

# Enhancement of E-learning through Instructional Design Technology

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**Abstract**—The move from an industrial to an information-driven society has significantly changed education delivery, often facilitated by the use of ICT driven communications that are a recent, yet foundational, component of many educational systems. Because of that people can experience new learning patterns used in world. It is paving a way for the people to connect and be familiar with the technology. Instructional technology is a concept which has number of benefits for both the students and teacher/instructor as induce students, catch their consideration and help explicate difficult theories. There are many Instructional design models, techniques and learning theories. The most important factor for effective incorporation of technology is that teaches should be able to integrate instructional technology activities to meet students' needs. E-learning can be enhanced through the successful utilization of instructional technology. Applying instructional technology into e-learning is most probably help to increase the effectiveness of the students. The purpose of this studying about e-learning and instructional technology, the better outcomes of using instructional technology into e-learning, importance and why it is effective, how to make effective e-learning with using an instructional technology, how instructional technology concept can be take into the classroom and hoe to enhance instructional technology in educational process

**Index Terms**— Instructional Technology, E- Learning, Instructional Design Models

## I. INTRODUCTION

Current developments of Information and Communication Technology has change over the conventional learning patterns of most learners irrespective of their demographic differences. The phenomenon of E-learning has developed and spreaded across the different research and development domains. As per stated by Dr. Joseph Lowman, “It is better for college students to be active seeker than passive recipient of learning” [1]. Along with the progress of the ICT, E learning was introduced to class room based teaching and learning to increase the effectiveness of students. where the students are expected become active learners in learning. E-learning is learning via the Internet, network, or individual computer. The applications of e-learning have become so much viral and it is being used by many uses collages, higher education institutions, businesses, and any other locations. [1].

Integrate the technology in the studying area is a complicated procedure that consist of studying the technology, using technology for teaching and learning procedure and integrating technology to enhancement of student learning. Instructional technology being a very much significant pedagogical aspect in teaching and learning since the learning becomes much more enhanced by using correct methodologies [1]. The knowledge creation and skills development can be enhance and increase by using the numerous methods of instructional design technologies and approaches. This can lead to high level of learner productivity. Most importantly the teachers have the ability to create courses using the correct methodology extracted by the instructional technology activities to meet the requirements of students. Instructional technology contributes instead of misfortune human learning procedures are key components to all great e-learning course materials [2]. This research paper describes the enhancement of instructional technology into e-learning including different methodologies of instructional technology, and how instructional design technologist can be use instructional technology for teaching to the students in the classroom, how to enhance instructional technology and the future of enhancement of adult learning [3].

## II. WHY E-LEARNING?

As explained in the previous section E-learning has become vital component in the modern day education irrespective of learner's age. Starting from the kindergarten to up to the university education the technology being applied and covered many existing areas of teaching and learning.

In E-learning the readers can either purchase the reading materials or can use freely available reading which Open Educational Resources is. The major objective of the Open Educational Resources movement is to provide open access to high quality digital educational materials on free access. As such there are so many advantages in e-learning and it is a way of individual learning. It gives instructions through on the web. It can gives wherever or whenever via Web-based course, video or audio materials, live virtual classes and discussion forums. [4]

There are many methods of learning exist and E-Learning can classified into synchronous or asynchronous. Synchronous eLearning happens in a real time environment which the learner get connected to other learners and facilitators real time. The Synchronous E-learning experience is much more equal to a regular classroom. Learners can be obtain courses anywhere in the world as the learners have access to an electronic devices with the internet connection [2]. Synchronous learning has the many advantages of having a real teacher and ability to interconnect with other users of course. Examples for synchronous learning are on line chat and video conferencing.

Asynchronous e-learning mode is the most applied online delivery mode since it is being connected to the instructor asynchronously. In asynchronous e-learning project or course works delivered via e-mail, websites, and community forms can be

mentioned. Students can log into Learning Management System and can download required learning materials and engage in learning at any time. [2]

### III. INSTRUCTIONAL DESIGN TECHNOLOGY

According to Seels & Richey, Instructional Technology defines as “practice and theory, areas of instructional technology of processes and resources for learning” [5]. Instructional design process is the systematic process by which instructional learning materials are designed, developed, and delivered. Research studies concerning learner behavior in online learning reveal that a combination of different learning modes and styles produce better performance, achievement and motivation. Instruction do help learners to identify suitable learning activities, guide learners to gather knowledge, helping learners for practice and checking performances, providing feedback as to the desirability of the learning activities. [4].

Instructional technology is a systematic application of learning theories, strategies, technologies and other organized knowledge to solving instructional and performance problems [6]. Use of instructional design technologies gives lot advantages for both the teacher and the students such as motivate students, capture their attention, and help explain complex concepts [5]. Instructional technology has some features both of instructional design and instructional development. Today most of the countries use instructional technologies are in the classrooms. To evaluate the use of any teaching style, educators will often use Benjamin Bloom’s taxonomy as a beginning point of planning the courses [1].

Different technological instruments that can be used by teachers to enhance instructional technology and e-learning. These instruments make e-learning more interesting, attractive, interactive, meaningful and motivating for the students. These tools are very much powerful since they can change and modify the traditional methods of teaching and learning. The teacher can use technology in various type such as web based activities, virtual labs, multimedia activities and assessments done by online. A good teacher always tries to motivate the every learner by using different techniques and skills. All the technologies not suitable for using to teach different students and it is the teacher’s responsible is to identify a suitable learning and teaching methodology to be applicable in technologies [1].

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#### *Benefits of Instructional Technologies*

Instructional technology has several advantages since it increases the attraction of the students and grasps their attention, and helps clarify difficult concepts. Using various type of methods, it is easily understand the complex things in the lesson. Teachers can be focus not only on the knowledge and skills of the learners but also how to keep the momentum towards active learning. Using instructional technology in classroom is help to participate learners in thinking judgmentally or innovatively, communication with mates in a small group or with the whole class, communicating concepts through writing, or speaking, search own opinions and values and Feedback. At the same time the interest of students will be increased and use greater array of visual instructional materials.

#### *How to Overcome the Barriers of Implying instructional Technology into E-Learning*

The education technologists and researchers have found some reasons as restrictive to the adoption of instructional technology into e-learning. Many higher education institutions are using ICT for the delivery., it does not imply that they use proper instructional technology in their course designs. Fear of failure is another issue hence the members are specialists in the content area, but they are not specialists in utilize of the technology [7].

Another barrier is high installation cost. The laboratory equipments, server facilities and preparation of ideal virtual class room is a challenge. Also one of the barrier is less awareness of student on how of the courses. Other factors such as lacking resources, lack of equipment, insufficient facilities, lack of knowledge, lack of preparation time to integrate instructional technology to teaching methods and students to use computers or the Internet for some instructional activities are main barriers of using instructional technology into e-learning [7]. Insufficient time and resources for student projects is another challenge in here. Teachers and facilitators are also need to pay much attention on engaging the learners on multitasking group work in order to develop the practical skill. This is not an easy task since some institutions are lack with the required hardware and software resources. Improperly developed e-learning materials led the students to be get away from the teacher since it does not attract the learner attention on active learning. Poor feedback facility and long time taken to provide feedback is another barrier in this technology.

### IV. INSTRUCTIONAL DESIGN MODELS

According to the research in Education it can explain as a form of learning and teaching in which the transformation of knowledge, awareness, and understanding of a group of people are moving from one generation to another. Instructional technology is a systematic way of designing, developing, implementing, and evaluating the processes of learning and teaching with specific objectives based on research in human learning and communication. Instructional design is art, science, reality, system, and

technology. As an example it is a science because it is based on learning theories like behaviorism, cognitivism and constructivism and it is an art because of the creativity of design process [6].

It is a theory that offers clear and descriptive direction on how to better support persons study and develop. Social, physical, emotional, cognitive and spiritual are the kinds of learning and development. The aim of instructional design is to accomplish the maximum would be probability of the expected outcomes occur [8]. The major accentuation of instructional system design is not the utilization of hardware. Hardware is one of the tool creators might use to address the issues of a given framework [8]. Instructional design is a technology which used to create learning experiences and environments and can promote the instructional activities through using it. The teaching and learning process is to be helped the aim of instructional design. The objective of the instructional design is to contribute the teaching and studying process by guaranteeing that experiences of education are improved for particular learning objectives [2, 3]. There are many Instructional design models, techniques and learning theories. Some of they are, The ADDIE Model, Dick and Carey Systems Approach Model, Seels and Glasgow ISD Model, Waterfall Model, Model Jerrold Kemp, Assure Model, Rapid Prototyping Model, The Four-Door ELearning Model, Successive Approximation Model

ISD practices continue from proper and systematic approach of thinking about the teaching and learning procedure. Systematic thinking is help to designers emphasis on every element of the design procedure that guarantees an effective design for learning.

### ***The ADDIE Model***

The ADDIE Model of instruction systems design (ISD) was first developed for the U.S. Army during the 1970s by Florida State University's Center for Educational Technology [9]. ADDIE is standard model which is used for generating instructional materials. All other instructional design models are rooted in the ADDIE model. Five original phases are contained in this model as A-Analysis, D-Design, D-Development, I-Implementation, E-Evaluation. Each of the steps are most important in this process.

As a first phase of the ADDIE model, in the analysis phase helps to identify the audience, limitations and opportunities, clarify problems, define goals and objectives, the learning background and student's current knowledge, collect essential data [9]. The second phase is design, here the phase describe about how the model should be specific and systematic. In this phase mainly focus on the learning objectives, content, exercise, lesson planning, assessment. It is brainstorming process which has many forms. In this phase, testing concepts it will save cost and time [9]. The development stage is where the designers create learning content, assessments as well as assignments and need to identify suitable technology before build it. This phase have three tasks namely planning, production and evaluation [10].

The implementation phase includes few steps such as the testing of prototypes and delivering to the audience. This phase is where instructional designs can design again, update and edit [10]. The Evaluation phase is the final stage in this process. It plays a vital role in the starting and at the ending of the process this phase can be classified into two parts as formative and summative. In this phase it mainly consider about the goal have been met or not [10].

### ***Dick and Carey Systems Approach Model***

Another most important instructional design model is Dick and Carey model. This ID model is use to create instructional materials, courses and LMS s. The model is widely implemented by curriculum developers in higher institutions. This model is developed by Walter Dick, Lou Carey and James Carey in 1978. This model starting with the instructional objectives and advances through to evaluation. It furthermore consist of feedback and revision loop. The model composed of ten components as follows [11]. Identify the instruction objectives, conduct the instructional analysis, recognize entry behaviors and student characteristics, write performance objectives, create assessment instruments, create instructional strategy, select and develop instructional materials, design and conduct formative evaluation, design and conduct summative evaluation, revise instruction are the components of that model [11].

### ***Seels and Glasgow ISD Model***

This model introduced by Seels and Glasgow. This ISD model places design within the context of project management to guarantee a course stays within constraints as time and budget. In this model, the instructional designer develop the course, perform the evaluations and can conduct front end analysis [12]. The Seels and Glasgow Instructional System Design model has three stages namely Needs Analysis Management Phase, Instructional Design Management Phase, Implementation and Evaluation Management Phase. In Needs Analysis Management Phase, the model analyze and recording instructional goals and requirements. In Instructional Design Management Phase, formulate instructional strategies, development is breakdown into several tasks, choosing distribution systems, performing formative evaluations. In Implementation and Evaluation Management Phase, developing and manufacturing the learning materials, distributing and evaluating the outcomes of the course [12].

### ***Kemp's Instructional Design Model***

The Jerrold Kemp developed the Kemp's ID model in 1985. This model is modified by Morrison and Ross in 1994. It is a classroom oriented model. The Jerrold Kemp model has nine components. The all components are can perform simultaneously. The important thing is it can be start in any of component. All the components in this model are interdependent. They are, recognize instructional troubles, characteristics of pupils, mission analysis, instructional purposes, content sequencing, instructional strategies, design the message, development of instruction, and evaluation developing [12].

***ASSURE Model***

In 1989, Heinich, Molenda, Russel and Smaldino developed by the ASSURE model is based on Gagne's Nine Events of Instruction [13]. This model assumes that the course design uses for designing e-learning courses. There are some components of ASSURE model and they are; letter A for Analyze Learners. In this stage, study the common characteristics of students such as their gender, age, grade and other characteristics. Also can further study about students learning styles and interests concentrating on the motivational aspects of learning.

Letter S - stands for State Objectives. At this stage, develop specific and measurable objectives for the course and describe what are the students need to do as an outcomes of instruction.

Letter S - stands for select the media and materials. In this stage, can choose the materials and media for the course and develop and modify already existing materials.

Letter U - stands for Utilize Media and Materials. In this stage, implement the selected materials. Before to the implementation, should test them to confirm that the selections meet your objectives. In this phase, confirm that the course works the way it should and that the learners can easily access all materials.

Letter - R stands for require learner Participation. In this stage, students need to practice learning things. Elicit participation through discussions, games, assessments. Ensure that all the activities allow students to apply their knowledge and understanding of the content.

Letter E - stands for evaluate and Revise. In this stage, evaluate whether the objectives were met or not. After doing an evaluation, consider editing your materials and revising the course based on your findings during this procedure.

***Rapid Prototyping Model***

Rapid Prototyping Model developed by David Meier for who work with tight deadlines a limited budget and constantly changing content. This model is all about faster learning design strategies and shortcuts. There are four phases in the Rapid prototyping model. The first phase is preparation. In this phase, stimulate interest and induce students by stating goals and eliminating students' barriers. The second phase is presentation. In this phase, meet new knowledge and abilities by appealing to all learning styles and incorporating interactive presentations and discovery activities into the learning experiences. The third phase is practice. In this phase, integrate new knowledge and skills by incorporating games and skill building practice exercises as well as providing substantial corrective feedback to the learner. The final phase is performance, and in this phase, allow to time put on the new knowledge and abilities and reward the use of these skills [13].

***The Four-Door E-Learning Model***

This is a simple model and has Four – Doors such as Library, Café, and Playground and Evaluation center. The Four-Door E-learning Model was developed by Dr. Sivasailam and that allows specialists to design e-learning courses cheaply and speedily while addressing different types of students [14]. In the Library center, students will discover all the facts and resources to complete the assessment. Presentations, videos and audios are some materials [14]. In this model the Café center, social education activities are taking place. The tools such as Wikipedia, blogs, Discussion boards using in the café center [14]. To recall and apply the content that they learned in the library center, students can play games many times in the Playground center [14]. In the Evaluation center, students take assessments and tests for measure their performance.

***Successive Approximation Model***

This model is an agile instructional design model developed by Michael Allen. The model highlights collaboration, efficiency, repetition. The model mainly focuses on prototyping. But other instructional design models do not focus on prototyping more deeply. This model considers collaboration and early evaluation is important to complete successful project.

**V. APPLYING OF INSTRUCTIONAL DESIGN MODELS**

Instructional development is a procedure of implementing the designing plans for the course designs. According to Seels and Richey the instructional development is a methodical learning of designing, developing and evaluating instructional processes, programs and products. It meet the crucial of internal consistency and effectiveness [15]. Instructional development will be used in a widely knowledge even so the specificity between instructional design and instructional development are identified. In this way in the context development cover all the phases of design developing, maintenance and evaluating of instructional resources [16].

In 1965 Robert M. Gagne explained about the learning objectives, nine events of instruction and relationship between both of them [17]. According to the Gagne s theory Gaining attention is a first step. The teacher needs to take the full attention of pupils, before the learners can start to deal with new information. This may involve using unexpected changes in the instruction. Telling a story or problem will take the attention of the students. The second step is provide learning of objectives. Because of the instruction, instructor or teacher inform the learner about what they will be allow to do and about the tools they can be used to accomplish the objectives of learning. The teacher gives notice the desired outcome to the group members. The third step is Stimulating recall of prior learning. The teacher asks the learners to recall existing knowledge from previously done lessons. Questioning is a common way to motivate recall.

The fourth step is presenting the stimulus. Here the teacher emphasizes to typical features. This is the place where new inclusion is presented in actually to the students. The fifth step is providing learning guidance and here the teacher supports the students to understand by giving organization and relevance. Tactics used for guidance are, examples and non-examples,

Simulations, case studies and graphical representations. Eliciting performance is a sixth step. The teacher requests the learners to answer, demonstrate learning. In this phase student can perform what they learn and show student have an accurate understand about the learning activities.

The seventh step is providing feedback and here the teacher provides useful comments forum of students' performance. The eighth step is evaluating performance. The teacher needs the learner to performance more, and provides comments, to support learning. The last step is increasing retention and transfer. The teacher provides various practices to simplifying abilities [18]. The Gagne's scientific classification is maybe the most popular of the numerous learning scientific classifications in the field of instructional design. According to the Robert Gagne's theory, there exist five major levels of learning. Each of these levels requires a different type of instruction. According to Seels and Richey the instructional development is a methodical learning of designing, developing and evaluating instructional processes, programs and products. This method meets the crucial of internal consistency and effectiveness.

### ***Enhance E-Learning Systems Using Instructional Design Models***

Instructional technology is adopted and change the way of methodology of teaching. It improves the affiliation between both teacher and the student. Nowadays many scholars and learners use of courses vary from each other since they use different devices to access the course Furthermore, the institute can integrate newly updated technologies such as instructional technology into the teaching and studying procedure. In fact the quality of learning and teaching depends on how much of effort and attention has put into the development of the courses. Mostly in the in the semi developed countries, the governments are confront the lot of challenges to recognize the best methods to use their rare properties and increase the value of learning. Even the well developed countries are using the instructional technology in e-learning that is using in the classrooms or anywhere.

The teachers can access internet to include online tutorials, lessons, and discussion forums for students who require further help. The instructional designees and course developers have the access to open educational resources and can use the learning materials without any cost. Some learners use the mobile and hand held devices as learning tools to take down notes and search the facts using wiki, blogs. Social networks and many other connecting platforms brings and connect users and facilitators together irrespective of where they log on. Mostly in modern e-learning platforms, self learning is promoted and learners are more like self directed. Thereby the students can communicate thoughts, beliefs, and knowledge with others. Then students can share all those things with teacher or other users present and share the knowledge with the others.

Peer learning is also an essential part of learning. These online learning platforms provide the facility to engage in peer learning. This can happen via discussion forum and chat forums. Special group work also let the students to develop the team building and creative skills. Well developed online courses are use video games for learning activities. Introducing video games into the courses is help to the students to understand the content of lessons. It helps to clarify complex theories and concepts. The games can be inserted in to the e-learning. It will be tend to students to study, increase the motivation and increase the interest. As a results students can gain better understanding than traditional classroom teaching.

Another constructive methodologies are storytelling and scenario based learning. Storytelling is a tool of learning that teaches, entertain, and tend students simultaneously. This can be presented via online games or interactive multimedia. Here, the students can get the idea of the content easily and can remember it easier. Adding this tactic to the e-learning it is help to learners remembering information, relate to the incident, and reflect on a situation [19]. Scenario-based learning is the other method which uses interactive scenarios to support active learning strategies such as problem-based or case based learning. This model is usually get the students working on their way through a storyline, on a given situation, case or a problem which they are required to solve.

Accordingly, using those methods in teaching and learning process can enhance instructional technology in e-learning. Then most of the institutions saw the benefits of using this technology into e- learning they tend to use this technology in their teaching and learning procedure in their countries.

## **VI. FUTURE TRENDS OF INSTRUCTIONAL TECHNOLOGY**

In the 21st century, many researchers are engaging with the important development in the information technology allied teaching and learning systems. The main attention is on the developments on E-learning and virtual learning systems [20]. The most recent definition of instructional technology, educational technology is the study and good conduct practice of facilitate to studying and enhancing performance by develop, utilize and manage suitable procedure of technology and resources [20].

According to Hannifin, the learning using different media increases the decision making. However in addition to that J. K. F Gallini & D. Barron tried to explain the future of instructional technology and learning. But still much researcher s focus on the effects of different media on learning [26]. The world is moving so fast for the concept of free and open learning which will be a remarkable turning point of the education history. Then Knezek brought a different perspective to the instructional technology with regards to teachers. Researchers explained that technology is no longer just a delivery system therefore more research questions should be raised in order to understand the phenomenon under the topic. In general instructional technology should always be able to solve the various kinds of educational problems by increasing the efficient usage of resources, students should be able to achieve knowledge and skills easily. Consequently to increase the efficient the researcher should survey more [20].

Reeves also brings out the social responsibility of research questions. Therefore researcher should find the problems faced by the teachers when introducing instructional technology to a teaching and learning process and find the related possible methods of enhance learning. When the research design is good the outcome is also accurate. Therefore, new teaching techniques improved decision making and suitable teaching environments. Apart from that in order to maintain the sustainability of instructional technology in class rooms there should be sustainable plan on the conduct [20].

Gustafson believes that the performance of human can be enhancing if there is a good instructional technology [20]. Introduction of virtual tools, interactive media, and augmented technology are some new instructional technologies used. In the same time the researcher should understand the purpose of each instructional development. With the rise of instructional technology there should be standards on quality control too. According to Wily, it don't matter what kind of technology being used but there should be a recognized standard for each and every development and delivery. In general it is not practicable, but researcher or educators should introduce world recognized standards for new technologies. So in the future the cost of education should be reduced and new technologies have to be introduced to the market in lower prices. [20]

## VII. DISCUSSION

E-learning is a most popular method of education. It helps to students learn anything in anywhere. Also instructional technology can be including to e-learning thereby students can learn in effectively. Teachers can use the instructional technology in the development of course designing. Using that technology into e- learning is gain lot of benefits. The learning theories can be used before apply it to the course. The instructional technology will enhance as many ways in the future. Many types of methods are using to teach to the students by teacher. Also it is possible for the researches and surveys using social networks effectively. Instructional technology will be very much useful in the quality and pedagogical aspects of online learning in future.

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