can have a dual purpose: they not only collect useful information but they also help educate the survey taker by raising their awareness of key issues or critical success factors for the initiative

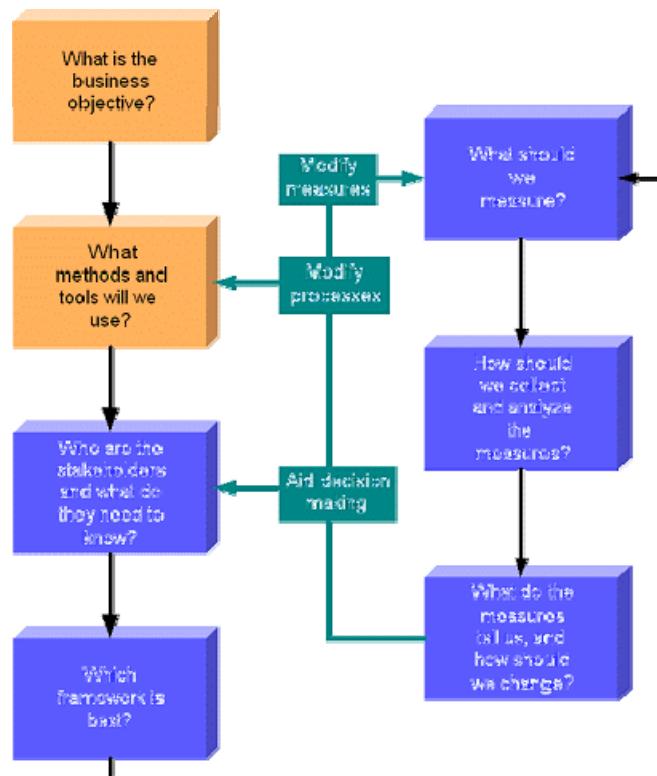


Figure 4: Metrics Decision Model (Source: Hebenstreit, 2009)

Another useful technique provided by BABOK [1] is interviews and workshops. Merely asking people what information they would like is unlikely to yield useful results. The useful decision-making information could be achieved by asking "what if" questions.

Tracing the flow of the program capabilities (structured program flows), the uses of these capabilities by direct users, and the benefits to the end user is another way to identify the information desired from performance measures. This flow tracking technique is particularly useful for programs for which it is difficult to directly identify or calculate measures for the ultimate end user benefits.

Once the measures have been collected, they should be analyzed within the framework of our e-learning program. This will ensure that the measures are correlated to the objectives of the initiative and aligned with the strategic goals of the organization. In particular, explicitly note whether the measures give a direct or indirect indication of effects so that project team and stakeholders don't misconstrue or have unrealistic expectations of performance. Also, use the metrics to discover the effectiveness and participation of

stakeholders in the project. Collect and prioritize these new ideas and go back to our original plans and assumptions to see if they need to be changed. It is normal that several measures will need to be modified. This is a good time to assemble our team and build a consensus on what should be changed, how to change it, and when to introduce the changes [2].

### **Performance Measures**

**Outcome:** Measure the change in resource costs (funds, time, personnel) used in a business process over time. To tie this to the e-learning initiative, gauge this against when the e-learning curriculum was made available and its usage, and to other business processes that are not part of the e-learning initiative. Also include surveys of user attitudes and practices. Have user surveys shown a higher level of satisfaction? Do they feel they have good opportunities to learn new skills and subjects? Have these values changed since the e-learning initiative started?

**Output:** Conduct a survey to find out how useful people find e-learning. How have people used the available courses? Was it valuable? Is it better than taking classroom courses? Were they able to learn topics that would not otherwise do? How do they suggest improving the system? Measure the usage of distance learning system.

**System:** How many times have the e-learning materials been accessed? Measure the activity of a Community of Practice for a course. How many members are in the community, and how often do they interact? Conduct a survey and test the site yourself. Is the site easy to navigate with an organizational structure consistent with the way they do work and think about the information? Measure how frequently the courses are updated.

As we design our metric process, remember that performance measures should be focused on factors that affect the ability to achieve our strategic objectives. We must "pick the right measure" just like "picking the right tool".

### **CONCLUSIONS AND FUTURE WORK**

George Box [11] once said "all models are wrong; some models are useful". The intention of this paper is to illustrate how to introduce modern approaches of Business Analytics to e-learning processes. The motivation is to raise the level of usability and performance of e-learning. We believe that the presented approach has a number of advantages over traditional approaches, as demonstrated in previous sections.

Additionally, e-learning effectiveness requires decentralizing responsibility (to include self-responsibility) and in traditional hierarchical organizations, if not properly aligned, roles can be confusing and not working in concert with one another to achieve the strategic objective. The result is multiple interpretations of expectations and chaos results since management has empowered a project teams and architects to institute e-learning but e-learning projects require concurrent alignment, especially in the first phases. So, the question we have set to ourselves is quite simple: how does one make sure their e-learning initiative is properly aligned to prevent the aforementioned issues from occurring? If embracement of technology to further organizational objectives is considered an essential element to the success of any organization and within that staff development resonates, then e-learning should be a strategic strategy for those organizations. If this is the case, the foundation needs to be constructed for alignment to maximize the objective, which is the basic mission of business analytics.

The essence of alignment starts with the strategic planning process. The secondary step provides on what is required to ensure e-learning success and aligning processes within the organization to support the strategic objective if not a stand-alone objective. It is at this point that we move along a continuum to allow e-learning to materialize. There is, of course, much more work to be done to implement and test the methods and techniques

described in this paper. We believe that in order to increase motivation of teachers and, consequently, to achieve a higher percentage of usage of e-learning materials, a thorough analysis of requirements and involvement of teachers in all phases of e-learning project development cycle is required.

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