

CRITICAL ANALYSIS OF META-COGNITIVE APPROACH FOR E-LEARNERS IN CONTEXT OF DIGITAL EDUCATION

Dr. Zuleika Homavazir

homavazirzuleika@gmail.com

Co-Author

Dr. Malcolm FirdoshHomavazir

mfhomavazir@gmail.com

Abstract

The meta-cognitive approach is a new theory that is applied in the field of educational technology. The goal of this study was to investigate the impact the cognitive paradigm has on e-learners' learning behaviours and performance, especially in contexts where digital is the main medium for learning. The paper is based on secondary sources of information from the different databases and published sources of information. The paper will describe the theoretical background of the meta-cognitive approach and digital learning environments. The study was conducted to explore the impact of meta-cognitive design principles on digital learning environments. It also investigated different factors influencing the e-learning scenario in digital education.

Keywords: Meta-Cognitive Approach, E-Learners, Digital Education, Learning Behaviors, Digital Environment.

Introduction

The study investigates how a meta-cognitive approach can be used to improve e-learning scenarios that are focused primarily on digital environments. While many discussions around e-learning are focused on learning theories, pedagogical approaches, business models, software tools, etc. The meta-cognitive approach can be applied in different contexts. According to (Sridharan et al., 2010), "meta-cognition is a cognitive state that involves both individual and social processes that allow individuals to work together to experience deeper thoughts and understandings, which can be used later in their lives for personal or professional growth" (p. 3).

Chou & Chen, (2016) used meta-cognition to perceive the cognition of people with autism and non-autistic persons when solving technical problems. The study showed that in both cases, people adopted different strategies to solve the problems and they were able to learn from the other person's experience. This shows that humans can adapt after observing others' solutions even though they feel very uncomfortable about it.

As suggested by (Lominadze et al., 2011), "meta-cognition is a cognitive state that involves both individual and social processes". That is why every person is capable of applying the meta-cognitive approach in different ways depending on their personality traits or previous experiences.

Objectives of the study

Followings are the objectives of the study

- To investigate how meta-cognitive design principles can be applied in digital learning environments.
- To study effective ways to develop digital environments to improve learners' performance.
- To explore different factors influencing the e-learning scenario is the available technology.

Research methodology

This study is compiled with qualitative research methodology, by using the secondary source of information from different sources This paper focuses on approach, understanding states the concept of digital of learners, digital education, meta-cognitive principles and digital environment.

Literature review

E-learning is a method of teaching and learning that takes place largely or entirely through the use of electronic media. These are all characteristics of e-learning therefore it is important to learn how to use it in the future. The meta-cognitive approach can be seen as more effective than

the cognitive approach. It helps e-learners to find what they are good at. It also helps e-learners to develop their cognitive competencies. It helps them to make choices of their future career(Rodríguez-Artacho & Maíllo, 2004).

Cognitive Approach

"E-learning is a method of teaching and learning that takes place largely or entirely through the use of electronic media and it focuses on activities that can be done on the computer and using the internet as a medium for effective communication and different courses and programs to learn, train, work or implement new skills, abilities and knowledge to gain knowledge in various subjects"(Aberšek et al., 2014)

The cognitive approach is not effective as it focuses on facts than on subjectivity processes such as thinking, reasoning, problem-solving, decision-making and cognitive competencies.

Digital Learning Theory

The digital learning theory is the foundation of the meta-cognitive approach. The main principles of digital learning theory are:

The main principle is an interpersonal concern in a relationship because it enables an understanding between learners and the teacher embracing them in a learning process. The second principle is situational context because it changes according to different situations which takes place in a classroom or an online environment, which requires a different way of teaching tasks because all change from one situation to another, from one time to another and from one teaching space to another). The third one is the global outlook which enables the learners to be the best of themselves. It has an impact on their future profession or hopefully in their future life. The last one is expertise; it discusses how to treat the problems that appear in the classroom or online environment(Skulmowski & Xu, 2021).

Implications of Being an e-Learner in the Context of Digital Education

Digitalization has changed traditional methods of learning and teaching, which emphasizes new material types, distribution media, opportunities for interaction between teachers and pupils, new possibilities for independent work with the subject matter, new formats for interactive learning

objects. Digital learning is relevant to all parts of the education system worldwide because of its acceptability that allows remote working(All et al., 2014). It has its advantages and disadvantages depending on how it is used by e-learners.

The digitalized learning environment would have more benefits for e-learners because of the great technological advantage in which everyone can have access to knowledge in a short time thanks to the internet. Like this, it could be useful for learners because they could get information faster. Secondly, it would be useful for learners that are living in isolated areas(Ismail & Sambanthan, 2021). They can communicate with other learners via online environment through various tools such as blogs, chat rooms. Finally, the education system would be more flexible(Steelman et al., 2016).

Meta Cognitive Design Principles and Digital Learning Environments

An exciting development in education, digital learning environments have the potential to transform the way students learn at colleges and universities. These latest types of software allow students to use a range of educational materials from various sources and work collaboratively with their peers, professors, or tutors. While digital learning environments are relatively new, the concept has its roots in the meta-cognitive design philosophy that emphasizes that education is about what students think, not what they know. In the past, there have been attempts to create educational software that is more flexible and customizable than conventional software. Despite their potential, these programs continue to be limited in terms of both functionality and control.

Since digital learning environments offer several advantages over traditional learning environments, they hold the potential to substantially improve student outcomes. For example, students can use extra materials that are not available to general users without affecting their ability to interact with a class. One benefit is a higher degree of security for university data because all digital learning tasks take place within a secure environment. Another upside is the ability for students to access their work from anywhere since they can access it from any device or computer. While digital learning environments provide several benefits, there is still room for growth. For example, these programs need to be more interactive and engaging. It is expected that digital learning environments will continue to evolve and grow in effectiveness and use,

becoming the new standard of teaching and learning at colleges and universities. Though somewhat new, digital learning environments are changing the way people share information and collaborate.

Digital learning environments are defined by the following characteristics:

- A student can interact with a digital learning environment in several ways, such as An ID and password must be inputted into the system to gain access to particular sections of the curriculum. Students can also work collaboratively within a digital learning environment. Each student receives his or her workspace in which to work, and all views and files are stored in their folder. Digital learning environments can be set up so that certain areas and tools cannot be accessed by other students. There is no need for passwords when using all features within a digital learning environment since they will already have an access code required to unlock the area in question. Digital learning environments can be used to share information with students. Digital learning environments allow for the quick and easy viewing of materials, notes, and other information.
- The term digital learning environment is also sometimes used to refer specifically to the online learning space provided by educational software packages like WebCT or Moodle (software), which are often used in distance education programmes. However, in a broader sense "digital learning environment" is a generic term that can be applied more widely including in education in non-distance settings.
- Based on the design philosophy of meta-cognition, digital environments can be created to give students more control over their learning experience and better prepare them for careers that require advanced knowledge and skills. This allows them to more effectively learn and retain information and helps them reach their full potential.
- A key element of digital learning environments is that they allow the flexibility and customization of the materials that are used. Depending upon their purpose, digital learning environments can be flexible because they may have different materials for different courses or degree programs. This means that students can have customized learning experiences based on their specific degree program or course of study.

- Digital Learning Environments are also beneficial because they allow students to work together in a collaborative manner which increases their ability to learn the material. This is especially effective for situations where students are working together to complete assignments over time online where it would be inefficient or even impossible to meet physically in person.
- Social software helps to foster student interaction. Students can collaborate, post comments, and share or save materials. This allows students to work more efficiently and make use of the tools available to communicate with other students, avoid duplication of effort, and gain feedback.
- It can be used by students who are studying in remote settings where traditional institutional access is only possible at specific times or places (i.e., on-campus or at home). However, digital learning environments also allow for the flexible usage of materials that are not available at the time of use (e.g., through an electronic library). Digital learning environments thus allow students to access their information from any location.
- A digital learning environment can function as a collaborative environment for students. Students can share specific information, such as assignments or projects, with other students. This allows for better communication between students and allows students to learn together.
- It is also beneficial because they allow for the easy sharing of documents and other information among different groups of people. For example, different groups of people can work on the same document at the same time without interfering with each other's work or conflicting information. They can then upload what they have produced to be shared with others in the group.
- The ability to organize data is also important for digital learning environments. Different groups can be represented by different folders or files, allowing for the organization of different files. This also allows that the different groups can collaborate.
- Digital learning environments are beneficial because they provide tools to help students learn more effectively (meta-cognitive features). For instance, digital learning environments allow students to store their notes and make annotations on the material

they are working on. This allows students to work more efficiently and gain feedback from other students.

Modern educators increasingly view technology as an important component of their pedagogy. To fully utilize technology, teachers need to first understand how it should be used in each context. It is important to understand that technology should be used in a way that enhances, rather than distracts from the learning experience. Ultimately, it must be used to help students engage in multi-modal learning experiences.

According to Sridharan et al. (2010) "multi-modal learning environments are user-controllable computer-aided environments where multimedia are coupled with computer-aided pre-designed software programmes and/or can be assembled as fully customized projects. They combine and integrate, and can display information and/or be used for interactions at any point. They provide different channels to communicate with the learners and different channels to provide feedback, both of which can vary between facilitator and learner."

A key component of digital learning environments is the ability for students to share materials with other students. This allows students to collaborate more easily. It also allows students to learn from each other since each student would have access to the resources that others are working on or have already completed. Digital learning environments also allow for the easy sharing of information among groups of people. This allows for better communication between people, which can allow them to more easily learn from each other. It also helps to foster student interaction. Students can work on a specific task together and this helps them to collaborate and share information more easily. This allows students to work more efficiently and reach their full potential while learning in a digital learning environment.

Many existing research studies show that students value digital learning environments over traditional do-it-yourself (DIY) platforms such as Blackboard. This is because students have a choice in what to do in a digital learning environment, whereas they do not have a choice on a DIY platform. For digital learning environments to be effective, the university must have the infrastructure and resources for students to participate. This includes networks, wireless network access points, and mobile devices that are capable of using the appropriate software applications. Digital learning environments also require administrators or faculty members who can ensure

that all of the necessary courses are available online for students to use. The university should also provide quality resources so that students can learn from them effectively. The digital learning environment also requires educators who are willing to take the time to teach the students how to successfully use the resources. This can be through online resources or personal instruction.

Digital learning environments are designed to encourage the participation of students in online courses. However, some students may be reluctant to participate in these courses because they are not accustomed to using them. While many schools have implemented digital learning environments, there are still many that have not yet done so. It is important for students who are new to these platforms to understand how they can be used effectively before being forced into using them. If they are not familiar with digital learning environments, they will not know how to effectively use them. Students also need to understand that there may be some restrictions and issues that come with these digital learning environments. Students must be aware of these issues and decide for themselves whether they will benefit from participating in a digital learning environment or whether it is an unnecessary aspect of their education.

The Meta-Cognitive Design Principle

The meta-cognitive design principle is based on the assumption that people are capable of adapting to different environments depending on their personality, previous experiences, culture, etc. Meta-cognitive principles are applicable in any learning environment because people can change their attitudes or behaviours depending on how they perceive the learning environment. Applying a meta-cognitive approach to design e-learning scenarios will allow students to become more aware of what they are doing. They will be able to examine their cognitive processes so they can improve their performance by making conscious decisions about what they should do next.

Meta-cognition is the Learning Process

Learning is a complex process that involves many factors including motivation, goals, strategies, and self-regulated behaviours. Even if people are highly motivated to learn something, they still need to understand how they can use what they learned in their daily activities. Meta-cognition

refers to the ability of an individual to become aware of his cognitive processes. Sanna et al. (2014) suggest that meta-cognition is defined as the step beyond simple thinking in which learners become aware of their cognitive process and show some kind of cognitive control. their thoughts and behaviours.

The concept of meta-cognition, as well as the theoretical foundations of this approach, can be traced back to the philosophy of Aristotle (Sridharan et al., 2010), meta-cognition is an "intrinsic part of human consciousness" (p. 172). Meta-cognitions reflect how people perceive their environment and choose what to do next based on their behaviour.

Many theories try to explain the phenomenon of meta-cognition. According to Lominadze et al. (2011), there are two main positions in this field of study: the first one starts with the study of self-awareness and self-improvement. Many psychological studies have focused on the links between cognitive development, learning, and meta-cognition. The second approach concentrates on individuals' ability to accept the differences between their true nature. For further analysis, people can be grouped into three groups based on their level of meta-cognitive awareness: autists (people whose cognitive processes are impaired), empathic nonautists (people with a high level of metacognitive awareness) and nonautists (people with a low level of meta-cognitive awareness).

Terras & Ramsay (2014) state that a higher level of metacognition in the learning process is positively correlated with the following outcomes: better performance, improved ability to make decisions, increased creativity, etc. Nonautists tend to be unable to focus on their performance during the learning process because their perception of the environment is too simple. On the other hand, autists are not able to become aware of their cognitive processes because they do not want to show it. Empathic nonautists are aware of their cognitive processes and can use them when they design complex content units for students.

Meta-cognition in E-Learning Environments

The meta-cognitive approach suggests that the way people perceive their environment is directly related to their perception of self. Salas and Fuentes (2014) state that people are continuously adapting to different environments, but they are also aware of their behaviours. They can

influence their emotions by changing strategies if the value of an activity is negative or positive. Although they can talk about what they did, they are not always able to explain why they did it.

All et al. (2014) stated that the reason why users often make inappropriate decisions in digital learning environments is that they were unaware of their cognitive processes.

The authors argue that students' level of meta-cognitive awareness can be positively related to their performance in online courses. Since meta-cognition is defined as the awareness of one's thoughts, the experts suggest that the more meta-cognitive people are, the better they will perform. One of the ways to improve learners' level of meta-cognitive awareness in designing learning tasks is so they become aware of how exactly their cognitive processes work, especially when they are looking for information on a particular topic.

Another way to improve meta-cognitive awareness is designing digital learning content that is focused on facilitating attitude and behaviour change. The virtual environment should be designed so that learners can become aware of different strategies and learn how they can use these strategies to achieve their goals. For example, if learners want to find the best solution for a particular problem, they need to understand if they are problem solvers or problem collectors. Problem solvers ask themselves what information they may need to solve a particular problem. Problem collectors explore as much data as possible before making their decisions (Salas & Fuentes, 2014). Once the learners become aware of these concepts, they can choose an appropriate strategy to solve the problem by their cognitive process.

There are many ways in which learners can become aware of their cognitive processes. One way is to provide them with specific feedback when they make choices. For example, when users are looking for information on a particular topic, they can be asked simple questions like "what would you like to find out more about?" or "what strategies can you use when solving this kind of problem?" In the case of online courses, instructors should ask students more complex questions that will help students understand their mental thinking about a specific topic.

A meta-cognitive approach is also particularly relevant for today's digital education, which seems to be mainly based on technologies aiming at making the possibility of autonomous learning strategies possible by providing alternatives to more traditional methods.

Factor Influencing the E-Learning Scenario

As the world becomes more technologically advanced, the need for innovative e-learning methods has become key. The biggest challenge facing these methods is their ability to offer end-to-end learning solutions that are satisfying to both learners and trainers.

However, in order to address this challenge, e-learning professionals must understand the factors that contribute to the success of learning experiences. These factors include learner motivation, learner personality types, and learning engagement.

Motivation is the determination by an individual to achieve a goal or task. Learners are highly motivated when they are engaged in activities that are relevant to their outlook on life and values.

Learner personality types are the tendencies of an individual based on their knowledge, skills, interests, attitudes, and values. For instance, individuals with positive attitudes and values in their lives and their careers tend to be more motivated learners.

Learner engagement can refer to whether or not an individual is actively involved in the learning process. This factor is also tracked by the degree of involvement of students and end-users in the creation of content for web-based e-learning modules. It supports the learner's ability to demonstrate relevant knowledge, skills, and attitude through appropriate e-learning coursework.

Various other factors influence the success of web-based e-learning, including the subject matter and objective of the coursework.

To help foster the motivation of students, instructors can promote positive attitudes and values. Teaching methods can include lecturing, role play, multimedia presentations, group discussion, and small group activities. In addition, instructors can promote a conducive environment by creating a learning atmosphere that encourages active engagement on the part of students.

There are many e-learning platforms available online that help to facilitate the learning process of a wide variety of courses for a variety of learners. These platforms allow instructors to create web-based e-learning courses that enhance the motivation of students since the learning experience is tailored to the individual's learning needs.

The online education of a learner can be enhanced by using instructional design techniques. Instructors can implement instructional design techniques such as goal setting, feedback loops, and learning pathways to encourage a successful learning environment.

Goal setting is a method of teaching and learning that helps an individual to set specific and attainable goals. This technique works best when the instructor and student set personal goals that are linked to the overall goal of the course. It also helps learners to identify their strengths, weaknesses, interests, and values. Instructors should let students discuss their goals so they can learn from one another.

Feedback loops are methods of interacting with individuals who have similar personalities because this type of activity helps them learn more effectively. It can also help students to develop their self-directed learning skills.

Learning pathways are methods of teaching and learning that take into consideration the personality type of a learner. This information allows instructors to create a learning environment in which the learner is comfortable, allowing them to communicate effectively and engage in active discussion.

The objective of e-learning is to transfer knowledge from trainer to learner. When instructors use effective techniques, they can help learners reach their desired objectives.

Conclusion

E-learning is a rapidly growing asset amongst organizations. It enhances productivity, innovation, learning and skillsets in the workplace. There are many benefits to eLearning but one of the most significant problems in this type of learning method is students' meta cognitive barriers when attempting to learn something new. The metacognitive barriers can impede someone's ability to become an expert when it comes to a particular topic. Some students cannot absorb what they need to know because they do not understand the reasons behind the knowledge. This means that people tend to get stuck in a rut of learning and proficiency, instead of furthering their learning and knowledge. Studies have shown that when using the digital method of teaching, students are more likely to read, retain, and understand the information

being presented to them. Digital education is an efficient manner for students to learn something new.

There are many benefits to this type of e-learning method, such as better use of technology in the classroom, greater access to information and help from a wide network of specialists or mentors, etc. The students can take advantage of digital education by using a metacognitive approach. This is an effective learning tool for students to use when trying to grapple with new information. It can be used by teachers to help students learn something that they have not already mastered. In the learning process, e-learning is used to help students tackle their comprehension problems. To ensure that students learn more on the topic, the teacher uses a metacognitive approach.

Reference

- Aberšek, B., Borstner, B., & Bregant, J. (2014). *Virtual teacher: Cognitive approach to e-learning material*. Cambridge Scholars Publishing.
- All, A., Castellar, E. N. P., & Van Looy, J. (2014). Defining effectiveness of digital game-based learning: a socio-cognitive approach. *European Conference on Games Based Learning*, 2, 669.
- Chou, H.-L., & Chen, C.-H. (2016). Beyond identifying privacy issues in e-learning settings—Implications for instructional designers. *Computers & Education*, 103, 124–133.
- Ismail, M. E. A. A., & Sambanthan, T. G. (2021). Constructivist Approach for E-Learning Effectiveness in African Higher Education Contexts. *Asian Journal of Research in Computer Science*, 29–41.
- Lominadze, T. N., Papiashvili, R. G., & Asatiani, T. M. (2011). Instructional strategies for e-learning. *2011 5th International Conference on Application of Information and Communication Technologies (AICT)*, 1–4.
- Rodríguez-Artacho, M., & Mañillo, M. F. V. (2004). Modelling educational content: the cognitive approach of the PALO language. *Journal of Educational Technology & Society*, 7(3), 124–137.

Skulmowski, A., & Xu, K. M. (2021). Understanding cognitive load in digital and online learning: A new perspective on extraneous cognitive load. *Educational Psychology Review*, 1–26.

Sridharan, B., Deng, H., & Corbitt, B. (2010). Critical success factors in e- learning ecosystems: a qualitative study. *Journal of Systems and Information Technology*.

Steelman, K. S., Tislar, K. L., Ureel, L. C., & Wallace, C. (2016). Breaking digital barriers: A social-cognitive approach to improving digital literacy in older adults. *International Conference on Human-Computer Interaction*, 445–450.

Terras, M. M., & Ramsay, J. (2014). A Psychological Perspective on the Temporal Dimensions of E-learning. *E-Learning and Digital Media*, 11(2), 108–122.