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Understanding the Impact of the Application of Information and Communication Technology on Islamic Student Learning Outcomes in the Digital Area

Abdul Walid[1], **Andri Kurniawan**[2], **Raya Mangsi**[3], **Ida Farida**[4], **Sri Utami**[5]
[1] STKIP Darud Da'wah wal Irsyad Pinrang, Indonesia
[2] Universitas Islam Syekh-Yusuf Tangerang, Indonesia
[3] UM Parepare, Indonesia
[4] STIE Tri Sakti, Indonesia
[5] Unikarta, Indonesia

Abstract
This article discusses the impact of information and communication technology on student learning outcomes, in which the influence of information technology cannot be avoided in students' lives. The study in this research is qualitative by using the literature method. Literature is taken from books, journals and others related to technological issues and student learning outcomes in the information age. The data obtained were analyzed and searched according to the problems in this study. The results of the study show that learning that utilizes digital applications can improve student learning outcomes. Because, the information technology used by students can broaden the scientific treasures of students to obtain information as desired by students from the subject matter taught by the teacher.

Keywords: *Impact, ITC, Learning Outcomes, Digital Era.*

Memahami Dampak Penerapan Teknologi Informasi dan Komunikasi Terhadap Hasil Belajar Islam Santri di Era Digital

Abstrak
Artikel ini membahas tentang dampak teknologi informasi dan komunikasi terhadap hasil belajar siswa, yang mana pengaruh teknologi informasi tidak dapat dielakkan pada kehidupan siswa. Kajian dalam penelitian ini adalah kualitatif dengan menggunakan metode literatur. Literatur diambil dari buku, jurnal dan lainnya yang berkaitan dengan masalah teknologi dan hasil belajar siswa di era informasi. Data yang diperoleh dianalisis dan dicari sesuai permasalahan dalam penelitian ini. Hasil penelitian menunjukkan bahwa pembelajaran yang memanfaatkan aplikasi digital dapat meningkatkan hasil belajar siswa. Karena, teknologi informasi yang digunakan oleh siswa dapat memperluas khazanah keilmuan siswa untuk mendapatkan informasi sesuai yang diinginkan oleh siswa dari materi pelajaran yang diajarkan oleh guru.

Kata kunci: Dampak, ITC, Hasil Belajar, Era Digital

Andri Kurniawan
Email: andri.kurniawan@unis.ac.id
Available online at http://journal.iaingorontalo.ac.id/index.php/au/index

A. Introduction

Research on student achievement is an exciting issue in an education quality improvement project. The results of studies that affect student learning outcomes are significant to continue to be studied.[1] Some variables significantly affect the acceleration of achieving the quality of school and college results, including the assessment of teaching implementation and changes in how teachers educate with various tools and media. Chiu,[2] states that data technology is indispensable for learning techniques. Some school personnel is passionate about implementing technology development as a feature of the educational experience in the classroom. However, the impact of data-based technological innovations on student learning performance is very potential. For this reason, Sarkar,[3] revealed that exploring students' academic implementation was a significant study in schools. Elements that affect the presentation of student education are essential, such as using technology in which several applications can innovate the experience of improving the quality of student learning outcomes.[4]

The variables of technology and the application of teaching and research will significantly affect teaching strategies, evaluation of student learning outcomes, and

[1] Abdullah M. Al-Ansi, Imam Suprayogo, dan Munirul Abidin, "Impact of Information and Communication Technology (ICT) on Different Settings of Learning Process in Developing Countries," *Science and Technology* 9, no. 2 (2019): 19–28. 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. Aslan Aslan dkk., "Teacher's Leadership Teaching Strategy Supporting Student Learning During The Covid-19 Disruption," *Nidhomul Haq : Jurnal Manajemen Pendidikan Islam* 5, no. 3 (21 November 2020): 321–33, https://doi.org/10.31538/ndh.v5i3.984.

[2] Mei-Shiu Chiu, "Exploring Models for Increasing the Effects of School Information and Communication Technology Use on Learning Outcomes through Outside-School Use and Socioeconomic Status Mediation: The Ecological Techno-Process," *Educational Technology Research and Development* 68, no. 1 (1 Februari 2020): 413–36, https://doi.org/10.1007/s11423-019-09707-x. Purniadi Putra dkk., "The Relevancy on Education Release Revolution 4.0 in Islamic Basic Education Perspective in Indonesia (An Analysis Study of Paulo Freire's Thought)," *Test Engineering & Management* 83 (2020): 10256–63.

[3] Sukanta Sarkar, "The role of information and communication technology (ICT) in higher education for the 21st century," *Science* 1, no. 1 (2012): 30–41.

[4] C. Resien, Harun Sitompul, dan Julaga Situmorang, "The effect of blended learning strategy and creative thinking of students on the results of learning information and communication technology by controlling prior knowledge," *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal* 3, no. 2 (2020): 879–93. Prasetyono Hendriarto dkk., "Understanding the Implications of Research Skills Development Framework for Indonesian Academic Outcomes Improvement," *Jurnal Iqra' : Kajian Ilmu Pendidikan* 6, no. 2 (15 Juli 2021): 51–60, https://doi.org/10.25217/ji.v6i2.1405.

changes in the way teachers educate. Bawaneh,[5] states that data innovation is an integral part of the learning methodology in universities. Some school personnel is passionate about developing mechanics as a feature of the educational experience in the classroom. However, the impact of data innovation on student scientific performance is vital. Persico et al.,[6] stated that before the PC became locally natural, the evolving experience was generally complete. However, recently, along with the development of innovation, the use of PCs in the public sphere has been increasing. Expanding the use of this data innovation firmly affects the entire schooling world, especially in the way and cycle of delivering learning materials. Most universities in America have led web-based bookkeeping courses to utilize online sites and media.[7]

Lopez Carrillo et al.,[8] points out that in the evolving experience, the improvement of performance applications has been prominent, particularly the use of PowerPoint in educational experiences. Several studies have shown a significant impact between using PowerPoint and student achievement. However, there are also concentrates that state that there is no relationship between the use of PowerPoint and learning achievement. This study will examine the impact of data innovation on student achievement. Regarding the exploration of Kryukov & Gorin,[9] the specialist seeks to develop the exam by testing the point of view of PowerPoint as a learning medium and the overall utilization of technological innovations on student achievement.

The increase in technological innovation is rapidly affecting various parts of students' lives, including the educational experience. Wang,[10] states that ongoing

[5] Shamsi Bawaneh, "Does using computer technology improve students' performance? Evidence from a management accounting course," 16 Oktober 2022.
[6] Donatella Persico, Stefania Manca, dan Francesca Pozzi, "Adapting the Technology Acceptance Model to Evaluate the Innovative Potential of E-Learning Systems," *Computers in Human Behavior* 30 (1 Januari 2014): 614–22, https://doi.org/10.1016/j.chb.2013.07.045.
[7] Sofoklis A. Sotiriou, "Invited talk abstract: Introducing large-scale innovation in schools," dalam *2016 11th International Workshop on Semantic and Social Media Adaptation and Personalization (SMAP)*, 2016, xxv–xxvi, https://doi.org/10.1109/SMAP.2016.7753374.
[8] Dolores López Carrillo dkk., "Using Gamification in a Teaching Innovation Project at the University of Alcalá: A New Approach to Experimental Science Practices," *Electronic Journal of E-Learning* 17, no. 2 (2019): 93–106.
[9] Vladimir Kryukov dan Alexey Gorin, "Digital technologies as education innovation at universities," *Australian Educational Computing* 32, no. 1 (2017): 1–16.
[10] Minghui Wang, "Analyzing the Influence of College Aesthetic Education Teaching on College Students' Innovation Ability and Artistic Literacy Based on Decision Tree Classification Model,"

data innovation cannot be separated from the developing experience in training. Various educational institutions, from elementary school to college level, have competed to put resources into data innovation to work on the nature of training. Selwyn,[11] makes sense that significant improvements in data innovation significantly affect the work of school organizations. Instructive organizations compete to spend their monetary assets to refresh data innovation. The increase in data innovation should significantly affect student learning methodologies. Babanazarovich,[12] states that working on the nature of schools is the primary goal of most developing countries.

The rapid increase in overall data innovation is affecting the world of schools. In the learning cycle, its use is expected to develop further the implementation of learning in more than one way.[13] First, the presence of data innovation in the homeroom should work on the evolving nature of the experience that affects student performance; second, the use of ICT is a natural thing to develop students' mental abilities further, which is expected to affect the implementation of student learning. Akindele et al.,[14] found that using data-based technological innovations should empathetically affect students' learning growth experiences. According to Sung et al.,[15] the development of PC utilization provides tremendous potential to drive educational experiences. The web, remote, tablet PC and other IT advancements are changing college learning approaches.

Mobile Information Systems 2022 (16 Agustus 2022): e9587049, https://doi.org/10.1155/2022/9587049.

[11] Neil Selwyn, *Education in a Digital World: Global Perspectives on Technology and Education* (New York: Routledge, 2012), https://doi.org/10.4324/9780203108178.

[12] Narbutaev Hushbak Babanazarovich, "Using of Innovative Educational Technologies in the Improvement of Ecological Thinking by Pupils in the Field of Biology Sciences," *International Journal of Innovative Analyses and Emerging Technology* 1, no. 6 (15 November 2021): 84–88.

[13] Barbara Bruns, Deon Filmer, dan Harry Anthony Patrinos, *Making Schools Work: New Evidence on Accountability Reforms* (World Bank Publications, 2011).

[14] Akinyinka Tosin Akindele dkk., "The Impact of COVID-19 and FAIR Data Innovation on Distance Education in Africa," *Data Intelligence*, 18 Agustus 2022, 1–34, https://doi.org/10.1162/dint_a_00184.

[15] Yao-Ting Sung, Kuo-En Chang, dan Tzu-Chien Liu, "The Effects of Integrating Mobile Devices with Teaching and Learning on Students' Learning Performance: A Meta-Analysis and Research Synthesis," *Computers & Education* 94 (1 Maret 2016): 252–75, https://doi.org/10.1016/j.compedu.2015.11.008. 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.

Holmegaard et al.,[16] expressed that using data innovation in the educational experience is fascinating to study, considering the many elements that can influence the utilization of data innovation. One of them is the state of the office. Assuming that an instructive establishment gives sufficient data innovation offices in learning, it will straightforwardly correspond to the utilization of existing data innovation. The utilization of data innovation is supposed to be coordinated to help the scholarly interaction at the college further develop understudy accomplishment. Ahmad et al.,[17] make sense that the utilization of innovation in the growing experience incorporates a few things, including the utilization of PowerPoint slides in the talk cycle, the utilization of the web in web-based addresses, the utilization of succeeding in doing questions and online talks gave a site. The utilization of data innovation in the talk cycle makes understudies keener on the material introduced and can further develop understudy scholastic execution.[18]

Euphrasia et al.,[19] expressed that the improvement of PCs and the web fundamentally affected the universe of schooling. Advanced education organizations put resources into different IT gear, for example, PC research facilities, sites, IT-based learning media, areas of interest, and video chats. The accessibility of satisfactory offices in the area of innovation is supposed to have the option to help the academic environment of understudies, further develop understudy execution and work on the nature of training. Jabr,[20] attempts to clarify the utilization of the web on understudy accomplishment. The web gives adaptability to understudies to find and download the necessary course materials. The advancement of sites, online journals, messages, and web-based entertainment extension of correspondence

[16] Henriette Tolstrup Holmegaard, Lene Møller Madsen, dan Lars Ulriksen, "To Choose or Not to Choose Science: Constructions of desirable identities among young people considering a STEM higher education programme," *International Journal of Science Education* 36, no. 2 (22 Januari 2014): 186–215, https://doi.org/10.1080/09500693.2012.749362.
[17] Mas Suryalis Ahmad dkk., "Photodentistry–an innovative approach to improving students' empathy and learning experiences in comprehensive patient care," *Journal of dental education* 84, no. 11 (2020): 1219–29.
[18] L. Dee Fink, *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses* (John Wiley & Sons, 2013).
[19] P. C. S. Euphrásio dkk., "Improving Teaching–Learning Process in MIL-STD-1553B Bus Classes Using a New Hybrid Web-Lab Methodology," *IEEE Transactions on Education* 63, no. 4 (November 2020): 291–98, https://doi.org/10.1109/TE.2020.2984882.
[20] Naeema H. Jabr, "Social networking as a tool for extending academic learning and communication," *International Journal of Business and Social Science* 2, no. 12 (2011).

networks among teachers and understudies and individual understudies is essential. The utilization of the web can emphatically affect understudy scholarly accomplishment assuming it is coordinated appropriately. By alluding to a portion of the writing surveys above, through this study, the writer will attempt to direct research on the impact of utilizing data innovation on understudy scholarly accomplishment.[21]

B. Research Methods

This paper discussed the understanding of the impact of the application of communication and information technology on student learning outcomes in an era that is now full of digital applications.[22] To discuss how the understanding of the two variables above, the author has always conducted an electronic search for data on literature sources in the form of books and scientific journals that publish the relationship of applications and analogies to the improvement and progress of achieving student learning outcomes in the digital era.[23] This study was designed as a descriptive qualitative study under a phenomenological approach. After a series of careful data collection in publications released between 2010 and 2022, the author conducted a data analysis involving a data coding system, analysis, and in-depth interpretation and drew conclusions that will conclude used as material for discussion by adhering to the principle of validity and reality of the data findings.[24] Searching electronically by embedding keywords in the Google Scholar application, the author quickly gets several data, both books and scientific publications, which are evidence of the results of field studies both in the context of Education in Indonesia and abroad, all of which are done to gain an understanding of the

[21] DR Rizwana Muneer, Munaza Mahmood, dan Salma Bano, "Impact of Digital Technology on Teaching and Learning Process at University Level," *International Journal of Social Sciences: Current and Future Research Trends* 3, no. 01 (12 Oktober 2019): 1–12.
[22] Ratnawati Susanto, Reza Rachmadtullah, dan Widarto Rachbini, "Technological and pedagogical models: Analysis of factors and measurement of learning outcomes in education," *Journal of Ethnic and Cultural Studies* 7, no. 2 (2020): 1–14.
[23] Ashley Castleberry dan Amanda Nolen, "Thematic Analysis of Qualitative Research Data: Is It as Easy as It Sounds?," *Currents in Pharmacy Teaching and Learning* 10, no. 6 (1 Juni 2018): 807–15, https://doi.org/10.1016/j.cptl.2018.03.019.
[24] Konstantina Vasileiou dkk., "Characterising and Justifying Sample Size Sufficiency in Interview-Based Studies: Systematic Analysis of Qualitative Health Research over a 15-Year Period," *BMC Medical Research Methodology* 18, no. 1 (21 November 2018): 148, https://doi.org/10.1186/s12874-018-0594-7.

relationship and impact of the application of technology that can innovate and transform so that student learning outcomes in this millennial era.

After a progression of studies and detailing of this review, we planned it in an engaging subjective way founded on the past review, specifically deliberate writing work, to see patterns in what innovation applications have a mean for working on the nature of understudy learning results.[25] The creator accepts that the effect coming about because of the utilization of innovation to work on the nature of understudy learning results is apparent through the proof and hypotheses introduced by specialists in innovation and learning. They subsequently clarified the strategies and materials passed in the phases of carrying out the review entitled Understanding the Effect of Utilization of Indonesian and correspondence innovation to further develop understudy learning results in an all-advanced time.[26]

This is the explanation of the study method with the theme of understanding the impact of information and communication technology applications on student learning outcomes in an era where everything is now all technology. Through the phenomenological approach, we have obtained data results that achieve the principles of validity and reliability of the findings of the discussion study that chose a descriptive qualitative design in the review study.

C. Results and Discussion

Moreover, in the outcomes and conversation area, we will introduce the aftereffects of the information examination connected with the review, whose topic is a top to bottom comprehension of the effect of computerized innovation applications on further developing understudy learning results in the ongoing time. In this segment, we will likewise portray the outcomes alongside a conversation upheld by different logical proof as the consequences of field concentrates on regards to homegrown and unfamiliar training, where we accept that openness upheld by hypothesis from the consequences of the field store study will reinforce

[25] Irma Rachmawati Maruf dkk., "Virtual Learning Apps: Best Instructional Leadership Practices in the Digital Age Efforts to Improve Student Learning Outcomes," *Jurnal Iqra' : Kajian Ilmu Pendidikan* 7, no. 1 (16 April 2022): 32–43, https://doi.org/10.25217/ji.v7i1.2187.
[26] Nazaruddin Musa, Norsiah Abd Hamid, dan Mohd Sobhi Ishak, "The Development of Digital Literacy in Academic Context in Indonesia: Literature Review Study," *Jurnal Iqra' : Kajian Ilmu Pendidikan* 6, no. 2 (2 Desember 2021): 198–214, https://doi.org/10.25217/ji.v6i2.1661.

our discoveries which will answer the issue through the conversation of the factors above.

Learning in technological times

Students who now live and study in the 21st century have experience and knowledge of technical matters. Hence, they come across the term information and communication technology when dealing with any content of lessons given in school. Seattle supports it, but some more technical information access Internet.[27] This is where students are held to the challenge of having to master technology and information, especially anything that focuses on scientific knowledge and communication. In other words, information and communication technology can be as deep as the Internet, wireless networks, and media connected from one computer to another. There is also the possibility of an unlimited connection because students live and study with a future orientation. Therefore, every student must understand science and technology and their ability to apply what they already know related to information and communication technology.[28]

This is because the benefits provided by this technology cannot be denied, whether they are a society, especially those as future leaders who are required to know various skills, both for self-understanding and for communicating in the field of economy and fire for every future generation.[29] Because students live in an era of continuous progress, namely the era of information and communication, they must be able to communicate directly and indirectly with people around them and anywhere they want to communicate. Without communication, the future world above them must know about technology and anything related to educating thinking patterns with fast and precise systems that are part of the benefits of technology for students as a generation. Therefore, using ICT also refers to how the technology

[27] Helen Soulé dan Tatyana Warrick, "Defining 21st century readiness for all students: What we know and how to get there," *Psychology of Aesthetics, Creativity, and the Arts* 9 (2015): 178–86, https://doi.org/10.1037/aca0000017.
[28] Charles Kivunja, "Exploring the Pedagogical Meaning and Implications of the 4Cs 'Super Skills' for the 21st Century through Bruner's 5E Lenses of Knowledge Construction to Improve Pedagogies of the New Learning Paradigm," 2015, https://doi.org/10.4236/ce.2015.62021.
[29] N.p. Morris dkk., "Mobile Technology: Students Perceived Benefits of Apps for Learning Neuroanatomy," *Journal of Computer Assisted Learning* 32, no. 5 (2016): 430–42, https://doi.org/10.1111/jcal.12144.

provides various conveniences, including audio-visual and network working with other computer networks worldwide. Students are connected with an integrated internet connection system so that those who master technology continue to develop all the time; they are generations who have universal knowledge and can communicate and provide valuable solutions for themselves and the wider community.[30]

Learning in an all-technology era is following the demands of the 21st century, where the readiness of parties such as teachers and students to use technology is following the demands and typical problems faced. The use of technology in adapting learning is not understood as technology replacing the role of a teacher. However, technology is an innovative tool capable of learning quickly, following the demands of learning in an all-technology era.

The role of ICT in education development

In the continuous period of data and correspondence, innovation is multiplying alongside an opportunity to fundamentally affect all parts of life. As well as in the field of schooling, data and correspondence innovation is critical in tackling different instructive issues and in working on the nature of Training.[31] Notwithstanding, we want to realize that Data and Correspondence Innovation incorporates two angles: Data innovation is connected with the cycle and utilization of apparatuses and supports data control and executives. Usually, it can likewise be utilized to oversee information, including handling, ordering, and putting away information in different ways to deliver quality data information. Correspondence Innovation is connected with using apparatuses to handle and move information from one gadget to the next. So, we realize that data and correspondence innovation are two perspectives that cannot be isolated and are related.[32] So, Information and

[30] FatimaEzzahra Benmarrakchi dkk., "Exploring the use of the ICT in supporting dyslexic students' preferred learning styles: A preliminary evaluation," *Education and Information Technologies* 22, no. 6 (2017): 2939–57.
[31] Hannatu Abdullahi, "The Role of ICT in Teaching Science Education in Schools," *International Letters of Social and Humanistic Sciences* 19 (22 Desember 2013): 217–23.
[32] Krzysztof Witkowski, "Internet of Things, Big Data, Industry 4.0 – Innovative Solutions in Logistics and Supply Chains Management," *Procedia Engineering*, 7th International Conference on Engineering, Project, and Production Management, 182 (1 Januari 2017): 763–69, https://doi.org/10.1016/j.proeng.2017.03.197.

Communication Technology comprehensively understand processing, data manipulation, processing, and information transfer activities. In simple terms, the benefits of ICT are seen from its objectives, namely to improve the quality of products and services, accelerate and streamline the learning and teaching process, and help increase efficiency and effectiveness in learning and teaching. The last is to improve the quality and productivity of Indonesian human resources in the future.[33]

Thus the discussion of the role of ICT in the development of education in an era where technology is capable of innovating human education work, from the issue of implementation planning to the evaluation of achieving learning objectives, is where the role of technology is ready to help increase learning outcomes following current demands.

ICT and student learning outcomes

Making clear and significant learning results is a significant part of a preparation program inside an association. While fostering this program, the administration and educators should know what students must grasp before finishing their learning. Learning results are not outright in that frame of mind of values. However, they can be changes in thinking, discipline, abilities, etc., that lead to positive changes. Understanding learning results is a cycle to decide the worth of understudy learning through evaluation exercises or estimation of learning results. Learning results likewise assume a vital part in evaluation and assessment, explaining what information understudies ought to have after finishing learning exercises. Elegantly composed learning results can zero in on how students will apply their new information in certifiable settings, not on students who can understand data—mental space, including information, grasping, application, appraisal, production, and assessment.[34]

Compelling involves acknowledgment, reaction, and assurance of significant worth. Psychomotor space covers crucial, conventional, ordinary, and imaginative

[33] Baishakhi Bhattacharjee dan Kamal Deb, "Role of ICT in 21st century's teacher education," *International Journal of Education and Information Studies* 6, no. 1 (2016): 1–6.
[34] Federico Biagi dan Massimo Loi, "Measuring ICT Use and Learning Outcomes: Evidence from Recent Econometric Studies," *European Journal of Education* 48, no. 1 (2013): 28–42, https://doi.org/10.1111/ejed.12016.

development in that learning results play a significant part in the educational experience. This is because learning results can be utilized as a benchmark to figure out how far the progressions of understudies in the wake of accepting their growth opportunities can be noticed and estimated as information, mentalities, and abilities.[35] Through the assistance of innovation, there are five kinds of learning results that specialists frequently express. With the assistance of innovation, learning and practice turn out to be not difficult to configure, create, use, oversee and assess cycles and assets for learning. This is brought together to further develop understudy learning results in the growing experience in instructive units. With the vast and expanding presence of innovation, it is normal for understudies to begin pondering involving innovation in their study hall learning. Innovation can lift various abilities.[36]

Mental capacities are the cerebrum-based abilities expected to play out any undertaking from the easiest to the most mind-boggling. Mental designs in a youngster are rapid; for example, they will all the more rapidly get and recollect something genuine. There is likewise notice of scholarly abilities. With this kind of learning result, students will grasp ideas, rules, or methods. It is grasping how to follow through with something.[37] The capacity acquired is the capacity to introduce ideas and images. Intellectual abilities comprise the capacity to order, an insightful capacity to blend realities and ideas, and foster logical standards. Intellectual abilities are the capacity to perform mental exercises that are remarkable. Intellectual abilities are the abilities or knowledge of an individual in thinking. Individual abilities are abilities to control one's self independently. An understudy can be said to have scholarly abilities. Alternatively, on the other hand, somebody is

[35] Vinesh Chandra dan Jo Briskey, "ICT driven pedagogies and its impact on learning outcomes in high school mathematics," *International Journal of Pedagogies and Learning* 7, no. 1 (1 Oktober 2012): 73–83, https://doi.org/10.5172/ijpl.2012.7.1.73.
[36] Stefania Bocconi, Panagiotis Kampylis, dan Yves Punie, "Framing ICT-Enabled Innovation for Learning: The Case of One-to-One Learning Initiatives in Europe," *European Journal of Education* 48, no. 1 (2013): 113–30, https://doi.org/10.1111/ejed.12021.
[37] Nidhi Agarwal, "A Study Of Innovations In Instructional Strategies And Designs For Quality Enrichment In Higher Education," 20 Desember 2018, https://doi.org/10.5281/zenodo.3942661.

said to have scholarly abilities assuming he can get different data and information from books.[38]

Alongside the times, the utilization of the web for instruction from primary school to college has encountered a massive turn of events. ICT innovation, which has a significant impact on the realm of schooling in a perfect world, must likewise be offset with the consciousness of every person.[39] Learning media with web innovation is a cutting-edge learning strategy, and at present, the school system in Indonesia likewise involves the web as a learning medium. The ongoing learning media that expects understudies to be dynamic and accessible makes the job of learning IT frameworks vital. Elements of Web Innovation Discuss the capability of the web, obviously, a considerable amount. Some of them are Correspondence media, Information trade media, and Learning media without an immediate educator Quest for learning materials. Make it simple and accelerate effective distance conveyance. Save time and cost more straightforward admittance to function admirably, based on the focus above.[40]

The presence of the web is vital not to simplify individuals' lives in different fields. Other than not irritating, with the assistance of the web, we can do numerous things all the more effectively, both time and cost. The advantages of IT in the understudy growing experience are currently mainly connected with the understudy growing experience, the presence of the web has the accompanying advantages: The learning framework turns out to be more imaginative and intelligent, Increments understudy inspiration because the educational experience fun, shows an assortment of learning media so that learning targets can be accomplished capable introducing conceptual material in a visual structure Adaptable capacity media Showing objects that should not be visible straightforwardly showing objects that are too enormous in the study hall Showing

[38] Alejandro Paniagua dan David Istance, "Teachers as designers of learning environments," *Educational Research and Innovation, OECD: Paris, France*, 2018.
[39] Robert A. Ellis dan Peter Goodyear, *The education ecology of universities: Integrating learning, strategy and the academy* (Routledge, 2019).
[40] Peter Serdyukov, "Innovation in education: what works, what doesn't, and what to do about it?," *Journal of Research in Innovative Teaching & Learning* 10, no. 1 (1 Januari 2017): 4–33, https://doi.org/10.1108/JRIT-10-2016-0007.

objects that are hard to get and risky to the learning climate.[41] Its benefits-based learning media will uphold understudy accomplishments to improve things. Thus, in this situation, the advantages of web innovation can surely be felt straight by students.

The impact of Web innovation on understudy accomplishment has been accounted for. The positive impact of Web innovation and the advantages of the IT framework technique will uphold understudy learning achievement. So understudies can accomplish outstanding learning accomplishments. For this situation, the upsides of web innovation incorporate the 1. Giving a comprehension of learning materials Simple web access assists understudies with tracking down learning materials.[42] Although many books now present learning materials, the web is one of the decisions for finding materials other than books. What understudies are searching for can quickly show up as per their desires. In this way, it is additional time adequate, and understudies can, without much of a stretch, grasp the material. Most understudies are now apathetic to understanding books, so searching for learning materials on the web can be another option. The media given is exceptionally assorted, so understudies are not quickly exhausted, such as learning as recordings. Understudies can likewise acquire more understanding than when in class with their companions. It can make sense of learning materials or dynamic articles.[43]

The media available during class learning is, of course, limited to each school itself. This internet technology makes it easier to deliver material so students can understand what the teacher is explaining.[44] For example, when studying science subjects regarding blood circulation and organs of the human body, students can see

[41] Michelle LaRocque, Ira Kleiman, dan Sharon M. Darling, "Parental Involvement: The Missing Link in School Achievement," *Preventing School Failure: Alternative Education for Children and Youth* 55, no. 3 (21 April 2011): 115–22, https://doi.org/10.1080/10459880903472876.
[42] Jacob L. Vigdor, Helen F. Ladd, dan Erika Martinez, "Scaling the Digital Divide: Home Computer Technology and Student Achievement," *Economic Inquiry* 52, no. 3 (2014): 1103–19, https://doi.org/10.1111/ecin.12089.
[43] Agâh Tugrul Korucu dan Hasan Cakir, "The Effect of Dynamic Web Technologies on Student Academic Achievement in Problem-Based Collaborative Learning Environment," *Malaysian Online Journal of Educational Technology* 6, no. 1 (2018): 92–108.
[44] Orhan Ercan, "The Effects Of Multimedia Learning Material On Students' Academic Achievement And Attitudes Towards Science Courses," *Journal of Baltic Science Education* 13, no. 5 (2014): 608–21.

what the process of blood circulation looks like and how the human organs look like. By helping teachers make it easier to explain the material, teaching teachers will find it easier to explain complicated material to become more accessible and more uncomplicated. The material presented with straightforward explanations will be understood by students well so that the material will be easy to remember and re-expressed.[45] The learning process will look attractive because it does not only use books as usual. It also brings students' attention, interest, motivation, and creativity. Learning materials that have been learned can be repeated. Students studied materials can be saved and played back when students need to learn the material again—for example, using video recordings, tape recorders, or television.

As a result of this kind of learning, students involve technology in the learning system to help them think, organize, and act. This kind of learning outcome is when students can state convincingly what they have gained from technology and information in a collaborative way.[46] Coordinated technology movement as a classification is connected with the capacity to perform activities and achieve fluency, familiarity, or precise timing through practice. Then cognitive intelligence as a student's internal state is reflected in how students behave. This is not very easy to measure but can be shown in students' reactions to individuals or circumstances.[47]

Therefore, the results of this learning can be in the form of the following results; With scientific abilities with this kind of learning outcome, students will find ideas, rules, or work systems and act. It is a way of figuring out how to act on something; mental techniques in this learning outcome involve individual thinking systems, coordination, thinking, and acting.[48] In addition, data on verbal learning

[45] Elian S.a dan Hamaidi D.a, "The Effect of Using Flipped Classroom Strategy on the Academic Achievement of Fourth Grade Students in Jordan," 2018, https://doi.org/10.3991/ijet.v13i02.7816.
[46] Vimala Balakrishnan dan Chin Lay Gan, "Students' Learning Styles and Their Effects on the Use of Social Media Technology for Learning," *Telematics and Informatics* 33, no. 3 (1 Agustus 2016): 808–21, https://doi.org/10.1016/j.tele.2015.12.004.
[47] Saskia Teri dkk., "Student Use and Pedagogical Impact of a Mobile Learning Application," *Biochemistry and Molecular Biology Education* 42, no. 2 (2014): 121–35, https://doi.org/10.1002/bmb.20771.
[48] Sumedha Chauhan, "A Meta-Analysis of the Impact of Technology on Learning Effectiveness of Elementary Students," *Computers & Education* 105 (1 Februari 2017): 14–30, https://doi.org/10.1016/j.compedu.2016.11.005.

outcomes are learning outcomes when students can state what they have obtained from a coordinated collection of information. Next is the result of coordinated movement learning, whose classification relates to the ability to carry out activities and achieve fluency, familiarity, or punctuality through practice. The last is disposition, which is an inner state that is reflected in the way students behave. This is not easy to measure but can be demonstrated in students' reactions to individuals or students' surroundings.[49]

Thus the discussion of the existence of ICT and improving student learning outcomes in an era where technology has been used to assist learning activities in an innovative, consistent and effective manner. Acceleration of learning outcomes can be carried out when education is in a crisis such as a pandemic and other crises, namely by utilizing the capacity of technology in providing educational services that are oriented towards accelerating the work of the system both in teaching methods to obtain materials while carrying out educational evaluations all will be easier when used appropriately efficiently towards productive educational outcomes.

D. Conclusion

Ending this discussion, the author reiterates that this study aims to explore a deep understanding of what and how the impact of information and information technology applications on student learning outcomes. Many studies have reported the impact of technology on improving the quality of Education in local and international contexts. However, we did not find an in-depth understanding of the impact of the application of technology on improving student learning outcomes when Education is run in the digital era. So by reviewing many scientific pieces of evidence from several local and international study reports, we have gathered much understanding; among others, we found that the model and typical learning in the technological era are undoubtedly different from the era where technology has not become a very dominant issue in life, especially learning. On the other hand, we see that the changes in Education today cannot be separated from the role of

[49] David Castillo-Merino dan Enric Serradell-López, "An Analysis of the Determinants of Students' Performance in e-Learning," *Computers in Human Behavior* 30 (1 Januari 2014): 476–84, https://doi.org/10.1016/j.chb.2013.06.020.

information technology which has innovated and transformed how learning education is carried out.

In addition, we also see that ITC and student learning outcomes indicate that there have been very significant results recently. It is proven that when technology is applied correctly, there will be various mental, intellectual, and even psychomotor learning outcomes, which makes us aware that the impact of this internet technology has become something very innovative to produce productive learning both at the education level—Elementary as well as in college. Our findings are inseparable from supporting scientific evidence from various studies in various application contexts. However, the results also have weaknesses and limitations. Therefore we expect constructive input and criticism to improve the quality of study reports.

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