

Practical and social interaction justice of online learning during the COVID-19 pandemic

Rahmi Ramadhani^{1,2}, Dian Armanto², Fikry Prastya Syahputra³, Titim Eliawati⁴

¹Department of Informatics, Faculty of Engineering and Computer Sciences, Universitas Potensi Utama, Medan, Indonesia

²Department of Mathematics Education, Postgraduate Doctoral Program, Universitas Negeri Medan, Medan, Indonesia

³Department of English Language, Faculty of Cultural Study, Universitas Sumatera Utara, Medan, Indonesia

⁴Department of English Education, Faculty of Social Sciences and Education, Universitas Potensi Utama, Medan, Indonesia

Article Info

Article history:

Received Feb 11, 2022

Revised Sep 30, 2022

Accepted Oct 18, 2022

Keywords:

COVID-19 pandemic

Critical realism

Philosophy objectives

Social interaction justice

Technology integration

ABSTRACT

The implementation of learning in the current situation can be carried out using online learning as part of the methodology to answer the educational challenges caused by the outbreak of the COVID-19 pandemic. The role of technology in the online learning process in previous research studies has made it a major and important factor for successful learning in this emergency situation. This study aimed to investigate a philosophical perspective using the critical realism paradigm regarding the role of technology in online learning practices based on e-learning systems and justice in social interaction in aspects of learning implementation during the COVID-19 pandemic. This was a qualitative method with a critical realism approach. The results indicated that several critical arguments exist to rebalance the role of technology back to its origin, which is not a major factor, but a factor that still requires support from personal factors, personal behavior, and teacher readiness in facing technological developments. The findings of the study can be used to implement technology-based online learning while keeping practical and social justice in mind for both students and teachers.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Rahmi Ramadhani

Department of Informatics, Faculty of Engineering and Computer Sciences, Universitas Potensi Utama
Tanjung Mulia, Medan Deli, Medan, North Sumatera 20241, Indonesia

Email: rahmiramadhani3@gmail.com

1. INTRODUCTION

The implementation of technology-assisted distance learning, also known as online learning, is one of the lessons that is currently being implemented in all parts of the world. Online learning can be done using a system known as e-learning. The emergence of online learning which has become a learning trend is caused by the outbreak of the COVID-19 Pandemic. The study from a philosophical perspective is very interesting to review, why technology plays a very important role in the implementation of online learning and how it is implemented in the implementation of learning, especially in Indonesia, as well as its relation to the learning concepts expected in the National Education Curriculum. Studies in the perspective of philosophy can be seen from three objects of philosophy of science, namely ontology, epistemology, and axiology. The first study begins with an ontology object, which underlies the emergence of technology-based distance learning as a solution used by academic communities around the world. Ontology itself is the truth, reality, and the nature of reality which is the beginning of knowledge that appears and is used [1]. Ontology is a formal tool that models the structure of a system, namely the relevant entities and relationships that arise from the observation process, and is useful for achieving the goals we expect. The entity that is the basis of the object

of ontology in philosophical studies leads us to find out what truth is behind it. In this article, the entity that will be described is technology-based distance learning (online learning) and how is this learning context used as a process to achieve learning goals during the COVID-19 pandemic? What was the initial reality before online learning became the current learning trend?

Reality begins with a series of pneumonia cases of unknown cause appearing for the first time in Wuhan (Hubei, China), in late 2019 [2]. The series of cases has expanded since January 2020 and February 11, 2020, the World Health Organization (WHO) Director-General, Dr. Tedros Adhanom Ghebreyesus gave the name of the disease caused by SARS-CoV-2 as "COVID-19" [3]. Based on the data obtained, the impact of the spread of COVID-19 around the world has brought a big change in the way of life. The negative impact given by the COVID-19 pandemic has also provided significant changes in teaching and learning activities. The COVID-19 pandemic has become a "reality" that forces the academic community to "literally" carry out a "transformation in the implementation of learning". The reality that occurs when viewed from the "ontology" position in the philosophical paradigm, is interpreted that the academic community can take into account what needs are the main priorities in order to continue to carry out learning activities and gain learning experiences even though they are carried out in conditions that are in accordance with the reality that occurs. This provides certainty for students to re-understand their role as humans who return to the "nature of self" where students find the truth of the knowledge that will be obtained through the learning process and use it in living the next life process [4].

The truth faced by the academic community forces them to think "rationally" according to the existing "reality" to find ways to continue implementing learning in the midst of the COVID-19 pandemic. If a study is carried out related to the thought process, it will be found that "rationality" is the decision to eliminate face-to-face learning as an initial solution to the COVID-19 pandemic. The decision to abolish face-to-face learning was made as part of the follow-up to physical and social distancing to slow the pace of development of the spread of COVID-19. Therefore, schools were closed, and the implementation of face-to-face learning was transformed into distance learning. The decision to close schools is part of the epistemology of the philosophical thought process carried out by the academic community. Based on this, the academic community decided to implement distance learning by using technology as a liaison between teachers and students, as well as between students. Technology-based distance learning becomes part of the "Methodology" obtained in the process of philosophical thinking. The methodology is part of the development of Epistemology obtained. The implementation of technology-based distance learning indirectly provides an important role for technology which is not only a medium but part of the learning process itself. The presence of technology during the COVID-19 pandemic is a solution choice for the academic community to continue to present learning through cyberspace. The stages of implementing learning using the concept of online learning using an e-learning system are carried out from the basic education level and higher education. Technology is really the main pillar in the implementation of online learning.

However, the use of technology in distance learning does not provide optimal results in improving the quality of learning. The existence of technology leaves a negative impact on both students and teachers. The obvious negative impact is the lack of social interaction that occurs in technology-based distance learning activities. Social interaction is an important factor in the implementation of constructivism-based learning and meaningful learning. The absence of social interaction in technology-based distance learning (online learning) also has an impact on the heightened sense of anxiety and fear of students participating in learning activities. As many as 22.4% of students in Jordan experienced abnormal anxiety and 33.8% of students experienced depression symptoms [5]. Anxiety is not only psychological and mental, Hebebcı, Bertiz, and Alan [6] obtained results where as many as 42.9% of Turkish students who took e-learning-based online learning experienced anxiety in participating in learning. Students experience difficulties when working on group projects due to a lack of socialization related to the implementation of online learning based on e-learning by the campus. Baloran [7] also obtained similar results, where as many as 59.25% of students in the Philippines experienced anxiety related to poor internet network connections when implementing e-learning-based online learning. This finding becomes interesting when justice in obtaining the learning that should be obtained by students is not well received due to the unpreparedness of technology in practice in the field.

Arribathi *et al.* [8] obtained results where 70.92% of students felt a decrease in enthusiasm in participating in e-learning-based online learning, and 69.87% of students also felt that their learning achievement had decreased since the outbreak of the COVID-19 Pandemic which caused learning to transform into online learning based on e-learning. Ramadhani *et al.* [9] also found an interesting finding, where Indonesian students have difficulty in conducting social interactions when the implementation of e-learning-based online learning is carried out. Students also feel anxious when they cannot adapt well to the use of technology which causes students to be trapped in ignorance regarding the material being studied. Students also feel "alone" when participating in learning and do not have the opportunity to explore their opinions and thoughts regarding the knowledge gained through technology-based platforms.

Several studies on technology-based distance learning carried out during the COVID-19 pandemic from various perspectives have been published. However, until now, there has been no research from a philosophical perspective with studies on ontology, epistemology, and axiology related to the practical existence and social justice from both the student and teacher perspectives. Previous research has not conducted specific research to examine how the role of personal factors and personal behavior of both students and teachers in presenting meaningful, practical learning and social interaction justice.

Based on the reality that the researcher found (ontology), the knowledge obtained from the finding of reality and looking for ways to solve problems caused by the reality that occurs (epistemology), processes and methods that have been carried out as part of the problem-solving solution due to the reality that occurs (methodology). It is necessary to further analyze how useful the procedure has been and whether the procedure represents the actual study or eliminates the actual usefulness (axiology). This article will provide a review from the perspective of axiology through the critical realism paradigm which focuses on the practical context and social interaction justice related to the role of technology in the implementation of e-learning based online learning. This research aims to: i) How is the development of technology in online learning based on e-learning?; ii) What is the role of personal factors and personal behavior in the implementation of online learning?; iii) How is the presence of social interaction justice in the implementation of online learning as a learning solution during the COVID-19 pandemic?

2. RESEARCH METHOD

The research methodology used in this article is a qualitative method with a critical realism approach. The critical realism approach is an epistemology rooted in the flow of realism which tries to see reality as it is, but with a critical attitude through the support of the strength of the description of ontological assumptions and explaining the arguments why this situation can occur. The ontological assumptions used in this research study are divided into three regional layers, namely the "empirical" region, the "actual" region, and the "real" region [10]–[12]. Research methods based on critical realism offer researchers new opportunities to investigate complex organizational phenomena holistically [13]. Modern critical realism in the philosophical thinking paradigm is positioned as an alternative to the positivist and interpretive paradigms, which utilize both elements to provide a new approach to developing knowledge [14], [15].

The critical realism approach also offers a way to address the rigor-relevance gap in research management caused by the multi-method and multilevel approach to causal analysis. Furthermore, the critical realism approach provides accommodation for various methodological options, so that researchers focus on carrying out research derived from ontology studies that bridge causal explanations from the truth of complex events [16], [17]. Philosophical studies based on a critical realism approach are supported by a review of phenomena from developing reality and supported by a literature review that aims to obtain findings that provide recommendations for the critical arguments given [18].

3. RESULTS AND DISCUSSION

3.1. Technological developments in e-learning

Before discussing further, the benefits of implementing e-learning-based online learning in learning during the COVID-19 pandemic, it is necessary to first examine the history of technological developments which are a vital part of implementing e-learning systems in the implementation of online learning. This study will also be part of the "ontology" process that underlies the emergence of e-learning systems in the implementation of online learning. E-learning or electronic learning has emerged since 1960 by bringing the concept of computer-assisted learning as a learning medium. However, e-learning only began to be glimpsed and applied in the learning process after the presence of the internet and the popular web at that time. This fact shows that the emergence of e-learning in learning cannot be separated from the presence of technology that supports the implementation of e-learning itself. Jethro, Grace, and Thomas [19] stated that at first e-learning was a technology that was integrated into learning through computers that could be used not only in distance learning but also in face-to-face learning.

The essence of e-learning can be seen in the computer system that is the basis for implementing e-learning. Bitzer from the University of Illinois the early 1960s created a system called PLATO and provided benefits in seeing students' literacy skills, to assisting teachers in communicating between users through the help of computer media [20]. This reality makes the e-learning system in the implementation of online learning provide an important position in utilizing advances in technology, information, and communication in the world of education [21], [22]. The entity concept formed in e-learning is based on the emergence of a system called Computer-Assisted Learning (CAL) in 1975-1985, then developed by adding multimedia and changing the concept of technology application by focusing on the concept of Computer-

Based Training in 1963-1990. The years 1990-1995 were the beginning of the development of web-based technology by carrying the concept of Web-Based Training which resulted in reduced interaction between users. Technological developments entered a new beginning starting in 1995 by bringing up concepts that carried flexibility and increased interactivity, as well as focusing on a constructivist approach to having control over interactions between users which is currently known as e-learning [20]. Technological innovations and developments are increasingly giving new colors and their own uniqueness to e-learning-based learning with the presence of various learning platforms that support the implementation of e-learning such as the presence of a learning management system (LMS) of various types, to combining e-learning in the current learning model. This is known as blended learning [23].

3.2. The role of personal factors and personal behavior in the implementation of online learning

The e-learning system entity is fully supported by the innovations presented in technology so that the application of the e-learning system in online learning becomes more flexible and complex. However, this statement is not only a reinforcement of the usefulness of technology in the development of learning but also a contradictory statement, where the concepts of flexibility, interactivity, and control are presented in social interactions that occur between users. The presence of flexibility, interactivity, and control in social interaction, in reality, does not appear in the field study. Previous research that makes technology has a "main role" in improving student learning outcomes, provides the view that technology is "like God" which offers significant changes in the quality of education. Findings that open a new paradigm to the existing reality, make technology "fail" to become "God" in constructing students' understanding to achieve learning goals. Selwyn [24], [25] argues with the same view that a critical approach can offer "a direct way" to dismantle social interactions that occur through the integration of technology in the education system. Technology does not stand alone in the success of the learning process, but there are other factors that provide important support in presenting a meaningful learning experience even though it is carried out with the help of technology in online learning schemes.

Technology offers convenience through flexibility in acquiring knowledge, and this can be interpreted as an ontology view in the application of e-learning-based online learning. The presence of flexibility certainly requires social interaction between users, which in this case are teachers and students, as well as between students themselves. The developing epistemological process provides a special space so that the social interaction process can be carried out and, in the end, it does not release the essence of the "essential" learning process. The presence of this flexibility does not appear in the practice of e-learning in the field, as well as what is presented in the truth of distance learning (online learning) based on e-learning during the COVID-19 pandemic. Technological entities in the e-learning system practically do not work according to the truth, and in the end, it creates negative effects on students' internal factors, such as anxiety, fear, low motivation, decreased learning achievement, to loss of confidence in the learning process itself.

Archer [26] argues that knowledge is literally obtained from direct interaction with nature, is always context-dependent, and requires the presence of others to provide validation and confirmation through the process of "knowing how" knowledge is acquired and used. However, the power of human reflexivity makes it possible to develop the knowledge gained through the process of rediscovering and using artifacts. The artifact in question is a supporting tool, which in this study is defined as a technological system such as e-learning. In addition to the use of artifacts, personal factors and personal behavior also support the process of acquiring knowledge in the learning process. The concepts of "knowing how" and "knowing what" is termed a skill, which later bridges practical knowledge to be used in the process of adapting technology in learning. This description is very interesting to give a different view that technology "does not play a role alone" in improving the quality of learning, especially in the implementation of e-learning systems for distance learning (online learning) during the COVID-19 pandemic.

Personal factors that support the role of technology in improving the quality of learning during the COVID-19 pandemic and improving student learning outcomes, including self-efficacy [27], [28], emotional intelligence [29], componential intelligence, experimental intelligence, and contextual intelligence [30]. Positive self-concept, realistic self-appraisal, preference for long-term goals, leadership experience, community involvement and knowledge adapted to the learning style preferred by individual students [31], a high level of learning independence in the learning process [32], student attitudes towards technology [33], student adaptation to technology use [34], and demographic factors [35]. The relationship between personal factors and personal behavior in the application of online learning based on e-learning can be seen in Figure 1. From the personal factors, it can be ascertained that these things have not been a concern for teachers in implementing e-learning-based online learning. Teachers do not pay attention to whether students are ready to follow a new learning environment that is different from the previous learning environment.

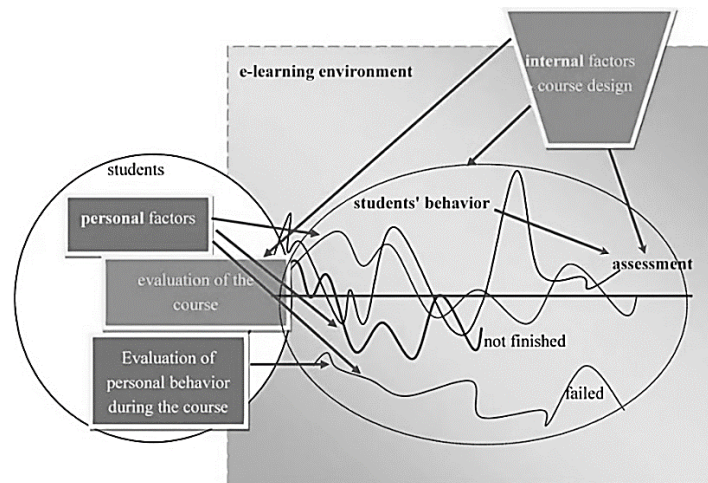


Figure 1. Personal factors and personal behavior in the application of online learning based on e-learning [4]

The same is true from the teacher's point of view, where teachers also do not pay attention to physical and mental readiness in dealing with emergency learning transformations as a result of the COVID-19 pandemic. Teachers who have fewer technological skills will feel that technology is preventing them from providing learning to students. In addition, teachers also feel that their existence will be replaced by technology in such a way that teachers do not want to follow the changes that occur and are still happy and comfortable with the teaching style in the previous learning phase. Teachers also experience difficulties in controlling the implementation of learning, where there is distrust in the role of technology and a low level of self-efficacy which makes technology-based learning as a whole not run optimally. This fact clearly confirms that the personal factors possessed by students and teachers are not considered in deciding the implementation of technology-based distance learning.

Personal behaviors also play an important role in the optimal implementation of e-learning-based online learning. The points contained in personal behavior are also clearly not visible in the implementation of learning during the COVID-19 pandemic. Learning that was carried out during the COVID-19 pandemic, one of which was mathematics learning, clearly provided space for students to carry out independent learning. However, this is not optimally implemented if students do not have a high level of learning independence. Mathematics learning taught in fully online learning will burden students who are not ready to study independently and still depend on face-to-face structured assistance and guidance from the teacher. This finding was obtained by previous researchers [9], [36], [37] where students are not accustomed to independent learning and feel alien to learning that is completely controlled by students. This is also felt by the teacher who provides learning. Teachers become burdened and think hard to try to design learning content that is interesting and easy to understand by students. However, teachers again find it difficult to adapt to new technologies and teaching environments [38]. High self-readiness, a positive attitude towards technology, and adaptation to the use of new technologies are important factors that must be ensured by both teachers and students.

Analysis studies and reviews related to the implementation of online learning based on e-learning provide findings that the implementation of online learning will be effective and optimally carried out with the condition that it takes into account the personal factors and personal behavior of students and teachers. Furthermore, what are the factors that make these two factors not considered in the implementation of technology-based distance learning? Emergency learning transformation is the main factor that eliminates the existence of personal factors and personal behavior in students and teachers. The transformation of learning that was carried out in an emergency and the total changes that occurred forced teachers to carry out full online learning. This in the end presents various negative impacts for both students and teachers.

Based on these findings, it can be used as a new epistemological study where research studies related to technology integration in learning need to pay attention to personal factors and personal behavior that provide strength and support in improving the quality of learning and learning outcomes. The critical research paradigm related to the support of other factors in improving the quality of learning is expected to be able to carry out further analysis, of how much effect and influence these factors have in the application of online learning based on e-learning systems, especially in facing the reality of the COVID-19 pandemic.

3.3. The presence of social interaction justice in the implementation of e-learning as a solution during the COVID-19 pandemic

The role of technology in the implementation of online learning based on e-learning systems during the COVID-19 pandemic in a critical realism paradigm in epistemological conditions requires supporting factors in implementing procedures that will be carried out under methodological conditions that are in accordance with the philosophical thought process. More specific studies will lead to unique findings obtained from the e-learning system entity itself in accordance with the initial study in its development process. In the previous description, it was stated that the e-learning system developed along with technological developments and was focused on controlling the interaction between users (in this case social interaction between teachers and students, as well as between students and students). This focus that becomes an artifact on the entity of the e-learning system is contradictory to the reality that occurred in field studies during the COVID-19 pandemic. Social interaction did not go well, even some other research findings revealed that there was an injustice in the process of implementing online learning based on e-learning systems during the COVID-19 pandemic. This contradictory argument occurs as an "ontology" that visualizes the implementation of online learning based on e-learning systems is not carried out evenly regardless of any factors.

The application of online learning as in the previous description requires readiness not only from the student but also from the institution or educational institution that carries out the learning process. The previous description has examined personal factors and personal behavior, but the support factor for supporting facilities also needs to be considered. Technological challenges, especially related to unreliable internet connections in the implementation of online learning, are also supported by the lack of electronic devices needed by students to access learning through e-learning systems [39].

The results of research that have studied quite a lot about the effectiveness of the application of technology in distance learning during the COVID-19 pandemic still have not analyzed the extent of the effect or influence of teacher incompetence in terms of technological skills. The injustices obtained by students in the implementation of online learning during the COVID-19 pandemic were caused by a lack of technological adaptation in learning [40]. The majority of teachers, especially teachers with "senior" status or who have long teaching experience are not used to implementing technology in the learning process during the COVID-19 pandemic. In addition to the lack of skills in using technology, information, and communication (ICT), some teachers were also found to be stuck with the face-to-face learning paradigm, even though the learning process had transformed into online learning.

The learning approach in online learning is no longer student-centered, but again teacher-centered because students pay more attention to teacher explanations than discussing with other students. Muthuprasad *et al.* [38] stated that online classes should engage students through frequent and meaningful activities with the aim of helping them to stay focused on the material provided through the platform. Huggett [41] also states that the importance of the frequency of interaction in the implementation of online learning is important to maintain fairness in the learning process received by students. Previous studies [42]–[44] stated that the lack of social interaction that leads to the unfair implementation of learning is the biggest challenge in the implementation of online learning.

The study conducted by Eder [45], proves that the impartiality of the internet network is also one of the injustices that occur in the implementation of e-learning-based online learning. Students with weak technological skills, and who do not have adequate device and internet network support [7] will find it difficult to participate in learning activities. In addition, feelings of unfairness will arise in students, which results in students not getting maximum learning [6], [46]. The technical skills of teachers and students related to the use of computers and the internet are the main factors that determine the effectiveness of online learning-based learning. This is also the forerunner to the emergence of social injustice which has a negative impact on the implementation of e-learning-based learning.

Sehoole [47] further emphasizes that technology-based distance learning has challenged education systems around the world to take advantage of the COVID-19 pandemic to bridge the gap between the rich and the poor in terms of access to education, and this challenge remains unsolved to date. This is in line with the findings of several researches [48]–[50], where convenience and flexibility are identified as strengths in the implementation of online learning based on e-learning. Petride [43] also claims that students and teachers show a comfortable attitude to working and learning in online-based learning and collaborate with groups of students without rearranging schedules for everyone as would be done in traditional classroom learning. This also shows that the learning environment does not support one particular group in the implementation of online-based learning by ensuring that all students have adapted well to the technology used. Poole [51] added the finding that students often access resources for the implementation of learning through their home computers, and it is the most convenient location for them. Therefore, teachers and the school environment should pay close attention to building an e-learning-based learning environment based on student comfort, so that it will have an impact on the same treatment by teachers to students. If the teacher does video

recording as a support for teaching materials to students, it should be recorded and uploaded on the school website so that students can access the video according to convenience and justice without taking sides with certain groups.

The impartiality of the internet network to students can be overcome by exploring other media options that can be used without the need for an internet network. Eder [45] recommends the use of television or radio as another alternative in the implementation of online learning to provide a sense of fairness and comfort to students who have limited internet networks and other technological devices. Prahmana *et al.* [52] also recommend the formation of a radio-based learning community as another option obtained from the "epistemology" process as a result of the unfairness of internet access and the difficulties of social interaction faced by students. Referring to the study in this critical research, the researcher provides recommendations to conduct further studies regarding the possibilities that can be done to provide a sense of justice for students in social interactions and justice in obtaining knowledge freely.

4. CONCLUSION

Online learning is learning designed to be applied in emergency conditions, one of which is the COVID-19 pandemic situation. The reality reflected in the ontology condition provides the truth that it is necessary to carry out responsive and intelligent procedures to continue to fulfill students' rights in obtaining appropriate knowledge. The injustice felt by students in carrying out learning with online learning models based on e-learning systems does not only appear in the distribution of internet networks and the availability of supporting technology devices but also in injustices in the process of social interaction which should be carried out in a meaningful learning process. Learning with online learning models does not present conditions that are in accordance with the epistemological paradigm of thinking in philosophy, namely determining how knowledge can be presented in conditions of reality.

Based on the results of this study, it is concluded that the application of technology-based distance learning (online learning) can run optimally by paying attention to social interaction justice both between students and between students and teachers. Furthermore, personal factors and the personal behavior of both students and teachers are also crucial to consider when implementing online learning. This research has a limited area of analysis that is carried out based on a philosophical perspective but can be used as a benchmark in conducting research related to the effectiveness of online learning, which is measured in terms of personal factors and personal behavior. The results of this study reinforce that the presence of teachers, the readiness of teachers and students, and the facilities owned by the school, are supporting factors for optimizing online learning.

REFERENCES




- [1] M. M. Rawnsley, "Ontology, epistemology, and methodology: A clarification," *Nursing Science Quarterly*, vol. 11, no. 1, pp. 2–4, Jan. 1998, doi: 10.1177/089431849801100102.
- [2] C. Huang *et al.*, "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China," *The Lancet*, vol. 395, no. 10223, pp. 497–506, Feb. 2020, doi: 10.1016/S0140-6736(20)30183-5.
- [3] World Health Organization (WHO), "WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 march 2020," Mar. 2020. [Online]. Available: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>.
- [4] Z. Li, "Natural, practical and social contexts of e-learning: a critical realist account for learning and technology," *Journal of Computer Assisted Learning*, vol. 29, no. 3, pp. 280–291, Jun. 2013, doi: 10.1111/jcal.12002.
- [5] I. A. Bashedi, Q. N. Mhaidat, and H. N. Mhaidat, "Prevalence of anxiety and depression during COVID-19 pandemic among healthcare students in Jordan and its effect on their learning process: A national survey," *PLOS ONE*, vol. 16, no. 4, p. e0249716, Apr. 2021, doi: 10.1371/journal.pone.0249716.
- [6] M. T. Hebecci, Y. Bertiz, and S. Alan, "Investigation of views of students and teachers on distance education practices during the Coronavirus (COVID-19) pandemic," *International Journal of Technology in Education and Science*, vol. 4, no. 4, pp. 267–282, Sep. 2020, doi: 10.46328/ijtes.v4i4.113.
- [7] E. T. Baloran, "Knowledge, attitudes, anxiety, and coping strategies of students during COVID-19 pandemic," *Journal of Loss and Trauma*, vol. 25, no. 8, pp. 635–642, Nov. 2020, doi: 10.1080/15325024.2020.1769300.
- [8] A. H. Arribathi, Suwanto, A. Miftakhu Rosyad, M. Budiarto, D. Supriyanti, and Mulyati, "An Analysis of student learning anxiety during the COVID-19 pandemic: A study in higher education," *The Journal of Continuing Higher Education*, vol. 69, no. 3, pp. 192–205, Sep. 2021, doi: 10.1080/07377363.2020.1847971.
- [9] R. Ramadhani, S. F. Sihotang, N. S. Bina, F. S. W. Harahap, and Y. Fitri, "Undergraduate students' difficulties in following distance learning in mathematics based on e-learning during the covid-19 pandemic," *TEM Journal*, vol. 10, no. 3, pp. 1239–1247, 2021, doi: 10.18421/TEM103-30.
- [10] S. Ackroyd, "Research designs for realist research," in D. A. Buchanan and A. Bryman, Eds., *The Sage Handbook of Organizational Research Methods*, London: SAGE, 2008, pp. 532–548.
- [11] S. Ackroyd and S. Fleetwood, "Realism in contemporary organisation and management studies," in *Realist Perspectives on Management and Organisations*, S. Ackroyd and S. Fleetwood, Eds. London: Routledge, 2000, pp. 3–25.
- [12] B. Danermark, M. Ekstrom, L. Jakobsen, and J. Karlsson, *Explaining Society: Critical Realism in the Social Sciences*. London: Routledge, 2005.

- [13] D. Wynn and C. K. Williams, "Principles for conducting critical realist case study research in information systems," *MIS Quarterly*, vol. 36, no. 3, pp. 787-810, Oct. 2012, doi: 10.2307/41703481.
- [14] R. Bhaskar, *A Realist Theory of Science*. Hassocks, England: Harvester Press, 2013.
- [15] R. Bhaskar, *Scientific Realism and Human Emancipation*. London: Verso, 1986.
- [16] P. J. Dobson, "Longitudinal case research: a critical realist perspective," *Systemic Practice and Action Research*, vol. 14, no. 3, pp. 283-296, 2001.
- [17] G. Easton, "Critical realism in case study research," *Industrial Marketing Management*, vol. 39, no. 1, pp. 118-128, 2010.
- [18] B. Danermark, "Applied interdisciplinary research: a critical realist perspective," *Journal of Critical Realism*, vol. 18, no. 4, pp. 368-382, Aug. 2019, doi: 10.1080/14767430.2019.1644983.
- [19] O. O. Jethro, A. M. Grace, and A. K. Thomas, "E-learning and its effects on teaching and learning in a global age," *International Journal of Academic Research in Business and Social Sciences*, vol. 2, no. 1, pp. 203-210, 2012.
- [20] P. Nicholson, "A history of e-learning," in *Computers and Education*, Springer, Dordrecht, 2007.
- [21] J. B. Williams and M. Goldberg, "The evolution of e-learning," in *ASCILITE 2005: Balance, Fidelity, Mobility: Maintaining the Momentum?*, Brisbane, Australia, 2005, pp. 725-728.
- [22] A. Odeh and I. Keshta, "Impact of COVID-19 pandemic on education: Moving towards e-learning paradigm," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 2, p. 588, Jun. 2022, doi: 10.11591/ijere.v11i2.21945.
- [23] S. Ali, M. A. Uppal, and S. R. Gulliver, "A conceptual framework highlighting e-learning implementation barriers," *Information Technology & People*, vol. 31, no. 1, pp. 156-180, Feb. 2018, doi: 10.1108/ITP-10-2016-0246.
- [24] N. Selwyn, "Looking beyond learning: notes towards the critical study of educational technology," *Journal of Computer Assisted Learning*, vol. 26, no. 1, pp. 65-73, Jan. 2010, doi: 10.1111/j.1365-2729.2009.00338.x.
- [25] N. Selwyn, "Making sense of young people, education and digital technology: the role of sociological theory," *Oxford Review of Education*, vol. 38, no. 1, pp. 81-96, Feb. 2012, doi: 10.1080/03054985.2011.577949.
- [26] M. Archer, *Being human: The problem of human agency*. Cambridge: Cambridge University Press, 2000.
- [27] B. J. Zimmerman and D. H. Schunk, *Self-regulated learning and academic achievement: Theoretical perspectives*, 2nd Ed. Abingdon, UK: Routledge, 2008.
- [28] E. A. Locke, *Social Foundations of Thought and Action: A Social-Cognitive View*. Englewood Cliffs, NJ, USA: Prentice Hall, 1987.
- [29] C. Koob, K. Schröpfer, M. Coenen, S. Kus, and N. Schmidt, "Factors influencing study engagement during the COVID-19 pandemic: A cross-sectional study among health and social professions students," *PLOS ONE*, vol. 16, no. 7, p. e0255191, Jul. 2021, doi: 10.1371/journal.pone.0255191.
- [30] R. J. Sternberg, "What would better intelligence tests look like?" in *Measures in the College Admission Process*, New York, NY, USA: College Entrance Examination Board, 1986, pp. 146-150.
- [31] W. E. Sedlacek, *Beyond the Big Test: Noncognitive Assessment in Higher Education*. San Francisco, CA, USA: Jossey-Bass, 2004.
- [32] Y. J. Katz, "Attitudes affecting college students' preferences for distance learning," *Journal of Computer Assisted Learning*, vol. 18, no. 1, pp. 2-9, Mar. 2002, doi: 10.1046/j.0266-4909.2001.00202.x.
- [33] M. A. Khan, V. Vivek, M. K. Nabi, M. Khojah, and M. Tahir, "Students' perception towards e-learning during covid-19 pandemic in india: An empirical study," *Sustainability*, vol. 13, no. 1, p. 57, Dec. 2020, doi: 10.3390/su13010057.
- [34] C. Coman, L. G. Țîru, L. Meseșan-Schmitz, C. Stanciu, and M. C. Bularca, "Online teaching and learning in higher education during the coronavirus pandemic: Students' perspective," *Sustainability*, vol. 12, no. 24, p. 10367, Dec. 2020, doi: 10.3390/su122410367.
- [35] S. R. Aragon and E. S. Johnson, "Factors influencing completion and noncompletion of community college online courses," *American Journal of Distance Education*, vol. 22, no. 3, pp. 146-158, Aug. 2008, doi: 10.1080/08923640802239962.
- [36] N. L. S. Habeahan, S. M. R. Leba, W. Wahyuniar, D. B. Tarigan, S. I. Asaloei, and B. R. Werang, "Online teaching in an Indonesian higher education institution: Student's perspective," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 2, p. 580, Jun. 2022, doi: 10.11591/ijere.v11i2.21824.
- [37] R. R. Cadapan, D. J. Tindowen, M. J. Mendezabal, and P. Quilang, "Graduate school students' self-efficacy toward online learning in the midst of the COVID-19 pandemic," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 2, p. 555, Jun. 2022, doi: 10.11591/ijere.v11i2.21856.
- [38] T. Muthuprasad, S. Aiswarya, K. S. Aditya, and G. K. Jha, "Students' perception and preference for online education in India during COVID-19 pandemic," *Social Sciences & Humanities Open*, vol. 3, no. 1, p. 100101, Jan. 2021, doi: 10.1016/j.ssaho.2020.100101.
- [39] F. Ferri, P. Grifoni, and T. Guzzo, "Online learning and emergency remote teaching: Opportunities and challenges in emergency situations," *Societies*, vol. 10, no. 4, p. 86, Nov. 2020, doi: 10.3390/soc10040086.
- [40] M. Maillizar, A. Almantari, S. Maulina, and S. Bruce, "Secondary school mathematics teachers' views on e-learning implementation barriers during the COVID-19 pandemic: The case of Indonesia," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 16, no. 7, p. em1860, May 2020, doi: 10.29333/ejmste/8240.
- [41] C. Huggett, "The virtual training guidebook: How to design, deliver, and implement live online learning," in *American Society for Training and Development*, American Society for Training and Development, 2014.
- [42] N. Hara and R. Kling, "Students' frustrations with a Web-based distance education course," *First Monday*, vol. 4, no. 12, Dec. 1999, doi: 10.5210/fm.v4i12.710.
- [43] L. A. Petrides, "Web-based technologies for distributed (or distance) learning: Creating learning-centered educational experience in the higher education classroom," *International Journal of Instructional Media*, vol. 29, no. 1, pp. 69-77, 2002.
- [44] S. Vonderwell, "An examination of asynchronous communication experiences and perspectives of students in an online course: a case study," *The Internet and Higher Education*, vol. 6, no. 1, pp. 77-90, Jan. 2003, doi: 10.1016/S1096-7516(02)00164-1.
- [45] R. Eder, "The remoteness of remote learning," *Journal of Interdisciplinary Studies in Education*, vol. 9, no. 1, pp. 168-171, May 2020, doi: 10.32674/jise.v9i1.2172.
- [46] L. Y. Tay, S.-S. Lee, and K. Ramachandran, "Implementation of online home-based learning and students' engagement during the COVID-19 pandemic: A case study of singapore mathematics teachers," *The Asia-Pacific Education Researcher*, vol. 30, no. 3, pp. 299-310, Jun. 2021, doi: 10.1007/s40299-021-00572-y.
- [47] C. Schoole, "Marching on to a new way of learning and working," Newsletter of the Faculty of Education at the University of Pretoria: Pretoria, South Africa, 2020. [Online]. Available: https://www.up.ac.za/media/shared/6/ZP_Files/up-education-intuition-april-2020-web.zp191180.pdf
- [48] M.-J. Tsai and C.-C. Tsai, "Information searching strategies in web-based science learning: the role of internet self-efficacy," *Innovations in Education and Teaching International*, vol. 40, no. 1, pp. 43-50, Jan. 2003, doi: 10.1080/1355800032000038822.




- [49] C. C. Tsai and C.-C. Lin, "Taiwanese adolescents' perceptions and attitudes regarding the internet: exploring gender differences," *Adolescence*, vol. 39, no. 156, pp. 725–734, 2004.
- [50] H. Peng, C. C. Tsai, and Y. T. Wu, "University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions of the Internet," *Educational Studies*, vol. 32, no. 1, pp. 73–86, Mar. 2006, doi: 10.1080/03055690500416025.
- [51] D. M. Poole, "Student participation in a discussion-oriented online course," *Journal of Research on Computing in Education*, vol. 33, no. 2, pp. 162–177, Dec. 2000, doi: 10.1080/08886504.2000.10782307.
- [52] R. C. I. Prahmana, D. Hartanto, D. A. Kusumaningtyas, R. M. Ali, and Muchlas, "Community radio-based blended learning model: A promising learning model in remote area during pandemic era," *Heliyon*, vol. 7, no. 7, p. e07511, Jul. 2021, doi: 10.1016/j.heliyon.2021.e07511.

BIOGRAPHIES OF AUTHORS






Rahmi Ramadhani    is a Ph.D. student, Mathematics Education, Postgraduate Program, Universitas Negeri Medan, Jl. William Iskandar Psr V, Medan, Indonesia. She also an Assistant Professor in Universitas Potensi Utama, Medan, Indonesia since 2015. She is passionate about raising the quality of teaching and learning students and development of ICT based social culture learning model. Her research focuses of mathematics education, flipped classroom, ICT in teaching and learning, ethnomathematics, and design research. She can be contacted at email: rahmiramadhani3@gmail.com; rahmi_ramadhani@potensi-utama.ac.id.



Dian Armanto    is a Professor in Universitas Negeri Medan, Medan, Indonesia. He graduated from The University of Iowa, AS, Early Childhood Mathematics Education, 1996 (Master Degree), The University of Twente, Netherland, Mathematics Curriculum, 1999 (Master Degree), and The University of Twente, Netherland, Mathematics Education (Ph.D. Degree). He has over 30 years of experiences as an Academician with Universitas Negeri Medan, where he is currently a professor since 2010, the coordinator of Higher Education Service Institute of Medan-Sumatera Utara since 2012-2018, and the Chair of Higher Education Service Institute of Medan-Sumatera Utara since 2018-2020. His current research interest includes students' learning and development at various levels, realistic mathematics education, and philosophy of education. He can be contacted at email: dianarmanto@unimed.ac.id; dianarmanto32@gmail.com.



Fikry Prastya Syahputra    is a lecturer in Universitas Sumatera Utara, Faculty of Culture Sciences, English language Study Program. He has a master's degree in Linguistics study specifically in Translation study. His study interest is in translation phenomena within different types of text, multimodal analysis especially advertising discourse, English language learning as foreign language, and a combination study of translation - multimodal - media. He is also an amateur translator. He assists other lecturers by translating their articles from Bahasa Indonesia into English. His expertise major in translation is agriculture, forestry and mathematics studies. From 2019 until now, he has been entrusted as a proofreader in *Jurnal Pertanian Tropik* (Sinta 4). He can be contacted at email: fikryprastya@usu.ac.id.



Titim Eliawati    is an Assistant Professor in Universitas Potensi Utama, Medan, Indonesia. She is passionate about Management Education. She graduated from Jakarta State University, Jakarta in 2014 (Master Degree). Her work in providing children in poverty to get free education has been started on 2005 in International Humanity Foundation. She was the executive director of the same organization since 2009. She had worked actively with the community in four provinces in Indonesia, the community in Nakuru, Kenya and the community in Chiang Rai, Thailand. In 2012, She started her project with Master School which provided free education for street children street in Depok, West Java. Her current research interest beside free education for children in poverty which has been her long focus areas, are includes character education, school culture, student's learning at several areas. She can be contacted at email: titim.eliawati@gmail.com.