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NEW HORIZONS OF EDUCATION: SHARPENING DIGITAL INTELLIGENCE FOR TODAY'S COMPETENCIES

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Abstract

Digital intelligence is a key element in modern education that explores how determination, skills, and ethics in using technology can be enhanced-integral to improving students' digital competence. The research method in this study uses literature by searching for literature that fits the context of the study. The results show that digital intelligence is not simply about mastering technological tools, but includes informatics skills, media knowledge, ethics and online social competence. The results highlight the importance of a holistic approach to education that refers to the creative, critical and responsible use of technology. This includes flexible and integrated curriculum implementation, effective teacher training and fostering a school climate that supports digital learning.

Keywords: digital intelligence, education, educational technology, digital competence.

Introduction

In today's digital era, advances in technology and information have changed various aspects of life, including education. Transforming education is key to preparing a generation that is able to compete and adapt to the times.

Digital intelligence has become an essential skill that learners must master to ensure they can fully participate in an increasingly technology-dependent global society (Fedeli, 2022). Digital intelligence not only involves the ability to use technological devices, but also encompasses critical skills such as data analysis, digital problem-solving, critical thinking, and communicating effectively in various digital platforms (Lam, 2024). These capabilities support learners in accessing vast knowledge quickly and efficiently, assisting them in deeper learning and enhancing their capacity for innovation and creativity in academia and everyday life (Hashemi, 2023).

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Furthermore, digital intelligence enables education to be more inclusive and accessible to more people, not limited by geographical boundaries or physical conditions. With the mastery of digital intelligence, educational institutions can provide more diverse learning resources and interactive teaching methods, tailored to the individual needs of learners, thus improving the effectiveness of the teaching and learning process (Yu & Wang, 2024). This creates a dynamic and adaptive learning environment, where the use of digital tools provides opportunities to deliver richer and contextualized learning materials (AŞICI & TEMEL, 2023). In the long run, this not only prepares learners with the necessary skills for entry into the fast-changing world of work but also equips them with the ability to continue learning and developing throughout their lives in a technology-dominated society (Sengsri & Khunratchasana, 2024). However, despite its importance, the challenges of integrating digital intelligence into educational curricula and practices are still vast, especially in countries that are still in the process of digital transition.

The paradigm shift from conventional education to education integrated with digital technology requires adaptation in terms of teaching methods, teaching materials, and evaluation (Sitopu et al., 2024); (Guna et al., 2024). Although many educational institutions have adopted the use of technology in learning, there are still gaps in the application of digital intelligence as the foundation of effective learning. This gap is a major concern in improving the quality of education to meet today's competency demands (Arslan-Ari & Başer, 2022).

In addition, the COVID-19 pandemic has accelerated digital transformation in education and increased the need to develop digital intelligence among educators and learners (Biswas et al., 2022). Virtual classrooms, distance learning, and the use of various digital learning apps and platforms have become the new norm. This phenomenon shows how important digital intelligence is as a fundamental competency that must be strengthened at all levels of education (Hairiyanto et al., 2024).

Seeing these conditions, this research seeks to answer how educational institutions and individuals can better hone digital intelligence to face today's competencies. This research is expected to provide insights, strategies, and recommendations for designing and implementing effective educational initiatives that not only prepare learners with academic knowledge but also the digital competencies needed to succeed in the future.

Research Methods

The study in this research uses literature. Literature research method, also known as literature study, is a research approach that involves collecting, analyzing, and interpreting data from existing literature sources such as books, scientific journals, articles, theses, and online documents related to the specified research topic (Madekhan, 2019); (Miharja, 2022). Literature research is conducted to gain a deep

understanding of a topic, identify gaps in existing research, and determine the direction of future research (Syawie, 2005).

The literature research method plays an important role in academic research, as it provides a strong theoretical basis for empirical research and is able to highlight new directions in future research (I. Nurdiana, 2020). It is also effective for gaining a comprehensive understanding of a topic without the need to conduct time- and resource-consuming field or experimental research (Afiyanti, 2014).

Results and Discussion

Concept of Digital Intelligence

Digital intelligence can be defined as the collection of skills and knowledge required to use digital resources, computer hardware, and the Internet effectively and ethically. This includes technical expertise such as operating digital devices, understanding software basics, as well as knowledge of cybersecurity and being responsible online (Rahimi, 2023). Digital intelligence also includes the ability to discover, evaluate and create meaningful digital content. It is not only limited to the aspect of gathering information but also deciphering, synthesizing, and communicating ideas in formats that can be disseminated through various digital platforms (Castañeda & Villar-Onrubia, 2023).

Moreover, digital intelligence involves both cognitive and socio-emotional aspects, such as thinking critically about information obtained from the Internet, being aware of the partiality and validity of sources, and skills to communicate effectively and politely in virtual environments (González & Sanz-Prieto, 2022). Also included is an awareness of digital ethics, relating to issues such as copyright and online privacy. As such, digital intelligence is an important foundation in meeting the challenges of a dynamic age, enabling individuals to interact with an increasingly connected world, act as responsible digital citizens, and continue to develop professionally and personally in an environment influenced by ever-changing technologies (Qiao & Fu, 2023).

Digital intelligence consists of several key components that interrelate to help individuals be efficient and responsible in using technology (Hung, 2024). First, there is digital literacy which includes the ability to read, write and communicate in digital settings. It also involves the skills of accessing, managing, integrating and evaluating information from various digital sources. This component is important as it equips individuals with basic knowledge of how devices function and how to utilize them effectively for decision-making and problem-solving (Carson et al., 2023).

Next is digital ethics, which refers to the understanding and responsible practice of using technology and the internet. This includes respecting copyright, maintaining

one's own and others' privacy, and behaving in a civil manner when communicating online. This component is vital because the intensity and scope of digital technologies require a deep understanding of the social, cultural and personal implications of actions taken in digital spaces (Marimon-Martí et al., 2022). Developing good digital ethics ensures that individuals are not only able to use technology effectively, but also responsibly and sustainably (Säljö, 2023).

Thus, digital intelligence is a multifaceted concept that includes digital literacy and digital ethics as its main components. The digital literacy component focuses on the ability to access, manage and analyze digital information, and communicate effectively in digital environments. Meanwhile, digital ethics emphasizes the importance of acting responsibly, ethically and politely in the digital space, covering aspects of privacy, copyright and constructive communication. The two components complement each other to form the basis of digital intelligence that enables individuals to operate successfully and responsibly in a world increasingly dominated by technology. Strengthening digital intelligence is not only important for individuals to thrive in personal and professional settings, but also crucial in shaping an ethical and responsible digital society.

Today's Competencies

In this ever-evolving digital era, the ability to adapt to technological change is crucial. Competencies in information and communication technology (ICT) are emerging as a basic need, covering software and hardware usage skills, programming, as well as an understanding of cloud computing and big data (Tkachov et al., 2023). However, these competencies are not just limited to technical aspects. Media and information literacy is also crucial, where individuals need to be able to evaluate the authenticity and relevance of information they find online. This ability helps individuals to become not only competent users of technology, but also critical and knowledgeable users (Tzafilkou et al., 2022).

Moreover, in this highly dynamic digital era, interpersonal competencies such as teamwork, effective communication, and the ability to learn independently are becoming increasingly important (Arteaga & Valdiviezo, 2022). Proficiency in virtual collaboration, managing online projects and participating in digital communities demands strong communication skills and flexibility in ways of working. Digital resilience, the ability to respond and adapt to challenges and rapid technological change, is also a key aspect (Undheim & Ploog, 2023). Thus, relevant competencies in the digital age include a combination of technical and social skills, which enable individuals to not only survive but also thrive in this rapidly changing environment.

Education and Technology

Technology has played an important role in the transformation of education, opening up access to unlimited learning resources and bringing new ways of teaching and learning. Through the use of online learning platforms, educational apps and other digital resources, the learning process becomes more flexible and customizable, allowing students to learn according to their own pace and learning style (Kasperė & Liubinienė, 2022). This accommodates the diversity of learning needs and increases students' engagement with the subject matter. In addition, technology enables more collaborative and interactive teaching, where students can participate in online discussions, group projects, and simulations that promote deeper understanding as well as the development of soft skills (Cook et al., 2023).

On the other hand, technology also opens up opportunities for educators to personalize teaching, analyze student performance in real-time, and tailor course materials to meet students' individual needs. Data-driven educational tools and analytics allow teachers to identify areas where students may need additional support and offer constructive feedback more efficiently (Vries, 2022). Furthermore, with distance learning initiatives and online courses, geographical boundaries in education are becoming increasingly blurred, allowing knowledge from around the world to be accessible to anyone, anywhere. Thus, technology not only supports innovation in teaching methodologies but also promotes inclusivity and equity in education, making it a powerful catalyst for educational transformation (Fedotova et al., 2022).

Digital Learning Models

Learning models that support the nurturing of digital intelligence often involve the use of technology as a core tool in the educational process. One such model is blended learning, which combines traditional face-to-face teaching methods with digital elements such as online courses, interactive videos and various web-based learning tools (Valeeva et al., 2022). This method allows students to utilize technology to learn new concepts at a time and pace of their choosing, while still getting direct help and guidance from the instructor. In addition to increasing flexibility and accessibility, blended learning encourages students to develop their digital skills, from information literacy to the ability to communicate and collaborate effectively in digital environments (Bećirović, 2023).

Another model that is effective in developing digital intelligence is project-based learning (PBL). In this model, students are given the opportunity to work on real or simulated projects that require the use of technology, from research and data collection to the digital presentation of their work (Cai, 2024). The projects often involve relevant real-world problems, so students not only improve their technical knowledge but also learn how to apply technology in real situations. This helps students build a deep understanding of technology as a tool for problem-solving and innovation, and hones their ability to think critically and creatively in a digital context (Eça & Saldanha, 2022).

Through these two models, education focuses not only on content mastery but also on developing digital skills and competencies essential for future success (Mellado-Moreno et al., 2023).

In addition to implementing the aforementioned learning models, it is also important to include media and information literacy elements in the education curriculum to complement students' digital intelligence (Geada, 2022). This includes teaching them how to critically evaluate information sources, recognize and manage misinformation or hoaxes, and use social media and the internet responsibly and ethically. Media and information literacy not only strengthens students' ability to manage digital information but also prepares them to participate actively and positively in today's information society (Tubagus et al., 2023); (Aslan & Shiong, 2023).

To support the effectiveness of learning models in honing digital intelligence, a multidisciplinary approach is often required. For example, involving IT professionals and media experts in the development of course materials and learning activities can provide valuable perspectives and ensure that students gain a realistic and applicable view of technology utilization (Hammoda, 2023). Furthermore, collaboration with industry and the use of innovative technologies such as virtual reality (VR), augmented reality (AR) and machine learning in learning projects can provide more immersive experiences and enrich students' understanding of the potential of technology (MOSKALENKO, 2023).

Finally, an education that supports the nurturing of digital intelligence is incomplete without equipping students with an understanding of digital ethics, which includes issues such as copyright, privacy, and cybersecurity. Educating students early on about the importance of acting with integrity and responsibility in all their digital interactions is key to preparing a digitally-ready and socially responsible generation. By creating a learning environment rich with digital resources, encouraging exploration and creativity, and emphasizing the importance of ethics and digital literacy, the education system can successfully produce individuals who are not only technologically proficient but also socially aware and prepared for the challenges of the digital age.

Digital Intelligence Sharpening

To develop digital intelligence in education, one effective method is the implementation of a technology-focused learning approach, known as STEM (Science, Technology, Engineering, and Mathematics) (MOSKALENKO, 2023). In this approach, technology is integrated into learning in a real-world context, through computer labs, the use of educational apps, and e-learning platforms. Students are involved in projects that encourage problem solving in innovative ways, using a variety of digital tools (Zlatkova & Kirilova, 2022). For example, the use of computer modeling software in science lessons to simulate experiments, or the use of algorithms in mathematics to teach basic programming. Students are also encouraged to develop critical and

analytical thinking skills through projects that require online research and evaluation of multiple sources of information (Kim, 2022).

Another strategy is to ensure that teachers receive adequate training and resources to utilize technology in learning. Professional development for teachers is key so that they are comfortable and competent in using new digital tools in teaching (R. Nurdiana et al., 2023). Teachers can be provided with workshops, seminars and online courses on the use of current educational technologies and best practices in digital teaching. Furthermore, it is important to create learning communities for teachers to share experiences, ideas and learning resources (Palacios-Rodríguez et al., 2023). Supporting collaboration between teachers and with students on technology projects, such as programming, web design and digital media, can enrich the learning experience and encourage creative use of technology in the classroom. Thus, learning is not just about absorbing information, but also about actively and effectively applying and innovating in technology (Hänti & Veermans, 2024).

Furthermore, the application of digital intelligence in education must be coupled with the establishment of positive digital values. This includes teaching students about online responsibility, privacy and data awareness, and digital ethics (Rasdiana et al., 2024). Through interactive discussions, case studies, and simulations, students can understand the consequences of their digital actions and learn to make wise decisions online. This aspect is vital as digital intelligence is not only about the ability to use technology, but also about being a responsible and ethical user (Modén et al., 2023). These values can be integrated into various subjects, not just ICT (Information and Communication Technology) lessons, so that students gain a holistic perspective on digital citizenship.

In implementing the methods and strategies outlined, collaboration between all education system stakeholders-teachers, students, parents and communities-is key. Ensuring that adequate and affordable technology infrastructure is available in schools is an important first step. Meanwhile, establishing a dialog between school and home on the use of technology and the internet can help reinforce the message of digital ethics and responsibility beyond the school environment (Nikolopoulou, 2022).

In conclusion, fostering digital intelligence in education requires a holistic approach that focuses not only on developing technical skills, but also on instilling digital values, ethics and responsibilities. By preparing students not only to be skilled users of technology but also smart and ethical ones, education can create the next generation ready to face the challenges and utilize the opportunities of the digital age successfully. This is an important investment for the future of individuals and society as a whole, where technology will continue to be an integral part of everyday life.

Conclusion

The research findings of "New Horizons of Education: Honing Digital Intelligence for Today's Competencies" highlight the importance of integrating digital intelligence in the education system to prepare students with the competencies required in the digital age. The research reveals that digital intelligence-the ability to use digital technologies, communication tools and/or networks to access, manage, integrate, evaluate and create information ethically and effectively-is fundamental in supporting active, critical and creative student learning. The findings emphasize the need for education that not only prioritizes mastery of technology but also wise guidance in its use, incorporating cognitive, emotional and social aspects in the learning process.

In addition, the findings of this study indicate the importance of continuous coaching and training for teachers in using and integrating technology in teaching. This aims to ensure that technology is applied effectively to improve student engagement, motivation and learning outcomes. Adequate supporting infrastructure and equitable access to digital resources are considered crucial to realizing optimal technology utilization in education. This research proposes recommendations for the development of future-oriented educational policies and practices, where the use of technology is encouraged not only as a teaching aid but also as an important tool in the development of students' character and digital intelligence.

References

Afiyanti, Y. (2014). PENGGUNAAN LITERATUR DALAM PENELITIAN KUALITATIF. *Jurnal Keperawatan Indonesia*, *9*(1). https://doi.org/10.7454/jki.v9i1.157

Arslan-Ari, I., & Başer, D. (2022). Assistive technology training within an educational technology course: Perceptions of preservice special education teachers. *Journal of Digital Learning in Teacher Education*, *39*(1), 4–20. https://doi.org/10.1080/21532974.2022.2137606

Arteaga, M., & Valdiviezo, E. (2022). Digital Competence Among Students of Pedagogy and EFL Teacher–Students in Ecuador: A Review of the Existing Literature. *Digital Literacy for Teachers*, *Query date: 2024-05-28 15:50:11*, 243–259. https://doi.org/10.1007/978-981-19-1738-7_13

AŞICI, F., & TEMEL, H. (2023). Analysis of secondary school mathematics textbooks in the context of digital competence. *Journal of Educational Technology and Online Learning*, *6*(4), 885–910. https://doi.org/10.31681/jetol.1365383

Aslan, A., & Shiong, P. K. (2023). Learning in the Digital Age Full of Hedonistic Cultural Values Among Elementary School Students. *Bulletin of Pedagogical Research*, *3*(2), Article 2. https://doi.org/10.51278/bpr.v3i2.515

Bećirović, S. (2023). Digital Competence of Teachers and Students. *Digital Pedagogy*, *Query date: 2024-05-28 15:50:11*, 39–50. https://doi.org/10.1007/978-981-99-0444-0_4

Biswas, B., Ullah, M. N., & Miah, Md. M. (2022). Assessing Institutional Support to Online Education at Tertiary Level in Bangladesh Coping with COVID-19 Pandemic: An Empirical Study. *Journal of Digital Educational Technology*, *2*(1). https://doi.org/10.21601/jdet/11735

Cai, M. (2024). Digital Intelligence Quotient: A New Way to Promote the Digitization of Higher Education. *Proceedings of the 3rd International Conference on Internet Technology and Educational Informatization, ITEI 2023, November 24–26, 2023, Zhengzhou, China*, *Query date: 2024-05-28 15:50:11*. https://doi.org/10.4108/eai.24-11-2023.2343615

Carson, L., Hontvedt, M., & Lund, A. (2023). Co-constructing teacher education. *Digitalization and Digital Competence in Educational Contexts*, *Query date: 2024-05-28 15:50:11*, 146–159. https://doi.org/10.4324/9781003355694-15

Castañeda, L., & Villar-Onrubia, D. (2023). Beyond functionality: Building critical digital teaching competence among future primary education teachers. *Contemporary Educational Technology*, *15*(1). https://doi.org/10.30935/cedtech/12599

Cook, H., Apps, T., Beckman, K., & Bennett, S. (2023). Digital competence for emergency remote teaching in higher education: Understanding the present and anticipating the future. *Educational Technology Research and Development*, *71*(1), 7–32. https://doi.org/10.1007/s11423-023-10194-4

Eça, T. T. de, & Saldanha, Â. (2022). Digital Media and Art Education: The European Digital Competence Framework. *Global Media Arts Education*, *Query date: 2024-05-28 15:50:11*, 149–163. https://doi.org/10.1007/978-3-031-05476-1_9

Fedeli, L. (2022). A Multidimensional Perspective on Digital Competence, Curriculum and Teacher Training in Italy. A Scoping Review on Prospective and Novice Teachers. *Digital Literacy for Teachers*, *Query date: 2024-05-28 15:50:11*, 261–274. https://doi.org/10.1007/978-981-19-1738-7_14

Fedotova, O., Belousova, A., & Vyshkvyrkina, M. (2022). Digital Competence of Future Teachers as a Topic of Russian Scientific Discourse. *Digital Literacy for Teachers*, *Query date: 2024-05-28 15:50:11*, 559–586. https://doi.org/10.1007/978-981-19-1738-7_26

Geada, N. (2022). Digital Technology. *Digital Active Methodologies for Educative Learning Management*, *Query date: 2024-05-28 15:50:11*, 133–147. https://doi.org/10.4018/978-1-6684-4706-2.ch006

González, G. de P., & Sanz-Prieto, M. (2022). Breaking the Digital Gender Gap with Inclusive Digital Education. *Inclusive Digital Education*, *Query date: 2024-05-28 15:50:11*, 271–292. https://doi.org/10.1007/978-3-031-14775-3_18

Guna, B. W. K., Yuwantiningrum, S. E., Firmansyah, S, M. D. A., & Aslan. (2024). Building Morality and Ethics Through Islamic Religious Education In Schools. *IJGIE (International Journal of Graduate of Islamic Education)*, *5*(1), Article 1. https://doi.org/10.37567/ijgie.v5i1.2685

Hairiyanto, Sartika, E., Fransiska, F. W., & Aslan. (2024). UNDERSTANDING THE STUDENTS' ENGLISH LEARNING ACHIEVEMENT AND HOME ENVIRONMENT SUPPORTS DURING SCHOOL CLOSURE TO RESPOND TO PANDEMIC AT PRIVATE MADRASAH TSANAWIYAH AT-TAKWA SAMBAS. *International Journal of Teaching and Learning*, *2*(4), Article 4.

Hammoda, B. (2023). Digital Technology in Entrepreneurship Education: An Overview of the Status Quo. *Digital Transformation for Entrepreneurship*, *Query date: 2024-05-28 15:50:11*, 71–93. https://doi.org/10.1142/9789811270178_0006

Hänti, S., & Veermans, K. (2024). Educators' Experiences in Enabling Students Learning for the VUCA World. *Engaged Learning and Innovative Teaching in Higher Education*, *Query date: 2024-05-28 15:50:11*, 13–28. https://doi.org/10.1007/978-981-97-2171-9_2

Hashemi, S. S. (2023). Adequate digital competence. *Digitalization and Digital Competence in Educational Contexts*, *Query date: 2024-05-28 15:50:11*, 177–193. https://doi.org/10.4324/9781003355694-18

Hung, B. K. H. (2024). Closing Competency Gaps for Engineering Students Using a Competence-Based Assessment Format. *Engaged Learning and Innovative Teaching in Higher Education*, *Query date: 2024-05-28 15:50:11*, 109–130. https://doi.org/10.1007/978-981-97-2171-9_8

Kasperė, R., & Liubinienė, V. (2022). Digital Competence and Teacher Training Overview: Is Lithuania Ready for Digitalism in Education? *Digital Literacy for Teachers*, *Query date: 2024-05-28 15:50:11*, 291–311. https://doi.org/10.1007/978-981-19-1738-7_16

Kim, K. (2022). Early Childhood Teachers' Perceptions of Needs for Digital Competence and Digital Competence Education. *The Journal of Educational Studies*, *53*(2), 75–95. https://doi.org/10.15854/jes.2022.06.53.2.75

Lam, C.-M. (2024). A Philosophical Approach to Teacher Education. *Engaged Learning and Innovative Teaching in Higher Education*, *Query date: 2024-05-28 15:50:11*, 213–231. https://doi.org/10.1007/978-981-97-2171-9_13

Madekhan, M. (2019). POSISI DAN FUNGSI TEORI DALAM PENELITIAN KUALITATIF. *JURNAL REFORMA*, *7*(2), 62–62. https://doi.org/10.30736/rfma.v7i2.78

Marimon-Martí, M., Romeu, T., Ojando, E. S., & González, V. E. (2022). Competencia Digital Docente: Autopercepción en estudiantes de educación: [Teacher Digital Competence. *Pixel-Bit, Revista de Medios y Educación*, *65*, 275–303. https://doi.org/10.12795/pixelbit.93208

Mellado-Moreno, P. C., Bernal-Bravo, C., & Morgado, A. (2023). DIGITAL RESOURCES. *Digital Competence in Higher Education: A European Perspective.*, *Query date: 2024-05-28 15:50:11*, 100–114. https://doi.org/10.2307/jj.5076296.9

Miharja, S. (2022). PERSPEKTIF BARU PENELITIAN KONSELING: METODE KUALITATIF DAN KUANTATIF SECARA ONLINE. *Sociocouns: Journal of Islamic Guidance and Counseling*, *2*(1), 23–42. https://doi.org/10.35719/sjigc.v2i1.25

Modén, M. U., Tallvid, M., & Lundin, J. (2023). Exploring the role of digital textbooks in education. *Digitalization and Digital Competence in Educational Contexts*, *Query date: 2024-05-28 15:50:11*, 133–145. https://doi.org/10.4324/9781003355694-14

MOSKALENKO, O. (2023). DIGITAL VISUALIZATION OF EDUCATIONAL CONTENT IN THE PROCESS OF FORMING DIGITAL COMPETENCE OF FUTURE MATHEMATICS TEACHERS. *THE SOURCES OF PEDAGOGICAL SKILLS*, *32*, 174–180. https://doi.org/10.33989/2075-146x.2023.32.292666

Nikolopoulou, K. (2022). Face-To-Face, Online and Hybrid Education: University Students' Opinions and Preferences. *Journal of Digital Educational Technology*, *2*(2). https://doi.org/10.30935/jdet/12384

Nurdiana, I. (2020). *Perbedaan Penelitian Kuantitatif Dan Kualitatif*. *Query date: 2024-05-25 20:59:55*. https://doi.org/10.31219/osf.io/t2d7x

Nurdiana, R., Effendi, M. N., Ningsih, K. P., Abda, M. I., & Aslan, A. (2023). COLLABORATIVE PARTNERSHIPS FOR DIGITAL EDUCATION TO IMPROVE STUDENTS' LEARNING ACHIEVEMENT AT THE INSTITUTE OF ISLAMIC RELIGION OF SULTAN MUHAMMAD SYAFIUDDIN SAMBAS, INDONESIA. *International Journal of Teaching and Learning*, *1*(1), Article 1.

Palacios-Rodríguez, A., Llorente-Cejudo, C., & Cabero-Almenara, J. (2023). Editorial: Educational digital transformation: New technological challenges for competence development. *Frontiers in Education*, *8*(Query date: 2024-05-28 15:50:11). https://doi.org/10.3389/feduc.2023.1267939

Qiao, W., & Fu, J. (2023). Challenges of Engineering Education in Digital Intelligence Era. *Journal of Educational Technology Development and Exchange*, *16*(2), 145–159. https://doi.org/10.18785/jetde.1602.09

Rahimi, A. R. (2023). Beyond digital competence and language teaching skills: The bi-level factors associated with EFL teachers' 21st-century digital competence to cultivate 21st-century digital skills. *Education and Information Technologies*, *Query date: 2024-05-28 15:50:11*. https://doi.org/10.1007/s10639-023-12171-z

Rasdiana, Wiyono, B. B., Imron, A., Rahma, L., Arifah, N., Azhari, R., Elfira, Sibula, I., & Maharmawan, Muh. A. (2024). Elevating Teachers' Professional Digital Competence: Synergies of Principals' Instructional E-Supervision, Technology Leadership and Digital Culture for Educational Excellence in Digital-Savvy Era. *Education Sciences*, *14*(3), 266–266. https://doi.org/10.3390/educsci14030266

Säljö, R. (2023). Conclusion – knowing in a digital world. *Digitalization and Digital Competence in Educational Contexts*, *Query date: 2024-05-28 15:50:11*, 207–217. https://doi.org/10.4324/9781003355694-20

Sengsri, S., & Khunratchasana, K. (2024). Artificial Intelligence Competence: A Crucial Skill for the Digital Citizens. *International Education Studies*, *17*(3), 75–75. https://doi.org/10.5539/ies.v17n3p75

Sitopu, J. W., Khairani, M., Roza, M., Judijanto, L., & Aslan, A. (2024). THE IMPORTANCE OF INTEGRATING MATHEMATICAL LITERACY IN THE PRIMARY EDUCATION CURRICULUM: A LITERATURE REVIEW. *International Journal of Teaching and Learning*, *2*(1), Article 1.

Syawie, M. (2005). PERSOALAN METODE KUANTITATIF DAN KUALITATIF. *Sosio Informa*, *10*(2). https://doi.org/10.33007/inf.v10i2.1086

Tkachov, S., Tkachova, N., & Shcheblykina, T. (2023). Developing Digital Competence of Future Teachers in the Modern Digital Learning Space. *Educational Challenges*, *28*(1), 149–160. https://doi.org/10.34142/2709-7986.2023.28.1.12

Tubagus, M., Haerudin, H., Fathurohman, A., Adiyono, A., & Aslan, A. (2023). THE IMPACT OF TECHNOLOGY ON ISLAMIC PESANTREN EDUCATION AND THE LEARNING OUTCOMES OF SANTRI: NEW TRENDS AND POSSIBILITIES. *Indonesian Journal of Education (INJOE)*, *3*(3), Article 3.

Tzafilkou, K., Perifanou, M., & Economides, A. A. (2022). Development and validation of students' digital competence scale (SDiCoS). *International Journal of Educational Technology in Higher Education*, *19*(1). https://doi.org/10.1186/s41239-022-00330-0

Undheim, M., & Ploog, M. (2023). Digital competence and digital technology: A curriculum analysis of Norwegian early childhood teacher education.

Scandinavian Journal of Educational Research, *Query date: 2024-05-28 15:50:11*, 1–16. https://doi.org/10.1080/00313831.2023.2204109

Valeeva, Y. S., Valeeva, S. N., & Shakurova, M. F. (2022). Digital Competence of Students, Postgraduates by means of Cross-cutting Digital Technologies in the Educational Process of Universities. *2022 VI International Conference on Information Technologies in Engineering Education (Inforino)*, *Query date: 2024-05-28 15:50:11*. https://doi.org/10.1109/inforino53888.2022.9782960

Vries, A. M. de. (2022). Digital Competence in Public Service – Challenges and Role of Continuing Education and Training: The Example of Deutsche Bundesbank. *Digital Competence and Future Skills*, *Query date: 2024-05-28 15:50:11*, 623–668. https://doi.org/10.3139/9783446474284.031

Yu, P., & Wang, S. (2024). An Examination and Analysis of the Integration of Artificial Intelligence and Gamification in the Pedagogy of Chinese Higher Education. *Engaged Learning and Innovative Teaching in Higher Education*, *Query date: 2024-05-28 15:50:11*, 29–46. https://doi.org/10.1007/978-981-97-2171-9_3

Zlatkova, P., & Kirilova, I. (2022). Dynamics in the Development of Digital Competence of Bulgarian Teachers. *Digital Literacy for Teachers*, *Query date: 2024-05-28 15:50:11*, 115–131. https://doi.org/10.1007/978-981-19-1738-7_7