JP article 2025 F.doc

by TI Mtshali

Submission date: 26-Feb-2025 06:30PM (UTC+0200)
Submission ID: 2599393956
File name: JP_article_2025_F.doc (320.5K)
Word count: 5102
Character count: 31459

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: jurnalfip@ikipmataram.ac.id

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

Teachers' integration of Educational Technologies for Creative Teaching in a Technology Classroom

Praygod Bonginkosi Nkosi[1*], Sylvia Manto Ramaligela[2]

[1*]Department of Mathematics, Science and Technology Education, University of Limpopo, Polokwane, South Africa
[2]Department of Science and Technology Education, University of Limpopo, Polokwane, South Africa
***Corresponding Author e-mail: Praygod.nkosi@ul.ac.za**

Abstract: In an era where technology is reshaping education, this study explores how Technology teachers enhance their Creative Teaching Skills by integrating Educational Technologies in their classroom practices. In this digital age, the advancement of technology has changed how people socialise, communicate, and conduct business. In addition, the fast expanding knowledge society is due to the widespread availability and use of technology. In education, it has changed how teaching and learning occur in the classroom. Therefore, teachers must rise to the challenge by gaining knowledge and skills to effectively use Educational Technologies in the classroom. Moreover, the education and training systems must be receptive to the new demands of skills to circumnavigate a more technologically driven world. The enquiry was conducted among a sample of Technology Education in-service teachers. Qualitative methods were employed to obtain data through non-participant observation. Data was analysed using qualitative content analysis to understand how teachers develop their Creative teaching skills through the integration of Educational Technologies. The findings indicate that through the planning and presentation of several lessons, the teachers showed great improvement on the integration of Educational Technologies into their classroom practices. Teachers gained knowledge and skills about the integration of Educational Technologies for presenting creative lessons. This finding suggests that the teachers developed Creative Teaching Skills, gaining experiences, and transforming their classroom practices. Lack of infrastructure and resources in rural public schools was also discovered to be a hindrance for teachers' inability to integrate Educational Technologies in their teaching. Integration of Educational Technologies with the creative teaching skills of Technology teachers was invigorated with knowledge facts as they gained insights during their participation in the multiple planning and presentation of creative lessons.

Article History
Received: 2
Revised:
Published: 2017

Key Words:
Educational Technologies, Creative Teaching, Integration of Educational Technologies, Classroom practices, Creative lessons

How to Cite: Nkosi, P.B., & Ramaligela, S.M. (2025). Teachers' integration of Educational Technologies for Creative Teaching in a Technology Classroom. *Jurnal Paedagogy: Jurnal Penelitian dan Pengembangan Pendidikan, vol*(no). doi:https://doi.org/10.33394/jp.vxxyyi

https://doi.org/10.33394/jp.vxxyyi

Introduction (12pt, Times New Roman)

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: jurnalfip@ikipmataram.ac.id

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

The rapid advancement of technology has significantly transformed classroom dynamics, reshaping how lessons are planned, delivered, and experienced in modern education, while also presenting new creative opportunities for teachers. Modern technologies offer creative opportunities for teachers, allowing them to enhance engagement, communication, and knowledge dissemination (Haleem et al., 2022). Furthermore, the flexibility of Educational Technologies does not only promote multiple ways of content presentation, but it also enhances the comprehension of knowledge complementing learners diverse learning styles (Onyema, et al, 2019). As such, it is important for teachers to understand the many creative ways that Educational Technologies can be used to impart knowledge in the classroom and how these approaches interact with different pedagogies (Bakhmat et al.,2022).

Despite having access to various Educational Technologies, many teachers struggle with integrating them into their teaching practices (Mynaříková & Novotný, 2020). While these technologies are frequently used for lesson planning and presentation, their full potential remains underutilized in classrooms, falling short of expectations for 21st-century teachers (Huang, 2019). The integration of educational technologies offers numerous opportunities for teachers to enhance the teaching and learning process; however, teachers primarily use these technologies to search for information and design lessons rather than to actively engage learners in the classroom (Mzimela et al.,2024). Mynaříková and Novotný (2020) further emphasise that although teachers have access to a range of digital tools, their ability to incorporate them meaningfully into classroom instruction is still quite limited. This is an illustration that teachers may lack inadequate training, limited pedagogical strategies, and resistance to change. Hence the need for comprehensive support to fully harness Educational Technologies in diverse learning environments.

The integration of Educational Technologies in classroom instruction offers numerous benefits for both teachers and learners. Educational Technologies enable teachers to adopt more creative approaches in lesson planning and delivery, fostering a more interactive and engaging learning experience (Henriksen et al., 2021). These technologies also facilitate the innovative presentation of lessons, optimizing knowledge acquisition in a dynamic and stimulating manner (Bereczki & Kárpáti, 2021). Moreover, the effectiveness of Creative Teaching can be significantly improved when instructional methods align with the preferences and learning styles of the current generation of students, often referred to as 'Gen Z' (Hussin, 2018).

Hence, this article explores the role of Educational Technologies in enhancing teaching and learning by highlighting the new opportunities modern technologies create for teachers. It examines how technology improves engagement, knowledge dissemination, and communication in classrooms while also discussing the potential of creative teaching methodologies supported by digital tools to foster learners' creativity and critical thinking. Additionally, the article identifies challenges in technology integration and emphasises the need for better teacher preparedness to ensure effective implementation in diverse learning environments. Identification of ways to integrate technology to maximize learning outcomes could contribute to enabling teachers to present lessons in multiple creative ways, improving

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

learner engagement and knowledge retention in an era where educational Technologies play a crucial role in modern education. Therefore, teachers must be equipped with the necessary skills and pedagogical strategies to effectively integrate Educational Technologies in their teaching practices.

Research Method

This study adopted the interpretivist paradigm, which focuses on understanding the social world, as it aligned with the study's aim of gaining deep insights into a teacher's lived experiences while delivering a creative lesson using Educational Technologies (Gray, 2021; Kivunja & Kuyini, 2017). As such, allowing the researcher to examine the development of Creative Teaching Skills in a practical classroom setting (O'Donoghue, 2018). A qualitative approach was chosen to gain a comprehensive understanding of teachers' planning process in designing and delivering creative lessons, emphasizing depth, and meaning by focusing on participants' interpretations as the core of the study (Tracy, 2024). This study employed action research to examine how Technology teachers use Educational Technologies for creative lessons, facilitating the development of their Creative Teaching Skills through action, evaluation, and reflection in a two-cycle lesson presentation (Clark et al., 2020), following the adapted stages of action research outlined by Brooks (2010).

Convenience and purposive sampling techniques were used simultaneously. Purposive sampling and convenience were used in unison to produce a thorough, contextualized account of the study under investigation (Atinaf et al., 2023). Therefore, convenience sampling permitted the recruitment of seven (7) teachers who were registered for an Honours degree in Technology Education at a university in South Africa and already practising as teacher at time of research out of a possible thirteen (3). The use of purposive sampling ensured that the seven (7) in-service teachers recruited were all teaching Technology in the senior phase at time of research.

Non-participant observations were conducted to collect data from seven participants to make sense of their decision- making and context from the planning process to the presentation of creative lessons. Non-participant observation enabled a systematic technique of taking notes and documenting participants' behaviour and occurrences in a classroom without interfering (Ciesielska et al., 2018).

To explore how Technology teachers use Educational Technologies to present creative lessons, the study employed the non-participatory observation technique. This technique assisted the researcher to gather data through observation, the researcher, as a non-participant observer, was able to extract more information in a more pragmatic setting, allowing the researcher to understand phenomena in nature, their relationships, and their interactions in a new way without prevalent categorisations and evaluations (Ciesielska et al., 2018). To extract data during the observations, the researcher used the developed observation schedule to understand how the teachers use Educational Technologies to present creative lessons in their classroom. An observation schedule was used to categorise different segments of observed behaviour in a classroom, enabling the researcher to generate data through taking notes of everything that occurs in the classroom space (Phellas et al., 2011). The observation schedule was designed considering teachers' use of various Educational Technologies and the Social Constructivism Approach, which included learners' Interaction with Prior Knowledge, Interaction with New Knowledge and Construction of Own Knowledge. Ethical clearance was obtained from the university, permission was granted by the Department of Basic

Education in various districts of Limpopo Province, and all participants provided informed consent for voluntary participation.

Qualitative content analysis was employed to create content categories related to interaction with prior knowledge, new knowledge, and construction of own knowledge, and test the established categories. Therefore, the data collected during the observations through observation schedules, and harmonised by reflecting and recasting on specific issues analysed. Through the qualitative content analysis, data were filtered, and dissected into significant elements, summarised, and provided details of all that transpired from the beginning of the lesson to the end.

Result and Discussion

As a reminder, this study is concerned with understanding how Technology teachers' use Educational Technologies to design and present creative lessons using non-participant observations. These observations of Technology lessons were conducted in seven (7) schools (A, B, C, D, E, F, and G) in different schools in Limpopo Province. Since this was an action research study, the lesson observations had two cycles. To determine if they understood the concept of creative teaching, and how they developed knowledge and skills for creative teaching over time with the integration of Educational Technologies during planning and presentation. The results are presented focusing on two aspects, the human resource and physical resource. The human aspect findings focus on the use of Educational Technologies, competence, and instructional strategies. The physical resources findings focus on the availability of resources in the schools and management in schools.

The first finding related to human resources revealed that teachers are knowledgeable and skilled regarding presenting creative lessons using Educational Technologies. During their participation in the intervention programme facilitated by the researcher, the participants experienced perceptible changes to their teaching practices. As part of the intervention programme teachers designed and presented lessons more than once, each time showing improvement in terms of the selection process during the planning stage and use of Educational Technologies for lesson presentation. This was evident since most teachers used various Educational Technologies to present their lessons in both presentations.

During the first lesson presentation the teachers succeeded in recapping and extracting knowledge from a previous lesson/grade/experience, but only to a limited extent because they did not fully capitalise on the opportunities provided by the Educational Technologies at their disposal. They were instances where they lacked creativity in teaching with technologies, where some would often switch and use traditional methods of teaching during their presentation. Some teachers employed hard copy documents (Word documents) to elicit learners' prior knowledge. In some cases, it was just a struggle to coherently use the technologies at their disposal, perhaps due to less use of technologies in their daily teaching.

> *For example, **Lebrone** in school A attempted to extract prior knowledge through simulation, which was perplexing because it appeared that new information was being delivered rather than prior knowledge from a previous lesson/grade/experience.*

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

> ***Calton*** *in school D, used a hard copy document to extract learners' prior knowledge, asking them questions referring from the document.*

Furthermore, while using YouTube videos to communicate information, teachers would often disrupt the flow of information by repeatedly playing and pausing the video. To ask question like "Do you follow? /Do you understand? / Do have questions" in some instance the disruption would be to further explaining concepts. In some circumstances, teachers choose to communicate the information using only one platform rather than two or more (for example, PowerPoint combined with a YouTube video), which would have resulted in higher comprehension of the information. Nonetheless, one teacher effectively distributed the material by using YouTube videos and PowerPoint presentations.

> *For instance,* ***Calton*** *in school D played and paused the video continually and engaged the learners through the question-and-answer method. The YouTube video unpacked Ohm's Law, and the question-and-answer method was aimed at introducing and guiding the learners to understand the relationship between current, voltage and resistance in relation to Ohm's Law. To complement the YouTube video clip, the teacher displayed the Word document on the whiteboard, continuing to unpack Ohm's Law, which was less interesting.*

The teachers used hard copy documents or presented Word documents, ignoring the more innovative methods for presenting information and improving understanding that technology has to offer. Three teachers, on the other hand, used PowerPoint to give learners with a platform to harmonise what they already knew and what they were learning now through an exercise. However, due to time constraints, learners of two of the teachers were unable to complete the activity, which hampered the achievement of the targeted results.

> *For instance, in school B* ***Judith****, distributed a black and white hard copy word document for learners to complete an activity on calculating resistance, where the colours on the resistors are crucial in determining the resistance. The teacher could have designed the activity on the slides to enhance learners' visualisation since colours were key in completing the activity.*
>
> *Hence, during the first cycle, teachers failed to facilitate the class activity meant for their learners within the stipulated time frame in lesson plans.*

During their second lesson presentations, the teachers demonstrated significant growth and assurance in their ability to use technology to engage learners in new information, based on their experience from the first presentation. The teachers showed improvement in how they presented their lessons and carried out instruction. It was evident that the Educational Technologies used during their presentation were carefully thought of along with other factors such as content to be taught, learning objectives and learners' learning styles. These teachers presented content in multiple ways to enhance comprehension, effectively catering to diverse learning styles in the classroom. This was evident during second lesson presentations as teachers were better composed, demonstrating improved use, and understanding of their choices in Educational Technologies integration.

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

> *For instance, in school A teacher **Lebrone** used a laptop and the whiteboard to display the PowerPoint presentation slides containing all three parts of the lesson (introduction, main content, and learners class activity) and two YouTube videos. The first YouTube video was used to supplement the main content presented using PowerPoint slides and the second YouTube video was used to present information aimed at assisting learners to complete their class activity. **Jude** in school B used a smartphone, laptop and, smartboard to display PowerPoint lesson slides containing all three parts the lesson (introduction, main content, and learners' class activity). He also used a YouTube video supplementation for the main content presented. In school E, **Jolie** used a laptop and whiteboard to display the PowerPoint presentation slides, YouTube videos, and simulation to present different parts of the lesson. The PowerPoint presentation slides contained all three parts the lesson (introduction, main content, and learners class activity) and the YouTube videos, supplementation, the simulations were conducted to assist learners to complete the activity. **Kim** in school F used the laptop and whiteboard to display the PowerPoint presentation slides and a YouTube to present different part of the lesson. PowerPoint presentation slides containing all three parts the lesson (introduction, main content, and learners' class activity) and YouTube video aimed at assisting leaners to complete the activity.*

These examples illustrate that teachers' creative teaching skills can be developed if they are properly trained in the use of Educational Technologies for classroom practices. Mynaříková and Novotný (2020) express that for Educational Technologies to be effectively integrated into the classroom, more time must be dedicated to lesson planning and preparation in addition to exploring new approaches of presenting and sharing information and cooperating with learners.

The second finding related to physical resources revealed that even with proper training, teachers in public schools, especially in rural areas, face significant challenges. These obstacles often make teachers reluctant to apply the knowledge and skills gained from professional development programs designed to enhance teaching and learning in the classroom. During observation, seven rural schools were visited, and only two out of the seven have smart classrooms equipped with basic tools such as projector smartboard/whiteboard and wi-fi internet. However, access to this space was a process that seemed to be due to micromanagement. In the other five schools, teachers used traditional classrooms where they had to set up everything to transform the class to enable them to creatively use technologies, and that proven to be time-consuming and perhaps discouraging.

> *For instance, **Judith** in School C had to move the learners from one class to another because her class did not have an electric outlet for her to make the necessary connections. **Jolie** in school E had to wait for a colleague to go and collect a school projector from her house. **Kevin** in school G had to first get permission to use the smart classroom form the sciences head of department. The smart classroom was supposedly donated by the local mine for the sciences.*

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

This may be due to a lack of policy development/implementation on provision, maintenance, security, keeping and handling of school infrastructure and resources.

In summary, teachers' Creative Teaching Skills in the use of contemporary technologies were enhanced, enabling the teachers to perform more effectively in the classroom. These experiences demonstrated that the rapid transformation of classroom practices together with instructional change is worthwhile. Henceforth, diverse aspects of the teachers' classroom practices and teaching strategies will be altered to match the requirements of the ever-changing scenery in teaching that is brought about through the advancement of technology to suit the content that is being taught. As expressed by Yurtseven Avci et al. (2020), the changes in classroom practices brought about by the effective integration of Educational Technologies can be seen in researching, planning, and presenting information. But let it be noted that training of teachers alone will not be good enough, if teachers will have challenges in accessing and using of school resources aimed at aiding the process of teaching and learning due to lack of policy development/implementation. Moreover, if the current school's infrastructure and physical resources do not cater for, nor support teachers' needs for good classroom practices for creative teaching in subjects like technology.

The discussion of the results, guided by the Social Constructivism Theory (Vygotsky, 1978), explores how teachers' creative teaching skills were transformed through the integration of Educational Technologies. It explored how this transformation promoted interaction with prior knowledge, interaction with new knowledge, and the construction of own knowledge during lesson presentations.

Interaction with Prior Knowledge

Teachers employ Educational Technologies to present creative lessons. During their initial lesson presentations, the teachers demonstrated their knowledge of integrating technology into teaching and learning. However, this was demonstrated with minimal success. The teachers with proper selection of Educational Technologies they could not fully exploit the opportunities that comes with. The teachers with the technologies at their disposal often switched to traditional methods of teaching such as using hard copy documents to extract learners' prior knowledge. This may perhaps be due to lack of confidence in the use of Educational Technologies, since it was a usual practice. This was also expressed by Bahari (2022), who discovered that many teachers continue to struggle to fully capitalise on the opportunities provided by Educational Technologies, and that during lesson presentations, they still alternate between conventional and modern methods of disseminating information.

During the presentation of their second lessons, most teachers demonstrated substantial improvement and calmness in their use of technology to elicit prior knowledge from a previous lesson/grade/experience. All the teachers used a laptop, or a smartphone connected to a projector and a smartboard to show their designed PowerPoint presentations to summarise and extract learners' prior knowledge from a previous lesson/grade/experiences.

Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email: jurnalfip@ikipmataram.ac.id

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

The use of technology in this area allowed teachers to present knowledge in a more innovative manner. It also gave them the ability to deliver explanations and 3D images in tandem for improved information visualization and understanding of a certain subject. This is consistent with the views of Haleem et al. (2022), who believe that using Educational Technologies for lesson presentation provides flexibility in terms of how information is shared in the classroom and allows a teacher to use text to provide descriptions as well as 3D images for better visualisation and understanding. In support Lawrence and Tar (2018) emphasise that the incorporation of Educational Technologies allows teachers to convey material in a variety of ways, which improves how new knowledge is digested for greater understanding.

Interaction with New Knowledge

Teachers employ Educational Technologies to deliver creative lessons. During the presentation of their first lessons, the teachers demonstrated significant knowledge. To a limited extent, the teachers employed PowerPoint, YouTube, simulations, and animations to interest learners in new topics. How information was consumed by the learner was often disturbed by Teacher's actions not allowing a flow during presentation. Such as, continual pausing and playing of the YouTube videos during presentation. In some cases, it seemed teachers did not cater the needs of all learners in relation to learners' diversity in learning styles. That could have been easily achieved if teachers were not open nor comfortable to use multiple ways of presenting information. This supports the viewpoint of Haleem et al. (2022), who contend that to raise the standard of teaching and learning in a classroom, teachers should explore every advantage that technology may provide.

During their second lesson presentation, due to their increasing familiarity with using technology to create and deliver innovative lessons, all the teachers chose to use multiple channels to disseminate information. Furthermore, their presentations were more logical and coherent since the technologies allowed for greater flexibility and different methods to engage with new information. Furthermore, the widespread usage of Educational Technologies easily accommodated learners' diverse learning styles, demonstrating that if the technologies are well integrated, they have much to offer in terms of improving the teaching and learning process. This is consistent with the views expressed by Bizami et al. (2023), who believe that with the successful integration of Educational Technologies, material can be delivered on a variety of platforms or in many ways to improve the teaching and learning process in classrooms.

Construction of Own Knowledge

Teachers employ Educational Technologies to provide creative lessons. During the first class, the teachers were unable to take advantage of the opportunities provided by the tools available. It seems like teachers were not comfortable in using technology through their presentation, this was evident since in some cases they looked unsure of what they were

doing. This may because they do not use technology often. According to Nayar (2018), incorporating Educational Technologies into a lesson presentation in the classroom can be a distraction and a time-consuming exercise if the teacher lacks the necessary skills and knowledge to champion the technologies for their intended use.

During the second lesson presentations, the teachers were successful in using the capabilities of Educational Technologies. The teachers employed a variety of avenues to convey content, including YouTube, simulation, and PowerPoint. At this point, they could all employ two or more methods to communicate the information (such as PowerPoint and simulations). Furthermore, the teachers had their learners do and complete the task in class as intended, allowing them to debate, discuss, discover, and draw conclusions about certain areas. This is consistent with Kilag et al.'s (2023) belief that the use of Educational Technologies is effective in education in a variety of ways, including increasing learners' excitement and engagement and making it easier for them to absorb knowledge. Furthermore, Munyengabe et al. (2017) argue that while Educational Technologies can be viewed as a 'mediator or bridge' between various elements that hamper teaching and learning, their integration is undoubtedly critical to these processes.

Conclusion

The study explored the development of Technology teachers' Creative Teaching Skills through the integration of Educational Technologies in a senior phase Technology classroom. The study uncovered the intricacy of designing and implementation the Creative Teaching approach using Educational Technologies that eventually bring about positive change in classroom practices. The study used the Creative Teaching Approach through the lens of Social Constructivism Theory. From the perspective of Vygotsky's (1978) theory of Social Constructivism, the study highlighted that teachers' Creative Teaching Skills were developed through the intervention regarding the use of Educational Technologies in classroom practices.

Firstly, during the observations of the teachers' lesson presentations, the study found that Creative Teaching Skills with Educational Technologies can be developed through continual appropriate skills development programmes. Secondly, the study discovered that the lack of ICT infrastructure and the shortage of resources in the schools proved to be limiting factor for teachers' integration of Educational Technologies into their teaching practices in the classroom. Lastly, the study uncovered the lack of policy on ICT infrastructure and resources is also a barrier to teachers using Educational Technologies in their teaching. In addition, some teachers would personalise the schools' few Technology resources (projector, folding whiteboard), not sharing them with other teachers even though they were the property of the school (NB: To be reflected on the results above). However, despite these constraints, the teachers showed determination during the intervention programme to overcome all adversity and persevere with changing their classroom practices. The whole process proved to be time consuming.

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

Recommendation

Regarding access and the use of resources the need for DBE to develop/amend ICT infrastructure policy to provide schools with the required infrastructure that support, promote, and allow easy access to ICT resources for all teachers is also highlighted. In view of the deadlock and the issues that were uncovered in relation to teachers' ICT knowledge and skills, ICT infrastructure, and policy in public schools, particularly in rural schools, several recommendations concerning changes in the classroom to support Creative Teaching through the integration of Educational Technologies are made. It emphasises the need for:

- continuous professional development,
- adequate ICT infrastructure,
- policy support while providing insights into challenges and
- advocating for systemic reforms to enhance equitable access in resource-constrained classrooms.

This study contributes to the body of knowledge by highlighting the development of Technology teachers' Creative Teaching Skills with the integration of Educational Technologies.

Acknowledgment

The author would like to express sincere gratitude to Dr. T.E. Mabila and Dr. T.I. Mtshali for their invaluable guidance and motivation throughout my studies. Special thanks are also extended to the Technology Education section at the University of Limpopo, as well as to all the teachers who participated in this study.

References

Atinaf, M., Anteneh, S., & Kifle, M. (2023). A Methodology for Context—Specific Information Systems Design Theorizing. *The African Journal of Information Systems*, *15*(2), 1.

Bahari, A. (2022). Teacher identity in technology-assisted language learning: Challenges and affordances. *E-Learning and Digital Media*, *19*(4), 396–420. https://doi.org/10.1177/2042753022109285

Bakhmat, N., Popadych, O., Derkach, L., Shvardak, M., Lukashchuk, M., & Romanenko, V. (2022). Using information technologies to train today teachers in the educational environment. *Revista Romaneasca Pentru Educatie Multidimensionala*, *14*(2), 479-499.

Bereczki, E. O., & Kárpáti, A. (2021). Technology-enhanced creativity: A multiple case study of digital technology-integration expert teachers' beliefs and practices. *Thinking Skills and Creativity*, *39*, 100791.

Bizami, N. A., Tasir, Z., & Kew, S. N. (2023). Innovative pedagogical principles and technological tools capabilities for immersive blended learning: A systematic literature review. *Education and Information Technologies*, *28*(2), 1373–1425. https://doi.org/10.1007/s10639-022-11243-w

Brooks, A. L. (2010). Intelligent decision-support in virtual reality healthcare and rehabilitation. In S. Brahnam, & L. C. Jain (Eds.), *Advanced computational intelligence*

paradigms in healthcare 5 (pp. 143–169). Springer. https://doi.org/10.1007/978-3-642-16095-0_8

Ciesielska, M., Boström, K. W., & Öhlander, M. (2018). Observation methods. *Qualitative methodologies in organization studies: Volume II: Methods and possibilities*, 33-52.

Cirneanu, A. L., & Moldoveanu, C. E. (2024). Use of digital technology in integrated mathematics education. *Applied System Innovation*, *7*(4), 66.

Clark, J. S., Porath, S., Thiele, J., & Jobe, M. (2020). *Action research*. New Prairie Press.

Gray, D. E. (2021). *Doing research in the real world* (3rd ed.). SAGE. pp. 1–100.

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

Henriksen, D., Creely, E., Henderson, M., & Mishra, P. (2021). Creativity and technology in teaching and learning: A literature review of the uneasy space of implementation. *Educational Technology Research and Development*, 1–18. https://doi.org/10.1007/s11423-020-09912-z

Huang, R. (2019). *Educational technology a primer for the 21st century*. Springer Nature Singapore Pte Ltd..

Hussin, A. A. (2018). Education 4.0 made simple: Ideas for teaching. *International Journal of Education and Literacy Studies*, *6*(3), 92–98. https://doi.org/10.7575/aiac.ijels.v.6n.3p.92

Kilag, O. K. T., Segarra, G. B., De Gracia, A. M. L., Del Socorro, A. S., Abendan, C. F. K., Camangyan, G. A., & Mahasol, E. T. (2023). ICT application in teaching and learning. *Science and Education*, *4*(2), 854–865.

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, *6*(5), 26–41. https://doi.org/10.5430/ijhe.v6n5p26

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

Munyengabe, S., Yiyi, Z., Haiyan, H., & Hitimana, S. (2017). Primary teachers' perceptions on ICT integration for enhancing teaching and learning through the implementation of one laptop per child program in primary schools of Rwanda. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(11), 7193–7204. https://doi.org/10.12973/ejmste/79044

Mynaříková, L., & Novotný, L. (2020). Knowledge society failure? Barriers in the use of ICTs and further teacher education in the Czech Republic. *Sustainability*, *12*(17), 6933. https://doi.org/10.3390/su12176933

Mzimela, A., Banoobhai, M., Ramollo, J. K., & Mtshali, T. I. (2024). The Evolution of Teaching Resources in South African Schools: A Quest for Adaptive Teaching Strategies. *Jurnal Paedagogy*, *11*(4), 697-706.

Nayar, A. (2018). *Teaching and learning in technology empowered classrooms—Issues, contexts and practices*. Partridge Publishing.

O'Donoghue, T. (2018). *Planning your qualitative research thesis and project: An introduction to interpretivist research in education and the social sciences*. Routledge. https://doi.org/10.4324/9781351165563

Month, Year. Vol,x No
p-ISSN: 2355-7761
e-ISSN: 2722-4627
Pp xx-yy

Onyema, E. M., Ogechukwu, U., Anthonia, E. C. D., & Deborah, E. (2019). Potentials of mobile technologies in enhancing the effectiveness of inquiry-based learning approach. International Journal of Education (IJE), 2(01), 1-22. https://doi.org/10.5121/IJE.2019.1421

Phellas, C. N., Bloch, A., & Seale, C. (2011). Structured methods: Interviews, questionnaires and observation. In C. Seale (Ed.), *Researching society & culture* (3rd ed.). SAGE.

Tracy, S. J. (2024). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact*. John Wiley & Sons.

Vygotsky L. S. (1978). *Mind in society: The development of higher psychological processes (Vol. 86)*. Harvard University Press.

Yurtseven Avci, Z., O'Dwyer, L. M., & Lawson, J. (2020). Designing effective professional development for technology integration in schools. *Journal of Computer Assisted Learning*, *36*(2), 160–177. https://doi.org/10.1111/jcal.12394

JP article 2025 F.doc

ORIGINALITY REPORT

12%	10%	7%	8%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Landmark University Student Paper	6%
2	e-journal.undikma.ac.id Internet Source	1%
3	repository.ukwms.ac.id Internet Source	<1%
4	Abueng Rachael Molotsi, Mari van Wyk. "Exploring Teachers' Use of Technological Pedagogical Knowledge in Teaching Subjects in Rural Areas", Journal of Information Technology Education: Research, 2024 Publication	<1%
5	Esen, Özgür. "An Evaluation of Expert and Novice Teachers' Behaviors in a Smartboard-Equipped Classroom Using Eye Tracking.", Middle East Technical University (Turkey) Publication	<1%
6	novapublishers.com Internet Source	<1%
7	Submitted to University of Central England in Birmingham Student Paper	<1%
8	Ncube, Rumbidzai. "Life Sciences Teachers' Pedagogical Beliefs and Their Influence on Information Communication and Technology Integration", University of Johannesburg (South Africa), 2023	<1%

	Publication	
9	Çiçek, Filiz. "Teachers' ICT Use in Turkey, Finland and South Korea: A Multi-Case Study.", Middle East Technical University (Turkey), 2024 Publication	<1 %
10	Tommy Tanu Wijaya, Qingchun Yu, Yiming Cao, Yahan He, Frederick K. S. Leung. "Latent Profile Analysis of AI Literacy and Trust in Mathematics Teachers and Their Relations with AI Dependency and 21st-Century Skills", Behavioral Sciences, 2024 Publication	<1 %
11	Cornett, CheRe Shakira. "Technology-Based Instruction on Tier II Students' Reading: Insights From K-5 English Language Acquisition Teachers", Grand Canyon University, 2025 Publication	<1 %
12	cdn.unicaf.org Internet Source	<1 %
13	journal2.um.ac.id Internet Source	<1 %
14	listens.online Internet Source	<1 %
15	purehost.bath.ac.uk Internet Source	<1 %
16	www.coursehero.com Internet Source	<1 %
17	www.mdpi.com Internet Source	<1 %
18	Areej ElSayary. "International Perspectives on Educational Administration Using Educational	<1 %

Inquiry - Conceptual and Theoretical Approaches", Routledge, 2024
Publication

19	ojs.uph.edu Internet Source	<1 %
20	www.asianinstituteofresearch.org Internet Source	<1 %
21	www.researchsquare.com Internet Source	<1 %
22	Johnson, Denise. "A Hermeneutic Phenomenological Study of a Blended Learning Community Designed to Encourage Biblical Literacy, Discipleship, and Formation of a Biblical Worldview in Members of a Local Church.", Liberty University, 2024 Publication	<1 %
23	risejournals.org Internet Source	<1 %
24	scholar.sun.ac.za Internet Source	<1 %
25	Andi Asrifan, Junaedah Junaedah, Abd. Ghofur, Muh Nashirudin. "chapter 10 Fostering Innovation", IGI Global, 2024 Publication	<1 %
26	Ermiyati Ermiyati, Nizwardi Jalinus, Waskito Waskito, Mukhlidi Muskhir. "E-module innovation: a product-based approach to database practicum", JPPI (Jurnal Penelitian Pendidikan Indonesia), 2024 Publication	<1 %
27	Padma Rani, Bhanu Bhakta Acharya, Kulveen Trehan. "Digital Inequalities in Media Education in South Asia - Context and	<1 %

Consequences of the Covid-19 Pandemic", Routledge, 2025
Publication

28 Rasool, Kharoon Nisha. "The Instructional Leadership Role of the School Management Team in Developing Teachers on the Use of ICT to Enhance Classroom Learning.", University of Johannesburg (South Africa), 2024 <1%
Publication

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		