



Use of Technology in Open and Distance Learning: Transforming Education

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ABSTRACT

A long with the times, the world of education is also developing. Technology has a very large influence in the world of education. Where technology is an important part of education. With the existence of technology, changes in the world of education are getting better day by day. This educational progress cannot be separated from the role of technology in increasing learning innovation in the education system. For this reason, technology is used as a means to create learning innovations in the current education transformation. The purpose of this research was to find out the use of technology in distance and open learning: educational transformation. The method used in this research is a quantitative research method with a research design in the form of a survey. The data in this study were obtained by filling out a questionnaire on the Google form link. The results of this study are that the Use of Technology in Distance and Open Learning: Educational Transformation, provides unique and interesting learning through the use of various technologies in the learning process. The conclusion from this study is that the use of technology in distance and open learning is very influential and suitable to be used to support distance and open learning as a change in the world of education or educational transformation, because students can learn anywhere and anytime even from home and the educational process is also supported. by the technology used. This research is also an answer from people who experience many obstacles in the educational process related to the time and place of education implementation. The limitation in this research is that researchers only conduct research at the school level. The researcher also hopes that further researchers will expand research to a higher level and the researcher also hopes that in the future other researchers will emerge who can develop this research and focus on one part of technology.

Keywords: *Distance and Open Learning, Educational Transformation, Technology*

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INTRODUCTION

In the current era of global technological development that has affected many aspects of life, be it politics, economics, culture, art and education, education develops over time because it is supported by technological developments (Nazemi et al., 2019). The world of education needs to improve schools and advance education through positive innovation (Chan et al., 2019). The utilization of technology in the education system has opened the door for increased educational innovation around the world (Pennycook & Makoni, 2019). The development of technology is closely related to the development of education, so that education today cannot develop without technological intervention (Hussain & Cambria, 2018). In education, technology acts as a facilitator in the development of education through online media. Today, technology plays an important role in education. Technology is the tool that education needs. Technology is also very useful in finding the latest information. If technology is used properly, it will lead to quality education because this technology can do a lot for education. Many believe that technology makes things easier, more efficient and more convenient (Loeb et al., 2019). From children to adults, there is no age limit for using technology. Schools are expected to keep up with significant technological developments by providing electronic devices that support learning. Good and complete facilities and infrastructure ensure that learning activities are carried out effectively and efficiently so that students get a conducive and enjoyable learning environment.

Technology is increasingly moving in a positive direction (Lu et al., 2021). The role of educators as teaching staff is to know how to use technology as well as possible. Technology can support learning through learning media and learning methods (McGrew, 2020). Designing a learning environment with the help of technology will certainly be better and more interesting, and the way teachers deliver material will also be influenced by technology. The learning environment is an important part of the learning system (Wang et al., 2019). The use of the learning environment can make teaching and learning simple and planned, because the material provided by the teacher must be in accordance with the learning environment (Kiran et al., 2022). But in this case, there is also a demand from teachers to use technology more creatively and innovatively. Educators should not master technology because it makes learning monotonous and boring for students. Moreover, the educational process relies heavily on technology to make it work according to the time and needs of the students. The world of education must welcome this change with vigor. This change is called the digital era (Kollins et al., 2020). The digital era is an era where information can be obtained and disseminated easily and quickly using digital technology (Attaran, 2020). Digital transformation in education is very important. Educational institutions ranging from elementary schools to universities cannot be separated from digitalization.

The development of technology is increasingly modern, causing humans to become dependent on technology. Technology is a basic need that is required for everyone (Partel et al., 2019). Technology is used in everyday activities from young to old, from experts to ordinary people. Beyond everyday life, technology also has its place in the teaching and learning world of education (Bhatia et al., 2020). Today's technology produces a variety of

online learning applications that are more creative, less monotonous, and more enjoyable for students (Zhang et al., 2020). Global demands demand that the world of education always develop in accordance with current technological needs, especially to support the use of technology and develop the quality of education. The demands of these changes require the world of education to be innovative and creative in the delivery of learning. The development and innovation of technology in recent years has given us the opportunity and convenience to seek information regardless of time and place. Thanks to digital technology, students can easily get information or learning resources. Both interactive learning (Ghesu et al., 2019). Thanks to technology, there are many ways to get children to learn through learning media. The third is adaptive learning. Thanks to technology, it is possible to adapt learning to the learning conditions, needs and environment of students.

It is undeniable that the world of education is the center of attention of all circles in the world. Education is the benchmark of a country's success. Because good education produces quality, competitive and innovative human resources (Theobald et al., 2020). Technology is very useful in online education processes such as distance learning and open learning (Al Lily et al., 2020). The success of the learning process is the main goal in organizing school education. In learning, the focus is on teachers and students (Al Maarif et al., 2023). Teachers should support students to develop knowledge according to their student structure for successful learning. In open and distance learning, technology is the most important support tool (Maryati et al., 2022). Technology allows students to learn anywhere, anytime, and distance learning is a formal learning method supported by interactive communication systems and various other supporting tools that connect teachers and students (Beckman et al., 2019). The existence of distance and open learning systems is one form of change and is an example of educational change in the world of education. All distance learning is open learning, but not all open learning is distance learning. Because open learning sometimes consists of meetings between students and teachers.

Distance learning is a form of learning where teachers and students are not in the same place and the implementation is involved through supporting tools such as cellphones and other communication tools. At the same time, open learning is a solution to learning problems related to time and place (Ahmed et al., 2021). This open and distance learning minimizes face-to-face learning. As a result, students also learn independently according to their own abilities, as teachers and students are separated. This open and distance learning makes it easier for students who live geographically far from school and also reduces school transportation costs as long as they study from home (Kendall et al., 2019). This is indicative of periodic changes in the education system. This open and distance learning has been applied during the Corona Pandemic that occurred yesterday in 2021 (Singh et al., 2021). As a solution, distance learning and open learning will be implemented so that students can still learn even though the system is implemented at home. Distance and open learning have both positive and negative impacts in their implementation. However, the technology is the safest solution for remote use.

Educational change is a change made to achieve educational goals in order to improve the quality of education. (Kioupi & Voulvoulis, 2019). How has education changed from the traditional to the digital age? With this change, there will certainly be differences in the way information is acquired and communicated. Previously, students only received information from materials delivered by teachers, which students listened to and recorded. But in the era of advanced technology, students can now access information from anywhere, such as the internet which is available to all students anytime, anywhere. In addition, the way of delivering learning materials has also changed (Oyedotun, 2020). Before learning about technology, teachers only used books as tools and could only do it in class with lecture or discussion methods. But since the existence of technology, the methods used have become more varied and learning does not only occur in the classroom, therapy can also be zoomed in, googling, etc. through social media (Tejedor et al., 2020). These are all manifestations of educational change that must be continuously developed. As expected, the road to digital education transformation is not an easy one. It requires cooperation between countries to overcome the challenges and obstacles that exist. The government actually has a roadmap through the Ministry of Education and Culture that aims to improve the quality of education and digital transformation in Indonesia. The government cannot act alone in digitally transforming education for a better life (Brunetti et al., 2020). In addition, as a diligent and active participant in building the nation's civilization, the government needs ideas, creative thinking, and straight movements from all corners of the country.

Some previous researchers' opinions on the utilization of technology in distance and open learning: Transformation of education. According to (Siahaan, 2019) For those who came up with the idea of introducing distance learning, the main concern was to provide educational services to the community, which face-to-face educational institutions are currently unable to do for one reason or another. As often explained, some of the obstacles faced are related to distance and geographical difficulties, transportation, time, budget constraints and physical weaknesses. Second, (Ibrahim, 2019) He said he had also conducted research on ICT for open distance learning. The results show that the use of different types and kinds of learning resources enables the expansion of quality learning opportunities in education. In addition, ICT can also help students who want to continue their studies to a higher level. Third, (Susanti, 2013) According to him, he also conducted research on educational technology and its role in educational transformation. The results show that the utilization of educational technology in professional learning makes a positive contribution to the achievement of students' learning goals. Therefore, educational technology efforts should be implemented in the learning process and educational change. The application of learning models with an educational technology approach, religion-based learning models and competency-based learning models is very useful. In addition, the implementation of teacher development in terms of educational technology is also very useful.

The purpose of this study is to examine the use of technology in distance and open learning: Transforming education. The purpose of this study is to examine the use of

technology in distance and open learning and explain what is meant by educational change or change in the world of education. With the help of this technology, it is expected that distance and open learning can be empowered and supported by technology. In this case, technology actually supports distance learning and open learning because it is supported by means of communication that can be used in online learning. The advantages of this technology attract researchers to examine the utilization of technology in distance and open learning: Educational transformation. Therefore, the researcher decided to conduct a study on the utilization of technology in distance and open learning: Educational transformation.

RESEARCH METHODOLOGY

The method used in this research is quantitative method (Yu et al., 2020). This quantitative research method produces data in the form of numbers obtained by filling out surveys on Google Forms and provided to students as research subjects. In addition, this quantitative method produces systematic, planned, and structured research. This quantitative research method is widely used in research (Nusinow et al., 2020). This quantitative method is defined as the process of discovering a phenomenon systematically and realistically by collecting information, then measuring it and confirming the truth by filling out questionnaires and interviewing stakeholders (Sullivan et al., 2019). This research is mostly done through statistical research where quantitative data is collected through research studies. This quantitative research method provides information that is truly accurate and realistic because the end result is in the form of numbers.

The type of research is a test whose purpose is to test the use of technology in distance and open learning. (Novikov et al., 2019). The researcher's data collection technique is to seek and collect factual and current information on the spot. Data collection at observation points is a quantitative research data analysis technique. When analyzing data, one does so by describing and characterizing the information collected, without altering the source of the information obtained (Li et al., 2020). The first step of this quantitative research is to find the root of the problem or formulate the problem, then conduct a literature review, determine the hypothesis, determine the method to be used, determine the instrument or research tool, and conduct data analysis. and finally draw conclusions.

RESULT AND DISCUSSION

As one of the factors affecting the quality of education, the use of technology that continues to grow has a significant impact on learning. The utilization of technology is one of the options in making learning media to support teachers and students. Technology is an integral part of education. Without technology, education feels flat and monotonous. Quality education is education that is always up to date and able to create an interesting learning process according to the needs of students, supported by the utilization of technology as a tool and means in the teaching process. Especially in distance and open

learning, it is necessary to pay attention to the use of suitable and appropriate supporting instruments, because this is part of educational change.

The utilization of technology is a solution for distance and open learning and is recommended for use in distance and open learning. Distance learning and open learning saves space and time because it can be done anywhere, anytime. Learning with this system has been carried out during the Covid-19 pandemic in 2021. And thus this distance and open learning shows the accuracy of its use. However, there are some things that need to be considered, namely signal and internet connection, because distance learning really needs these two things. This distance learning may win in terms of time and place, but financially it is still uncertain. The reason is that students have to spend money to buy online packages and even official schools need money for transportation to school.

Distance learning and open learning are not new to education as they have been developing since the 1970s. A clear analysis shows that distance learning and open learning are forms of learning where learning is away from the education center and independent. Distance and open learning is a learning model that offers students the opportunity to learn anywhere, anytime with as little help from others as possible. The communication that takes place in this learning system is indirect communication, meaning that learning takes place in different media in the form of online media and specially designed multimedia. Even if there is direct contact, it is not a learning process, but a teaching activity that ensures that the learning materials disseminated through the media actually achieve the learning objectives that have been set.

In today's educational transition, distance learning and open learning are innovative changes that are in high demand. Educational change is increasingly developing in a good and positive direction. Educational change, especially in the field of education, creates a learning environment that is innovative, creative, and oriented to the needs of today's learners. With this change in the world of education, it is also hoped that educators will become wiser and more careful in utilizing various technologies that are currently developing rapidly, because for educators who do not know how to navigate the world of technology, is this really a loss. When technology is utilized properly and appropriately, a smart and competitive next generation will be born so that they can compete internationally. In addition, technological people can later produce great inventions. To increase the flexibility of education, one must begin to understand the changes both in the educational environment and among students on the spot (will). It takes sensitivity to understand the present and predict the future. If health education is not only timeless, so is educational flexibility. What needs to be learned now may very well be unnecessary or will diminish or even become irrelevant in the next five to ten years.

There are many opportunities and challenges in the use of technology in the open and distance learning process in education. The opportunities obtained can be in the form of breadth for time and implementation of learning, facilitating distance and open learning and making it easier for learners to get information, while also minimizing the cost of learner transformation. It also creates independent learners because they are able to learn the material themselves. Meanwhile, the challenges that must be faced in using technology

in distance and open learning are signals and internet access. It is feared that areas located far from the city do not have internet access, making it difficult to carry out the learning process remotely and openly. In addition, distance and open learning also requires internet packages so that students have to spend money to buy internet packages. It is also feared that students will have difficulty learning later, because they are in a different room with the teacher.

Figure 1: Opportunity score for using technology in open and distance learning:
educational transformation

ASPECT	
Opportunities Use of technology in open and distance learning	
Agree	Disagree
60	40

Based on Figure 1 above, it can be concluded that the utilization of technology in distance and open learning: educational transformation brings with it not too great opportunities for students. The majority of respondents gave positive answers and reactions to the use of technology in distance and open learning: Educational transformation brings benefits to the development of the quality of distance and open education. The results of the survey conducted as part of the survey also show that technology is very important in the process of distance and open learning. One of the main advantages of the technological intelligence model is that it provides different platforms that can be used to communicate easily and quickly and can be used as a learning environment to support the learning process.

Figure 2: Scores Challenges of using technology in open and distance learning:
transforming education

ASPECT	
GPT Chat Usage Challenge	
Agree	Disagree
70	30

Based on the survey results filled in through a questionnaire containing statements filled in by students as respondents, it can be concluded that there are several challenges that must be faced with this technology. These challenges can be in the form of challenges in the implementation of distance learning which can be constrained by networks and must use packages for implementation. Also, challenges from within students to be serious or not in carrying out learning because they are not brought by the teacher directly. Nevertheless, the use of technology in distance and open learning has a myriad of benefits that can facilitate the process of distance and open learning, especially for people who have time and place constraints related to direct learning implementation.

At this stage of the research, the researcher did not go directly to the school to conduct research, but by distributing a questionnaire link made on google forms. The questionnaire contains statements which are then given five responses from which students will choose one. The purpose of distributing questionnaires is to obtain relevant and actual data about the researcher's study entitled The Use of Technology in Distance

and Open Learning: Educational Transformation. The data test was conducted by filling out a questionnaire from Google Form. The questionnaire contains 15 statements in which it contains the Use of Technology in Distance and Open Learning: Educational Transformation. From the results of filling out the questionnaire, the following data were obtained:

NO	Statement	SS	S	RR	TS	STS
1	I feel that the use of technology can help distance and open learning	60%	40%			
2	I feel that technology has a positive impact on the transformation of education.	33,3%	50%	16,7%		
3	I feel that technology can facilitate the process of distance and open learning	70%	30%			
4	I feel that technology can support distance and open learning.	66.6%	33.3%			
5	I think that technological development should be followed by every educational institution	55%	45%			
6	I feel that digital technology can make it easier to understand distance and open learning.	50%	50%			
7	I think technology is very suitable to be applied in distance and open learning.	70%	30%			
8	I think that with technology the distance and open learning process will run more effectively.	50%	50%			
9	I think technology as a transformation in distance and open learning has an interest in each other.	50%	50%			
10	I feel that with technology information is quickly obtained.	60,7%	39,3%			
11	I feel that with technology the organizing process becomes easier.	60 %	40 %			
12	I feel that every learner should be able to master technology because technology has many benefits in its use.	50%	50%			
13	I feel that distance and open learning processes will improve if technology is used.	66,7%	33,3%			
14	I feel that technology can change the way students learn.	50%	50%			
15	I think the use of technology in distance and open learning does not consume a lot of time.	33,3%	50%	16,7%		

Figure 1: Table of questionnaire filling by students

Notes:

SS = Strongly Agree

S = Agree

RR = Undecided

TS = Disagree

STS = Strongly Disagree

The table above is data obtained from filling out a questionnaire containing statements filled in by students. The statement consists of 15 statements related to the Use of Technology in Distance and Open Learning: Transforming Education. The assessment stage consists of 5 categories, namely strongly agree, disagree, undecided, disagree, and strongly disagree. The highest assessment result is 70% with a strongly agree category related to the statement "I feel that technology can facilitate the distance and open learning process". The second highest assessment result is 66.7% with the same category, namely strongly agreeing regarding the statement "I feel that the distance and open learning process will improve if technology is used" and also the statement "I feel that technology can support distance and open learning". From the results of filling out the questionnaire, it can be concluded that on average students give a positive response to the use of technology in distance and open learning: educational transformation.

CONCLUSION

Based on the research results of Technology Use in Distance and Open Learning: Educational Transformation has an influence and effect on distance and open learning: educational transformation. Learners feel that the presence of technology can support the distance and open learning process. Learners also feel that the presence of technology in learning transformation provides convenience and opportunities for learners in doing assignments and in obtaining information. There are many opportunities resulting from the presence of technology in distance and open learning such as students will be more accustomed to learning independently, streamlining the use of time in learning, tasks are completed quickly. It is expected that the utilization of digital technology in learning becomes one of the resources for students to be able to develop their abilities and experiences in learning flexibly and interactively. In addition, distance and open learning also minimizes the costs incurred both transportation costs and other educational costs. There are some challenges in using technology in distance and open learning, namely the internet. Distance and open learning relies heavily on the internet, so it is feared that in signal-prone areas, distance and open learning will be difficult to implement. Schools should carefully consider the potential risks and benefits of using technology and take steps to ensure that it is used ethically and responsibly in open and distance learning as a form of educational transformation.

REFERENCES

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- Ahmed, I., Ahmad, M., Rodrigues, J. J. P. C., Jeon, G., & Din, S. (2021). A deep learning-based social distance monitoring framework for COVID-19. *Sustainable Cities and Society*, 65, 102571. <https://doi.org/10.1016/j.scs.2020.102571>
- Al Lily, A. E., Ismail, A. F., Abunasser, F. M., & Alhajhoj Alqahtani, R. H. (2020). Distance education as a response to pandemics: Coronavirus and Arab culture. *Technology in Society*, 63, 101317. <https://doi.org/10.1016/j.techsoc.2020.101317>
- Al Maarif, M. F., Afifah, R. A. N., Choirunnisa, A., Jannah, A. M., Zanuar, M. Y., Saddhono, K., & Yingxiang, S. (2023). Integrating and Strengthening National Vision in the Community as an Effort to Prevent Radicalization and Foster Love for the Motherland. *Pengabdian: Jurnal Abdimas*, 1(1), 20–29. <https://doi.org/10.55849/abdimas.v1i1.151>
- Attaran, M. (2020). Digital technology enablers and their implications for supply chain management. *Supply Chain Forum: An International Journal*, 21(3), 158–172. <https://doi.org/10.1080/16258312.2020.1751568>
- Beckman, G. H., Polyzois, D., & Cha, Y.-J. (2019). Deep learning-based automatic volumetric damage quantification using depth camera. *Automation in Construction*, 99, 114–124. <https://doi.org/10.1016/j.autcon.2018.12.006>
- Bhatia, S. K., Jagtap, S. S., Bedekar, A. A., Bhatia, R. K., Patel, A. K., Pant, D., Rajesh Banu, J., Rao, C. V., Kim, Y.-G., & Yang, Y.-H. (2020). Recent developments in pretreatment technologies on lignocellulosic biomass: Effect of key parameters, technological improvements, and challenges. *Bioresource Technology*, 300, 122724. <https://doi.org/10.1016/j.biortech.2019.122724>
- Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: Strategies emerging from a multi-stakeholder approach. *The TQM Journal*, 32(4), 697–724. <https://doi.org/10.1108/TQM-12-2019-0309>
- Chan, H. C. S., Shan, H., Dahoun, T., Vogel, H., & Yuan, S. (2019). Advancing Drug Discovery via Artificial Intelligence. *Trends in Pharmacological Sciences*, 40(8), 592–604. <https://doi.org/10.1016/j.tips.2019.06.004>
- Ghesu, F.-C., Georgescu, B., Zheng, Y., Grbic, S., Maier, A., Horneegger, J., & Comaniciu, D. (2019). Multi-Scale Deep Reinforcement Learning for Real-Time 3D-Landmark Detection in CT Scans. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 41(1), 176–189. <https://doi.org/10.1109/TPAMI.2017.2782687>
- Hussain, A., & Cambria, E. (2018). Semi-supervised learning for big social data analysis. *Neurocomputing*, 275, 1662–1673. <https://doi.org/10.1016/j.neucom.2017.10.010>
- Ibrahim, N. (2019). ICT UNTUK PENDIDIKAN TERBUKA JARAK JAUH. *Jurnal Teknodik*, 005–018. <https://doi.org/10.32550/teknodik.v0i0.534>
- Kendall, A., Hawke, J., Janz, D., Mazur, P., Reda, D., Allen, J.-M., Lam, V.-D., Bewley, A., & Shah, A. (2019). Learning to Drive in a Day. *2019 International Conference on Robotics and Automation (ICRA)*, 8248–8254. <https://doi.org/10.1109/ICRA.2019.8793742>
- Kioupi, V., & Voulvoulis, N. (2019). Education for Sustainable Development: A Systemic Framework for Connecting the SDGs to Educational Outcomes. *Sustainability*, 11(21), 6104. <https://doi.org/10.3390/su11216104>
- Kiran, B. R., Sobh, I., Talpaert, V., Mannion, P., Sallab, A. A. A., Yogamani, S., & Perez, P. (2022). Deep Reinforcement Learning for Autonomous Driving: A Survey. *IEEE Transactions on Intelligent Transportation Systems*, 23(6), 4909–4926. <https://doi.org/10.1109/TITS.2021.3054625>
-

-
- Kollins, S. H., DeLoss, D. J., Cañadas, E., Lutz, J., Findling, R. L., Keefe, R. S. E., Epstein, J. N., Cutler, A. J., & Faraone, S. V. (2020). A novel digital intervention for actively reducing severity of paediatric ADHD (STARS-ADHD): A randomised controlled trial. *The Lancet Digital Health*, 2(4), e168–e178. [https://doi.org/10.1016/S2589-7500\(20\)30017-0](https://doi.org/10.1016/S2589-7500(20)30017-0)
- Li, K., Fang, Y., Li, W., Pan, C., Qin, P., Zhong, Y., Liu, X., Huang, M., Liao, Y., & Li, S. (2020). CT image visual quantitative evaluation and clinical classification of coronavirus disease (COVID-19). *European Radiology*, 30(8), 4407–4416. <https://doi.org/10.1007/s00330-020-06817-6>
- Loeb, S. K., Alvarez, P. J. J., Brame, J. A., Cates, E. L., Choi, W., Crittenden, J., Dionysiou, D. D., Li, Q., Li-Puma, G., Quan, X., Sedlak, D. L., David Waite, T., Westerhoff, P., & Kim, J.-H. (2019). The Technology Horizon for Photocatalytic Water Treatment: Sunrise or Sunset? *Environmental Science & Technology*, 53(6), 2937–2947. <https://doi.org/10.1021/acs.est.8b05041>
- Lu, F., Qin, W., & Wang, Y.-X. (2021). Research on Spatial Pattern Dynamic Evolution Algorithm and Optimization Model Construction and Driving Mechanism of Provincial Tourism Eco-Efficiency in China under the Background of Cloud Computing. *Scientific Programming*, 2021, 1–12. <https://doi.org/10.1155/2021/1951264>
- Maryati, A., Ameer, A., & Egie, J. (2022). Utilization of Animiz Animation Application in Arabic Class 2 Madrasah Tsanawiyah Lessons at Diniyyah Pasia Modern Islamic Boarding School. *Sciencetchno: Journal of Science and Technology*, 1(1), 25–45. <https://doi.org/10.55849/sciencetchno.v1i1.3>
- McGrew, S. (2020). Learning to evaluate: An intervention in civic online reasoning. *Computers & Education*, 145, 103711. <https://doi.org/10.1016/j.compedu.2019.103711>
- Nazemi, H., Joseph, A., Park, J., & Emadi, A. (2019). Advanced Micro- and Nano-Gas Sensor Technology: A Review. *Sensors*, 19(6), 1285. <https://doi.org/10.3390/s19061285>
- Novikov, D. S., Fieremans, E., Jespersen, S. N., & Kiselev, V. G. (2019). Quantifying brain microstructure with diffusion MRI: Theory and parameter estimation. *NMR in Biomedicine*, 32(4). <https://doi.org/10.1002/nbm.3998>
- Nusinow, D. P., Szpyt, J., Ghandi, M., Rose, C. M., McDonald, E. R., Kalocsay, M., Jané-Valbuena, J., Gelfand, E., Schweppe, D. K., Jedrychowski, M., Golji, J., Porter, D. A., Rejtar, T., Wang, Y. K., Kryukov, G. V., Stegmeier, F., Erickson, B. K., Garraway, L. A., Sellers, W. R., & Gygi, S. P. (2020). Quantitative Proteomics of the Cancer Cell Line Encyclopedia. *Cell*, 180(2), 387–402.e16. <https://doi.org/10.1016/j.cell.2019.12.023>
- Oyedotun, T. D. (2020). Sudden change of pedagogy in education driven by COVID-19: Perspectives and evaluation from a developing country. *Research in Globalization*, 2, 100029. <https://doi.org/10.1016/j.resglo.2020.100029>
- Partel, V., Charan Kakarla, S., & Ampatzidis, Y. (2019). Development and evaluation of a low-cost and smart technology for precision weed management utilizing artificial intelligence. *Computers and Electronics in Agriculture*, 157, 339–350. <https://doi.org/10.1016/j.compag.2018.12.048>
- Pennycook, A., & Makoni, S. (2019). *Innovations and Challenges in Applied Linguistics from the Global South* (1st ed.). Routledge. <https://doi.org/10.4324/9780429489396>
-

- Siahaan, S. (2019). PEMANFAATAN TEKNOLOGI DALAM PENYELENGGARAAN PENDIDIKAN TERBUKA/JARAK JAUH. *Jurnal Teknodik*, 019–045. <https://doi.org/10.32550/teknodik.v0i0.535>
- Singh, A. V., Maharjan, R.-S., Kanase, A., Siewert, K., Rosenkranz, D., Singh, R., Laux, P., & Luch, A. (2021). Machine-Learning-Based Approach to Decode the Influence of Nanomaterial Properties on Their Interaction with Cells. *ACS Applied Materials & Interfaces*, 13(1), 1943–1955. <https://doi.org/10.1021/acsami.0c18470>
- Sullivan, M. R., Danai, L. V., Lewis, C. A., Chan, S. H., Gui, D. Y., Kunchok, T., Dennstedt, E. A., Vander Heiden, M. G., & Muir, A. (2019). Quantification of microenvironmental metabolites in murine cancers reveals determinants of tumor nutrient availability. *ELife*, 8, e44235. <https://doi.org/10.7554/eLife.44235>
- Susanti, R. (2013). TEKNOLOGI PENDIDIKAN DAN PERANANNYA DALAM TRANSFORMASI PENDIDIKAN. *Jurnal Teknologi Pendidikan*, 2(2). <https://doi.org/10.32832/tek.pend.v2i2.448>
- Tejedor, S., Cervi, L., Pérez-Escoda, A., & Jumbo, F. T. (2020). Digital Literacy and Higher Education during COVID-19 Lockdown: Spain, Italy, and Ecuador. *Publications*, 8(4), 48. <https://doi.org/10.3390/publications8040048>
- Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*, 117(12), 6476–6483. <https://doi.org/10.1073/pnas.1916903117>
- Wang, Q., Gao, J., Lin, W., & Yuan, Y. (2019). Learning From Synthetic Data for Crowd Counting in the Wild. *2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 8190–8199. <https://doi.org/10.1109/CVPR.2019.00839>
- Yu, F., Yan, L., Wang, N., Yang, S., Wang, L., Tang, Y., Gao, G., Wang, S., Ma, C., Xie, R., Wang, F., Tan, C., Zhu, L., Guo, Y., & Zhang, F. (2020). Quantitative Detection and Viral Load Analysis of SARS-CoV-2 in Infected Patients. *Clinical Infectious Diseases*, 71(15), 793–798. <https://doi.org/10.1093/cid/ciaa345>
- Zhang, S., Yao, L., Sun, A., & Tay, Y. (2020). Deep Learning Based Recommender System: A Survey and New Perspectives. *ACM Computing Surveys*, 52(1), 1–38. <https://doi.org/10.1145/3285029>

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