

The Psychology of E-learning

Nabia Luqman Siddiquei¹, Dr. Ruhi Khalid²

(Ph.D. Scholar, Institute of Psychology, Beacon House National University, Lahore)¹

(Director, Institute of Psychology, Beacon House National University, Lahore)²

Abstract: *This article represents our views regarding the psychology of e-learning which is emerging as a significant, more promising and more interdisciplinary field of study. The purpose is to endorse knowledge, capability and skills in the minds of young learners to enhance both quality and quantity of learning. This paper discusses the well-known learning theories and elaborates its implication within the context of online courses. The theories include: behavior, cognitive and constructive. Further, the effect of these learning theories on implementing e-learning courses is identified in this paper. It will help the researchers to design and develop appropriate e-learning courses and enhance learning process for e-learners. The paper proposes that learning material for e-learning must contain activities based on the learner's related learning style. This paper aims to provide better practices to design e-learning courses based on the principles of learning theories.*

Key words: E-learning, Psychology, Learning theories, Behaviorism, Cognitivism, Constructivism

Research Area: Psychology

Paper Type: Conceptual Paper

1. INTRODUCTION

1.1 The Perspective of E-learning- As an Emerging Field

E-learning is the transfer of precise educational content and potential instructional method via World Wide Web. The purpose is to endorse understanding, capabilities and skills in young learners to enhance their knowledge both qualitatively and quantitatively (Rovai, 2004). The e-learning activities extend from classroom in the form of two-minute video to open online courses through the medium of internet. Numerous technological grounds of e-learning (for example: cable TV, cable internet, mini computers and tablets), present in diverse forms (for example: distance learning, virtual learning, Web-based learning and online learning), and also by utilizing various channels (for example: electronic books, e- journals, e- assignments, e-dictionary, e-library, e-classroom, e-assessment, e-homework, and e-management). To define e-learning is difficult because of its complex and diverse nature. E-learning is as an emerging field in this global village (Huffakerb & Calvert, 2003; Mayer, 2003).

Researches on this topic have shown that web-based learning environment is complicated as well as compromising task. It involves principles of wide range of disciplines such as psychology, pedagogy, knowledge engineering and ICT technologies (Jarc, 1999; Ross & Schulz, 1999). Instead, learning activities have been enhanced all over the world due to advanced technology and changing role of ICT in education (Gardner, 1999). There is always a misconception that e-learning is a product of technology enhancement (Teo & Ray, 2006). If e-learning is considered to be technology alone then it should emphasize on delivering educational material rather than as a fundamental nature. The e-learning environment will not be able to prove it sufficient and efficient if it has only pedagogical grounds.

It has been explained in a research that “learning as an efficient phenomenon must develop understanding rather than reproduction of knowledge alone” (Jarc, 1999). It has been explicitly suggested, along with many other identified critical aspects to instructors to think over learning principles as a means of historically deep rooted theories of learning. Findings of empirical researches based on learning theories provides evidence of variables which influence the learning process and explanation of how that influence occurs has also been identified (McLeod, 2003). It is an attempt by learning theory to explain the phenomena of learning both by humans and animals as well. It helps us to understand the learning as an inherently complex process. Learning must be taken into account as a change in behavior on permanent basis in which both observable behavior and internal processes like thinking, emotions and attitude change as well (Burns, 1995).

1.2 The Psychology of E-learning

Given the perspective of e- learning as an emerging field, it is difficult to highlight the importance of e-learning not only as an effective learning system but also its difficult to establish its psychological dimension as well. It is essential to encourage psychological factor of an individual (such as cognitive style, learning modes, and motivation), their processes (such as creativity, retention and spatial cognition) and mechanisms (such as split attention effect & dual coding mechanism). These are at the heart of e-learning in order to transform e-learning from “technology-based” to “human - based” process of learning. Yet limited numbers of studies are available to examine e-learning systematically as a coherent learning system (Schank, 2002) and to uncover above mentioned psychological factors, processes and mechanism in an effective way (Mayer, 2001). Hence, it is important to realize the importance of exploring the psychology of e-learning timely by synthesizing the latest understanding of e-learning from four traditional learning theories, by facilitating information exchange, by collaborating between educationists, researchers and practitioners and last but not the least by developing potential and creative research projects to provide information to thousands of e-learners in their day to day e-learning experience (Harasim, Hiltz, Teles, & Turoff, 1995; Khan,1997; Porter, 1997; Windschitl, 1998).

The ultimate notion of educational system is to enhance knowledge in young learners. Therefore, it is required that developers must be aware of how the learners learn before the development of the learning theories prior to the designing, developing and implementing of the solution for e-learners. The history of psychology encompasses various learning theories but unfortunate no theory is generated to maintain and sustain e-learning environment. It is a hopeful that new-fangled and innovative learning theories are emerging, yet the blend of more than one learning theory in order to develop e-learning environment and its related learning content is the most appealing approach. In this regard, few researchers are of the view that there is no need of new theories of learning as already existing theories are adequate, well known and well recognized to meet the needs of new trends and are giving good result and providing success in education. The major concern with these learning theories is that they have been developed before the propagation of the ICT and its diverse use in the field of education.

As discussed above, it is essential to develop adequate and effective material which should be based on the doctrine of pedagogy. The designer of e-learning environment must be familiar with the learning style of learners. They should know the motivating factors of learners and should know how to facilitate the cognitive procedure. They should also know how to endow

efficient and adequate feedback in order to identify the needs of e-learners. They should also require supporting students in their entire educational program. The focus of all the above mention awareness in the online or e-learning environment in which teachers and learners are not present at the same time in the same environment.

This paper aims to focus on the basic principles of three theories or models of learning: Behaviorism, Cognitivism, Constructivism and Active Learning discussed in section 2. In this paper, section 3 comprises of summary of these learning theories and their general orientations whereas in section 4 concluding remarks and future orientation are discussed.

1.3 Learning Theories

The learning theories fall under three major types or frameworks which are: behaviorism, Cognitivism and constructivism schools. The focus of behaviorism is perhaps objective, observable and scientifically measurable aspects of learning. On the other hand, Cognitivism typically deals with a specific form of mental activity which is advanced by computational theory of mind. As far as constructivism school is concerned, it deals with process of learning in which students or learners plays an active role in constructing or building unique and novel concepts or ideas.

1.3.1 Behaviorism

The school of behaviorism is a scientific as well as systematic approach that deals with the study of human and animal behavior. The behaviorist is of the view that both human and animal behavior is a result of individual's history, in which reinforcement and punishment both are included along with motivational status of an individual (Mödritscher, 2006). We can say that behaviorism is the combination of philosophy, methodology and lastly psychological theory. Watson, founder of behaviorism, views the human mind as a "black box" in which response produced by the stimulus could be quantitatively observed, by ignoring the consequences of thought processes taking place in mind. Initial computer based learning systems were intended to be on the principles of behaviorist school of thought. Speaking more precisely, behaviorism postulated that learning is the change in behavior of the learner that is observable and originates from the stimuli in external environment (Skinner, 1974). Skinner claimed that in view of the fact that it is impossible to provide evidence for internal processes with the help of any scientific measures, researchers should focus on "cause-effect" relationships, which can be observed through observation. Behaviorist researchers claims that it can be indicated through observable behavior that either the learners have learned or not or whatever is going on in the young learner's head (Mödritscher, 2006). Therefore, the implications suggested by behaviorists for e-learning by keeping in view the behaviorism school of thought are summarized below:

- In e-learning environment, only explicit outcomes of the learning should be informed to the learners in this way expectation and judgment can be set by the learners themselves about the result of online lessons (Mödritscher, 2006).
- Sequences of instruction should be identified by the course developers by branching them into conditional or unconditional resources of other units of instructions. They are also required to pre-determine the choices within the courses.
- Learners should be examined in order to determine either the learning outcomes have been achieved or not.

- Behaviorist should demonstrate the skills, operations and procedures by breaking it into various segments with suitable details prior to learners in order to copy the desired behavior (Mödritscher, 2006).
- Proficiency should be achieved by the learners from frequent reviews, along with checklists at calculated points and allow learners to do it again along with feedback (Mödritscher, 2006).

1.3.2 Cognitivism

It has been argued by the researcher that every change in behavior is not observable and besides that learning is more than a change in behavior. Such views form the basis of paradigm shift from behaviorism to Cognitivism theory of learning. Cognitivism claims that the “black-box” of behaviorism must be opened and understood by all. They view learner as an information processing unit just like computers. The learning of cognitive psychology includes different types of memory, motivation and thought processes. In cognitive learning, reflection also plays a major role with a belief that learning belongs to an internal process. They are in complete harmonization that levels of mental processes are not affected (Craik & Tulving, 1975; Ausubel, 1968) by the memorized information and already existing knowledge (Stoyanova & Kommers, 2002). They view learning as a pattern of nodes that forms a network in which connection of nodes are in the form of relations to one another (Hung, 2001). The figure 1 shows that learners utilize different types of learning while learning (Mödritscher, 2006).

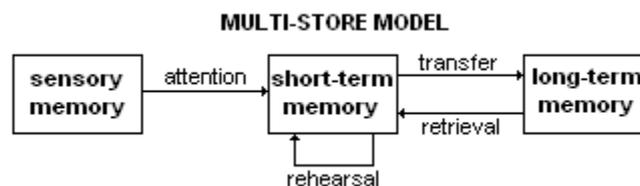


Figure 1: Types of Memory

Cognitivism emphasized the importance of individual differences and to accommodate those differences, Cognitivism includes diverse form of learning strategies in e-learning environment. The perception, interaction and response of a learner in a learning environment is called learning style and it is used to determine individual differences (Mödritscher, 2006). Therefore, instructional designers need to follow the suggestions given below by keeping in view cognitivism for online courses in e-learning environment:

- Different activities should be included in online learning content for cognitive and learning styles.
- Learning process should be enhanced by the teaching strategy. It can be done by the facilitation of sensors, focused attention of the learners on important information, provide rational and logical grounds for instructions, and introducing activities equivalent to learners level of cognition (Schulz & Schultz, 2002).
- New information should be linked up with pre-existing information of long-term memory in order to trigger cognitive structures (Mödritscher, 2006; Hung 2001).
- Chunking should be used in learning material in order to avoid cognitive load for learners. Information maps of linear, hierarchical or spider-shaped should be given to

students to learn by increasing the number from five to nine items (Anderson & Elloumi 2004).

1.3.3 Constructivism

Currently constructivist paradigm is acknowledged by e-learning developers. It is observed that most of the e-learning programs are focused on constructivist theory of learning now-a-days (Schulz & Schultz, 2002). The notion of constructivist theory of learning is that information is encoded and interpreted by the learners whereas combined on the basis of their own perception. In this way, learners are in better position to learn by attributing the information to a personal meaning. It can be defined as “construction of knowledge actively grounded on the previous experience.” Researchers approve that the notion of constructivism is a better option for e-learning as it confirm and enhances learning in e-learners (Mödrischer, 2006). Constructivists highlighted learning as situated learning in which learning is considered as contextual. They argued that activities of learning letting the learner to contextualize the information must be used in online mode of learning (Anderson & Elloumi, 2004). The pedagogies based on constructivism defines the role of teacher as the observer and assessment of learners as well as they are also required to engage students in learning activities while they are performing those activities alone and putting questions to each other for understanding.

Learners in constructivism have to play an active role to become the center point of learning along with instructor who is playing the role of advisor and facilitator. Learning should be considered as an active process, in which learners are engaged in higher-order activities, provided with real-world scenarios and are encouraged to interpret the educational content subjectively and discussion of topics in groups and so on. Therefore, suggestions given below should be considered for developing instructions for e-learning by keeping in view the Constructivism school of thought:

- Learners should be required to develop their own knowledge in which teachers play the role of resource person for providing the instructions in online environment.
- The control of learning process should be in hands of learners. Learners should be allowed to make decisions by developing their learning goals and they can take guidelines from instructors as well.
- Interactive activities should be focused by the instructor in order to enhance cooperative learning (Mödrischer, 2006; Hung, 2001).

2. RESULTS AND DISCUSSION

The review of literature in this paper reveals that it is the need of time to re-evaluate e-learning design on pedagogical grounds. Technology should be accepted as a neutral on pedagogical basis (Teo & Ray, 2006). It is significant to note the purpose of using technology rather than technology on its own (Kozma, 2001). Acquisition of knowledge is the important factor particularly in an e-learning environment, therefore long-term information retention and the capability to apply what is being learned in day to day life should be focused. It should be required by the institutions to boost and upgrade academic system by merging the principles of learning into e-learning environment. The summary of discussed learning theories in this paper is presented in table# 1. Every theory has certain aspects which provide

a framework for teaching styles, delivery modes, management of pace and time, interfacing issues and learner's focus.

Learning Theories	Core Principles
Behaviorism	<ul style="list-style-type: none">• Considered brain as a black box• Reactions can be provoked by external stimuli• Behaviors can be observed
Cognitivism	<ul style="list-style-type: none">• Types of memories are involved• Learning can be viewed as an internal process• Node patterns are used
Constructivism	<ul style="list-style-type: none">• Information is attributed to personal meaning• Learning is active rather than passive process• Developing of personal understanding

Table 1: Summary of Learning Principles

Conventional books and reading material are not adequate and appropriate for e-learning environment as the teacher and student are not physically available to each other. The learning content must be precise, concise and appropriate to meet the demands of e-learners in order to provide quality of learning. The educational content should be structured from simple to complex, known to unknown and from theory to application. It has been suggested by researchers that different types of educational activities should be introduced in an e-learning program in order to facilitate learning styles, in this way, e-learners select learning activities suitable for their learning style. Various different ways can be utilized with the help of Behaviorists, Cognitivists and Constructivists theories for the development of e-learning content. In this regard, behaviorism paradigm could be used to educate the facts (what); cognitive paradigm could be used to address the processes and principles (how) whereas day to day life experiences and context based learning could be discussed according to constructivist school of thought. However, a shift from behavior to cognitive and now from cognitive to constructive learning has been observed which allows the learner to develop the meaning on their own from the presented information in e-learning environment. Learning material available in online or e-learning would be developed in small coherent chunks so that it can be redeveloped according to the needs of e-learners in varied contexts (Anderson & Elloumi, 2004). It is under discussion to decide whether learning can be improved with the help of utilization of a specific mode of delivering technology or it is instructional design that improves learning (Craik & Lockhart, 1972; Craik & Tulving, 1975; Kozma, 2001).

In this paper, on the basis of review of literature, it has been reported that three theories i.e. behavior, cognitive and constructivism are the most common theories of learning now a days. The mind is seen as a “black-box” in behaviorism, in a way that the response produced by a stimulus can be measured in a quantitative way without consideration of thought process of mind. It has also been observed by the review of literature that cognitive school of learning

suggested that the black box of behaviorism must be open to e-learner, flexible to e-learner and understandable to e-learner. They argued that e-learner should be considered as an “information-processor” just like a computer. Again literature review helps us to argue that cognitivism suggested learning as a procedure of memory, thinking and motivation and all these plays a significant role in learning whereas formation of new knowledge that is based on individual’s previous experiences is the notion of constructivism. In this paper, it is concluded that the theory which is best and suitable for e-learning is constructive theory of learning as it guarantees learning in e-learners. Summary of our research paper is mentioned in Table 2.

Theories of learning	Description	Suggestion based on Theories for E-Learning Courses
Behaviorism	Based on stimulus-response notion. Change in behavior because of conditioning Presence of teacher for feedback	Mind is seen as a “black-box” so little impact on e-learners and e-learning courses as well.
Cognitivism	Based on information processing” Student’s learning based on rules, pattern and strategies. Nodes pattern are also plays a role. Planning of teachers according to cognitive learning schemes.	Mind is seen as open, flexible and understandable. Therefore impact on e-learning courses is high.
Constructivism	Formation of new knowledge on personal experiences. Relationship between concepts developed through prior experience. Teacher acts as facilitator based on context. Students acts as self-regulator.	Learner is viewed as an individual entity with unique characteristics and demands. Therefore high impact on e-learning courses.

Table 2: Conclusion of Research Paper

3. CONCLUSION

In this paper, three well-known theories of learning i.e. behaviorism, cognitivism and constructivism have been described along with its implication on the courses of e-learning. Table 1 provides the summary of learning theories which helps the researcher to benefit from this article in order to make a better decision about the selection of an appropriate theory when they are designing or developing the courses for e-learning. In the future, it is expected to extend our work by developing a comparison between more theories of learning in this way e-learning course developers will be able to have more information regarding e-learning courses and will be able to reach an appropriate decisions.

REFERENCES

1. Anderson, T & Elloumi, F. (2004). *Theory and Practice of Online Learning*. Athabasca University, AU Press, Canada.
2. Ausubel, D.P. (1968). *Educational Psychology: A Cognitive View*. New York: Holt, Rinehart & Winston.
3. Burns, R. (1995). *The adult learner at work*. Sydney: Business and Professional Publishing, 99.
4. Cooper, P.A. (1993). Paradigm shifts in designing instruction: From behaviorism to Cognitivism to constructivism. *Educational Technology*, vol. 33 (5), 12–19.
5. Craik, F. & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, vol. 11(6), 671–684.
6. Craik, F. and E. Tulving, (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, vol. 104(3), 268–294.
7. Gardner, H. (1999). *Intelligence Reframed: Multiple Intelligences for the 21st Century*. New York: Basic Books.
8. Huffaker, D. A., & Calvert, S. L; (2003). The New science of learning: Active learning, meta cognition, and transfer of knowledge in e-learning applications. *Journal of Educational Computing Research*, Vol. 29 (3), 325-334.
9. Hung, D. (2001). Theories of Learning and Computer-Mediated Instructional Technologies" SSN 0952-3987 print/ISSN 1469-5790 online © 2001 International Council for Education Media.
10. Jarc, D. J. (1999). *Assessing the Benefits of Interactivity and the Influence of Learning Styles on the Effectiveness of Algorithm Animation using Web-Based Data Structures Courseware*. PhD Dissertation, George Washington University.
11. Kozma, R. B. (2001). Counterpoint theory of learning with media. In R. E. Clark (Ed.), *Learning from media: Arguments, analysis, and evidence* (pp. 137- 178). Greenwich, CT: Information Age Publishing Inc.
12. Mayer, R. E. (2003). Elements of a science of E-learning. *Journal of Educational Computing Research*, Vol.29, 297-313.
13. McLeod, G. (2003). Learning Theory and Instructional Design. *Learning Matters*, Vol. 2, 35-43.
14. Mödritscher, F. (2006). E-Learning Theories in Practice: A Comparison of three Methods. *Journal; of Universal Science and Technology of Learning*, vol. 0 (0), 3-18.
15. Ross, J. L.& Schulz, R. A. (1999). Using the World Wide Web to Accommodate Diverse Learning Styles, *College Teaching*, Vol. 47(4), 123-129.
16. Rovai, A. P. (2004). A constructivist approach to online learning. *The Internet and Higher Education*, vol. 7, no. 2, 79-93.

17. Schank, R. C. (2002). *Designing world-class e-learning: How IBM, GE, Harvard Business School, and Columbia University are succeeding at e-learning*. New York: McGraw-Hill.
18. Schulz, D. P. & Schultz, S.E. (2002). *A History of Modern Psychology*. San Diego, CA: Book World Promotion.
19. Skinner, B.F. (1974). *About behaviorism*, Knopf, New York.
20. Stoyanova N. & Kommers, P. (2002). Concept mapping as a medium of shared cognition in computer-supported collaborative problem solving. *Journal of Interactive Learning Research*, vol. 13, 111–133.
21. Teo, C.B. & Ray, K.L. (2006). A Knowledge-Driven Model to Personalize e-Learning. *ACM Journal of Educational Resources in Computing*, vol. 6(1), pp. 1-1.
22. Wilson, B. (1997). Reflections on constructivism and instructional design, *Instructional development paradigms*, 63–80. In Dills, C. R. & Romiszowski, A. (Eds.), *Instructional Development Paradigms*, New Jersey: Educational Technology Publications, 63-80.