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TEACHERS' PREPAREDNESS AND TECHNOLOGY ADOPTION IN THE INTEGRATION OF DIGITAL PEDAGOGY IN EARLY CHILDHOOD EDUCATION IN OYO TOWNSHIP, OYO, NIGERIA

BY

MUSTAPHA-DOKUNMU FOLAKE ADENIKE
DEPARTMENT OF EARLY CHILDHOOD CARE AND EDUCATION
OYO STATE COLLEGE OF EDUCATION, LANLATE
mustaphafolake@gmail.com
08056679663

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Abstract

This study analyses the preparedness, attitudes and technological self-efficacy of the early childhood educators of the combined LGAs of Oyo township (Atiba, Oyo East, Oyo West and Afijio) on the integration of vocational technology tools into the early childhood educators' curriculum, which are, namely, digital storytelling, virtual manipulatives games, coding toys and multimedia vocational simulations. A convergent parallel mixed-methods approach was applied and included 180 Early Childhood Education teachers from both public and private nursery/primary schools in the four LGAs. Data were gathered quantitatively through an adapted Technological Pedagogical Content Knowledge (TPACK) scale and a Vocational Technology Integration Self-Efficacy (VTISE) questionnaire. Focus group discussion (FGD) and classroom observation were used as data-gathering instruments in collecting qualitative data. Preliminary results show that 62% of the teachers have positive attitudes towards the use of technology in education, but only 28% have moderate TPACK skills in vocational ECE. The major barriers identified were infrastructure deficits (unreliable electricity and limited internet connectivity) and inadequate pre-service training. The technology integration score was significantly higher for the teachers in private schools compared to their public-school counterparts ($p < 0.05$). The study suggests a professional development model that is adapted for the context, the Oyo Township ECE-Vocational Technology Model, focusing on low-bandwidth digital tools, community-based teacher learning circles and policy advocacy for equitable resource distribution. The results add to the debate about technology and teacher education in vocational education in the developing world.

Keywords: Early childhood education; vocational technology integration; teacher preparedness; digital pedagogy; technology-enhanced learning; teacher professional development

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Introduction

Early Childhood Education (ECE) is central to the building blocks of lifelong learning and cognitive development. The relationship between basic education and vocational technology has become a pivotal area in today's digital age for the preparation of young people in a technologically advanced society. The National Policy on Education (2009) in Nigeria identifies ECE as an important sub-sector to support strong intellectual and skill development. The integration of digital vocational pedagogy (DVP) with the use of digital tools such as digital storytelling, virtual manipulatives, coding toys and multimedia vocational simulations, however, requires a paradigm shift in the way things are done in the traditional pedagogical approach to the technology-mediated pedagogical approach (Kandel, Kandel, & Bist, 2026). The effective use of these contemporary pedagogical tools is strongly dependent on the preparedness of the teachers to operate in intricate digital environments, combining developmentally appropriate practices.

Digital technologies have changed the way learning spaces are designed, taught and experienced at all levels of learning in the world at a rapid pace. In this metamorphosis, digital pedagogy has become a central concept that focuses on not just using technology as a teaching aid but as a means to create interactive and learner-centred experiences that stimulate cognitive engagement and meaningful learning. Studies in different learning contexts indicate that access to digital resources, technological competencies, and attitudes towards digital resources have a significant impact on the effectiveness of technology-mediated learning environments (Habibi, Sofyan, & Mukminin, 2023; Muhaimin, Habibi, Mukminin, & Hadisaputra, 2020). Meanwhile, digital literacy and technology-based learning innovation management are as yet a significant challenge for teachers and educational institutions who want to apply digital systems in learning innovations (Rasimin, Semma, Zakiyuddin, Ali, & Helmy, 2024; Setyadi, Pawirosumarto, Damaris, & Dharma, 2025). Thus, the challenge of pedagogically meaningful incorporation of technology has become a major issue in education, especially in areas where development is important like ECE. (Li et al., 2026; UNESCO, 2023)

In this context, the use of technology as a resource to positively contribute to the development of early learners has received greater focus and attention in recent years.

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Pedagogically designed digital resources can enhance the cognition of early childhood education children by providing them with learning experiences that are interactive, exploratory and context-rich, which are suitable for early childhood education children's developmental characteristics. The recent studies indicate that the digital platforms and learning applications can positively impact the early developmental processes by offering children meaningful interactions between the children, the carers, and the educational environments (Alam, Hickie, Poulsen, Ekambareshwar, Loblay, Crouse, Hindmarsh, Song, Yoon, Cha, Wilson, Sweeney-Nash, Troy, & LaMonica, 2023; LaMonica, Song, Loblay, Ekambareshwar, Naderbagi, Zahed, Troy, & Hickie,2024). In addition, the use of special educational technologies, like early literacy applications, shows great promise in supporting basic cognitive functions, such as symbol recognition and early literacy development (Maassen, Glatz, Borleffs, Martínez, & De Groot,2025). Teachers' digital competency and perceptions of Information Communication Technology usability play a vital role in the successful implementation of technology in preschool education, as these factors drive the actual classroom practices derived from technology (Ismail, 2023).

The bottom line, whether it is a curriculum reform or an integration of technology, is the preparedness of the teacher. In Nigeria's educational setting, preparedness goes beyond just being willing; it involves academic readiness, pedagogical proficiency, and psychological readiness. Given the lack of solid teacher training in digital tools, the investment that goes into acquiring costly classroom technology has little educational payoff, according to research (Vanegas, De María Segovia Cifuentes, & Morrás, 2025). This readiness is especially delicate in early childhood education contexts, where young children need to learn through play and hands-on experiences while also learning about abstract digital concepts. The teachers who deliver vocational technology courses may not have a complete pre-service or in-service training model designed specifically for vocational technology, leaving them lacking in the ability to effectively scaffold children's interactions with digital media. (Papavlasopoulou et al., 2024; UNESCO, 2023)

In addition to general preparedness, technology adoption is related to the Technological Pedagogical Content Knowledge (TPACK) and self-efficacy of the educator. The TPACK model suggests that integration of technology into education should exhibit a natural fusion

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of content, pedagogy, and technology (Ali, Meniari, Filali, Morabite, Senhaji, & Khabbache 2023;Zhang, Yu, Cui, Ji, & Wang, 2020). It's a tall order for ECEs in developing regions to build specialist vocational technology self-efficacy. This is where many teachers have problems conceptualising using digital simulation or coding toys to teach vocational and experiential skills to children between the ages of three and five (Salami Akinjobi, Omilani, Adeniyi, Oyefeso, Oyekola, Ogunniyi, Salami, Rabiu, Olaleye, Olalekan and Babalola, 2026). As a result, the ways teachers think about technology and their perceived competencies directly influence how technology is used as an active catalyst for learning or as an electronic babysitter. (Li et al., 2026)

This is particularly interesting in the Oyo Township which is made up of the four Local Government Areas (LGAs) of Atiba, Oyo East, Oyo West and Afijio. This is a sub-region in which a combination of semi-urban socio-economic characteristics exists, with public and private educational institutions existing in very different realities. The existing administrative requirements in private nursery and primary schools in these LGAs are often more flexible and have better infrastructural facilities to allow for the adoption of modern digital tools in a faster time. In contrast, public schools suffer from systematic funding shortfalls, overcrowding and long delays, affecting both student exposure and teacher performance in the process (Ezekiel-Hart & Joshua, 2024).

In addition to these institutional disadvantages are the macroeconomic problems that are inherent in the Nigerian educational sector. The most prominent among these are significant infrastructure shortages, with access to electricity supplies being particularly problematic and high internet data fees in rural and semi-urban areas hindering digital initiatives (Adam & Nuhu, 2026). In addition, most Teacher Education Institutions in Nigerian Universities and Colleges of Education have not introduced or integrated modern vocational tools for early childhood into their teacher training curriculum. To fill these gaps, interventions are needed that are localized and context specific, including the use of low bandwidth digital tools and community based learning networks, to achieve an equitable digital vocational pedagogy in Oyo State. (UNESCO, 2023)

Statement of the Problem

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Although there is a policy change in the world towards the integration of digital literacy in early childhood education, the nursery and primary schools in the Oyo Township are facing challenges of implementing digital vocational pedagogy effectively. Teachers have positive attitudes by nature, but there is a huge gap between positive attitudes and their actual implementation in the classroom. Low technological self-efficacy, a key lack of TPACK skills for vocational ECE, and poor pre-service training are responsible for this gap. In addition, there are significant infrastructural constraints like frequent power outages and weak internet connectivity that impede teachers' ability to sustainably use digital resources. This situation is compounded by the rising digital divide between private and public schools in Atiba, Oyo East, Oyo West and Afijio LGAs. If there is no empirical evidence or pedagogical model that takes such gaps into account, early childhood education children in public institutions are likely to be systematically excluded from the development of basic digital and vocational skills.

Research Objectives

i. To evaluate the preparedness of early childhood educators and their TPACK skills in Oyo Township.
ii. To investigate the impact of the school types (public vs. private) on the use and incorporation of digital tools for vocational pedagogy.
iii. To find out the main infrastructural and institutional challenges to digital vocational technology integration in the study area.

Research Questions

1. What are the current status of the TPACK skills and technological self-efficacy of the ECE teachers in Oyo Township?
2. Do PVEE teachers have higher digital vocational technology integration scores than public early childhood education teachers?
3. What are some of the institutional and infrastructural challenges to integrating digital vocational pedagogy?

Methodology

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This study used a convergent parallel mixed-method research design to obtain quantitative and qualitative data simultaneously and therefore to obtain a comprehensive analysis of the research problem. The quantitative strand measured the structural effects of both teachers' preparedness and use of technology on a sample of 180 Early Childhood Education (ECE) teachers. The participants were selected using a multi-stage stratified random sampling design which involved both public and private nursery and primary schools in four Local Government Areas (LGAs) of Oyo Township (Atiba, Oyo East, Oyo West, and Afijio). The data collection instruments were two closed-ended instruments that were adapted: The first instrument was an adapted Technological Pedagogical Content Knowledge (TPACK) scale that was used to measure digital pedagogical competencies, and the second instrument was a Vocational Technology Integration Self-Efficacy (VTISE) questionnaire for measuring teachers' confidence levels. The quantitative data were analysed with descriptive statistics (mean, standard deviation, and percentage) and inferential statistics (independent samples t-tests) using the statistical software, and the difference was tested using the significant level $\alpha=0.05$, which was to ensure the accuracy of the empirical data.

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The qualitative strand was conducted in parallel with the quantitative data collection process with the use of Focus Group Discussions (FGD) and structured classroom observation with the purpose of capturing the contextual nuances of classroom realities. Two focus groups (6-8 members of ECE teachers) were held in each LGA to examine the institutional and personal concerns expressed in the questionnaires that were related to low self-efficacy scores. Meanwhile, in 20 selected schools non-participant classroom observations were conducted to confirm the application of available digital tools, including digital storytelling or programming toys, in the classroom or their lack of use because of infrastructure problems. Thematic analysis was used to transcribe, categorise and analyse the data in the qualitative section. The study validated the data obtained from the quantitative statistical analysis with the firsthand experiences of the educators in the Oyo Township educational ecosystem during the final stage of interpretation, ensuring an accurate and contextually rich analysis of both data sets.

Results of the Findings

Demographic Profile of Respondents

Table 1:Early Childhood Education Teachers across Oyo Township (N=180)

Demographic Variable	Category	Frequency (N=180)	Percentage (%)
School Type	Public	85	47.2
	Private	95	52.8
LGA Location	Atiba	48	26.7
	Oyo East	46	25.6
	Oyo West	44	24.4
	Afijio	42	23.3
Teaching Experience	Below 5 years	55	30.6
	5–10 years	82	45.6
	Above 10 years	43	23.8

The demographic profile of the 180 teachers sampled from the Early Childhood Education (ECE) sector provides a high level of representativeness and provides a good sense of the statistical validity and localised degree of accuracy of this study. From an institutional

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perspective, the split between public and private school teachers is close (47.2%: 52.8%), thus eliminating analytical bias and giving a true picture of the socio-economic and administrative differences between the two sectors in the Oyo Township. Geographically, there is no apparent clustering, and the four Local Government Areas of the region (Atiba 26.7%, Oyo East 25.6%, Oyo West 24.4% and Afijio 23.3%) reflect the complete range of the region, from dense semi-urban areas to peripheral semi-rural regions. In addition, the professional experience information shows a relatively stable teaching staff, with 45.6% of teachers having 5 to 10 years of experience and 23.8% having more than 10 years of experience. The lack of technological self-efficacy and digital integration scores observed in this research is not due to inexperience of the teachers, as experienced teachers make up 69.4% of the participants; on the contrary, this profile empirically shows that traditional pedagogical experience does not necessarily correspond to technological experience, pointing to a critical and systemic deficiency in long-term professional development and pre-service training in the region.

Analysis of Research Questions

Research Question One: What are the current status of the TPACK skills and technological self-efficacy of the ECE teachers in Oyo Township?

Table 2: Descriptive Analysis of ECE Teachers' TPACK Skills, Attitudinal Dimensions, and Perceived Vocational Self-Efficacy

TPACK / Self-Efficacy Dimension	Specific Evaluative Construct	H/P	M/N	L/N	Mean Score ($\bar{x}$)	Standard Dev. (SD)
Attitudinal (TK)	General disposition and willingness to adopt classroom technology	112	45	23	3.49	0.68
Pedagogical (PK)	Capacity to design developmentally appropriate, play-based ECE lessons	98	61	21	3.42	0.71
Integrated (TPACK)	Ability to align coding toys and virtual manipulatives with vocational curricula	20	50	110	2.11	0.78

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Self-Efficacy (VTISE)	Confidence in troubleshooting digital vocational simulations independently	27	54	99	2.22	0.82

Table 2 revealed the ECE teachers' TPACK skills, attitudinal dimensions, and perceived vocational self-efficacy. The Oyo Township ECE structure reveals a very large pedagogical gap: a positive attitude toward technology does not automatically equate to pedagogical expertise. Close examination of the Oyo Township ECE structure reveals that there is a pedagogical disconnect because a positive attitude towards technology does not automatically translate into pedagogical competency. The educators exhibit high levels of psychological readiness and general technological willingness ($\bar{x}$ = 3.49, SD = 0.68) and good training levels in traditional childhood pedagogy ($\bar{x}$ = 3.42, SD = 0.71), but their competencies in integrating the two domains are very weak. This deficit is clearly demonstrated in the results of the integrated TPACK mean score ($\bar{x}$ = 2.11, SD = 0.78): 61.1% of the sample were placed in the lowest tier when asked to explicitly connect the vocational content to digital media such as virtual manipulatives and a digital storyboarding system. Moreover, there was also considerable misunderstanding about one's own level of technical self-efficacy ($\bar{x}$ = 2.22, SD = 0.82), with 55.0% reporting that they are very intimidated by setting up or troubleshooting digital educational tools without external IT support. The data from Focus Group Discussions (FGDs) confirmed this, as teachers easily use their mobile devices for personal communication but have not received the targeted training to make them quickly turn from passive screens to interactive devices for vocational learning.

Research Question Two: Do PVEE teachers have higher digital vocational technology integration scores than public early childhood education teachers?

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Table 3: Independent Samples t-Test Comparing Digital Vocational Technology Integration Scores by School Type (Public vs. Private)

School Type	N	Mean Integration Score ($\bar{x}$)	Std. Deviation (SD)	t-value	p-value
Public Schools	85	34.20	5.80	-4.62	< 0.05
Private Schools	95	58.50	7.40		

Table 3 shown the t-test was conducted to compare technology integration scores. The results demonstrate that private school teachers ($\bar{x}$ = 58.50, SD = 7.40) scored significantly higher than public school teachers ($\bar{x}$ = 34.20, SD = 5.80) where $p < 0.05$. This statistically establishes a profound digital divide driven by institutional affiliation.

Research Question Three: What are some of the institutional and infrastructural challenges to integrating digital vocational pedagogy?

Table 4:Mean Score Ranking and Percentage Distribution of Institutional and Infrastructural Barriers to Digital Pedagogy Integration

Specific Institutional	SA	A	D	SD	Mean Score ($\bar{x}$)	Standard Dev. (SD)
Poor national grid supply / frequent electricity cuts.	124	41	11	4	3.58	0.62
Digital tools are not used in the NCE/Degree curricula at all.	102	40	22	16	3.27	0.81
Over-priced internet bills / weak cell reception.	93	45	28	14	3.21	0.85
ECE classrooms that are too large to safely handle devices.	81	54	31	14	3.12	0.83
No hardware (coding toys, tablets, simulations) at all.	78	42	44	16	3.01	0.90

The table above revealed the structural constraints that hinder classroom reform in the region and shows that the key structural constraints that stall technological implementation are more likely to be environmental and curriculum-related rather than teacher-related. The most significant obstacle was unreliable electricity ($\bar{x}$ = 3.58, SD = 0.62), with 91.7% of educators

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reporting that the unavailability of electricity frequently causes their limited hardware to become depleted and unavailable for regular use. The qualitative reports from Focus Group Discussions (FGDs) corroborate these structural issues and reveal that teacher training institutes (particularly local colleges of education) are still using a purely theoretical instructional approach for teachers, which completely omits practical, hands-on work with early childhood digital applications ($\bar{x}$ = 3.27, SD = 0.81). In addition, financial constraints ($\bar{x}$ = 3.21), physical constraints like managing fragile devices in overcrowded classroom settings ($\bar{x}$ = 3.12), and physical constraints like literally running out of functional devices ($\bar{x}$ = 3.01) place a significant constraint on operational conditions. The results show that any pedagogical effort in the Oyo Township must be grounded in different approaches than those used in the West, e.g., low power versus high power, offline versus on-line, local versus global, and so on.

Discussion of the Findings

This study revealed that there is a significant gap between teachers' motivation and the possession of positive dispositions towards the use of digital technology and the actual pedagogical competencies (TPACK) possessed by the teachers in the Oyo township educational ecosystem. This misalignment mirrors that of Agyei (2022), who suggested that in the sub-Saharan African education space, technological willingness is confused with technological capability. The enthusiasm of a teacher is not enough without pedagogical system training. In addition, 55% of the respondents had low self-efficacy, which reflects the findings ofAdeyinka et al. (2023) that early childhood educators are intimidated by the use of sophisticated digital tools such as multimedia vocational simulations because of limited exposure to practical use during their basic college training.

The significant differences between the public and private school integration scores ($p < 0.05$) are reflective of the integration inequity that exists in Nigeria's education system. Structural agility, accountability systems that reward teachers for using digital devices, and the ability to generate resources with parental funds are all advantages of private schools that were identified by Imhanyehor (2021). On the other hand, there is a lack of adequate funding and maintenance of public schools in Atiba, Oyo East, Oyo West and Afijio.

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Consensus ranking of the qualitative results reveals that the main barriers are power outages (91.7%) and data cost (76.7%), pointing to the conclusion of Bello & Ajao (2024) that macroeconomic and infrastructural failures are constant challenges for digital literacy policies in West Africa. Thus, taking a standard high-bandwidth learning approach from the West cannot be adopted without making strategic adaptations to the local context.

Conclusion

The results of this study revealed that the opinion of ECEs in the Oyo Township is positive and favourable towards the implementation of a digital vocational pedagogical approach in the classroom, but the implementation is still very limited. Low TPACK proficiency and low technological self-efficacy, coupled with an increasing gap between public and private schools in digital access, have restricted the educational potential of young learners. Systemic infrastructural weaknesses, particularly the unreliable electricity supply and poor teacher training systems, worsen these problems. This approach includes using low-bandwidth, offline digital tools, creating teacher learning circles within the community and policy intervention to alleviate inequities in resources between public and private schools.

Recommendations

i. The Oyo State Ministry of Education should implement the pedagogical frameworks, which are localised and focus on mobile applications that work without internet connectivity, solar-powered learning media, and low-bandwidth digital storytelling tools.

ii. The introduction of micro-credentials and hands-on modules on coding toys, virtual manipulatives, and digital pedagogical design should be adopted in Nigerian Colleges of education and universities.

iii. Teachers from each cluster in the schools in Atiba, Oyo East, Oyo West and Afijio should work together in cluster-based teacher professional networks to share digital skills, resources and best practices.

iv. The Oyo State government needs to roll out special solar power inverter systems and hardware kits equipped with simple digital vocational tools for public nursery and primary schools.

v. Educational stakeholders need to work together with local telecommunication companies to ensure that ECE centres that are registered with the Department of Early Learning and Care receive zero-rated data usage and subsidised Internet connections.

References

Adam, A. and Nuhu, U. (2026). Challenges of Digitalization Among UBE Teachers: Implications for Effective Curriculum Implementation in Nigeria. World Journal of Innovation and Modern Technology. Pg. 147.153

Adeyinka, B., Aina, A. Y., Ogegbo, A., Abubakar, F., Ahmad, H., Aminu, M., Samah, N., Blackwell, C., Garba, S., Alademerin, C., Ogegbo, A., Aina, A., Olowe, P., Onasanya, S., Shehu, R., Oduwaiye, R., Shehu, L., Owate, I., Williams, C., . . . Davis, F. (2023). Demographic Characteristics of Teachers' Perceptions Towards the Use of Technology in Early Childhood Education. *Education and New Developments*, *1*, 231–235. https://doi.org/10.36315/2023v1end049

Agyei, D. D. (2022). The Impact of Educational Technology Initiatives on Student Learning Outcomes: Perspectives of Sub-Saharan Africa. International Journal of Education, Learning and Development. 8(7).43-62

Ali, D. A., Meniari, A. E., Filali, S. E., Morabite, O., Senhaji, F., & Khabbache, H. (2023). Empirical Research on Technological Pedagogical Content Knowledge (TPACK) Framework in Health Professions Education: A literature review. *Medical Science Educator*, *33*(3), 791–803. https://doi.org/10.1007/s40670-023-01786-z

Bello, O. and Ajao, A.O. (2024). Digital Literacy and Skills Development in Nigeria: Policies, Barriers and Recommendations. Journal of African Innovation & Advanced Studies (JAIAS). 5(2). 133-150

Eke, P. E., Nneji, S. O., & Eya, G. M. (2024). Inclusion of computer-based assessments and pedagogies into Nigerian teacher education curriculum: Imperatives for globalization interplay with education. International Journal of Innovative Technology Integration in Education, 7(1).

Imhanyehor, G. O. J. (2021). Digital Literacy and Primary Educational System in Nigeria. *Journal of Public Administration Finance and Law*, *20*. https://doi.org/10.47743/jopafl-2021-20-13

Kandel, R. K., Kandel, G. K., & Bist, R. B. (2026). Paradigm shift in Pedagogy: traditional to Transformative approaches. *Madhyabindu Journal*, *11*(1), 160–175. https://doi.org/10.3126/madhyabindu.v11i1.91890

Li, H., He, H., Luo, W., & Li, H. (2026). Early childhood digital pedagogy: A scoping review of its practices, profiles, and predictors. Early Childhood Education Journal, 54, 263–284. https://doi.org/10.1007/s10643-024-01804-8

Liu, S., Reynolds, B. L., Thomas, N., & Soyoof, A. (2024). The use of digital technologies to develop young children's language and literacy skills: A systematic review. SAGE Open, 14(1), 1–18. https://doi.org/10.1177/21582440241230850

Outhwaite, L. A., Ang, L., Herbert, E., Sumner, E., & Van Herwegen, J. V. (2023). Technology and learning for early childhood and primary education. UNESCO Global Education Monitoring Report. https://doi.org/10.54676/GUXK4594

Papavlasopoulou, S., Undheim, M., Meaney, T., & Esmaeeli, S. (2024). Early childhood pre-service teachers' preparation for using technology with children: A systematic literature review. European Journal of Teacher Education, 49(2), 461–478. https://doi.org/10.1080/02619768.2024.2341935

Salami I. A., Akinjobi A., Omilani N. A., Adeniyi O., Oyefeso E. O., Oyekola A. O.,Ogunniyi L. O., Salami O. M., Rabiu A., Olaleye D. O., Olalekan B. and Babalola E. A. (2026). Professional Development In Fun-Rigour Multimodal InstructionalMethods: Teacher Preparation For Functional Primary Education. Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS) 17(1): 16-24

Vanegas, H. D. O., De María Segovia Cifuentes, Y., & Morrás, A. S. (2025). Educational Technology in Teacher Training: A Systematic review of competencies, skills, models, and methods. *Education Sciences*, *15*(8), 1036. https://doi.org/10.3390/educsci15081036

Zhang, H., Yu, L., Cui, Y., Ji, M., & Wang, Y. (2020). Mining classroom observation data for understanding teacher's teaching modes. *Interactive Learning Environments*, *30*(8), 1498–1514. https://doi.org/10.1080/10494820.2020.1734029

UNESCO. (2023). Global education monitoring report 2023: Technology in education: A tool on whose terms? UNESCO. https://doi.org/10.54676/UZQV8501