THE IMPLICATION OF THE LEARNING THEORIES ON IMPLEMENTING E-LEARNING COURSES

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ABSTRACT: *The aim of this paper is to describe the implication of the three commonly known learning theories on online courses. These theories are: the behaviorism, cognitivism, and constructivism. Moreover, the effect of these learning theories on implementing e-learning courses is reported. The description of the implication of these learning theories can help to develop the process of learning for the learner. Online learning materials should include activities for the different learning styles, so that learners can select appropriate activities based on their preferred style. Thus, a shift to pedagogy-based initiatives can be observed within the field of e-learning. In this paper, these three theories are described in short, and implications for realizing online courses are derived.*

General Terms: Theory

Keywords: e-learning; learning theories; behaviourism; cognitivism; constructivism.

1. INTRODUCTION

E-learning is the delivery of education including the activities of instruction, teaching, learning and assessment through various electronic media [1]. E-learning is identified as one of the emerging areas as shown by means of concrete numbers [2] and has turned out to be important for educational institutions as well as for companies as highlighted by concrete application scenarios in [3]. E-learning lets the learner learn and get knowledge at a distance, over the Internet. For example, a class student can get real-time training on new subject without traveling to class. Managers can remain at their work office while they take online courses they need to update and enhance their knowledge and ability to understand the work or as they perform their new manager role. E-learning enables employees to learn at any time and any place. All they need is a computer, an Internet connection, and access to the course materials that reside on the Web [4]. Implementing e-learning courses can be seen as a complex process going beyond systematically executing steps within an instructional design model. Among a large number of critical aspects, [5] suggests instructors to consider principles of learning by means of historically grown learning theories. Learning theories provide empirically-based accounts of the variables which influence the learning process, and provide explanations of the ways in which that influence occurs. A learning theory is an attempt to describe how people and animals learn; thereby helping us understands the inherently complex process of learning. Imagine of learning as a relatively permanent change in behavior with behavior including both observable activity and internal processes such as thinking, attitudes and emotions [6, 15].

In this paper, the three major models of learning: behaviourism, cognitivism and constructivism are described in section 2. Based on these models, summary of those learning theories and their general orientations are given in section 3. Conclusion and future work is given in section 4.

2. LEARNING THEORIES

Here are three commonly known learning theories main categories or philosophical frameworks under which learning theories fall: behaviorism, cognitive and constructive. Behaviorism focuses only on the objectively observable aspects of learning. Cognitive theories look beyond behavior to explain brain-based learning. And constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts.

2.1 Behaviourism

The behaviorist school sees the mind as a "black box," in the sense that a response to a stimulus can be observed quantitatively, totally ignoring the effect of thought processes occurring in the mind. Early computer learning systems were designed based on a behaviorist approach to learning. The behaviorist school thought of postulates that learning is a change in observable behavior caused by external stimuli in the environment. Skinner [7] argued that since it is not possible to prove the inner processes with any available scientific procedures, researchers should concentrate instead on 'cause-and-effect relationships' that could be established by observation. Behaviorists claim that it is the observable behavior that indicates whether or not the learner has learned something, and not what is going on in the learner's head [8]. However

behaviorists suggest Implications for Online Learning with respect to the behaviourist school:

1- Learners should be told the explicit outcomes of the learning so that they can set expectations and can judge for themselves whether or not they have achieved the outcome of the online lesson [4, 8].
2- Course designers have to define sequences of instructions using conditional or unconditional branching to other instructional units and pre-determining choices within the course.
3- Learners must be tested to determine whether or not they have achieved the learning outcome.
4- The behaviouristic approach for learning suggests to demonstrate the required operation, procedure or skill, and to break it down into its parts with appropriate explanation before learners are expected to copy the desired behaviour. Learners are supposed to build proficiency from frequent review or revision with check tests at strategic points or repeat practice with feedback [8].

2.2 Cognitivism

The cognitivism paradigm essentially argues that the "black box" of the mind should be opened and understood. The learner is viewed as an information processor (like a computer). Cognitive psychology claims that learning involves the use of memory, motivation, and thinking, and that reflection plays an important part in learning. They see learning as an internal process and contend that the amount learned depends on the processing capacity of the learner, the amount of effort expended during the learning process, the depth of the processing [9, 10], and the learner's existing knowledge structure [11, 14]. They also look at learning from an information processing point of view, where the learner uses different types of memory during learning (Figure 1) [8].

The cognitive school recognizes the importance of individual differences, and of including a diversity of learning strategies in online instruction to accommodate those differences. Learning style refers to how a learner perceives, interacts with, and responds to the learning environment; it is a measure of individual differences [8].

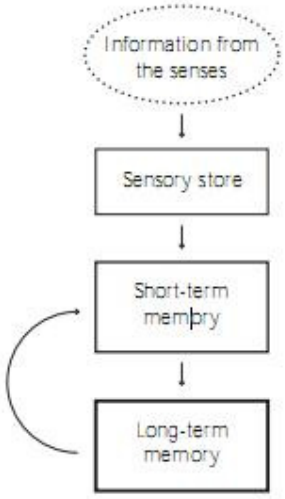

Figure 1: Types of memories

Some aspects have to be followed by the Instructional designers for realizing the online courses:

1- Online learning materials should include activities for the different learning and cognitive styles.
2- The teaching strategy should enhance the learning process by facilitating all sensors, focusing the learner's attention by highlighting important and critical information, reasoning each instruction, and matching the cognitive level of the learner [12].
3- The instructional designer should tie up to new information with existing information from long-term memory using advanced organizers to activate exiting cognitive structures [8, 12].
4- The learning content should be chunked to prevent cognitive overload. Exceeding a number of five to nine items to learn, linear, hierarchical, or spider-shaped information maps should be provided [4].

2.3 Constructivism

Constructivism learning theory is defined as active construction of new knowledge based on a learner's prior experience. Research agrees that constructivism learning theory, which focuses on knowledge construction based on learner's previous experience, is a good fit for e-learning because it ensures learning among learners [8]. A major emphasis of constructivists is situated learning, which sees learning as contextual. Learning activities that allow learners to contextualize the information should be used in online instruction [4]. In most pedagogies based on constructivism, the teacher's role is not only to observe and assess but to also engage with the students while they are completing activities, wondering aloud and posing questions to the students for promotion of reasoning.

Constructivists see learners as being active rather than passive so he will be the center of the learning, with the instructor playing an advising and facilitating role. That will encourage the learner to arrive at his or her version of the truth, influence by his or her background, culture or embedded worldview [12].

Learning should be an active process by means of keeping learners active doing high-level activities such as asking learners to apply information in practical situations, facilitating personal interpretation of learning content, discussing topics within a group, assessment and so forth. (Figure 2) shows the relation between constructivism and e learning design.

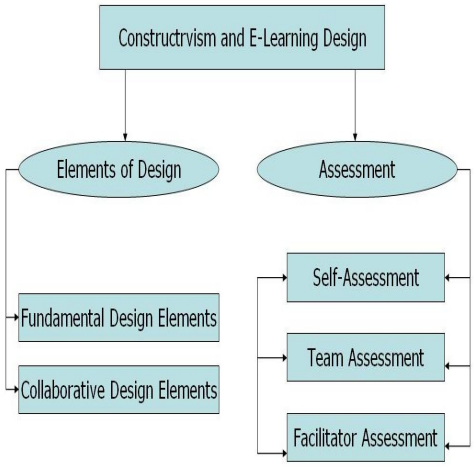

Figure 2: Constructivism and e learning design

Experiences and social interactions play a role in the learning process [4]. The following statements show some of the deriving implications for creating instructions for online learning:

1- To enforce learners constructing their own knowledge, instructors have to provide good interactive online instructions.
2- Learners should be given control of the learning process. Besides, there should be a form of guided discovery where learners can make their decision on learning goals, but can also use some guidance from the instructor
3- Instructors should focus on interactive learning activities as collaborative and cooperative learning should be encouraged to facilitate constructivist learning [8, 12].
4- Learning should be made meaningful and illustrative for learners by including examples and use cases for theoretical information.

3- RESULT DISCUSSION

Online learning materials should include activities for the different learning styles, so that learners can select appropriate activities based on their preferred style [4]. Behaviorist, cognitivist, and constructivist theories have contributed in different ways to the design of online materials, and they will continue to be used to develop learning materials for online learning. Behaviorist strategies can be used to teach the facts (what); cognitivist strategies to teach the principles and processes (how); and constructivist strategies to teach the real-life and personal applications and contextual learning. There is a shift toward constructive learning, in which learners are given the opportunity to construct their own meaning from the information presented during the online sessions. The use of learning objects to promote flexibility and reuse of online materials to meet the needs of individual learners will become more common in the future. Online learning materials will be designed in small coherent segments, so that they can be redesigned for different learners and different contexts [4]. There is ongoing debate about whether it is the use of a particular delivery technology or the design of the instruction that improves learning [9, 10, 13, 15].

From the literature review, my findings reported that the behaviorist, cognitivist, and constructivist are the most common learning theories. The behaviorist school sees the mind as a "black box," in the sense that a response to a stimulus can be observed quantitatively, totally ignoring the effect of thought processes occurring in the mind. Early computer learning systems were designed based on a behaviorist approach to learning.

The cognitivism paradigm essentially argues that the "black box" of the mind should be opened and understood. The learner is viewed as an information processor (like a computer). Cognitive psychology claims that learning involves the use of memory, motivation, and thinking, and that reflection plays an important part in learning.

Constructivism is an active construction of new knowledge based on a learner's prior experience. Research agrees that constructivism learning theory, which focuses on knowledge construction based on learner's previous experience, is a good fit for e-learning because it ensures learning among learners. Table 1 shows the summary of our research paper.

Table 1: Summary of our research paper

Learning theories	Explanation	Implication on e-learning course
Behaviorism	Stimulus and response: - Students remember and respond (change in clear behaviour due to conditioning)	Sees mind as a "black box, so very little effect on e-learning courses

	- Teachers present and provide for practice and feedback	
Cognitivism	Information transmission and processing: – Students remember strategies, rules and patterns. – Teachers plan for cognitive learning strategies.	The mind should be opened and understood. Therefore, it has high effect on e-learning courses
Constructivism	Personal discovery of knowledge: – Discover relationships between concepts, e.g. addition and subtraction. – Teachers provide instructional context for active and self-regulated students.	Sees each learner as a unique individual with unique needs and backgrounds, so it has very high effect on e-learning courses

4- CONCLUSION:

This paper describes the three commonly known learning theories the behaviorism, cognitivist, and constructivist and how their implication on e-learning courses; By summarizing the three commonly used learning theories in table 1, the researchers can benefit from our result that it can help them to make a good decision about the choice of a suitable learning theory when they develop their e-learning courses. Our future work should be extended to include comparison between more learning theories so that the e-learning courses developer will have more information to make an easy decision.

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