

Critical thinking and online learning during the pandemic

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### Abstract

In many learning places, online learning has become the new normal with the major aim of averting the Covid-19 pandemic effects. Besides, the e-learning benefits can help mitigate the effects of conventionalism and deferment in education institutions and foster the development of student's critical thinking skills as would be anticipated in traditional residential practices if exploited effectively. Even though research myriads have proved that it is a student-and-action-based model that has the potential to accomplish optimal education and learning outcomes when applied successfully, online learning more often than not has been criticized for being unable to engage learners amply. Understandably, in residential systems, teaching learners to develop critical thinking skills has been challenging because it needs the physical presence of students and faculty to participate in the analyses and syntheses of complex concepts for applications, clarity and better assimilations. To successfully apply the same in an e-learning setting will need augmented knowledge in the subject matters as well as knowledge in the e-learning dynamics, including applications of germane instructional strategies, contexts and influential theories.

### Introduction

The traditional education models for learning institutions before the eruption of Coronavirus have been classroom environments with educators providing instructions and learners listening and taking notes (Aizikovitsh-Udi & Amit, 2011). One-on-one interactions among educators and learners have been important educational aspects within the education setting. Covid-19 eruption defied the traditional education models by providing available breaks in the education systems.

COVID-19 eruption forced learning institutions to integrate online learning by incorporating ICT technologies (Bates & Poole, 2003). It is asserted that learners can study more via online learning than conventional lecture room approaches, maybe because they become more engaged in the education processes through interactivity. Flexibility is one of the main features of online learning. Online learning promotes the choice and autonomy of students about when, how, and where to learn (Akyüz & Samsa, 2009). Nevertheless, the online education approach encounters challenges and issues during its implementation.

During the COVID-19 pandemic, most learning institutions embraced e-learning technologies as the next sensible approach to teach students and prevent the spread of the virus (Benson & Samarawickrema, 2009). Online learning is considered an educational strategy for the future that many educational institutions have continued to embrace and integrate to help curb the spread of Coronavirus (de Leng, et al., 2009). Some experts have moved ahead to anticipate that the "residential-oriented approaches" (learners taking classes at predetermined times and areas) in the near future will be a thing of the past. Students could adapt to the new learning models of full distance learning despite the challenges (Burgess, 2009). Most students supported that blended education that combines distance and classroom learning can make learning easier during the pandemic.

The prevailing Coronavirus pandemic has compelled most education systems to integrate alternatives to one-on-one learning and teaching (Duffy, Dueber, & Hawley, 1998). Many education systems moved activities online to enable instructions to closures of learning institutions. E-learning has been an important tool for sustainable development of skills during the closure of schools considering the alternatives of no schooling. Still, there are concerns that online schooling may have been sub-optimum substitutes for one-on-one and conventional instructions,

particularly so in the lack of enough preparation among educators and learners and the absence of universal access to infrastructures (software and hardware) for unique demands which online education pose.

Creating a strong attitude toward learning can assist learners in overcoming some of the possible concerns posed by e-learning, for example, maintaining sufficient motivation or remaining focused during online classes (Aizikovitsh-Udi & Amit, 2011). Also, they are important in supporting learners utilizing ICT (information and communication technologies) and efficiently using modern technologies for education. Intrinsic motivation to learn, positive attitude toward learning, and self-regulation play a crucial role in enhancing performance in schools in general but can be particularly vital should e-learning continue.

The dispositions and attitudes of students are affected to a higher level by the role models they are interacting with and the support they get from teachers and parents (Bates & Poole, 2003). Diverse support forms from educators and parents, including educator enthusiasm and parental emotional support, are crucial for developing positive attitudes toward education. Educator enthusiasm and parental emotional support can ensure learners acquire dispositions and attitudes to maximize their abilities to make the most of the e-learning opportunities (Benson & Samarawickrema, 2009). Due to a lack of curricular guidelines, time, and insufficient digital skills, some teachers and parents can struggle to offer such support. To enhance guidance and information to parents on effective approaches supporting their children's education, education systems need to strengthen cooperation between parents and schools (Akyüz & Samsa, 2009). Educators also need support to successfully integrate technologies into their teaching methods and practices and assist learners in overcoming some of the concerns related to e-learning settings.

Living during the Covid-19 period has motivated most students to one stride ahead, maximizing the updated and existing technologies for education (Burgess, 2009). Maintaining long-distance and autonomous education has been introduced and implemented in educational institutions due to curb the spread of Covid-19. Without the ability to think critically, integrating e-learning environments is not enough. In higher education contexts, critical thinking is the ability that is necessarily needed for students. E-learning can be an excellent support for learners to enhance their critical thinking abilities and skills (de Leng, et al., 2009). Well-maintained instructions, well-designed online discussions (interactivity), and critical-thinking learning contents are various elements required by online course educators to improve their students' critical thinking.

There is a single approach of education to integrate one-on-one education with e-learning or online learning (Eisenstadt & Vincent, 2012). The blended learning models are education models that combine one-on-one learning and e-learning. Online learning and blended learning models improve the critical thinking skills of students. When the demands of students to be able to access learning materials outside lecture hours and lack of time is overcome on campus, e-learning-oriented learning is beneficial for the planning of learning (Garrison & Vaughan, 2007). The online learning aspects are designed in the forms of websites with components consisting of learning animations, videos, materials, lesson schedules, profiles and main menus. In this study, critical thinking skills measured are five factors of indicators: making integration and estimates, giving further explanations, making conclusions, building basic abilities, and providing simple explanations (Kim et al., 2013). This work aims to test online feasibility and practicality to enhance levels of critical thinking skills of learners based on the facts and descriptions.

Subject

E-learning should be implemented during this COVID-19 pandemic to encourage interactive learning (Benson & Samarawickrema, 2009). Instead, only practical tasks determined by best practice studies should apply the online learning devices. Among different matters recently researched in online learning, critical thinking aspects and skills are usually viewed as principally vital. When learners feel contented with e-learning technologies and culture, they positively contribute to learning activities and develop critical thinking skills (Burgess, 2009). Teachers are the key to the success of online learning experiences. Teachers play a role in ensuring positive experiences among students during e-learning. The importance of critical thinking skills is a vital factor for the effectiveness of interaction and discussion in online learning settings (Bates & Poole, 2003). In implementing and applying online learning in schools and higher education institutions, technical support, lecture characteristics, information quality, and system quality play important roles. The learners are more accommodative toward online and blended learning (Aizikovitsh-Udi & Amit, 2011). Lecturers should thus adapt their teaching styles to create more interactive learning for students that help them develop critical thinking skills.

In online learning, technological knowledge is an important element (Akyüz & Samsa, 2009). For students who are computer or technologically illiterate, integrating online learning would be hard. Students would have to be trained and educated first before integrating e-learning technologies. Training students to understand computer and modern technologies improve their critical thinking skills. The learners are expected to be conversant with digital technologies such as chatting through the internet, using Zoom, and mastering the learning management systems (de Leng, et al., 2009). Important sections of the e-learning settings are the e-learning examinations and assignment submissions. Collaborative learning offers new prospects and challenges regarding the support of critical skills development and separation of the products and processes of

collaborations (Duffy, Dueber, & Hawley, 1998). Collaboration and cooperation among the teachers and universities allow students to expand and enrich their understandings of online learning and develop critical thinking skills. The online learning setting should be planned so that students are provided with opportunities to choose what to learn, be motivated to interact with their peers and teachers, and be given suitable support. The self-learning ideas are rooted in the philosophy that students' education is more effective when it occurs within practical experience contexts and when the learners understand the educational objectives.

In educational institutions, there are different e-learning types that are applied, but Learning Management System (LMS) is one of them (Ku, 2009). As a software, LMS is known for developing and creating web-oriented e-learning lectures and stuff and managing their learning activities and results. Some LMS characteristics can meet all the needs of the students regarding education. Various LMS types are being provided currently (Kurubacak, 2007). Each LMS type has its strengths and weaknesses. Currently, Schoology and Edmodo are very easy to use LMS types. Schoology and Edmodo are social webs that offer online learning for free same as the classrooms, as social media platforms such as Facebook, Edmodo, and Schoology are easy to use through different forms.

The application of e-learning platforms such as Schoology and Edmodo as alternative learning model forms is very good for critical thinking, improving motivation, and solving students' learning problems (Ravenscroft, 2001). Essential assessments of thinking integrate all available data like phenomena and questions to study situations or problems to get conclusions or hypotheses because they can be justified with confidence. The critical thinking characteristics have two things: learning how to reason, when to apply reasoning and what reasoning strategy to utilize, and secondly, learning how to ask, when to ask, and what the questions are. Therefore, people who

think critically often ask the correction questions, creatively and efficiently compile information, and combine suitable information and have sensible reasons for the information held (Salleh, Tasir, & Shukor, 2012). Their conclusions are reliable and consistent and can reap success and be sued for human life. Critical thinking is making reasonable choices about what to do and believe.

Learners use online learning platforms such as Edmodo and Schoology to influence and improve critical thinking skills (Benson & Samarawickrema, 2009). In learning and planning lectures, the variations indicate that students' critical thinking skills obtain average scores by learners during the lecture processes using online learning. Learners actively express their viewpoints search for and solve problems provided in e-learning lectures so that they get new expertise using chat facilities and forums. According to constructivism theory and models, learners check new information with old guidelines, discover themselves, construct knowledge and review again when these instructions apply to construct knowledge in which guidelines are no longer used (Aizikovitsh-Udi & Amit, 2011). The primary points of approach are that learners can build their information through learning utilizing e-learning.

### **Critical thinking**

According to one section of higher-order thinking, critical thinking is a held process rooted in conclusions of deciding and drawing suitable information, including developing thinking, arguing, hypotheses, explaining and analyses (Akyüz & Samsa, 2009). Critical thinking skills are viewed as very vital to train learners in 21st C. Critical thinking has become one of the major goals of education systems. The significance of creating these critical thinking abilities and skills, the facts are not in line with the learning conditions in the field. Learning approaches applied through traditional learning methods have not enabled learners to practice critical thinking skills. The



strategies used are still traditional, and the applications of technologies are still lacking (Bates & Poole, 2003). Therefore, students encounter challenges in developing their critical thinking ability.

In the 21<sup>st</sup> C, traditional education strategies usually used by educators in practicing the critical thinking skills of students are no longer solutions since the problems of this era need the application of technologies in all the learning processes (Burgess, 2009). The applications of technologies bring new challenges in the education world and have vital roles in developing 21<sup>st</sup> Century skills. The skills of learners in using technologies are very critical. The learning models should be modified to adapt to the application of technologies and the 21<sup>st</sup> C digitalization period and the times.

As a subject, critical thinking has been defined in literature to include the demonstration of cognitive maturity and intellectual capabilities, sound reasoning and representations, application of prior learning experiences to new knowledge, and the degree of thoughtfulness regarding its processes (de Leng, et al., 2009). Others have sought to include reflective dialogue, the ability to provide evidence of problem-solving and sound decision-making skills, as well as the application of mental and emotional equability. Developing critical thinking should be devoid of moral ambiguities that promote self-gratification, skepticism and altruism by either the faculty or student.

Indeed, helping students develop critical thinking skills means adopting an effective communication style regarding the ability of the faculty member to moderate and keep focused during class interactions. It is unsurprising that critical thinking is recognized as a major skill for job placement across the globe and considered one of the most important skills for success in higher education (Şendağ & Ferhan Odabaşı, 2009). It allows students to evaluate sources of information for reliability, develop analytical skills, demonstrate intellectual capabilities, and apply them in real-life contexts.

### **Influential theories**

Learning, instruction and communication theories form major components in technology integration in the classroom and assessing student performance (Aizikovitsh-Udi & Amit, 2011). These theories are distinct academically, yet they correlate with playing major roles in defining learning, the learner, conditions, and contexts under which knowledge can be acquired, reinforced and applied. Yet, related studies have shown that many faculty and facilitators have a limited understanding of these philosophies and do not apply such in any learning environments, whether traditional or virtual (Akyüz & Samsa, 2009). Irrespective of the context and level of education, pedagogical knowledge is vital for success in all learning contexts.

For these reasons and many more, educators must plan for technology integration as a vital educational tool, intended not only for knowledge acquisition but also for productivity and critical thinking (Bates & Poole, 2003). Educators must not depend on technological infrastructure and devices solely as mediating components for learning outcomes since that could result in misdirection and misrepresentations. The fact is, inadequate knowledge in the applicable theories can result in frustrations, and faculty may tend to blame students for under-performance and under-achievement.

### **The role of online learning to promote critical thinking**

Online tools and the internet play important roles today in different fields like daily life, workplaces, educational domain and health system (Benson & Samarawickrema, 2009). In educational systems, the internet's significance and impacts on teaching strategies and students' curricula are obvious (Duffy, Dueber, & Hawley, 1998). On the other side, in the 21<sup>st</sup> C, critical thinking has been popular as one of the primary skills that lead to competence and success in

employment and academic responsibilities. Online learning supports critical thinking and enables learners to prepare for the modern world. Online learning systems are student-oriented, saving learners' time (Burgess, 2009). When students answer the questions and do their assignments through e-learning, they can think deeply.

Two educational strategies based on the leaders in the learning procedures are asynchronous and synchronous learning (de Leng, et al., 2009). While asynchronous learning self-paced strategy, synchronous learning is teacher-based and takes place with all participants in real-time. Asynchronous learning can happen every time when learners want to share their viewpoints without need of attending at the same time. The synchronous learning environments can include virtual classes or chat rooms in which each student is studying or working at the same time (Ku, 2009). Besides web-supported textbooks, asynchronous learning settings or environments involve discussion boards, emails and blogs. Based on the internet usage level, online learning can be used in two different environments: distributed and blended learning environments. Some scholars recommend models to promote critical thinking in these settings, such as online discussions and conference systems for distributed environments; and electronic and project-based curricula for blended learning environments. Besides, in online learning environments, various strategies are applied to cultivate critical thinking such web-based and collaborative learning approaches (Salleh, Tasir, & Shukor, 2012). Figure 1 provides online learning taxonomy based on the environments and approaches/tools.

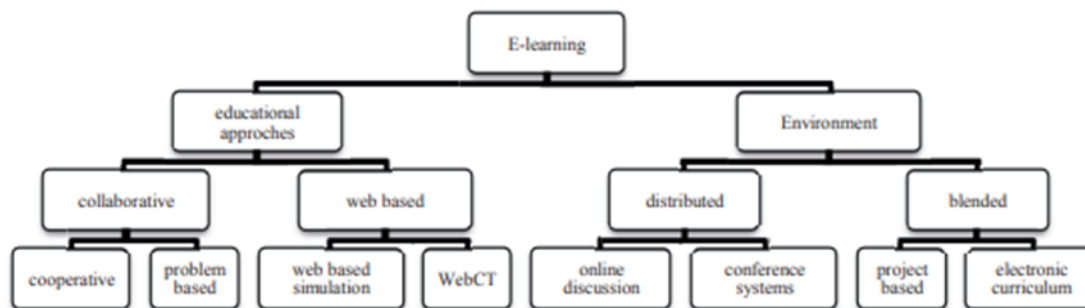


Figure 1. Taxonomy of E-learning based on critical thinking

### Strategies to develop critical thinking

Designing for intellectual and reflective engagements online can be challenging but relevant for student learning experiences (Aizikovitch-Udi & Amit, 2011). For better pedagogical discourse, knowledge of the infamous Bloom's Taxonomy can be handy for designing and applying online instructional strategies. Multimedia engagements can be guided by using Dale's Cone of Experience to improve the learning architecture. In fact, several instructional models and appraisals abound to guide the design, development and assessment of critical thinking skills (Akyüz & Samsa, 2009). Many available virtual learning tools and platforms provide essential features and functionalities to engage both faculty and students effectively.

Having benefited from an educational system in which reflective thinking is integrated into course structures, whether online or physical, I sincerely believe students can be engaged meaningfully through reflective decision-making and myriad assessment techniques to achieve optimal education and learning outcomes (Bates & Poole, 2003). In the school, a student cannot complete a course successfully without submitting reflective papers for expert, peer and self-reviews. Students have the option to clarify or defend their proffers through seminars and presentations.

Reflective assignments, in this case, involve synthesis of ideas, creativity, judgment and applied knowledge rather than declarative and reproducible knowledge and contents (Benson & Samarawickrema, 2009). The processes involve the demonstration of cognitive maturity, metacognition, problem-solving, and application. Students get engaged in both individual and team projects with the purpose of creating own and shared vision of learning cultures that are relevant to students' learning goals and future aspirations (Burgess, 2009). Again, projects are developed to respond to diverse communities of interest and expertise in the various fields and scholarships as applied within the contexts of work experience and requirement.

Using available technological media, students conduct a quality online search for information, evaluate leading-edge research and use germane knowledge to articulate plans for transformative projects (Senge, 2013). Others use the knowledge to develop strategies to mitigate existing problems effectively (de Leng, et al., 2009). Assessment rubrics in the form of self, peer, and expert reviews are usually made available to guide students' thought processes, while online assignments, threaded discussions and chats are employed for clarity of purpose. The presence of the lecturer online is paramount to guide, facilitate and moderate the process for achievement and result, and students are motivated to excel by awarding badges and scores (de Leng, et al., 2009). In this case, Keller's ARCS Model of Motivation becomes very handy for online learning and performance.

Online courses use combinations of weekly live online group classes and interactive learning contents to assist students study and practice their evaluation and critical thinking skills (Aizikovitsh-Udi & Amit, 2011). Learners will learn to confirm bias, recognize alternative viewpoints, evaluate data, solve problems, use evidence and develop skills such as determining fallacious arguments. Besides, learners will evaluate online academic course materials and

information, find out how bias and emotions can influence thinking and identify poorly constructed arguments.

### **Engaging students online**

Online teaching refers to any form of instruction that occurs via the internet (Akyüz & Samsa, 2009). By extension, e-learning employs electronic tools to engage both faculty and students via a plethora of communication and collaboration media. This engagement can be synchronous – in real time, or asynchronous – anytime, anywhere basis. Different from the residential setting, e-learning is dependent on time, space and technological resources (Bates & Poole, 2003). With advancement in educational technology, students can interact better among themselves and the lecturer with regular feedback and support systems via digital devices.

Utilizing multimedia resources such as texts, simulations, images, infographics, videos, animations and audios offers the opportunities to making meanings of otherwise passive learning environments (Benson & Samarawickrema, 2009). Student-led discussions, reflective assignments, seminars, presentations, inquiry-based learning and group collaborations can foster active e-learning and internalization of development of critical thinking skills. Both faculty and students can equally access quality learning materials from virtual sources from across the globe through internet connections to enhance the learning experience. A major and inherent constraint could be engaging students with cost-ineffective, unreliable and limited internet bandwidth (Burgess, 2009). These factors can restrain the use of multimedia and students' affectivity, confidence and reliance on digital learning tools.

Given online learning, critical thinking skills development can be achieved through a plethora of collaboration resources and tools and digital communications (de Leng, et al., 2009).

The elements of critical thinking, which include observation, analysis, interpretation, reflection, synthesis, and evaluation, can be instructionally designed carefully for better effects. The process will demand a paradigm shift from transmitting content knowledge only to self-directed learning, knowledge application and reflective behaviours (Duffy, Dueber, & Hawley, 1998). Whereas critical thinking can be developed through e-learning; its integration can be determined by the ingenuity of educators and its impact through evaluation and research over time.

Online learning media and platforms have notable impacts on enhancing the levels of critical thinking skills of students. Critical thinking skills of students improve as a result of using online learning platforms (Salleh, Tasir, & Shukor, 2012). Higher education institutions should thus integrate e-learning approaches to improve critical thinking skills of their students. Online learning media are suitable learning platform to improve critical thinking skills because they enable the learners integrate digital skills. In the online learning features, blended learning models improve critical thinking skills of students.

### **Ways to Shift Your Mindset for Effective Digital Instruction**

It is no secret that the Coronavirus has made people make notable changes to their daily lives (Aizikovitsh-Udi & Amit, 2011). Where possible, many university and college scholars who had previously been registered in in-person programs now get themselves in unforeseen e-learning, companies have moved to remote work, and learning institutions have embraced distance learning by necessity (Akyüz & Samsa, 2009). Online and distance learning does not come without its challenges, particularly for more conversant learners with on-campus courses, even though it carries many multiple positive benefits. Below are some tips that students can effectively adjust their study practices and habits during the transitions to completely e-learning (Burgess, 2009). Embracing the guidance explained below may help students get the best out of their course, even

though e-learning may not have been their first choice (Bates & Poole, 2003). Above all, sustaining open and clear communication lines with your classmates and lecturers and remaining involved in the program materials shall go far in making sure achievement during the pandemic period.

For group projects, the students should communicate regularly (Benson & Samarawickrema, 2009). University programs usually include team assignments and projects developed to be finished with other students in the same class. For online courses, this fact is as true as it is for on-campus courses. Online students must take specific care in ensuring that they are successfully communicating, whereas on-campus programs enable team projects by integrating teams together one-on-one (de Leng, et al., 2009). Groups must prioritize communications to avoid confusion, whether through shared documents, instant messages, phone calls, emails, Zoom, or other communication forms altogether.

Learners who typically take online programs interact with the subject matters and their projects via e-learning management systems (Garrison & Vaughan, 2007). The students must spend time familiarizing themselves with the interfaces and their particular assignments, whichever learning management systems their courses use. Typically, things run in modular formats in online classes. Often, students do not have those physical reminders of being in the classrooms that works are due (Senge, 2013). Participation is important to success whether a student is taking on-campus or online courses. Active participations indicate the student is learning and that they are ready to put in the efforts needed to be successful and show that they are learning. Participation turns to learn into an active process even though it is usually perceived as a passive process.

E-learning needs flexibility from the students, professors, and instructors. It is important to note that educators had to make the transition within a short period. Therefore, the students should



take the shortest time to transition to online learning because nobody planned for Covid-19 (Duffy, Dueber, & Hawley, 1998). It is likely to restructure the students' community on campuses and ensure that these transitions are as smooth as possible by talking to the classmates and instructors, demonstrating empathy, and being active in the course materials.

Many learners pursue their education together with other obligations and responsibilities (Aizikovitsh-Udi & Amit, 2011). Internships, family obligations, childcare, and work all compete for attention and time, making it important that the students develop schedules that enable them to meet all of these challenges. Teams need to divide different works in suitable ways to group members. This ensures that each group member completes their tasks in time because they know what they are responsible for completing (Akyüz & Samsa, 2009). The students should look far ahead to divide the tasks up and coordinate their efforts when they are doing group projects.

### Conclusion

Online learning is a strategy to learning that integrates traditional place-based classroom approaches with online education materials and opportunities for online interactions. E-learning needs the physical presence of both teachers and students, with certain aspects of learner control over speed, path, place or time. The present period is characterized by speedy transformation originating from technological and scientific advancements, including IT (information technologies). Online learning is an educational model offered through traditional learning methods and digital networks to share knowledge and education resources between instructors and learners. Besides, e-learning provides learning courses accessed through digital platforms and gadgets utilizing online technologies such as smartphones, tablets, laptops, and personal computers. Denoted as e-learning, these platforms are important in teaching and training students through the internet and wireless technologies. In any course, offering online learning plays a great

role because e-learning provides the students the opportunities of developing their capabilities, specifically in information science courses. In modern education, digital learning is becoming a gradually popular option. The classroom settings moved online from full digital courses to classes held remotely. However, effective communication in a digital learning environment may be hard, particularly when digital learning transition is unplanned or has been sudden. Making such massive overhauls are confusing and frustrating for the teachers, learners, and parents.

Students have appreciated the opportunities offered by online learning, the way online learning supports learning, accommodating their learning situations and requirements, and promoting communication. Online learning has helped in meeting the demands of learning during this COVID-19 pandemic period. However, there are some challenges e-learning is facing that originates from the information diversity accessible via ICT. Improvements can be made through training, specialized staff, and planning. Most barriers to e-learning originate from infrastructural weakness and lack of online learning acceptance. Higher education institutions such as colleges and universities can deal with most of the identified problems in products and infrastructures as they work closely with the community and private sector.

In education sectors that use e-learning technologies, educators are the major players in an educational context. Thus, teachers' knowledge aspects need to be considered important and should be included in the technology acceptance models and implementation of online learning in schools and other learning institutions such as colleges and universities. The knowledge variables have been identified conceptually and tested empirically. Besides information validity and authenticity, inadequate support from school management and lack of training in applying online learning technologies are some reasons for failures to integrate e-learning.

### Bibliography

- Aizikovitsh-Udi, E., & Amit, M. (2011). Developing the skills of critical and creative thinking by probability teaching. *Procedia - Social and Behavioral Sciences*, 15, 1087-1091.
- Akyüz, H. İ., & Samsa, S. (2009). The effects of blended learning environment on the critical thinking skills of students. *Procedia - Social and Behavioral Sciences*, 1, 1744-1748.
- Bates, A. W., & Poole, G. (2003). *Effective Teaching with Technology in Higher Education: Foundations for Success*: ERIC.
- Benson, R., & Samarawickrema, G. (2009). Addressing the context of eLearning: using transactional distance theory of inform design. *Distance Education*, 30, 5-21.
- Burgess, M. L. (2009). Using WebCT as a Supplemental Tool to Enhance Critical Thinking and Engagement among Developmental Reading Students. *Journal of College Reading and Learning*, 39, 9- 33.

- de Leng, B. A., Dolmans, D. H. J. M., Jöbbsis, R., Muijtjens, A. M. M., & van der Vleuten, C. P. M. (2009). Exploration of an e-learning model to foster critical thinking on basic science concepts during work placements. *Computers & Education, 53*, 1-13.
- Duffy, T. M., Dueber, B., & Hawley, C. L. (1998). Critical thinking in a distributed environment: A pedagogical base for the design of conferencing. In: Citeseer.
- Eisenstadt, M., & Vincent, T. (2012). *The knowledge web: Learning and collaborating on the net*: Routledge.
- Garrison, D. R., & Vaughan, N. D. (2007). *Blended learning in higher education: Framework, principles, and guidelines*: Jossey-Bass
- Kim, K., Sharma, P., Land, S., & Furlong, K. (2013). Effects of Active Learning on Enhancing Student Critical Thinking in an Undergraduate General Science Course. *Innovative Higher Education, 38*, 223-235.
- Ku, K. Y. L. (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking skills and creativity, 4*, 70-76.
- Kurubacak, G. (2007). Building knowledge networks through project-based online learning: A study of developing critical thinking skills via reusable learning objects. *Computers in Human Behavior, 23*, 2668-2695.
- Ravenscroft, A. (2001). Designing E-Learning Interactions in the 21st Century: Revisiting and Rethinking the Role of Theory. *European Journal of Education, 36*, 133-156.

Salleh, S. M., Tasir, Z., & Shukor, N. A. (2012). Web-Based Simulation Learning Framework to Enhance Students' Critical Thinking Skills. *Procedia - Social and Behavioral Sciences*, 64, 372-381.

Şendağ, S., & Ferhan Odabaşı, H. (2009). Effects of an online problem based learning course on content knowledge acquisition and critical thinking skills. *Computers & Education*, 53, 132-141.

Senge, P. (2013). 5 Learning organizations. *Knowledge Management in Education: Enhancing Learning & Education*, 77.