The Relationship Between Teacher Performance and Teacher Digital Literacy with the Implementation of Online Learning

Baso Intang Sappaile [1], **Andi Tenri Abeng** [2], **Nuridayanti** [3]

[1] Universitas Negeri Makassar, Indonesia
[2] Universitas Palangka Raya, Indonesia
[3] Universitas Negeri Makassar, Indonesia

ABSTRACT

Background. The study population was all teachers of State Senior High Schools in Gowa Regency, while the samples were all teachers of State Senior High School 10 and State Senior High School 14 in Gowa Regency

Purpose. This study aims to determine whether there is a relationship between teacher performance and digital literacy with the implementation of online learning for teachers of SMA Negeri Gowa Regency, both jointly and separately

Method. Data was obtained by giving teacher performance scales, teacher digital literacy, and online learning implementation scales.
Results. Data were analyzed quantitatively, namely by using multiple linear regression analysis. The conclusions in this study are: 1) teacher performance and teacher digital literacy together have a relationship with the implementation of online learning, 2) teacher performance has no relationship with the implementation of online learning, and 3) teacher digital literacy has a relationship with the implementation of teacher online learning Gowa Regency Public High School.

Conclusion. The conclusion of this study is to find out whether there is a relationship between teacher performance and digital literacy with the implementation of online learning in public high school teachers in Gowa Regency, both together and separately.

INTRODUCTION

In the educational process, the teacher is one of the factors that determine the success of their students and in the teaching and learning process teachers are not only required to be able to convey subject matter and master the subject matter but also must be able to activate students in the learning process (Danecek dkk., 2021). Teachers should always try to provide guidance and always encourage the enthusiasm for learning of their students (Li dkk., 2020), organize learning activities as well as possible and become a medium of information that students really need in the fields of knowledge, skills, attitudes and behavior (Lundberg dkk., 2020). Through learning guided by the teacher it is expected that students can learn well. When participating in learning activities between one

student and another student who has a different learning behavior, so that the learning process will form a variety of student learning behavior (Ibtehaz & Rahman, 2020). Teachers, as stated in the regulations of the State Minister for Administrative Reform and Bureaucratic Reform and existing laws, state that a professional teacher who has the status of a civil servant (PNS) is a teacher who is considered to have all the competencies that a professional teacher must have, with technological developments (Carter dkk., 2020). which has grown rapidly now a professional teacher is required to understand and master technology to support the ability of a teacher which is in line with the times, on the other hand the development of technology and the internet can help teachers in the learning process in class (Chen dkk., 2019). Suryadi (2016) argues that the development of information and communication technology has had a major influence on the world of education, especially in planning, process and evaluation activities. Teachers can provide services without having to deal directly with students. Likewise students can obtain information in a broad scope from various sources through cyber space by using a computer or the internet.

Indonesian education is currently being faced with challenges amid the outbreak of the Covid-19 virus, with the outbreak of the virus the government is urging people to carry out activities from home (Zhong dkk., 2020). The Covid-19 pandemic also had an impact on the education sector, where the government through the ministry of education and culture issued a policy through Circular Letter No. 4 of 2020 which contains the implementation of education policies during the emergency period of the spread of the Covid-19 virus (Di Valentino dkk., 2021). In its policy, it states that the teaching and learning process is carried out at home through online or distance learning which aims to provide a meaningful learning experience for students without any demands to complete both the overall grade increase curriculum achievements and graduation.

The implementation of online learning by the government requires all teaching and learning activities to be carried out from home without face-to-face meetings (Fraga dkk., 2019). The implementation of online learning is carried out as one of the efforts to continue to realize the goals of education in Indonesia amid the Covid-19 pandemic and efforts to prevent the spread of the Covid-19 virus (Kim dkk., 2022). This pademi made the learning system in schools change drastically from face-to-face meetings to online learning, so that learning activities that were originally carried out face-to-face turned to non-face-to-face learning (Fang dkk., 2019). The implementation of this learning takes place from elementary school to university. According to Pohan (2020) online learning is also known as online learning (online learning) or distance learning (learning distance) which is learning that takes place in a network where teachers and students do not need to meet face to face directly by utilizing an internet connection and can do anywhere and anytime (Benitez dkk., 2020). The results of Shivangi's research (2020) stated that online/online learning can save the education system during the Covid-19 crisis because it offers a lot of flexibility in terms of time and location (Putri dkk., 2023), adjusts the learning process based on the needs of students, online/online teaching methods support and facilitate all learning activities teaching and assisting in providing inclusive education even during the Covid -19 pandemic crisis.

The results of the author's unstructured interviews conducted with several public high school teachers stated that teachers had implemented online learning during the issuance of education policy no. 4 of 2020 which contains the implementation of educational policies during the emergency period of the spread of the Covid-19 virus (Johanna dkk., 2023), where online learning media that are usually carried out by teachers use digital technology such as zoom, whatshap, google from and google meet in learning and teaching activities (Andra dkk., 2023). Then it was also stated that there were still public high school teachers who had minimal understanding of digitalization in the online learning process (Feichtenhofer dkk., 2019), both in teaching preparation

and application in the learning process due to limited teacher skills in operating digital devices and aged over 40 years, even though the school already had the facilities and infrastructure (Kurniawan dkk., 2023). such as having a computer laboratory (Bai dkk., 2019), internet network, providing online learning guidance, computers that are connected to wifi to carry out the online learning process (Susanti dkk., 2023). The main obstacle for teachers in carrying out online learning is the inability of teachers to operate digital devices, which is 67.11% of the results of a survey conducted by the Ministry of Education and Culture (2020) (Wen dkk., 2019). Of course, the presence of teachers who are less competent in the area of digital literacy will have an impact on the implementation of online learning by teachers.

Digital literacy in primary and secondary education must be characterized by mastery of skills, abilities and intellectual attitudes in using computer systems which include hardware and software, as well as utilizing and interpreting information to be able to compete at the global level. Learning digital literacy carries a pedagogical mission (Karras dkk., 2020), which is to produce Indonesian people who are critical, creative (Peery dkk., 2019), innovative, and productive through efforts to build digital skills that are integrated with other knowledge, accompanied by attitudes and affective digital (attitude and affective toward digital) to become people with character, and conceptually integrated with the competency-based 2013 Curriculum (Kemdikbud, 2017).

The formulation of the problems in this study are: 1) does teacher performance and digital literacy have a relationship with the implementation of online learning?, 2) does teacher performance have a relationship with the implementation of online learning?, and 3) does teacher digital literacy have a relationship with the implementation of high school online learning? Gowa Regency Country? The benefits of the results of this study are: 1) it can provide input for teachers of district public high schools in Gowa as a contribution to education practitioners in improving the learning achievement of high school students, and 3) it can be used as a reference for other researchers with a broader scope.

RESEARCH METHODOLOGY

This research is a type of ex-post facto research with two independent variables and one dependent variable. Teacher performance (X1) and teacher digital literacy skills (X2) as independent variables, and implementation of online learning (Y) as independent variables. This research was carried out in the odd semester of the 2022/2023 school year at the Gowa District Public High School. The study population consisted of all PNS teachers at State Senior High School in Gowa Regency and the sample was taken by random sampling technique, and the Slovin formula was used to determine the sample size. The research design is shown in the following figure.

Information:
X1: Teacher performance
X2: Teachers' digital literacy skills
Y : Implementation of online learning.
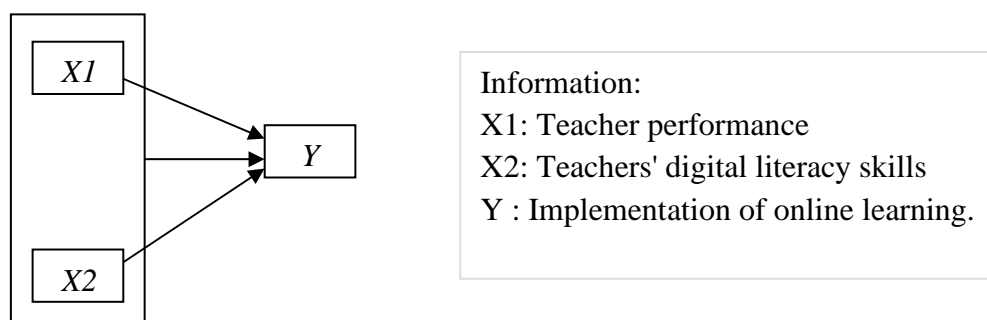
The research data analysis technique used multiple regression analysis with the regression model:

$Y = \beta 0 + \beta 1 X 1 + \beta 2 X 2 + \varepsilon$ and regression function: Y = B0 + B1X1 + B2X2.

RESULT AND DISCUSSION
Research result
1. Teacher performance and teacher digital literacy together have a relationship with the implementation of online learning for teachers at SMA Negeri Gowa Regency.

Statistical hypothesis tested:

Ho: $\beta 1 = \beta 2 = 0$

H1: $\beta i \neq 0$ for i, i = 1, 2.

Table 1. Analysis of Variance

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	896.689	2	448.344	12.465	0,0001a
Residual	971.178	27	35.970		
Total	30,997	79			

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0,693	0,480	0,442	5,997

Based on table 1, the value of Fcount = 12.462 with a p-value = 0.0001 < □ = 0.05, it can be stated that Ho is rejected or H1 is accepted. This shows that the independent variables X1 and X2 together have a relationship with the dependent variable Y. Furthermore, based on table 2, R2 = 0.48 or R2 = 48%. This shows that the relationship between teacher performance and teacher digital literacy together has a relationship with the implementation of online learning for teachers at SMA Negeri Gowa Regency by 48%.

2. Teacher performance has no relationship with the implementation of online learning for Gowa Regency State High School teachers.

Statistical hypothesis tested:

Ho: $\beta 1 = 0$

H1: $\beta 1 \neq 0$

Table 3. Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.314	99.188		-.023	.982
	X1	.239	1.045	.033	.229	0,821
	X2	.713	.148	.685	4.806	0,0001

Based on table 3, for variable X1 the value of tcount = 0.229 with a p-value = 0.82 > □ = 0.05, it can be stated that Ho is accepted or H1 is rejected. This means that the independent variable X1 has no relationship with the dependent variable Y. Furthermore, for the variable X2 the value of tcount = 4.81 with a p-value = 0.0001 < □ = 0.05, it can be stated that Ho is rejected or H1 is accepted. This means that the independent variable X2 has a relationship with the dependent variable Y.

Discussion

This discussion will present: 1) the relationship between teacher performance and teacher digital literacy skills with the implementation of online learning, 2) the relationship between teacher performance and the implementation of online learning, and 3) the relationship between teacher digital literacy skills and the implementation of online learning as follows.

The Relationship between Teacher Performance and Teacher Digital Literacy Skills with the Implementation of Online Learning at High Schools in Gowa Regency

In connection with efforts to improve the quality of education, teachers are required to be professional in carrying out their duties and responsibilities, this has been stated in Law no. 14 of 2005 Article 20b which states that teachers in carrying out their professional duties are obliged to improve and develop academic qualifications and competencies on an ongoing basis in line with developments in science, technology and art. The realization of quality education is inseparable from the role of a teacher who continues to strive to provide learning that students can easily understand, including in learning and teaching activities (KBM) in the Covid-19 pandemic situation, where the government through the Ministry of Education and Culture issued a policy in which the implementation of learning activities and Teaching (KBM) is carried out online or remotely. Not only that, the learning system during the Covid-19 pandemic has also experienced many changes, especially in the world of education where the government is looking for alternatives so that the learning process in Indonesia continues as usual to replace face-to-face classes directly in class teachers or education staff using virtual space. like zoom and goggle meet for everyday learning.

The implementation of online learning is essentially a learning process carried out by teachers by utilizing electronic devices, information technology and internet access as learning media in conveying material. To maximize the implementation of online learning by teachers, of course digital literacy skills and good quality performance are needed. Teacher digital literacy skills and teacher performance are one of the dominant elements in implementing online learning. Teacher digital literacy shows the teacher's skills in utilizing information technology and digital media in learning, while teacher performance shows the teacher's ability to carry out their duties as long as online learning is implemented. The maximum implementation of online learning depends on the teacher's digital literacy skills and teacher performance during the implementation of online learning.

The results of multiple correlation analysis based on data collection that has been carried out at public high schools in Gowa Regency obtained a coefficient value of 0.74 which indicates a positive direction followed by an F test analysis with the acquisition of a calculated F value of 41.95 which is greater than the F table value (3.13) and the significance of p (0.00) $< \alpha$ (0.05) so that it was revealed that there is a relationship between teachers' digital literacy skills and teacher performance together with the implementation of online learning conducted by teachers and proven significant.

Further analysis with multiple regression techniques and regarding the regression equation model formed in this study. Based on these gains, the regression equation model formed is $\hat{Y}$= -2.34 + 0.24X1 + 0.71X2 explaining that if teacher performance (X1) and teacher digital literacy skills (X2) both variables are zero, then the implementation of online learning has constant value of -2.31. Then the coefficient value $\beta 1 = 0.24$ (positive) means that the implementation of online learning carried out by the teacher is expected to increase by 0.24 for an increase in teacher performance by one score. Furthermore, the value of the coefficient $\beta 2 = 0.71$ (positive), means that the implementation of online learning carried out by teachers is expected to increase by 0.49 for an

increase in teacher performance by one score. Furthermore, to find out the contribution of the teacher's digital literacy skills and teacher performance together to the implementation of online learning, the coefficient of determination (R2) is 48%. This value means that the influence or contribution of teacher performance and teacher digital literacy skills together on the implementation of online learning is 48%. In other words, the variance of the implementation of online learning that can be explained using teacher performance variables and teacher digital literacy skills is 48%.

It is known that the contribution of the two independent variables together is 48% to the implementation of online learning carried out by teachers, therefore teacher performance and teacher digital literacy skills have an important role in implementing online learning. This role can imply that the better the teacher's performance and the teacher's digital literacy skills, the more it will support the success of the implementation of online learning carried out by the teacher in achieving learning goals in the midst of a pandemic.

The success of implementing online learning is not only influenced by teacher performance but also influenced by teacher literacy skills. Teacher performance and digital literacy skills will not have a significant effect if the teacher does not have skills in using digital media in learning will not have a significant effect if the teacher not professional in working while carrying out online learning, this is shown in this study that the contribution of teacher performance and teacher digital literacy skills together is 48% to the implementation of online learning which is revealed through multiple regression analysis. Therefore, teacher performance and the use of information technology which is manifested in digital literacy skills that appear from professional responsibilities that must be of particular concern to teachers in implementing online learning. This has been disclosed by Santoso, et al (2020) that online learning is a learning mechanism that utilizes information technology.

The findings in this study are in line with the results of research conducted by Dwijayanti & Nurmalasari (2021) which revealed that the quality of online learning at SMKN 5 Jambi is largely determined by the role of teacher professionalism and teacher digital literacy skills. Therefore, based on the results of the analysis and findings in this study, it can be concluded that there is a significant relationship between teacher performance and teacher digital literacy skills together with the implementation of online learning in public high schools in Gowa Regency.

The relationship between teacher performance and the implementation of online learning at high schools in Gowa Regency

Another component that is expected to optimize the quality of online learning implementation is teacher performance. Teacher performance is essentially a description of the process and results of teacher work achieved related to tasks based on their professional responsibility in managing learning to achieve educational goals during a pandemic and the issuance of a policy that the learning process is carried out online.

In connection with efforts to improve the quality of education, teachers are required to be professional in carrying out their duties and responsibilities, this has been stated in the regulation of the Minister of State for Administrative Reform and Bureaucratic Reform No. 16 of 2009 Article 1 paragraph 2 which states that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing and evaluating students. The teacher is the main actor as a determinant of the success of education because it is the teacher who will manifest the curriculum in classroom learning, including the implementation of online learning.

The results of the inferential analysis show that teacher performance has no relationship with the implementation of online learning, even though teacher performance has an important role in

implementing online learning. The role of teacher performance can imply that the better the teacher's performance, the more it will support the successful implementation of online learning carried out by teachers in achieving educational goals, but the results of this study are not the case.

The findings in this study are not in line with the results of research conducted by Sampebua, et al (2021) which found that there is a positive correlation between teacher performance and online learning at Tagari Christian Vocational School. Furthermore, the results of Busyra & Sani's research (2020) revealed that teacher performance has an impact on implementing online learning, namely in carrying out teacher learning using more technological devices to support communication during the learning process with a portion of 95%, but the results of this study are not like that.

The relationship between teacher digital literacy skills and the implementation of online learning at public high schools in Gowa Regency

In organizing education, teachers are one of the factors that determine success in achieving educational goals based on law no. 20 of 2003. To achieve these educational goals, a quality education and learning process is needed. Entering the Covid-19 pandemic, the government through the Ministry of Education and Culture issued policy no. 1 of 2020 where the learning process is carried out online by utilizing various digital information technology tools. Of course, the use of technology during the Covid-19 pandemic is a must that must be used in learning media.

Online learning is essentially a learning process carried out by teachers by utilizing electronic devices, information technology and internet access as learning media in conveying material. One of the skills that teachers must have in implementing online learning is digital literacy skills. Teacher digital literacy skills are essentially a description of the skills and attitudes of teachers in utilizing information technology and digital media in learning to achieve educational goals.

For the sake of the continuity of learning and teaching activities (KBM), most schools, including Vocational High Schools, must implement online or distance learning. The implementation of online learning requires teachers to use digital technology in teaching and learning activities. Teachers who previously rarely used digital technology for learning activities, now have to get used to it and even have to be able to use digital technology both to find subject matter, convey material or give assignments to students.

Digital literacy skills are very important in the online learning period. because of the student learning environment. more contact with the digital world. In educating in online learning, the role of the teacher is needed to develop themselves as a role model and equip students about digital literacy from an early age. Then, based on the results of the multiple regression analysis, a termination coefficient value of 0.48 was obtained, which indicates that 48% of online learning validation comes from teacher performance and teacher digital literacy.

In connection with the interpretation that the implementation of online learning carried out by teachers at Public High Schools in Gowa Regency for teacher performance has not contributed to online learning. Teachers have not been able to create quality learning that is in line with technological developments that are currently developing, especially in In the 21st century, technological developments in the field of education are increasingly advanced. This should be able to be considered by the teacher as one of the strategies in developing a lesson (Rahyubi, 2014).

The teacher's digital literacy skills are very important in the online learning period, because the learning environment and teaching and learning activities are more in contact with the digital world. This has been stated (Kemdikbud, 2017) that digital literacy skills carry a pedagogical mission, namely to produce creative, innovative and productive Indonesian people. This is consistent with the results of the study that teacher digital literacy has a relationship with online

learning. Thus, through efforts to build digital skills that are integrated in learning, including in the implementation of online learning.

Every teacher needs to understand that digital literacy skills are important and needed in the learning process in today's modern world. If the teacher is proficient in digital literacy, he will create a teacher structure and with a critical, creative and innovative mindset. The success of forming digital literacy skills is an indicator of achievement in the field of education. This is in line with the terminology developed by UNESCO, namely the concept of digital literacy related to the world of education which is a life skill that involves the ability to use information technology devices in learning (Kemdikbud, 2017).

In fact, the use of technology cannot be separated from the world of education today. Even though it cannot be fully implemented, it is wise and intelligent use of technology that can help the teaching and learning process. Of course, the use of this technology requires the right skills, especially in digital literacy. The skills needed are not just understanding how to use technological tools or educational applications, but the ability to know the correct norms and practices for using IT.

The findings in this study are in line with the results of research conducted by Slamet, et al (2021) which revealed that one important aspect that supports the successful implementation of online teaching and learning is the digital literacy competency possessed by teachers. Then Dinata (2021) in his research revealed that digital literacy skills play an important role in supporting the success of online learning. Good digital literacy skills will try to convey ideas in digital space, besides that, digital literacy skills will open up opportunities for students to think, communicate, and work which ultimately leads to learning success. Furthermore, research by Ningsih, et al (2021) revealed that the involvement of digital literacy is very important in learning during the Covid-19 pandemic. Digital literacy is very important to be developed by all elements in the world of education in order to carry out learning well, especially during a pandemic.

This pandemic has made a new transformation in the face of education in Indonesia, especially at the secondary school level. Education that is usually held face-to-face in front of the class between teachers and students is now switching to using technology and information devices. Digital technology and education are an inseparable package. The application of online learning processes as part of government policies in a pandemic situation makes digital technology very important. Therefore, based on the results of the analysis and findings of this research, it can be concluded that the digital literacy skills of teachers have a relationship with the implementation of online learning in public high schools in Gowa Regency.

CONCLUSION

Based on the results and discussion of the research, it is concluded that: 1) teacher performance and the implementation of online learning are in the high category, while teacher digital literacy is in the medium category, 2) teacher performance and teacher digital literacy together have a relationship with the implementation of teacher online learning Gowa Regency Public High School, 3) teacher performance has no relationship with the implementation of online teacher learning at Gowa Regency State High School, and 4) teacher digital literacy has a relationship with the implementation of online teacher learning at Gowa Regency State High School.

Based on the conclusions that have been put forward, it is suggested: 1) for schools, it is best if the school can make plans to hold routine activities or training for teachers in the use of IT, both at the secondary education level (SMA/SMK/MAN) and at the basic education level, 2) for

teachers, teachers should always provide learning materials that are more interesting, especially those related to IT so that students are more interested in learning and can improve student learning outcomes, and 3) the results of this study are expected to be a reference for other researchers.

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REFERENCES

Andra, A., Dylan, M., & Alon, F. (2023). Efforts of Guidance Counseling Teachers in Handling Students: High School Level. *International Journal of Educational Narratives*, *1*(1), 22–27. https://doi.org/10.55849/ijen.v1i1.242

Bai, S., Da, P., Li, C., Wang, Z., Yuan, Z., Fu, F., Kawecki, M., Liu, X., Sakai, N., Wang, J. T.-W., Huettner, S., Buecheler, S., Fahlman, M., Gao, F., & Snaith, H. J. (2019). Planar perovskite solar cells with long-term stability using ionic liquid additives. *Nature*, *571*(7764), 245–250. https://doi.org/10.1038/s41586-019-1357-2

Benitez, J., Henseler, J., Castillo, A., & Schuberth, F. (2020). How to perform and report an impactful analysis using partial least squares: Guidelines for confirmatory and explanatory IS research. *Information & Management*, *57*(2), 103168. https://doi.org/10.1016/j.im.2019.05.003

Carter, L. J., Garner, L. V., Smoot, J. W., Li, Y., Zhou, Q., Saveson, C. J., Sasso, J. M., Gregg, A. C., Soares, D. J., Beskid, T. R., Jervey, S. R., & Liu, C. (2020). Assay Techniques and Test Development for COVID-19 Diagnosis. *ACS Central Science*, *6*(5), 591–605. https://doi.org/10.1021/acscentsci.0c00501

Chen, C., Kuang, Y., & Hu, L. (2019). Challenges and Opportunities for Solar Evaporation. *Joule*, *3*(3), 683–718. https://doi.org/10.1016/j.joule.2018.12.023

Danecek, P., Bonfield, J. K., Liddle, J., Marshall, J., Ohan, V., Pollard, M. O., Whitwham, A., Keane, T., McCarthy, S. A., Davies, R. M., & Li, H. (2021). Twelve years of SAMtools and BCFtools. *GigaScience*, *10*(2), giab008. https://doi.org/10.1093/gigascience/giab008

Di Valentino, E., Mena, O., Pan, S., Visinelli, L., Yang, W., Melchiorri, A., Mota, D. F., Riess, A. G., & Silk, J. (2021). In the realm of the Hubble tension—A review of solutions [*]. *Classical and Quantum Gravity*, *38*(15), 153001. https://doi.org/10.1088/1361-6382/ac086d

Fang, G., Zhu, C., Chen, M., Zhou, J., Tang, B., Cao, X., Zheng, X., Pan, A., & Liang, S. (2019). Suppressing Manganese Dissolution in Potassium Manganate with Rich Oxygen Defects Engaged High-Energy-Density and Durable Aqueous Zinc-Ion Battery. *Advanced Functional Materials*, *29*(15), 1808375. https://doi.org/10.1002/adfm.201808375

Feichtenhofer, C., Fan, H., Malik, J., & He, K. (2019). SlowFast Networks for Video Recognition. *2019 IEEE/CVF International Conference on Computer Vision (ICCV)*, 6201–6210. https://doi.org/10.1109/ICCV.2019.00630

Fraga, C. G., Croft, K. D., Kennedy, D. O., & Tomás-Barberán, F. A. (2019). The effects of polyphenols and other bioactives on human health. *Food & Function*, *10*(2), 514–528. https://doi.org/10.1039/C8FO01997E

Ibtehaz, N., & Rahman, M. S. (2020). MultiResUNet: Rethinking the U-Net architecture for multimodal biomedical image segmentation. *Neural Networks*, *121*, 74–87. https://doi.org/10.1016/j.neunet.2019.08.025

Johanna, A., Avinash, B., & Bevoor, B. (2023). Small Group Discussion Method to Increase Learning Activity: Its Implementation in Education. *International Journal of Educational Narratives*, *1*(1), 18–21. https://doi.org/10.55849/ijen.v1i1.237

Karras, T., Laine, S., Aittala, M., Hellsten, J., Lehtinen, J., & Aila, T. (2020). Analyzing and Improving the Image Quality of StyleGAN. *2020 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 8107–8116. https://doi.org/10.1109/CVPR42600.2020.00813

Kim, M., Jeong, J., Lu, H., Lee, T. K., Eickemeyer, F. T., Liu, Y., Choi, I. W., Choi, S. J., Jo, Y., Kim, H.-B., Mo, S.-I., Kim, Y.-K., Lee, H., An, N. G., Cho, S., Tress, W. R., Zakeeruddin, S. M., Hagfeldt, A., Kim, J. Y., … Kim, D. S. (2022). Conformal quantum dot–SnO_2 layers as electron transporters for efficient perovskite solar cells. *Science*, *375*(6578), 302–306. https://doi.org/10.1126/science.abh1885

Kurniawan, N., Limei, S., & Catherine, S. (2023). Improving Students Islamic Behavior through Teacher Prophetic Education Model. *International Journal of Educational Narratives*, *1*(1), 28–32. https://doi.org/10.55849/ijen.v1i1.239

Li, L., Zhang, W., Hu, Y., Tong, X., Zheng, S., Yang, J., Kong, Y., Ren, L., Wei, Q., Mei, H., Hu, C., Tao, C., Yang, R., Wang, J., Yu, Y., Guo, Y., Wu, X., Xu, Z., Zeng, L., … Liu, Z. (2020). Effect of Convalescent Plasma Therapy on Time to Clinical Improvement in Patients With Severe and Life-threatening COVID-19: A Randomized Clinical Trial. *JAMA*, *324*(5), 460. https://doi.org/10.1001/jama.2020.10044

Lundberg, S. M., Erion, G., Chen, H., DeGrave, A., Prutkin, J. M., Nair, B., Katz, R., Himmelfarb, J., Bansal, N., & Lee, S.-I. (2020). From local explanations to global understanding with explainable AI for trees. *Nature Machine Intelligence*, *2*(1), 56–67. https://doi.org/10.1038/s42256-019-0138-9

Peery, A. F., Crockett, S. D., Murphy, C. C., Lund, J. L., Dellon, E. S., Williams, J. L., Jensen, E. T., Shaheen, N. J., Barritt, A. S., Lieber, S. R., Kochar, B., Barnes, E. L., Fan, Y. C., Pate, V., Galanko, J., Baron, T. H., & Sandler, R. S. (2019). Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2018. *Gastroenterology*, *156*(1), 254-272.e11. https://doi.org/10.1053/j.gastro.2018.08.063

Putri, L. R., Vera, A., & Visconte, A. (2023). Quraish Shihab and Buya Hamka: The Concept of Multicultural Education from a Qur'anic Perspective. *International Journal of Educational Narratives*, *1*(1), 1–17. https://doi.org/10.55849/ijen.v1i1.236

Susanti, R., Tariq, K., & Carmelo, D. (2023). Strategic Management of Madrasah Heads in Improving The Quality of Language Learning Arabic in Islamic Educational Institutions. *International Journal of Educational Narratives*, *1*(1), 33–42. https://doi.org/10.55849/ijen.v1i1.231

Wen, L., Gao, L., & Li, X. (2019). A New Deep Transfer Learning Based on Sparse Auto-Encoder for Fault Diagnosis. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, *49*(1), 136–144. https://doi.org/10.1109/TSMC.2017.2754287

Zhong, M., Tran, K., Min, Y., Wang, C., Wang, Z., Dinh, C.-T., De Luna, P., Yu, Z., Rasouli, A. S., Brodersen, P., Sun, S., Voznyy, O., Tan, C.-S., Askerka, M., Che, F., Liu, M., Seifitokaldani, A., Pang, Y., Lo, S.-C., … Sargent, E. H. (2020). Accelerated discovery of CO2 electrocatalysts using active machine learning. *Nature*, *581*(7807), 178–183. https://doi.org/10.1038/s41586-020-2242-8