

**BOOK CHAPTER | RE & Educational Technology**  
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## **Significance Of Requirement Engineering In Educational Technology Development**

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### **ABSTRACT**

To effectively actualize the advantages of educational technology in the educational sector, the requirements of the learners, the teachers and all the stakeholders must be thoroughly captured by requirement engineering. This chapter shows the different ways in which requirement engineering has managed the requirements to produce software and other educational technology tools and platforms to make teaching and learning more effective.

**Keywords:** Requirement Engineering, Educational Technology, Teaching, learning, Institutions.

## **Introduction**

Educational Technology (ET) is described as a field which examines the process of analyzing, designing, development, implementation as well as assessing the pedagogical and learning environment, the learners, instructional materials and the entire learning process with the sole objective of improving the teaching and learning process and enhancing the quality of education. ([www.google.com](http://www.google.com)). It focuses on the implementation of tools and media that enhance communication of knowledge, its development and knowledge exchange. It produces unique effect in the educational sector by creating a student- centered learning environment.

## **Educational Technology**

The field of educational technology combines the use of computer hardware, software with theories and practices involved in education to facilitate the learning process. One major example of educational technology is the introduction of ICT in the educational section, which is the use of information and communication technology (ICT) for the purpose of education. Some examples of educational ICT include but not limited to cloud-based learning software, digital white boards, app, discussion board and any other interactive online tools available for teaching and learning. (<https://files.eric.edu.gov>)

## **Requirement Engineering (RE) in Educational Context**

Requirement Engineering (RE) in educational context involves a systematic approach through which requirements of all that are involved in the educational sector are collected and implemented into the software and hardware developmental process.

Requirement Engineering describes the task and techniques which lead to an understanding of the requirements of learners and instructors which starts from the communication stage and continues into the modeling activity. It provides the right medium and mechanism for understanding what the learners and their instructors want by analyzing their needs, negotiating for a reasonable solution, specifying the solution, validating the specification and managing the requirement as they get transformed into an operational system.

### **Related Literature**

According to Pohl, K. (2010), RE functions by eliciting the requirements and needs of each stakeholder processing and developing those needs into detailed agreed requirements which become documented and specified so that they can serve as the basis for all the other system development activities. Nusseibeh and Easterbrook (2000), in describing RE as a road map acknowledged that software creation and management, designing software and requirement analysis are basic components of requirement engineering. RE process model consists of requirement development and requirement management.

The requirement development process includes requirement elucidation, requirement analysis, requirement specification, requirement validation and verification. Requirement management includes investigation, feasibility study, design, construction, testing and release. Hence in consideration of requirement of the learners and the teachers, a lot of learning software, app and various information technologies can be developed to improve the teaching and learning processes.

RE provides the necessary mechanism for understanding what the learners and their teachers want by analyzing needs, evaluating the feasibility, negotiating solutions, specifying the feasible solutions, validating the specifications and managing the requirements in order to transform them into an operational system. RE has also played major roles in e-learning services in the educational sector.

According to Khan W., et al (2014), RE employs the system approach in which the software engineer on capturing the requirements from various sources, implements them into the software development process by applying the requirement development and requirement management models. Khan W., et al (2014) further emphasized that Requirement Engineering can form a collaborative tool for e-learning activities which provides needed facilities for the teachers and learners.

The e-learning environment created by the requirement engineering assists the learners to have easy access to information and help them learn at their own pace and time as well as interact with other learners around the globe. This provision enhances the learner's social interactions.

### **RE and Its Impact on Educational Technologies**

With the aid of RE, the major requirement for learners and teachers and all the stakeholders in the educational sector are taken into consideration and identified. This is subsequently followed by step-by-step implementation into software designs and e-learning services and other modern technologies which can be made available to the learners and the instructors to improve the teaching and learning process.

Educational Technology has been used in various ways to meet the unique needs of the learners. The use of educational software has been observed globally though their maximum potentials are yet to be harnessed due to the gaps between educational requirements and software dynamics. <https://tech.ed.gov/files/2017/01/NETPI7.pdf> Educational software requirements differ based on levels and types of education hence requirement analysis must be conducted using different perspectives.

Sriran (2011), outlined some common requirements of educational software coined to the instructors' and learners and perspectives. For the instructor, the software must provide services to help the teacher upload contents and must provide opportunities to add new topics and ideas. For the learner, the educational software must create avenue and opportunity for viewing and printing of the content.

### **Concluding Remarks**

The above requirements can effectively be aligned by employing the functions of Requirement Engineering for each type of user. The major functions of Requirement Engineering development namely requirement elicitation, requirement analysis, requirement specification, requirement validation and verification can help develop the requirements suited to the needs of the learners and teachers.

The above functions of Requirement Engineering can subsequently be applied in the production of any technology to be used in teaching and learning.

The Requirement Management process which includes investigation of the educational stakeholders, conducting of feasibility studies, design, construction, testing the technologies with the pre-decided parameters and release of the outcome can help in producing information and communication technologies that are learner centered as well as teacher or instructors compliant.

In conclusion, Requirement Engineering is a very important discipline which plays a crucial role in gathering and managing requirement of all the stakeholders in the educational sector. The analysis of the requirements of all involved can be employed in the design of software, creation of e-learning environment, production of instructional media which can be visual, audio and audiovisual which are learner centered so that teaching and learning becomes very efficient and effective. Abstract ideas are also made concrete by using these educational technologies.

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