

Access and Utilization of Online Learning Resources Among Undergraduate Students

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Abstrak

Sumber belajar online telah memberikan kontribusi besar untuk pengajaran dan pembelajaran. Telah dirasakan bahwa banyak mahasiswa kurang memanfaatkan sumber belajar online karena berbagai alasan. Tujuan dari penelitian ini adalah untuk menganalisis sumber belajar online yang tersedia untuk mahasiswa program sarjana, menyelidiki tingkat penggunaan sumber belajar online oleh mahasiswa sarjana serta mengkaji tantangan yang dihadapi mahasiswa saat mengakses dan menggunakan sumber belajar online. Penelitian ini merupakan penelitian deskriptif dengan jenis penelitian survey. 200 mahasiswa dipilih sebagai sampel. Tiga pertanyaan penelitian diajukan dan dijawab. Temuan penelitian mengungkapkan bahwa responden telah mendengar tentang alat web untuk pengajaran dan akrab dengan konsep alat web untuk pembelajaran, institusi menyediakan tablet dan internet gratis untuk siswa juga, ada cukup komputer di perpustakaan elektronik sekolah dengan internet gratis, dan ada warnet di lingkungan sekolah dan juga Siswa menggunakan Smartphone untuk mengakses dan menggunakan sumber belajar online. Hasil penelitian menyimpulkan bahwa sumber belajar online mendorong pembelajar dalam bidang akademik dan membantu siswa dalam belajar ke depan. Berdasarkan temuan dan kesimpulan, direkomendasikan bahwa; perguruan tinggi harus mendorong distribusi perangkat pembelajaran mobile, pemerintah harus menyediakan dana untuk pengadaan bandwidth dan e-library, dan guru harus terlibat dalam pemanfaatan sumber belajar online karena ini akan memudahkan proses pengajaran dan mendorong peserta didik.

Kata kunci: Akses, Pemanfaatan, Sumber Belajar Online, Medium

Abstract

Online learning resources have made a significant contribution to teaching and learning. It has been felt that many students are underutilizing online learning resources for various reasons. This study aimed to analyze the online learning resources available to undergraduate students, the level of use of online learning resources by undergraduate students, and examine the challenges faced when accessing and using online learning resources. This research is descriptive research with the type of survey research. 200 students were selected as the sample. Three questions were asked and answered. The research findings revealed that the respondents had heard of web tools for teaching and were familiar with web tools for learning. The institution provided free tablets and internet for students as well. There were enough computers in the school's electronic library with free internet. There were internet cafes in the school environment as well as Students used Smartphones to access and use online learning resources. The study results concluded that online learning resources encourage students in the academic field and assist students in future learning. Based on and conclusions, it is recommended that; Universities must support the distribution of mobile learning devices, the government must provide funds for the provision of bandwidth and e-libraries, and teachers must be involved in the use of online learning resources because this will facilitate the teaching process and encourage students.

Keywords: Access, Utilization, Online learning resources, Medium

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1. INTRODUCTION

The word education comes from the Latin word educare, which means "to raise up," and is linked to educere, which means "to bring forth what is inside," "to bring forth potential," and educere, which means "to lead." Any act or event that has a formative influence on an individual's intellect, character, or physical ability is considered education in the broadest sense. Education, in its most technical definition, is the purposeful transmission of society's acquired knowledge, skills, and values from one generation to the next (Y. J. Kim et al., 2019; Kusumaningrum & Wahyono, 2020; Scherer et al., 2021). The process of educating or teaching is defined by Webster as the process of educating or teaching (now

that's a pretty handy definition, isn't it?). "To improve an individual's knowledge, competence, and character" is another definition of educate (Eze et al., 2018; Munoto, 2018). As a result of these concepts, we may deduce that the goal of education is to help people develop the knowledge, skill, or character of students. Education may be a systematic process which yields encouraging changes within the behaviour and lifetime of human (Soetan et al., 2021; Taimur & Sattar, 2018).

In ancient Greece, Socrates argued that education was about drawing out what was already within the student. (As many of you know, the word education comes from the Latin *educere* meaning "to lead out.") At the same time, the Sophists, a group of itinerant teachers, promised to give students the necessary knowledge and skills to gain positions with the city state. Education is the dynamic side of philosophy which takes into its orbit, all the dimensions of human life (Deodhar, M. and Powdwal, 2017; Yanow, 2015). Similarly, education also reflects the multifaceted nature of human life. Therefore, education is closely related to various aspects of human life and environment. Hence, the term education has a wide connotation. It is difficult to define education by single definition. Philosophers and thinkers from Socrates to Dewey in west and a host of Indian philosophers have attempted to define education. However, education can be understood as the deliberate and systematic influence exerted by educator through instruction, and discipline (Davies et al., 2017; Restrepo et al., 2012; Yue, 2019). It means the harmonious development of all the skills need to be acquired by human being such as ICT skills and others (Asad et al., 2020; Heemskerk et al., 2012; Khlaisang & Koraneekij, 2019). Generally, there are four key stages of education, these are: early childhood education, primary education, secondary education, and tertiary education.

Early childhood education (ECE) is about honing and moulding the holistic child. It is a term used to explain any type of educational program that serves children in their preschool years (Dwi et al., 2021; Kusumaningrum & Wahyono, 2020). It is during this phase of life that the foundations for cognitive, physical and emotional development are built. Young children generally start learning the basics of walking, talking and naming colours and shapes at home. Primary education comes after preschool and before secondary school (Vartiainen & Kumpulainen, 2020; Yildirim, 2010). It takes place in primary school, the elementary school or first and middle school depending on the location. The International Standard Classification of Education considers primary education as a single-phase where programmes are typically designed to provide fundamental skills in reading, writing and calculations and to establish a solid foundation for learning (Y. J. Kim et al., 2019; Nur Aisyah et al., 2018). Secondary school has further been divided into junior secondary (or junior high) and senior secondary (senior high) (Filgona et al., 2017; Yemi et al., 2018). Tertiary education is usually referred to as higher education or post-secondary education. It generally culminates in the receipt of certificates, diplomas, or academic degrees. Students traditionally apply for admission into colleges, polytechnics and universities (Eze et al., 2018; Gafurov et al., 2020). Higher education is taken to include undergraduate and postgraduate education, while vocational education beyond secondary education is known as further education in the United Kingdom, or included under the category of continuing education in the United States. In every stage of education, the best way to impart knowledge, skills and attitude to their learners is to implement good teaching and learning process.

The modern mode of education which facilitate communication between teachers and students, add more flexibility, and add customized learning experience, is accomplished through Information and Communication Technology (ICT) (Lange et al., 2020; Yuniarti, 2012). ICT is an acronym for "Information and Communication Technology." ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economic and cultural

matters (Haviluddin, 2010; M. Kim et al., 2020). The term ICT is also used to refer to the convergence of audiovisual and telephone networks with computer networks through a single cabling or link system. There are large economic incentives to merge the telephone network with the computer network system using a single unified system of cabling, signal distribution, and management (Heemskerk et al., 2012; Winarni, 2020). ICT is an umbrella term that includes any communication device, encompassing radio, television, cell phones, computer and network hardware, satellite systems and so on, as well as the various services and appliances with them such as video conferencing and distance learning. ICTs have revolutionized the way people work today and are now transforming education systems. As a result, if schools train learners in yesterday's skills and technologies they may not be effective and fit in tomorrow's world (Lawrence & Tar, 2018; Leon & Castro, 2014).

Online learning encompasses learning at all levels both formal and non-formal that uses an information network, the Internet, an intranet (LAN) or extranet (WAN) (Maulana, 2021; Scherer et al., 2021). The components include e-portfolios, cyber infrastructures, digital libraries and online learning object repositories (Alchamdani et al., 2020; Dong et al., 2020; Hermanto et al., 2021). All the above components create a digital identity of the user and connect all the stakeholders in the education. It also facilitates inter-disciplinary research. The considerable number of undergraduate students in Nigeria accessed and use the internet through their mobile telephones and laptops using a modem as a router, whereas a few accessed the internet through the University digital centre and none accessed through the University Library (Otinla, A.O., 2013). Therefore, this study intends to find out the access to and utilization of online learning resources among undergraduate students based on online learning resources that are available in the school premises, mediums of accessing online learning resources by undergraduate students, challenges facing undergraduate students in accessing online learning resources and rate of using online learning resources based on the gender of undergraduate students. Education also can be defined as a progression of obtaining knowledge through training or conveying knowledge by way of instructions or another applied procedures (Basith et al., 2020; Ferri et al., 2020). Specifically, education helps and guides individuals to rework from one class to other. The necessity for technological innovation has brought a revolution in development of technological application in education (Soetan et al., 2021). The main purpose of this study is to analyze access to and utilization of online learning resources among undergraduate students in university of Ilorin.

2. METHODS

This section discusses the procedures employed in carrying out this study. The population of this study comprises all undergraduate students of university of Ilorin, stratified random sampling technique were used to select 200 undergraduate students to participate in this study. The sample institution is university of Ilorin, Ilorin, Kwara State. A researcher designed questionnaire was used to elicit information from the respondents. It consisted of three sections. Section A required demography of the respondents' personal information, Section B consisted the items on access to online learning resources among undergraduate students in university of Ilorin, Section C generated items on utilization of online learning resources among undergraduate students in university of Ilorin. The data gathered from the research instrument were collected, collated and analysed using the descriptive and inferential statistics. Frequency count and percentages and mean were used to analyze the data. Before the instruments were administered, authorization from the necessary authorities was acquired with the aid of a research assistant from each of the study's universities. The information was gathered through a questionnaire delivered to the respondents' schools. After

the students completed the questionnaire, it was promptly collected from them. No information from the respondents in the study that was not related to the study's goal was obtained in order to ensure ethical problems. The respondents were not forced to complete the questionnaire; instead, they were given the option to do so at their leisure. In addition, all authors listed in this paper were appropriately cited.

3. RESULTS AND DISCUSSION

Results

Based analysis data, the Research Question one: The mean value of positive response by the undergraduate students of Online Learning Resources available is 121.6 (60.8%), which is greater than the mean value of online learning resources not available response 78.4 (39.2%). This implies that online learning resources are available to undergraduate students in university of Ilorin. The results of data analysis are presented in [Table 1](#).

Table 1. Online Learning Resources available for Undergraduate Students

S/N	Items	Available	Not Available
1	Computer centre	200	-
2	DVD-ROM	147	53
3	Free flash drive	89	111
4	Social media output channel	170	30
5	Free internet	140	60
6	E-books	200	-
7	Electricity	74	126
8	Empty Re-Writable Disc	30	170
9	Personal computer	108	92
10	E- journals	58	142
	X	121.6 (60.8%)	78.4 (39.2%)

Utilization of online learning resources shown in [Table 2](#). Item 1 with mean value 2.81 reveals the students use online learning resources perform better than other students. Item 2 with the mean value 3.47 indicate that online learning resources help students in preparing and learning ahead. Also, Item 3 with the mean value 2.56 revealed that Lecturers that use online learning resources perform better than those that don't use it. Item 4 with the mean value 3.08 revealed the respondents were of the opinion that Online learning resources can enhance students' performance, item 5 with the mean value 3.55 revealed the respondents were of the opinion that Online learning resources can enhance independent learning in students.

Table 2. Utilization of Online Learning Resources

S/N	Items	Mean
1	Students use online learning resources perform better than other students	2.81
2	Online learning resources help students in preparing and learning ahead	3.47
3	Lecturers that use online learning resources perform better than those that doesn't use it	2.56
4	Online learning resources can enhance students' performance	3.08
5	Online learning resources can enhance independent learning in students	3.55
	Grand Mean	3.10

The challenges faced by students in accessing and using online learning resources are presented in [Table 3](#). Item 1 with mean value 2.02 reveals that there is no access to free internet service in the school premises. Item 2 with the mean value 2.84 revealed the respondents Poor networking is one of the challenges for them to access online learning resources. Also, Item 3 with the mean value 3.01 revealed that Poor maintenance hinder free access and utilization of online learning materials in school premises. Also, Item 4 with the mean value 3.33 revealed respondents were of the opinion that Subscription is also a challenge for students in accessing and utilization of online learning materials. Furthermore, Item 5 with the mean value 2.21 revealed that lack of computer skill can hinder students in accessing and utilization of online learning materials. Item 6 with the mean value of 2.06 revealed the respondents were of the opinion that poor technology developments hinder students in accessing online learning resources. Item 7 with the mean value of 3.27 revealed that large mass of irrelevant information is a challenge for students in accessing and using online learning resources. Item 8 with the mean value of 2.64 revealed that the respondents were of the opinion that difficulties in navigating through some online learning resources hinder the accessibility and utilization of online learning resources. Item 9 with the mean value of 3.43 revealed that the respondents were of the opinion that lack of stable electricity is a challenge for students in accessing online learning resources. Item 10 with the mean value of 2.74 revealed that unavailability of proper digital tools can also hinder the accessibility and utilization of online learning resources by students.

Table 3. Challenges Face by Students in Accessing and Using Online Learning Resources

S/N	Items	Mean
1	There is no access to free internet service in the school premises	2.02
2	Poor networking is one of the challenges for me to access online learning resources.	2.84
3	Poor maintenance hinder free access and utilization of online learning materials in our school premises	3.01
4	Subscription is also a challenge for students in accessing and utilization of online learning materials	3.33
5	Lack of computer skill can hinder students in accessing and utilization of online learning materials	2.21
6	Poor technology development hinder students in accessing online learning resources	2.06
7	Large mass of irrelevant information is a challenge for students in accessing and using online learning resources	3.27
8	Difficulties in navigating through some online learning resources can hinder the accessibility and utilization of online learning resources	2.64
9	Lack of stable electricity is also a challenge for students in accessing online learning resources	3.43
10	Unavailability of proper digital tools can also hinder the accessibility and utilization of online learning resources by students	2.61
Grand Mean		2.74

Discussions

Teaching and learning process are combined processes where an educator assesses learning needs, establishes specific learning objectives, develops teaching and learning strategies, implements plan of work and evaluates the outcomes of the instruction ([Alchamdani et al., 2020](#); [Hussin et al., 2018](#); [Thoyyibah et al., 2019](#)). Teaching and learning is a process that includes many variables which interact as learners work toward their goals

and incorporate new knowledge, behaviours, and skills that add to their range of learning experiences (Darmaji et al., 2019; Desyandri et al., 2019; Kristanto et al., 2021). These variables include: instructional arrangements (e.g., whole class to individual); instructional delivery methods (e.g., inquiry, direct instruction, etc.); student engagement techniques; supplemental interventions; resources and materials; and technology. Teacher must assess every learners' unique situation and decide according to their needs and goals, and while this alternative to traditional education is not for everyone, online learning is a convenient option with virtually endless options (Gusmida & Islami, 2017; Meşe & Sevilen, 2021; Rati & Rediani, 2020).

This is a sufficient reason for ICTs to win global recognition and attention (Haviluddin, 2010; Khlaisang & Koraneekij, 2019; Lange et al., 2020). For instance, ICTs are dependable tools in facilitating the attainment of one of the Millennium Development Goals (MDGs), which is achievement of universal primary education by the year 2015. Kofi Anan, the former United Nations Secretary General, points out that in order to attain the goal of Universal Primary Education by the year 2015; we must ensure that information and communication technology (ICT) unlock the door of education systems. ICT facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. The field of education has been affected by ICT, which have undoubtedly affected teaching and learning (Haviluddin, 2010; Khan & Ghosh, 2021; Leon & Castro, 2014). Use of ICT has improved the quality of education, ICT have the potential to innovate, accelerate, enrich and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for workers, as well as strengthening teaching and helping school change (Dewi et al., 2019; Fernández-Gutiérrez et al., 2020; Heemskerk et al., 2012).

The study examined the Access to and Utilization of Online Learning Resources in university of Ilorin, Nigeria. The discussions of this study were based on findings of the research questions. Based on the fact that the curriculums used are technology oriented, undergraduate students have access to internet facilities, the Institution provide tablet and free internet for the students and also students use Smartphone to access and use online learning resources. In this study, it is observed that there is cybercafé in the school premises, there is enough computers in the school's E-library and also free internet for the students. Also, it is observed that online learning resources help students in preparing and learning ahead, Online learning resources enhance independent learning in students and online learning resources enhance students' performance.

Based on the findings of this study, the following implications were drawn: first, The findings have strong implication on the Access to and Utilization of Online Learning Resources. It is an indication that there would be great improvement in the way learning take place digitally for learners. Second, The findings have a strong implication on the learners through the Online Learning Resources. It can enhance/influence student's interaction with their colleagues and motivate learners; build their confidence, allow for interaction and involvement in collaborative learning and learning at their own pace. Based on the findings and conclusion, recommendations were made: first, Universities should encourage the distribution of mobile learning devices such as tablet pc, increase in bandwidth connection strength and coverage within the universities environment and off campus encourages the utilization of online learning resources for online learning; Second, The government should provide funds for procurement of bandwidth, E-library, PC tablet, Desktop for distance learners (both federal and state). This will enable Undergraduate learners and other institutions to be acquainted with the latest technology available for online learning; iii. Teachers should engage in the utilization of online learning resources as this will ease the

teaching process and it will encourage the learners to be able to learn at their own pace and makes learning more flexible and fun.

4. CONCLUSION

The result obtained from data gathered and analyzed in this study indicated that introduction of Online Learning Resources encourages learners in their academics for learning and help students in preparing and learning ahead. Also, undergraduate personal access to digital devices like personal computer, internet access, Tablets, Smart Phones, and so on encourages learners on the utilization of Online Learning Resources.

5. REFERENCES

- Alchamdani, A., Fatmasari, F., Rahmadani Anugrah, E., Putri Sari, N., Putri, F., & Astina, A. (2020). The Impact of Covid19 Pandemic on Online Learning Process in the College at Southeast Sulawesi. *Jurnal Kesehatan Lingkungan*, 12(1si), 129. <https://doi.org/10.20473/jkl.v12i1si.2020.129-136>.
- Asad, M. M., Gul, J., & Lashari, M. A. (2020). Digital Skills and Literacy among Prospective Teachers of Sukkur Pakistan: A Conceptual Framework. *ICTASE*, 1(1), 27–36. <https://doi.org/10.31098/ictase.v1i1.18>.
- Basith, A., Rosmayadi, R., Triani, S. N., & Fitri, F. (2020). Investigation of Online Learning Satisfaction During COVID 19: In Relation to Academic Achievement. *Journal of Educational Science and Technology (EST)*, 1(1), 265–275. <https://doi.org/10.26858/est.v1i1.14803>.
- Darmaji, Kurniawan, D. A., Astalini, Lumbantoruan, A., & Samosir, S. C. (2019). Mobile learning in higher education for the industrial revolution 4.0: Perception and response of physics practicum. In *International Journal of Interactive Mobile Technologies* (Vol. 13, Issue 9). <https://doi.org/10.3991/ijim.v13i09.10948>.
- Davies, I., Grammes, T., & Kuno, H. (2017). Citizenship education and character education “character is the continuously defined way of how man relates to the world” (Herbart 1919, p. 524). *Journal of Social Science Education*, 16(3), 2–7. <https://doi.org/10.4119/UNIBI/jsse-v16-i3-1716>.
- Deodhar, M. and Powdwal, S. (2017). Impact of Continuing Education Programs (CEPs) on LIS Professionals in Academic Libraries in Mumbai, India. *Library Management*, 38(2/3), 117–130. <https://doi.org/10.1108/LM-07-2016-0051>.
- Desyandri, D., Muhammadi, M., Mansurdin, M., & Fahmi, R. (2019). Development of integrated thematic teaching material used discovery learning model in grade V elementary school. *Jurnal Konseling Dan Pendidikan*, 7(1), 16. <https://doi.org/10.29210/129400>.
- Dewi, R. K., Wardani, S., Wijayati, N., & Sumarni, W. (2019). Demand of ICT-based chemistry learning media in the disruptive era. *International Journal of Evaluation and Research in Education*, 8(2), 265–270. <https://doi.org/10.11591/ijere.v8i2.17107>.
- Dong, C., Cao, S., & Li, H. (2020). Young Children’s Online Learning during COVID-19 Pandemic: Chinese Parents’ Beliefs and Attitudes. *Child Youth Serv Rev*, 118. <https://doi.org/10.1016/j.childyouth.2020.105440>.
- Dwi, Y., Septyarini, A., Gading, I. K., & Antara, P. A. (2021). Validity and Reliability : Early Childhood ’ s Locomotor Capability Assessment Instruments Dwi, Y., Septyarini, A., Gading, I. K., & Antara, P. A. (2021). Validity and Reliability : Early Childhood ’ s Locomotor Capability Assessment Instruments. *Advance. Advances in*

- Social Science, Education and Humanities Research*, 540(Ictes 2020), 400–404. <https://doi.org/10.2991/assehr.k.210407.271>.
- Eze, S. C., Chinedu-Eze, V. C., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, 15(1). <https://doi.org/10.1186/s41239-018-0116-z>.
- Fernández-Gutiérrez, M., Gimenez, G., & Calero, J. (2020). Is the use of ICT in education leading to higher student outcomes? Analysis from the Spanish Autonomous Communities. *Computers and Education*, 157, 103969. <https://doi.org/10.1016/j.compedu.2020.103969>.
- Ferri, F., Grifoni, P., & Guzzo, T. (2020). Online Learning and Emergency Remote Teaching: Opportunities and Challenges in Emergency Situations. *Societies*, 10(4), 86. <https://doi.org/10.3390/soc10040086>.
- Filgona, J., Filgona, J., & Linus, K. S. (2017). Mastery Learning Strategy and Learning Retention: Effects on Senior Secondary School Students' Achievement in Physical Geography in Ganye Educational Zone, Nigeria. *Asian Research Journal of Arts & Social Sciences*, 2(3). <https://doi.org/10.20944/preprints201702.0018.v1>.
- Gafurov, I. R., Ibragimov, H. I., Kalimullin, A. M., & Alishev, T. B. (2020). Transformation of higher education during the pandemic: Pain points. *Vysshee Obrazovanie v Rossii*. <https://doi.org/10.31992/0869-3617-2020-29-10-101-112>.
- Gusmida, R., & Islami, N. (2017). The Development of Learning Media for the Kinetic Theory of Gases Using the ADDIE Model with Augmented Reality. *Journal of Educational Sciences*, 1(1), 1. <https://doi.org/10.31258/jes.1.1.p.1-10>.
- Haviluddin. (2010). Active Learning berbasis Teknologi Informasi (ICT). *Jurnal Ilmiah Ilmu Komputer*, 5(3). <https://doi.org/10.30872/jim.v5i3.64>.
- Heemskerck, I., Volman, M., Admiraal, W., & Ten Dam, G. (2012). Inclusiveness of ICT in secondary education: Students appreciation of ICT tools. *International Journal of Inclusive Education*, 16(2), 155–170. <https://doi.org/10.1080/13603111003674560>.
- Hermanto, Y. B., Agustini, V., & Srimulyani. (2021). The Challenges of Online Learning During the Covid-19 Pandemic. *Jurnal Pendidikan Dan Pengajaran*, 54(1). <https://doi.org/10.23887/jpp.v54i1.29703>.
- Hussin, W. N. T. W., Harun, J., & Shukor, N. A. (2018). Problem Based Learning to Enhance Students Critical Thinking Skill via Online Tools. *Asian Social Science*, 15(1), 14. <https://doi.org/10.5539/ass.v15n1p14>.
- Khan, A., & Ghosh, S. K. (2021). Student performance analysis and prediction in classroom learning: A review of educational data mining studies. *Education and Information Technologies 2018 24:2*, 26(1). <https://doi.org/10.1007/s10639-020-10230-3>.
- Khlaisang, J., & Koraneekij, P. (2019). Open online assessment management system platform and instrument to enhance the information, media, and ICT literacy skills of 21st century learners. *International Journal of Emerging Technologies in Learning (IJET)*, 14(7). <https://doi.org/10.3991/ijet.v14i07.9953>.
- Kim, M., Lee, H., & Kwak, J. (2020). The changing patterns of China's international standardization in ICT under techno-nationalism: A reflection through 5G standardization. *International Journal of Information Management*, 54. <https://doi.org/10.1016/j.ijinfomgt.2020.102145>.
- Kim, Y. J., Radloff, J. C., Stokes, C. K., & Lysaght, C. R. (2019). Interprofessional education for health science students' attitudes and readiness to work interprofessionally: a prospective cohort study. *Brazilian Journal of Physical Therapy*, 23(4), 337–345. <https://doi.org/10.1016/j.bjpt.2018.09.003>.

- Kristanto, A., Sulistiowati, ., & Pradana, H. D. (2021). Brain-Based Online Learning Design in The Disruptive Era for Students in University. *Journal of Educational and Social Research*, 11(6), 277. <https://doi.org/10.36941/jesr-2021-0147>.
- Kusumaningrum, & Wahyono. (2020). Developing A Pop-Up Storybook Based on Multicultural Education for Early Childhood Students. *Jurnal Obsesi Jurnal Pendidikan Anak Usia Dini*, 4(1). <https://doi.org/10.31004/obsesi.v4i1.230>.
- Lange, S., Pohl, J., & Santarius, T. (2020). Digitalization and energy consumption. Does ICT reduce energy demand? *Ecological Economics*, 176. <https://doi.org/10.1016/j.ecolecon.2020.106760>.
- Lawrence, J. E., & Tar, U. A. (2018). Factors that influence teachers' adoption and integration of ICT in teaching/learning process. *Educational Media International*, 55(1), 79–105. <https://doi.org/10.1080/09523987.2018.1439712>.
- Leon, L. P. de, & Castro, P. L. (2014). ICT in Career Guidance. A Case Study of a “Blended Learning” Career Guidance Programme for Music Students. *Procedia - Social and Behavioral Sciences*, 116. <https://doi.org/10.1016/j.sbspro.2014.01.518>.
- Maulana, H. A. (2021). Psychological Impact of Online Learning during the COVID-19 Pandemic: A Case Study on Vocational Higher Education. *Indonesian Journal of Learning Education and Counseling*, 3(2), 130–139. <https://doi.org/10.31960/ijolec.v3i2.833>.
- Meşe, E., & Sevilen, Ç. (2021). Factors influencing EFL students' motivation in online learning: A qualitative case study. *Journal of Educational Technology & Online Learning*, 4(1), 11–22. <https://doi.org/10.31681/jetol.817680>.
- Munoto, W. and. (2018). 21st centuries skill implication on educational system. *IOP Conference Series Materials Science and Engineering*, 296(1). <https://doi.org/10.1088/1757-899X/296/1/012036>.
- Nur Aisyah, E., Samawi, A., & Fitri Untariana, A. (2018). Efforts to Improve the Ability of The Teachers in Development Program for Strengthening Character Education (PPK) in Early Childhood Education (ECE) through Workshop Activities. *Proceedings of the 1st International Conference on Early Childhood and Primary Education (ECPE 2018)*, 244(Ecpe), 38–41. <https://doi.org/10.2991/ecpe-18.2018.9>.
- Otunla, A.O. (2013). Internet Access and Use Among Undergraduate Students of Bowen University Iwo, Osun State, Nigeria. *Library Philosophy and Practice (Ejournal)*.
- Rati, N. W., & Rediani, N. N. (2020). E-learning Assissted by Finger Printing on Students' Critical Thinking and Creativity. *Journal of Education Technology*, 4(4), 433. <https://doi.org/10.23887/jet.v4i4.30214>.
- Restrepo, E. G. Y., Benavidez, C., & Gutiérrez, H. (2012). The challenge of teaching to create accessible learning objects to higher education lecturers. *Procedia Computer Science*, 14(Dsai), 371–381. <https://doi.org/10.1016/j.procs.2012.10.043>.
- Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior*, 118, 106675. <https://doi.org/10.1016/j.chb.2020.106675>.
- Soetan, A. K., Alaka, & Onojah, A. A. (2021). Attitude of Hearing-Impaired Students Towards Assistive Technology Utilization in Oyo State Adopting the Survey Method. *Indonesian Journal of Community and Special Needs Education*, 1(2). <https://doi.org/10.17509/ijcsne.v1i2.36963>.
- Taimur, S., & Sattar, H. (2018). Education for Sustainable Development and Critical Thinking Competency. *Springer Nature Switzerland AG*, September, 1–11. https://doi.org/10.1007/978-3-319-69902-8_64-1.

- Thoyyibah, N., Hartono, R., & Bharati, D. A. L. (2019). The Implementation of Character Education in the English Teaching Learning Using 2013 Curriculum. *English Education Journal*, 9(2), 254–266. <https://doi.org/10.15294/eej.v9i2.30058>.
- Vartiainen, J., & Kumpulainen, K. (2020). Playing with science: manifestation of scientific play in early science inquiry. *European Early Childhood Education Research Journal*, 28(4). <https://doi.org/10.1080/1350293X.2020.1783924>.
- Winarni, E. W. (2020). Analysis of Language and Scientific Literacy Skills for 4th Grade Elementary School Students through Discovery Learning and ICT Media. *International Journal of Instruction*, 13(2), 213–222. <https://doi.org/10.29333/iji.2020.13215a>.
- Yanow, D. (2015). *Thinking interpretively: Philosophical presuppositions and the human sciences. In Interpretation and method.*
- Yemi, T. M., Binti, N., & Azid, H. (2018). Effect Of Jigsaw Strategy Of Cooperative Learning On Mathematics Achievement Among Secondary School Students. *European Journal of Education Studies*, 51–61. <https://doi.org/10.5281/zenodo.1167888>.
- Yildirim, A. (2010). Creativity in early childhood education program. *Procedia - Social and Behavioral Sciences*, 9. <https://doi.org/10.1016/j.sbspro.2010.12.365>.
- Yue, X. (2019). Exploring Effective Methods of Teacher Professional Development in University for 21st Century Education. *International Journal for Innovation Education and Research*, 7(5), 248–257. <https://doi.org/10.31686/ijer.vol7.iss5.1506>.
- Yuniarti, D. (2012). Analisis Kesiapan Industri Manufaktur Teknologi Informasi dan Komunikasi (TIK) Dalam Negeri Untuk Mendukung Implementasi Green-ICT Pada Sektor Telekomunikasi. *Buletin Pos Dan Telekomunikasi: Media Komunikasi Ilmiah*, 10(3). <https://doi.org/10.17933/bpostel.2012.100305>.