KWANGSAN

Jurnal Teknologi Pendidikan
Vol: 07/11 Juli 2023.
Online ISSN: 2622-4283, Print ISSN: 2338-9184

ANALYZE THE DEVELOPMENT OF DIGITAL LITERACY FRAMEWORK IN EDUCATION: A SYSTEMATIC LITERATURE REVIEW

Analisis Perkembangan Framework Literasi Digital dalam Dunia Pendidikan: Kajian Literatur yang Sistematis

Imas Istiani[1],Eva Fatimah[2], Ahmad Husain[3*], Yuvita[4], Anin Eka Sulistyawati[5], Sakina Sunmud[6]

[1]Universitas Negeri Semarang, [2]Universitas Wahid Hasyim, [345]Universitas Pancasakti Tegal, [6]Hatyai University, Thailand

[1]Sekaran, Gunung Pati, Semarang City, Central Java 50229, [2]Jl. Menoreh Tengah X No.22, Sampangan, Kec. Gajahmungkur, Kota Semarang, Jawa Tengah 50232, [345]Jl. Halmahera Km.01 Kota Tegal, Jawa Tengah, 52122, [6]222 ถนน พลพิชัย-บ้านพรุ Kho Hong, Hat Yai District, Songkhla 90110, Thailand

Keywords:

digital literacy; frameworks, systematic review; education

Kata kunci:

literasi digital; kerangka kerja; tinjauan sistematis; pendidikan

***ABSTRACT**:*

The development of technology massively increase during covid-19. Then, a dozen beneficial invention in many sectors such as education race to be better forward. This research aims to suggest and map the domains of digital literacy in each previous research without any reduction of meaning and analyze the development of digital literacy in education. This research used a systematic literature review as a method to find the result, meaning that the researcher has a procedure to collect the previous research. The procedure is for the researcher to collect 200 papers from Scopus Database, Search by "Digital Literacy" and filter by the keyword "framework" and "Education". Then, it is reduced into only for digital literacy framework proposal. The result shows that communication, information, content creation, safety, and critical digital literacy still become a suitable domain around the framework. This research concluded that five domains above suggested to use in further research.

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

ABSTRAK

Perkembangan teknologi sangat pesat di masa covid-19. Kemudian, selusin penemuan bermanfaat di berbagai sektor seperti pendidikan berlomba menjadi lebih baik ke depan. Penelitian ini bertujuan untuk menyarankan dan memetakan domain literasi digital pada setiap penelitian sebelumnya tanpa adanya pengurangan makna dan menganalisis perkembangan literasi digital dalam pendidikan. Penelitian ini menggunakan sistematika literature review sebagai metode untuk menemukan hasil, artinya peneliti memiliki prosedur untuk mengumpulkan penelitian sebelumnya. Prosedurnya peneliti mengumpulkan 200 makalah dari Basis Data Scopus, Pencarian dengan "Melek Digital" dan menyaring dengan kata kunci "kerangka" dan "Pendidikan". Kemudian direduksi menjadi proposal kerangka literasi digital saja. Hasilnya menunjukkan bahwa komunikasi, informasi, pembuatan konten, keamanan, dan literasi digital kritis masih menjadi domain yang sesuai di sekitar framework. Penelitian ini menyimpulkan bahwa kelima domain di atas disarankan untuk digunakan dalam penelitian selanjutnya.

INTRODUCTION

Information and Communication Technology (ICT) is recognized as one of the factors influencing teachers' success in mastering professional competence. However, the effectiveness of utilizing ICT in each subject or course depends on the subject itself (Ocaña-Fernández and Fernández, 2020). The differenced analysis obtained in the years before finding the way to maximize of using ICT to increase the learning outcomes (Sianturi, 2016; Dwiningsih *et al*., 2018; Indriastuti and Saksono, 2018; Mulyani, 2018; Maulana *et al*., 2019; Resmayania and Putrab, 2020; Raes, 2020;Fatimah, *et al*., 2022). They discovered that ICT has been integrated into the learning and teaching process of their system. Not only integrated but also relied on it. It means they force to use ICT in their learning system.

Meanwhile, in recent years the use of ICT madly increased to support agenda of preventing the Covid-19 Outbreak. The covid-19 situation pushes the world of education to become the beginner in ICT. Then

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

integrate it into all aspects of the lifestyle. Even they are in the basic proficiency to use it (Adarkwah, 2021).

The basic ability to use ICT has become one of hundred problems for the learning and teaching process. It is also known as digital literacy, learning how to use a computer, a keyboard, and conduct internet searches are only the most basic aspects of digital literacy. Thus, some of the fundamentals must come first (Buckingham, 2015).

The previous researches reported that a lower level of digital literacy influences the effectiveness of using media in education. It can be seen by E. I. Nada and W. K. Sari using the measurement of digital literacy from Ferrari et al.,. They reported that the students' digital literacy reach in basic level and lower score to use media. It can be drawn if an indication of the influence of digital literacy with the use of media in education (Nada and Sari, 2020).

The common framework of digital literacy is information, communication, content-creation, safety, and problem solving (Ferrari, Punie, and Bre, 2013). However, Buckingham, stated a specific definition of digital literacy that goes well beyond some of the methods used in the field of information technology in education at the moment (Buckingham, 2015). In addition, the development of digital literacy framework broadly consists of digital technologies, digital learning (professional & lifelong), digital creation & communication, digital citizenship & identity, and information, academic, media and data literacy. However, as the last update of the researcher that promote digital literacy, he gathered all aspects, internal and external in each domain only encompasses the term of digital (Johnston, 2020).

In conclusion, the findings above indicate a different framework and find the weakness and strengths of the previous framework. The way the researcher formulated and proposed a new framework created framework gaps. It appears for different places and needs to be used. Nevertheless, in the current situation, educators need the best formula to assess their students using ICT in learning. Then this research takes places on it. It aims to suggest and map the domains of each research without any reduction of meaning, the writer composes the analysis of the development of digital literacy in education.

A similar research was conducted by Martinez-Bravo using the network analysis as a literature review analysis.

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

They aimed to find the relationship between the areas in digital literacy and meta-theoritical for interdisciplinary purpose (Martínez-Bravo et al., 2020). Those researches have a general focus and did not focus on one particular research but focused on critical digital literacy and interconnectedness.

However, this research examines the development of digital literacy by the time, analyzing and mapping each framework, whether reliable or not. It becomes the urgent research to analyze for better understanding and preparation to assess and suggest the researcher and educators in the near future to face a new modern era in education.

METHOD

This research is a systematic literature review based on the article from Scopus database with a specific key terms of "digital literacy", and keywords of "framework" and "education", and then filtered by scopes.

It can be done by determining the years of publication from 2000 until 2022, indicating that the first digital literacy terms appeared until the writer extracted the data. All categorize above is presented in the Table 1 below.

Tabel 1: Criteria exploration of article

Criteria	
Time frame	1997-2022
Key terms & Keywords	"framework", "digital literacy" and "education"
Databases	Scopus

Then to make a better visualization, the writer use NVIVO to code, explore, and visualize the development of the digital literacy framework and produce a graphic regarding the framework.

Table 2: Filterization Process of Literature

No	Papers	Filter	Result
1	200 papers	Decreased it between 1997-2022	187 papers
2	187 papers	Education Scopes	150 papers
3	150 papers	Only the framework development	57 papers
4	57 Papers	Duplicate papers	23 Papers

The filter process found many papers in database scopus strongly related to digital literacy and education framework as shown in the following Table 2. It described how the author filtered the papers into selected papers that were appropriate to analyze in this research.

RESULT AND DISCUSSION

The result of the research conducted is presented in two stages. The first shows the research spread

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

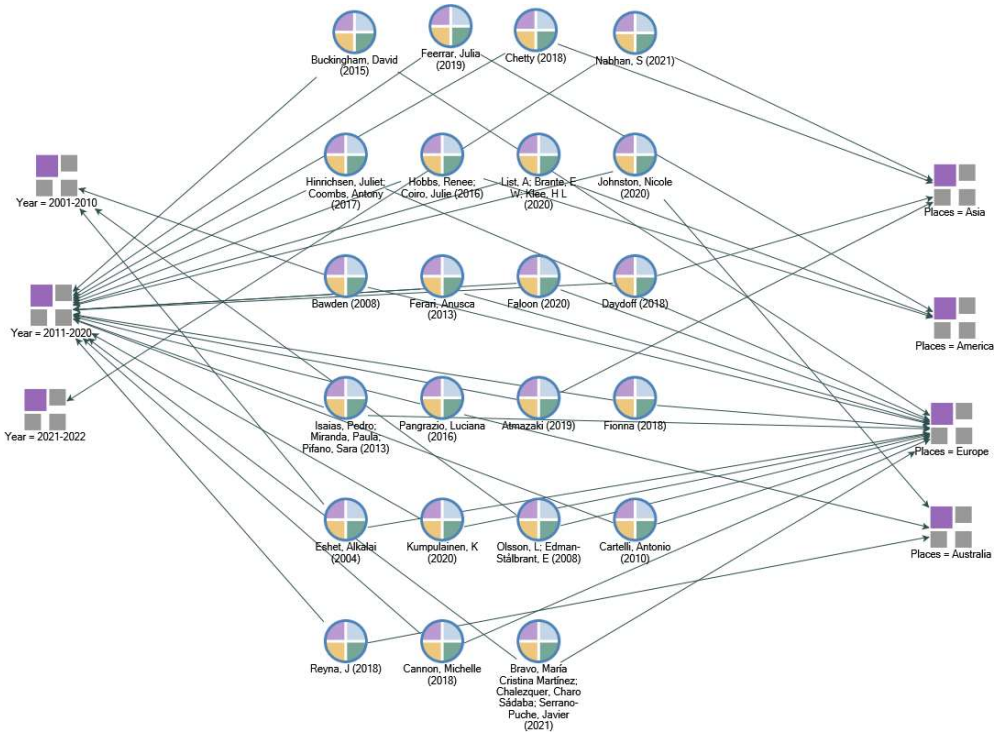
Picture 1: Word Cloud of Digital Literacy based on database

based on the time of publishing, thereby responding to this objective of the research. The second stage shows the framework domain, which appears frequently and is stated by the previous researcher.

The selected articles primarily focus on proposing a new framework and theories and suggesting a revision of the framework. Furthermore, these scopes provide a general insight into how the framework of digital literacy is, especially in the educational field.

Table 3: Papers by the time

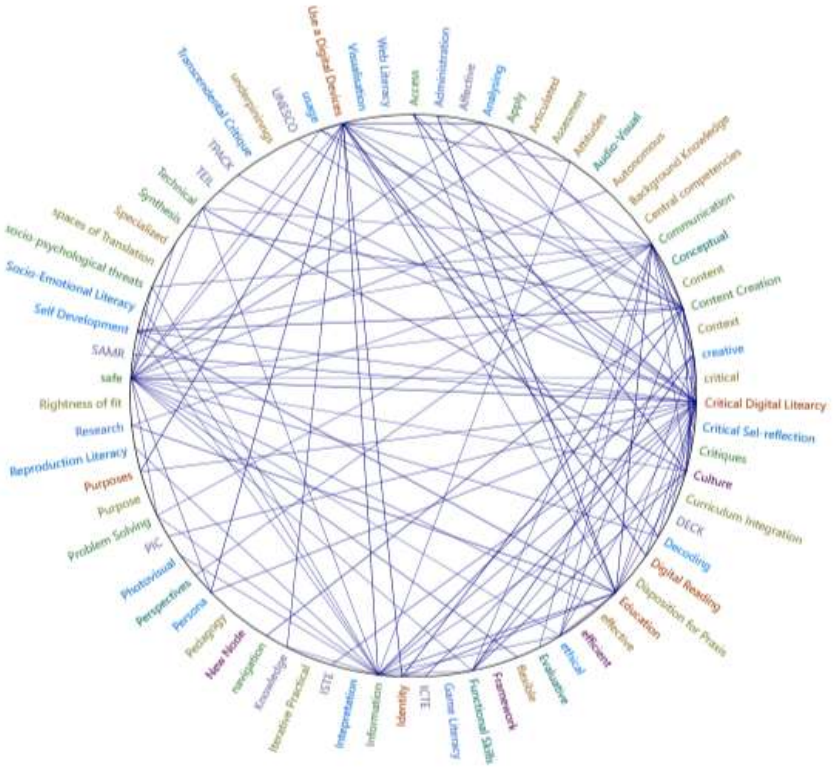
No	Year	Papers
1	2000-2010	**3**
2	2011-2020	19
3	2021-2022	1



Picture 2: Research of digital literacy framework by the time and location

The selected researches highlight the digital literacy as one of the trends of the current researches. It can be seen by the increasing a new research reforming the framework.

http://doi.org/10.31800/jtp.kw.v11n1.p242--254



Picture 3: The growth of Digital Literacy Framework

In this regard, the author identified three researches published between the years of 2000-2010, nineteen researches published between the years of 2011-2020, and one published in the years of 2021-2022. Furthermore, the researcher also identified that the researches spread from many locations, such as: Asia (4), Europe (13), America (3), and Australia (3).

The year of 2010-2020 become the rapidly development and the use of digital literacy. The one of the use of digital literacy indicates fostering development of ICT in Education (Bravo, Chalezquer and Serrano-Puche, 2021). It brought nineteen research on the framework of digital literacy. Align with it in the years of 2020-2022 as a short time of the year hows if the new digital literacy framework was born (Nabhan, 2021).

In Addition, Picture 3 is the cluster analysis created by coding each previous research that is suitable with the criteria of this research. Picture 3 shows that there are many various domains in each framework to measure the digital literacy between the years of 2000-2022. Furthermore, this research found five domains in the

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

framework that mostly appear, namely: information, critical digital literacy, content creation, communication, and safety.

Information

Information means the student must be competent in gathering information through digital media. Not only find but also understand how they use the information in the correct way (Atmazaki & Indriyani, 2019).

It aligns with Davydov et al., which supports a previous international project held in Moscow called "information for all" (Davydov *et al*., 2019). The Moscow Declaration on Media and Information Literacy was adopted as an independent statement during the 2012 international conference on "Media and Information Literacy in Knowledge Societies". The Media Information Literacy (MIL) concept was the outcome of integrating media education and information literacy, which had existed independently since 1970s. The first of these two sectors arose at the intersection of communities of media academics and educators concerned about the media's detrimental influence on youth. The second significantly unified library communities (Davydov et al., 2019).

The concept of information in digital literacy was also stated before in 2004 by Castro. He agreed with the information domain issue regarding the way they decide the origin and truth of information (Castro, 2022). They should assess the credibility and originality of the information. They are mainly influenced by the quality of conclusion, positions, opinion, and models constructing the information. Information literacy also refers to the cognitive abilities that enable consumers to evaluate information in an informed and efficient manner (Castro, 2022). Information literacy functions as a filter: it identifies incorrect, irrelevant, or biased information and prevents it from entering the learner's system of considerations.

In contrast with J Feerrar and Castro proposed information domain emergence with communication technology and concern to the way they utilize, adjust, and adapt fundamental digital tools according to their needs (J Feerrar, 2019; Castro, 2022). It indicates that he mainly focuses on technical skills on the information domain (Castro, 2022; Atmazaki and Indriyani, 2019; Davydov et al., 2019; Feerrar, 2019).

Ferrari, Punie, and Bre proposed a framework with the

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

information domain as the primary domain to measure the level of digital literacy. Information entails accessing and searching for online information, articulating information needs, locating relevant information, selecting resources effectively, navigating between online sources, and developing personal information strategies (Ferrari, Punie, and Bre, 2013).

Furthermore, Johnston and Nabhan also include the information on their framework (Johnston, 2020; Nabhan, 2021). They are concerned with the use of digital literacy framework to measure Australian University Libraries' employees. Students taught information, academic, media, and data literacy in collaboration with the key university departments. One action resulting from this strategy is a collaborative team approach between librarians, learning advisors, and learning designers that utilizing the skills of each team member to collaborate with academics to integrate digital literacy skills into the curriculum (Johnston, 2020).

Critical Digital Literacy

Being critical is more valuable if followed by a proper context in education. This research found many previous researches proposed the terms of critical in the digital literacy framework. It can be seen who proposed the five resources of critical digital literacy for curricula integration on this framework. Their reason for using the term "critical" is considered into two sides: internal and external to the digital.

The internal refers to analysis and judgment applied to the technology's content, usage, and artifacts. The external significance relates to a stance on technology's development, effects, and social relationships (Hinrichsen & Coombs, 2017). This position focuses primarily on historical and cultural analysis and operates in a technology field broader than computers. These meanings are both internal and external to the digital.

However, a conception of digital literacy that views it as the reflective and evaluative process of employing technology and digital reading to achieve task objectives as known as critically digital literacy. (List, Brante, and Klee, 2020). In addition, Feerrar and Nabhan also proposed the term of critical become the framework of digital literacy. It is because the role of being critical is used for each digital literacy domain (Feerrar, 2019; Nabhan, 2021).

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

Content Creation

Being digitally literate means how they understand, operate, and share knowledge and the ability to support the professional use of a computer or digital devices (Chetty, 2018).

Hobbs emphasized the decisions that going into these kinds of digital projects, such as determining the appropriate media, making design decisions, and reflecting on the ethics and impact of a work, rather than describing specific tools or platforms for creation (Hobbs, 2013). Content creation also refers to creating and editing new content (from word processing to images and video) and integrating and reworking prior knowledge and content. Then the next research also defined content creation as the development of artistic expressions, media products, and programming; manage and implement intellectual property rights and licenses (Ferrari, Punie, and Bre, 2013). Meanwhile, Johnston also supports that content creation belongs to how to create and share the media, that is considered the originality issue. It also merges with the way to spread the media and communicate with them (Johnston, 2020).

Communication

Communication enhances the traditional media literacy skills by introducing the new media-specific elements. The emphasis is on the development of communicative abilities and knowledge, particularly in forums, chat rooms, blogs, and social media (Ferrari, Punie, and Bre, 2013; Davydov et al., 2019).

It also involves the creation of one's own informational content, ranging from simple texts and photographs to producing video, audio, and combinations. It also involves the practice of comprehending media content and the ability to evaluate and interpret it. It enhances traditional media literacy skills by introducing new media-specific elements. Here, the emphasis is on the development of communicative abilities and knowledge, particularly in forums and chat rooms, blogs, and social media. It also involves the creation of one's own informational content, ranging from simple texts and photographs to producing video, audio, and combinations. It also involves the practice of comprehending media content and the ability to evaluate and interpret it (Davydov et al., 2019).

In addition, Handley proposed that the term of communication

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

belongs to someone who actively participates in a digital forum, such as room chat or directly engage (Handley, 2018). It aligns with Gündüzalp which focuses on the way to digitally communicate among the students with computer work areas open, lively spaces for individual and group work social interaction and students' communication patterns (Gündüzalp, 2021)

Safety

The term of safety means to protect one's own devices and comprehend online risks and threats. It is necessary to be aware of safety and security measures (Ferrari, Punie, and Bre, 2013). They also explain the domain having the scope to protect data, personal information, health, and the environment.

It means the scope of safety does not only user center but also the external scopes. Align with it, Hinrichsen & Coombs broadly explained in persona or identity issue which the disembodiment of virtual spaces can result in an identity that is decontextualized, whereas paradoxically, choice in presentation, locality, and juxtaposition act to recontextualize and therefore alter that identity (Hinrichsen & Coombs, 2017).

The extent to which presentation is managed (e.g., in terms of language, image, and content) and control is exerted (e.g. privacy settings, placement, disclaimers) are new skill sets. Persona also refers to a user's sensitivity to reputation, identity, and membership issues. Persona also refers to a user's sensitivity to issues of reputation, identity, and membership (Hinrichsen, 2013).

CONCLUSION

Being digitally literate is essential for educators and students nowadays. Even if the students and educators have no difficulties in operating digital devices to entertain, it does not guarantee their ability to use digital devices in education. This research found many frameworks proposed in an educational manner and develop by time.

Information, communication, critical digital literacy, content creation, and safety become the domains that still exist inside the framework of digital literacy. Researchers suggest that educators to entail those domains to become their consideration to assess or evaluate the students digital literacy skills.

The research also found the need for conducting a further research by holding a focus group discussion to

http://doi.org/10.31800/jtp.kw.v11n1.p242--254

identify the update of digital literacy skill with the experts and formulated the model of digital literacy.

REFERENCES

Adarkwah, M. A. (2021) '"I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19', *Education and Information Technologies*, 26(2), pp. 1665–1685. doi: 10.1007/S10639-020-10331-Z.

Atmazaki and Indriyani, V. (2019) 'Digital Literacy Competencies for Teacher Education Students', 335(ICESSHum), pp. 1010–1018. doi: 10.2991/icesshum-19.2019.156.

Bravo, M. C. M., Chalezquer, C. S. and Serrano-Puche, J. (2021) 'Meta-framework of digital literacy: Comparative analysis of 21st century skills frameworks', *Revista Latina de Comunicacion Social*, 2021(79), pp. 76–110. doi: 10.4185/RLCS-2021-1508.

Buckingham, D. (2015) 'Defining digital literacy: What do young people need to know about digital media?', *Nordic Journal of Digital Literacy*, 2015(4), pp. 21–34. doi: 10.18261/issn1891-943x-2015-jubileumsnummer-03.

Castro, A. (2022) 'Proof of Concept Teaching for 21st Century Digital Literacy in Portugal: A Pedagogical Approach Towards a New Educational Model', *IFIP Advances in Information and Communication Technology*, pp. 168–178. doi: 10.1007/978-3-030-97986-7_14.

Chetty, K. (2018) 'Bridging the digital divide: Measuring digital literacy', *Economics*, 12(1). doi: 10.5018/economics-ejournal.ja.2018-23.

Davydov, S. *et al.* (2019) *Digital Literacy Concept and Measurement*. 1st edn, *Chart*. 1st edn. Edited by S. Davydov. Moscow: Springer Netherlands. doi: https://doi.org/10.1007/978-3-030-33016-3.

Dwiningsih, K. *et al.* (2018) 'PENGEMBANGAN MEDIA PEMBELAJARAN KIMIA MENGGUNAKAN MEDIA LABORATORIUM VIRTUAL BERDASARKAN PARADIGMA PEMBELAJARAN DI ERA GLOBAL', *Kwangsan: Jurnal Teknologi Pendidikan*, 6(2), pp. 156–176. doi: 10.31800/JTP.KW.V6N2.P156--176.

Eshet-Alkalai, Y. (2004) 'Digital Literacy: A Conceptual Framework for Survival Skills in the Digital era', *Journal of Educational Multimedia and Hypermedia*, 13, pp. 93–106.

Fatimah, E., Husain, A. and Sunmud, S. (2022) 'Philippines Students' Perception (ESL) of Indonesian Professional Teacher (EFL)', *Cakrawala: Jurnal Pendidikan*, 16(1), pp. 1–8. doi: 10.24905/CAKRAWALA.V16I1.206.

Feerrar, J (2019) 'Development of a framework for digital literacy',

Reference Services Review. Available at: https://www.emerald.com/insight/content/doi/10.1108/RSR-01-2019-0002/full/html.

Feerrar, Julia (2019) 'Development of a Framework for Digital Literacy', *Reference Services Review*, pp. 1–17.

Ferrari, A., Punie, Y. and Bre, B. N. (2013) *DIGCOMP : A Framework for Developing and Understanding Digital Competence in Europe* . doi: 10.2788/52966.

Fricles Ariwisanto Sianturi (2016) 'Aplikasi Pembelajaran Citra Dengan Menggunakan Metode Computer Assisted Instruction (CAI)', *Jurnal Riset Komputer (JURIKOM)*, 3(4), pp. 1–4. Available at: http://e-jurnal.pelitanusantara.ac.id/index.php/JIPN/article/view/292.

Gündüzalp, S. (2021) '21st Century Skills for Sustainable Education: Prediction Level of Teachers' Information Literacy Skills on Their Digital Literacy Skills', *Discourse and Communication for Sustainable Education*. Available at: https://search.proquest.com/openview/ecdeb5f47186229763205cc1869e2a09/1?pq-origsite=gscholar&cbl=2026372.

Hinrichsen, J. (2013) 'The five resources of critical digital literacy: A framework for curriculum integration', *Research in Learning Technology*, 21. doi: 10.3402/rlt.v21.21334.

Hinrichsen, J. and Coombs, A. (2017) 'Research in Learning Technology The five resources of critical digital literacy : a framework for curriculum integration', 7069(May), pp. 0–16. doi: 10.3402/rlt.v21.21334.

Hobbs, R. (2013) 'Learning to engage: how positive attitudes about the news, media literacy, and video production contribute to adolescent civic engagement', *Educational Media International*, 50(4), pp. 231–246. doi: 10.1080/09523987.2013.862364.

Indriastuti, F. and Saksono, W. T. (2018) 'ADAPTASI TEKNOLOGI QR CODE AUDIO PADA TORSO BIOLOGI UNTUK SISWA TUNANETRA', *Kwangsan: Jurnal Teknologi Pendidikan*, 6(2), pp. 137–155. doi: 10.31800/JTP.KW.V6N2.P137--155.

Johnston, N. (2020) 'The Shift towards Digital Literacy in Australian University Libraries: Developing a Digital Literacy Framework', *Journal of the Australian Library and Information Association*, 69(1), pp. 93–101. doi: 10.1080/24750158.2020.1712638.

List, A., Brante, E. W. and Klee, H. L. (2020) 'A framework of pre-service teachers' conceptions about digital literacy: Comparing the United States and Sweden', *Computers & Education*. Available at: https://www.sciencedirect.com/science/article/pii/S0360131519303380.

Martínez-Bravo, M. C., Sádaba-

Chalezquer, C. and Serrano-Puche, J. (2020) 'Fifty years of digital literacy studies: A meta-research for interdisciplinary and conceptual convergence', *Profesional de la Informacion*, 29(4), pp. 1–15. doi: 10.3145/epi.2020.jul.28.

Maulana, A. *et al.* (2019) 'PENGEMBANGAN MEDIA VIDEO PRESENTASI PADA MATA KULIAH HIDROLOGI DI UNIVERSITAS NEGERI JAKARTA', *Kwangsan: Jurnal Teknologi Pendidikan*, 7(2), p. 170. doi: 10.31800/JTP.KW.V7N2.P170--183.

Nabhan, S. (2021) 'Pre-service teachers' conceptions and competences on digital literacy in an EFL academic writing setting', *Indonesian Journal of Applied Linguistics*, 11(1), pp. 187–199. doi: 10.17509/ijal.v11i1.34628.

Nada, E. I. and Sari, W. K. (2020) 'Digital Literacy Analysis of Chemistry Education Students in Using the Chemdraw Application', 5(3), pp. 293–299.

Ocaña-Fernández, Y. and Fernández, L. A. V (2020) 'Digital skills and digital literacy: New trends in vocational training', … *Special Education* …. Available at: https://www.int-jecse.net/abstract.php?id=161.

Putu Ade Resmayania, N. and Nyoman Tri Darma Putrab, I. (2020) 'Gamification: Using Kahoot! to Make Students Love the Class from the Very Beginning', *Linguistics and ELT Journal*, 7(1), pp. 10–18. doi: 10.31764/LELTJ.V7I1.1649.

Raes, A. (2020) 'Learning and instruction in the hybrid virtual classroom: An investigation of students' engagement and the effect of quizzes', *Computers and Education*, 143. doi: 10.1016/j.compedu.2019.103682.

Sri Mulyani, E. W. (2018) 'DAMPAK PEMANFAATAN APLIKASI ANDROID DALAM PEMBELAJARAN BANGUN RUANG', *Kwangsan: Jurnal Teknologi Pendidikan*, 6(2), pp. 122–136. doi: 10.31800/JTP.KW.V6N2.P122--136.

http://doi.org/10.31800/jtp.kw.v11n1.p242--254