



TRENDS IN TECHNOLOGICAL INNOVATION IN EDUCATION DURING A TIME OF PANDEMIC DISRUPTION: EXAMINING THE PERSPECTIVE OF TEACHING DIGITAL PEDAGOGY

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Abstract

Since the world has been disturbed by the increasing impact of Covid-19, various countries have applied distance learning, responding to the pandemic policy on an international scale. The author believes that the learning of technological innovation for Indonesia is different from that of developed countries, so this study tries to understand the digital pedagogical perspective of teaching. A series of successful electronic literature searches were carried out on several scientific journal publications, books, and other website literature to get the intended understanding. The data that we have obtained are then analyzed in-depth, involving critical coding and high evaluation to obtain understanding and conclusions that can answer the core questions of this study. We used all data from secondary data, namely scientific evidence published between 2010 and 2021. Then the design of this study was in a descriptive qualitative system under a phenomenological approach, an effort to explore data as widely as possible. After discussing the results, we included pedagogical technology, which is a method that discusses how teachers handle their duties assisted by technological innovation. However, the pedagogy also helps teachers become student learning facilitators by using existing technological facilities to improve learning outcomes. While at the same time developing students' potential even though they are being afflicted with learning disorders due to pandemics. We hope this result can be a contributing input for further studies.

Keywords: Innovation, Trend, Education, Perspective, Pedagogy, and Pandemic

Abstrak

Sejak dunia diganggu dengan meningkatnya dampak Covid-19, berbagai negara telah menerapkan pembelajaran jarak jauh, menanggapi kebijakan pandemi dalam skala internasional. Penulis berkeyakinan bahwa pembelajaran inovasi teknologi untuk Indonesia berbeda dengan negara maju, sehingga penelitian ini mencoba memahami perspektif pedagogis digital dalam pengajaran. Serangkaian pencarian literatur secara elektronik yang berhasil dilakukan pada beberapa publikasi jurnal ilmiah,

buku, dan literatur situs web lainnya untuk mendapatkan pemahaman yang dimaksud. Kemudian kami menganalisa secara mendalam, melibatkan pengkodean kritis, dan evaluasi tinggi untuk memperoleh pemahaman yang dapat menjawab pertanyaan penelitian ini. Kami menggunakan semua data dari data sekunder, yaitu bukti ilmiah yang diterbitkan antara tahun 2010 dan 2021. Desain penelitian ini dalam sistem deskriptif kualitatif dengan pendekatan fenomenologis, upaya untuk menggali data seluas-luasnya. Setelah membahas hasil, kami dapat ringkaskan bahwa teknologi pedagogis, yaitu metode yang membahas bagaimana guru menangani tugasnya dengan bantuan inovasi teknologi. Namun, pedagogi juga membantu guru menjadi fasilitator belajar siswa dengan menggunakan fasilitas teknologi yang ada untuk meningkatkan hasil belajar. Sekaligus mengembangkan potensi siswa meski sedang ditimpa gangguan belajar akibat pandemi. Kami berharap hasil ini dapat menjadi masukan untuk penelitian selanjutnya.

Kata Kunci: Inovasi, Tren, Pendidikan, Perspektif, Pedagogi, Dan Pandemi

INTRODUCTION

Since UNESCO and WHO declared the Covid-19 attack worldwide, the world of education has experienced changes in both policy and implementation.¹ The policies of each country are an effort to save the community from the Coronavirus attack by closing learning activities from schools to universities and community education centers. The closure is a technology application-based learning solution that allows learning to take place remotely.² Because the application of a digital-based learning system is a solution or alternative learning from traditional face-to-face methods in schools and universities to distance learning by relying on a digitalization system which has become a trend of solutive learning since the Coronavirus attack hit education almost all over the world,³ the question arises if you want to get optimal learning outcomes after the learning system shifts from traditional methods to data-based methods and distance applications, of course, it will be a change and challenge for both teachers and parents.⁴

Besides that, the digital method solution is also full of challenges; its vigilance requires a collection of experiences and views from various discussion perspectives, both in the context of national and international practice. A reminder of traditional teaching pedagogy is

¹ Sarjdana Orba Manullang dan Erwinsyah Satria, "The Review of the International Voices on the Responses of the Worldwide School Closures Policy Searching during Covid-19 Pandemic," *Jurnal Iqra': Kajian Ilmu Pendidikan* 5, no. 2 (1 September 2020): 1–13, <https://doi.org/10.25217/ji.v5i2.1036>. SUDARMO dkk., "The Identification of Online Strategy Learning Results While Students Learn from Home During the Disruption of the COVID-19 Pandemic in Indonesia," *Journal of Contemporary Issues in Business and Government* 27, no. 2 (8 Maret 2021): 1950–56, <https://doi.org/10.47750/cibg.2021.27.02.205>. Sardjana Orba Manullang, Mardani Mardani, dan Aslan Aslan, "The Effectiveness of Al-Quran Memorization Methods for Millennials Santri During Covid-19 in Indonesia," *Nazhruna: Jurnal Pendidikan Islam* 4, no. 2 (12 Juni 2021): 195–207, <https://doi.org/10.31538/nzh.v4i2.1334>.

² Luh Devi Herliandry dkk., "Pembelajaran pada masa pandemi covid-19," *JTP-Jurnal Teknologi Pendidikan* 22, no. 1 (2020): 65–70. Sudarmo Sudarmo dkk., "The Future of Instruction Media in Indonesian Education: Systematic Review," *AL-ISHLAH: Jurnal Pendidikan* 13, no. 2 (31 Agustus 2021): 1302–11, <https://doi.org/10.35445/alishlah.v13i2.542>.

³ Firdaus Firdaus, "Implementasi Dan Hambatan Pada Pembelajaran Daring Di Masa Pandemi Covid 19," *Utile: Jurnal Kependidikan* 6, no. 2 (2020): 220–25. Purniadi Putra dkk., "The Students Learning from Home Experiences during Covid-19 School Closures Policy In Indonesia," *Jurnal Iqra': Kajian Ilmu Pendidikan* 5, no. 2 (5 September 2020): 30–42, <https://doi.org/10.25217/ji.v5i2.1019>.

⁴ Ria Puspita Sari, Nabila Bunnanditya Tussyantari, dan Meidawati Suswandari, "Dampak pembelajaran daring bagi siswa sekolah dasar selama covid-19," *Prima Magistra: Jurnal Ilmiah Kependidikan* 2, no. 1 (2021): 9–15.

undoubtedly different from digital and digital-based learning pedagogy.⁵ Based on these changes and adoptions, this situation wants to collect as much data as possible to answer and discuss the typical learning and challenges facing students, teachers, and all learning communities because *Panda mi* requires learning activities to be carried out remotely.⁶

Exploring various views and experiences of technology-based learning that have been practiced in many countries will undoubtedly illustrate what the adaptation model is and the challenges faced by all learning components from a pedagogical perspective and learning success orientation.⁷ After gaining understanding and perspectives from various contexts of global education applications, there will be essential points that can be noted and used as lessons for improving the quality of learning in Indonesia. Considering that Indonesia is a country that is still developing where learning activities occurred before the pandemic disruption occurred, on average, teaching is still conducted face-to-face and assisted by several technology applications.⁸

After getting various views from the point of view of teaching digital pedagogy from various contexts of application abroad, this research will gain new light and want a solution, the message is not what is happening at home between learning in countries that are already accustomed to digital technology,⁹ and the conditions in Indonesia which are said to be trending in technology-based learning is not a robust solution. It must be admitted that learning conditions in Indonesia are very diverse, both in terms of government readiness for school readiness and the readiness of students and parents.¹⁰

All of that will be one of the factors that will determine the success of technology-based learning. The middle school in Indonesia does not yet have adequate facilities or resources to support technology-based learning.¹¹ Limitations are not only absolute on the teacher government, but problem after problem arises when facilities are provided. Then teacher readiness is adequate, but there are still challenges and difficulties; how are students and parents prepared who have not been able to seek the procurement of learning technology

⁵ Purniadi Putra dan Aslan, "PENGEMBANGAN BAHAN AJAR BERBASIS IMTAQ DAN IPTEK DI ERA REVOLUSI INDUSTRI 4.0 PADA MATA PELAJARAN SAINS MADRASAH IBTIDAIYAH," *Ta Limuna: Jurnal Pendidikan Islam* 9, no. 1 (30 Maret 2020): 1–15, <https://doi.org/10.32478/talimuna.v9i1.345>.

⁶ Christine Greenhow, Cathy Lewin, dan K. Bret Staudt Willet, "The educational response to Covid-19 across two countries: A critical examination of initial digital pedagogy adoption," *Technology, Pedagogy and Education*, 2021, 1–19. Amat Suroso dkk., "Challenges and Opportunities towards an Islamic Cultured Generation: Socio-Cultural Analysis," *Linguistics and Culture Review* 5, no. 1 (28 Juni 2021): 180–94, <https://doi.org/10.37028/lingcure.v5n1.1203>.

⁷ Aslan Aslan dkk., "TEACHER'S LEADERSHIP TEACHING STRATEGY SUPPORTING STUDENT LEARNING DURING THE COVID-19 DISRUPTION," *Nidbomul Haq: Jurnal Manajemen Pendidikan Islam* 5, no. 3 (21 November 2020): 321–33, <https://doi.org/10.31538/ndh.v5i3.984>.

⁸ Olena Terenko dan Olena Ogienko, "How to Teach Pedagogy Courses Online at University in COVID-19 Pandemic: Search for Answers.," *Romanian Journal for Multidimensional Education/Revista Romaneasca pentru Educatie Multidimensionala* 12 (2020).

⁹ Joseph Crawford dkk., "COVID-19: 20 countries' higher education intra-period digital pedagogy responses," *Journal of Applied Learning & Teaching* 3, no. 1 (2020): 1–20.

¹⁰ Ben Williamson, Rebecca Eynon, dan John Potter, "Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency," *Learning, Media and Technology* (Taylor & Francis, 2020).

¹¹ Muhammad Adnan dan Kainat Anwar, "Online Learning amid the COVID-19 Pandemic: Students' Perspectives.," *Online Submission* 2, no. 1 (2020): 45–51. Aslan, "Peran Pola Asuh Orangtua di Era Digital," *Jurnal Studia Insania* 7, no. 1 (2019): 20–34, <http://dx.doi.org/10.18592/jsi.v7i1.2269>.

infrastructure, not to mention the ability to operate or implement standard operational learning technologies that support appropriate learning models and demands.¹² Such a gap will determine the failure of an educational model, especially what is still necessary.

In terms of digital pedagogy readiness, which is an approach that is not only based on the skills of teachers using technology but how educators must become facilitators by utilizing digital technology to build skills in using these tools, not only using but thinking about efforts to develop intelligence aspects and the effect of the effectiveness of using technology, by students.¹³ Everyone has witnessed that since the covid pandemic, which forced the government to make breakthroughs and policies, namely technology-based learning for almost two years, this left many problems and application challenges so that after being evaluated with all its impacts, it increasingly showed a significant problem.¹⁴ The potential to decrease student learning outcomes is only because of the adaptation of traditional learning and methods to digital ways, which are increasingly popular. Indeed, the Ministry of Education and Culture has tested the effectiveness of using high technology, the government itself has not been able to guarantee the quality of the skills of teachers and students in technology-based learning.¹⁵

Therefore, as some of the things mentioned above must be a concern and an effort to anticipate what if both teachers and students and parents have not been able to understand digital pedagogy where the ability to carry out various creativity leads to online-based learning innovation, namely by utilizing the convenience of existing technology that has been standardized for use. in supporting learning during a pandemic,¹⁶ it must also be acknowledged that the necessity of pedagogical technology education as a need and skill that students and teachers must possess needs to be studied and discussed on the surface of any obstacles and obstacles that occur when the government closes schools face to face opening schools online with the help of technology.¹⁷

Consciously and unconsciously integrating technology in education is an effort that must be made by educational institutions such as schools and high schools. However, it must be emphasized that the facilities and support for all learning activities are a problem that needs to be addressed¹⁸ and resolved together. Such as data released by the government, namely the technology and communication center of the ministry of education and culture, which states

¹² Prasetyono Hendriarto dkk., "The Relevance of Inquiry-Based Learning in Basic Reading Skills Exercises for Improving Student Learning Outcomes in Madrasah Ibtidaiyah," *At-Tajdid: Jurnal Pendidikan Dan Pemikiran Islam* 5, no. 01 (15 Juni 2021): 28–41, <https://doi.org/10.24127/att.v5i01.1473>.

¹³ Liwei Zhang, Huijie Li, dan Kelin Chen, "Effective risk communication for public health emergency: Reflection on the COVID-19 (2019-nCoV) outbreak in Wuhan, China," dalam *Healthcare*, vol. 8 (Multidisciplinary Digital Publishing Institute, 2020), 64.

¹⁴ Nina Khodakova, Anna Antonova, dan Tatiana Semenova, "Teacher Refresher Course as Digital Pedagogy Tool in Moscow" (EasyChair, 2020).

¹⁵ Vian Ahmed dan Alex Opoku, "Technology supported learning and pedagogy in times of crisis: the case of COVID-19 pandemic," *Education and Information Technologies*, 2021, 1–41.

¹⁶ Carlo Giovannella, Passarelli Marcello, dan P. Donatella, "The effects of the Covid-19 pandemic on Italian learning ecosystems: The school teachers' Perspective at the steady state," 2020.

¹⁷ Marcelo C. Borba, "The future of mathematics education since COVID-19: humans-with-media or humans-with-non-living-things," *Educational Studies in Mathematics*, 2021, 1–16.

¹⁸ Simin Ghavifekr dan Wan Athirah Wan Rosdy, "Teaching and learning with technology: Effectiveness of ICT integration in schools.," *International Journal of Research in Education and Science* 1, no. 2 (2015): 175–91.

that there is a gap between teachers and students in using digital technology where only 50% of teachers are able and ready to carry out learning.¹⁹ Task-based digital application technology. This is a new technology application of public internet services. The use of technology should be more to the skills of teachers and students to transfer knowledge and skills and transfer the character and character of students based on technology.²⁰

This is considering the demands of the revolution era 4.0 era ideally must be able to change the flow of thought not only oriented to realizing learning but must allow learning and be adapted to 21st-century skills and abilities that focus on student character literacy and most importantly be creative with critical thinking projects to give birth the latest innovations related to the character of communication, the character of collaboration and the character of creativity both by students, teachers, and other communities who are directly involved in digital-based education projects during the pandemic.²¹ On the other hand, the actual learning conditions during the pandemic are online learning solutions, not where the role of educators is abandoned, but the role of teachers in the success of this revitalization-based learning—transformed from skills that cannot be digitized to skills that are successful in reporting, especially the learning approach.²²

For this reason, the author wants to gain a deep understanding as evidenced by scientific evidence of the latest research in the context of technology-based learning and its relation to digital pedagogy, which requires how education is run online while responding to each government's policies related to the dangers and reduction of the impact of a pandemic.²³ Because efforts to fight the Corona outbreak and learn even though distanced are supported by technology, which has now become a decision and constitutional mandate for each country that is seriously affected. Thus, efforts to obtain data and understanding on these issues have become our duty and dedication as researchers and educational practitioners so that later input can become important input for decision making and scientific development and training.²⁴

METHOD

In this method section, the author will describe problem formulation strategies, studies on procedures for obtaining data and analysis, and types of digital pedagogical

¹⁹ Edwina Neyland, "Integrating online learning in NSW secondary schools: Three schools' perspectives on ICT adoption," *Australasian Journal of Educational Technology* 27, no. 1 (2011).

²⁰ Chaidar Husain, "Pemanfaatan teknologi informasi dan komunikasi dalam pembelajaran di SMA Muhammadiyah Tarakan," *Jurnal Kebijakan dan Pengembangan Pendidikan* 2, no. 2 (2014).

²¹ Heriyanto Heriyanto dkk., "Character education in the era of industrial revolution 4.0 and its relevance to the high school learning transformation process," *Utopía y praxis latinoamericana: revista internacional de filosofía iberoamericana y teoría social*, no. 5 (2019): 327–40.

²² Abeer Ali Okaz, "Integrating blended learning in higher education," *Procedia-Social and Behavioral Sciences* 186 (2015): 600–603.

²³ Roy Y. Chan, "Studying coronavirus (COVID-19) and global higher education: Evidence for future research and practice," *Available at SSRN 3622751*, 2020.

²⁴ Günes Korkmaz dan Çetin Toraman, "Are we ready for the post-covid-19 educational practice? An investigation into what educators think as to online learning," *International Journal of Technology in Education and Science* 4, no. 4 (2020): 293–309.

education designs.²⁵ First, an understanding of the core problems of this research, then a literature search that will be studied in depth to obtain a summary that is the answer to this research.²⁶ The literature sources we visited included some journal publications, both overseas and domestically, that actively studied and discussed learning problems disrupted by the pandemic and online learning solutions based on educational applications.²⁷ After getting the data, the subsequent analysis and review process involves a coding system for high evaluation data and in-depth data interpretation with a phenomenological approach, namely an effort to find the broadest possible data to study and answer questions about this research with valid and reliable standards.²⁸

This study relies on the findings of previous studies with convincing empirical evidence, and then we design a report in the form of qualitative and descriptive data. This is because we did this research. Indonesia still has the status of restrictions and imitation of community movements to obtain data in the field, such as from schools, universities, and other learning centers.²⁹ So the best solution is to search the data electronically. Our report builds on several previous studies that have actively reviewed and revised the literature on the legal impact of education and the barriers faced when adapting digital-based learning. Because this study utilizes scanned data from the field, the search effort is not carried out.³⁰ This includes exposure to meteorology used in conducting studies to understand technological innovations in learning during pandemic disruption, examination, and analysis in a pedagogical digital learning perspective.

RESULTS AND DISCUSSION

Computerized innovation during a pandemic

Since the Covid-19 pandemic has hit the world in all areas of life, it has unquestionably felt an enormous effect, including the schooling administration area.³¹ Since a long time ago, this area has needed advanced innovation for instructive administrations. In any case, since shutting schools and turning on distance classes, the pattern in the utilization of instructive innovation keeps on being something uncommon where all understudies, all guardians are relied upon to have the option to finish training from a distance, at the end of the day, they should have the option to do computerized innovation-based schooling.³²

²⁵ Alyssa Friend Wise, "Designing pedagogical interventions to support student use of learning analytics," dalam *Proceedings of the fourth international conference on learning analytics and knowledge*, 2014, 203–11.

²⁶ M. De Simone dkk., "6.1 Reference procedures for obtaining occupancy profiles in residential buildings," 2018.

²⁷ Víctor Manuel López-Pastor dkk., "Alternative assessment in physical education: a review of international literature," *Sport, Education and Society* 18, no. 1 (2013): 57–76.

²⁸ Daniel Maier dkk., "Applying LDA topic modeling in communication research: Toward a valid and reliable methodology," *Communication Methods and Measures* 12, no. 2–3 (2018): 93–118.

²⁹ Guido KW Frank dkk., "Toward valid and reliable brain imaging results in eating disorders," *International Journal of Eating Disorders* 51, no. 3 (2018): 250–61.

³⁰ E. Pantano, G. Pizzi, dan A. Rogers, "education? The (mis) match between the leading universities' offerings and job demand in UK. *International Journal of Retail and Distribution Management*. <https://doi.org/10.1108/IJRDM-04-2019-0139>," 2020.

³¹ Pravat Kumar Jena, "Impact of pandemic COVID-19 on education in India," *International journal of current research (IJCR)* 12 (2020).

³² Krešimir Čosić dkk., "Impact of human disasters and COVID-19 pandemic on mental health: potential of digital psychiatry," *Psychiatria Danubina* 32, no. 1 (2020): 25–31.

The school climate is a long way behind because it takes on an example of advancement. The most recent example of informational advancement is reviving change. Since the pandemic diverted schools from homerooms into homes, we have seen better ways to deal with learning and instructing.³³ Inventive examples in informative advancement allow meeting developing informational necessities. Settings, for example, web-based homerooms give strategies to affect learning spaces significantly, and examples, for example, expanded reality and active learning, are the reason for upgrading improvement and improving learning encounters.³⁴

The fact is that the covid pandemic has forced distance learning to be the right decision when the government has to save their families from the pandemic but still wants education to continue.³⁵ Along with that, learning through digital has the opportunity to take a computer-based learning system that allows learning to continue; efforts to minimize the risk of being exposed to viruses are also the right choice.³⁶ Innovative learning patterns are centered on the availability of flexible means. The teacher and student councils and all these activities must lead to students' interests, namely achieving maximum educational goals.³⁷

Through the creative use of technology, he will give birth to learning innovations that refer to the presentation of technology and informatics devices in the study rooms at home to make the learning experience unique but superior and interesting.³⁸ The technology application strategy is exciting, different from conventional learning strategies, focusing on teacher-based education and infrastructure in the classroom. However, what has happened since the pandemic has innovated the thought of reconstructing human education. It turns out that it not only happen face-to-face but can happen remotely. This is an innovation of creativity, and the distinction of something fun is no longer an incentive but an alternative that plays a role in helping teaching with maximum learning tasks.³⁹

Technological digital education matter

Digital online learning pedagogy during the pandemic disruption the term instructional pedagogy generally alludes to methodology; Following the times, this implies that a teacher must understand and use computerized gadgets to implement internet learning.⁴⁰ This is an essential point for teachers, students, and parents to understand when learning from

³³ Jena, "Impact of pandemic COVID-19 on education in India."

³⁴ Neena Pandey dan Abhipsa Pal, "Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice," *International journal of information management* 55 (2020): 102171.

³⁵ Chusna Apriyanti, "Distance learning and obstacles during Covid-19 outbreak," *Jurnal Ilmiah Pendidikan Dasar* 7, no. 2 (2020): 68–83.

³⁶ Pamela McElwee dkk., "Ensuring a post-COVID economic agenda tackles global biodiversity loss," *One Earth*, 2020.

³⁷ Delipiter Lase, Trisa Genia Chrisantiana Zega, dan Dorkas Orienti Daeli, "Parents' perceptions of distance learning during Covid-19 pandemic in rural Indonesia," *Journal of Education and Learning (EduLearn)*, 2021. Hilmi Mizani dkk., "Understanding Islamic Education Model for Children of Early Married Families in South Kalimantan," *Talent Development & Excellence* 12, no. 2 (2020): 4365–74.

³⁸ Sravani Singu dkk., "Impact of social determinants of health on the emerging COVID-19 pandemic in the United States," *Frontiers in public health* 8 (2020): 406.

³⁹ Junhong Zhu, Teresa Stone, dan Marcia Petrini, "The ethics of refusing to care for patients during the coronavirus pandemic: a Chinese perspective," *Nursing Inquiry* 28, no. 1 (2021): e12380.

⁴⁰ Roy Schwartzman, "Performing pandemic pedagogy," *Communication Education* 69, no. 4 (2020): 502–17.

home. Honestly, it can be proven that innovation can also affect the world of teaching during a pandemic. For example, the culture of the same glue, usually done when students get assignments, clearly does not teach them to think fundamentally.⁴¹ This digital-based digital teaching method and approach has become a global trend, although the level and scope will differ between countries and learning communities. The pandemic may be the same, but the learning solutions are different between countries because the solutions and efforts are very different.⁴²

To be sure, awareness of the use of innovation in learning is a means to utilize innovation from a fundamental and adapted theoretical point of view.⁴³ More clearly, the computerized learning method is the ability of teachers to use sophisticated equipment admirably, how, when, for how long, and choosing the proper application is a critical point of interest. The term instructional method generally alludes to methodology; Following times, this implies that a teacher must understand and use computerized gadgets to implement internet learning.⁴⁴ This is an essential point for both teachers and students to understand. Honestly, it can be proven that innovation can also affect the world of schooling. For example, the duplicate culture is usually done when students get assignments that do not teach them to think fundamentally and develop their cognitive potential.⁴⁵

Undoubtedly, attention to innovation in learning uses innovation from a fundamental and adapted theoretical point of view. More precisely, computerized learning pedagogy is the ability of educators to use sophisticated tools admirably, how, when, for how long, and the selection of the proper application is essential to consider.⁴⁶ Incidentally, many instructors apply it alternately when learning how to respond to Covid-19 so that regardless of how interesting it is, it will somehow cause student and teacher fatigue and exhaustion. Let students have experience in observing new things according to the directions that have been given, of course, still with deviant supervision from guardians and educators when they learn with the help of digital tools. This can cause them to feel tested and eager to learn. Technology instills in students that learning is practicing, changing, and having fun under the control of teachers and parents when learning remotely.⁴⁷

⁴¹ Kenneth Ronkowitz dan Lynnette Condro Ronkowitz, "Online Education in a Pandemic: Stress Test or Fortuitous Disruption?," *American Journal of Economics and Sociology* 80, no. 1 (2021): 187–203.

⁴² James M. Crick dan Dave Crick, "Coopetition and COVID-19: Collaborative business-to-business marketing strategies in a pandemic crisis," *Industrial Marketing Management* 88 (2020): 206–13.

⁴³ Andrew D. Yates dkk., "Ensembl 2020," *Nucleic acids research* 48, no. D1 (2020): D682–88.

⁴⁴ Wendy Barber, Sherry King, dan Sylvia Buchanan, "Problem based learning and authentic assessment in digital pedagogy: Embracing the role of collaborative communities.," *Electronic Journal of E-Learning* 13, no. 2 (2015): 59–67.

⁴⁵ Karsten Krauskopf, Carmen Zahn, dan Friedrich W. Hesse, "Leveraging the affordances of Youtube: The role of pedagogical knowledge and mental models of technology functions for lesson planning with technology," *Computers & Education* 58, no. 4 (2012): 1194–1206.

⁴⁶ Anthony G. Picciano, "Theories and frameworks for online education: Seeking an integrated model.," *Online Learning* 21, no. 3 (2017): 166–90.

⁴⁷ Patient Rambe dan Aaron Bere, "Using mobile instant messaging to leverage learner participation and transform pedagogy at a South African University of Technology," *British Journal of Educational Technology* 44, no. 4 (2013): 544–61.

Online pedagogy during learning disruption

To be sure, awareness of the use of innovation in learning is a means to utilize innovation from a fundamental and adapted theoretical point of view.⁴⁸ More clearly, the computerized learning method is the ability of teachers to use sophisticated equipment admirably, how, when, for how long, and choosing the proper application is a critical point of interest. The term instructional method generally alludes to methodology; Following times, this implies that a teacher must understand and use computerized gadgets to implement internet learning.⁴⁹ This is an essential point for both teachers and students to understand. Honestly, it can be proven that innovation can also affect the world of schooling. For example, the duplicate culture is usually done when students get assignments that do not teach them to think fundamentally and develop their cognitive potential.⁵⁰

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CONCLUSION

We reiterate that the core aim of this is to understand the cranes of technological innovation in learning afflicted by examining the perspective of digital technology-based pedagogic teaching. With the presentation of data supported by scientific evidence from various national and international publications databases, we hope this presentation has answered this study project's hypotheses and core problems. We review and report on these events in a descriptive qualitative research format. Well, in this section, we can conclude essential findings, among others, we report learning during the pandemic by relying on technological innovation as a solution to respond to the disruption of a losing pandemic, which has indeed become a health issue and also other sectors not lagging behind the education sector, which world institutions confirm, such as WHO and UNESCO. Next, we see that digital was channeled in education are very important and need serious attention. Based on our search, digital online learning at school is an approach or teaching method that

⁴⁸ Yates dkk., "Ensembl 2020."

⁴⁹ Barber, King, dan Buchanan, "Problem based learning and authentic assessment in digital pedagogy."

⁵⁰ Krauskopf, Zahn, dan Hesse, "Leveraging the affordances of Youtube."

⁵¹ Picciano, "Theories and frameworks for online education."

⁵² Rambe dan Bere, "Using mobile instant messaging to leverage learner participation and transform pedagogy at a South African University of Technology."

helps students and teachers succeed with the help of technology that is oriented to the ability to use technology and synchronizes with the learning objectives to be achieved by education.

Another point that we found, for example, when this pandemic disrupted education, required awareness from the first parties of teachers in why and adapting themselves to how this payment system can be a solution when students cannot access or continue learning conventionally, so in other words Traders of the learning nation during this disturbance call for the attention of educators to understand that technology also has a culture, namely a techno-culture that makes the parties think in a table manner, not only thinking about the ability to use technology but also thinking about how to develop cognitive learning so that students are not negligent with itself, but technology must be a processing device, not a goal. We summarize the descriptions and conclusions from a series of studies of various literature sources that we hope have tried to answer the problems that we raise in this paper. We are aware that the data we present have many shortcomings and limitations; therefore, constructive input and criticism are highly sought after so that the implementation of future studies will provide higher enlightenment.

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