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AI Integration in Early Childhood Education: Awareness among Preschool Teachers in Ondo Town

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ABSTRACT

This study examines the level of awareness among preschool teachers in Ondo Town regarding the integration of Artificial Intelligence (AI) in early childhood education. AI's potential to revolutionize education, particularly in early childhood, is becoming more recognized globally, yet the extent to which preschool teachers are aware of it and its potential benefits when applied remains under-explored. Using a descriptive survey research design, the study surveyed 83 preschool teachers from both public and private schools in Ondo Town. Data was collected through a questionnaire assessing teachers' awareness of AI concepts, AI tools relevant to early childhood education, and the potential benefits AI offers in preschool settings. The findings reveal that while teachers have a general understanding of AI as a tool capable of performing human-like tasks (weighted mean = 2.48), their awareness of specific AI tools such as Bee Bot ($\bar{x}$ = 1.84), Endless Alphabet ($\bar{x}$ = 2.07), (Miko 3($\bar{x}$ = 2.00), Toca Boca($\bar{x}$ = 1.99) and Class Dojo ($\bar{x}$ = 1.95) remains limited. Teachers recognized the benefits of AI (weighted mean = 2.47), particularly in areas such as personalized learning, grading, and creating engaging learning materials. The study concludes that integrating AI and its applicable tools in early childhood education may become far from being realized if preschool teachers' awareness remains limited. Recommendations include deliberate attempt by the preschoool teachers to seek hands-on training on how to incorporate AI into early childhood education teaching practices.

Keywords: Artificial Intelligence, Early Childhood Education, Preschool teachers, AI tools, Teacher awareness.

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1. INTRODUCTION

In the rapidly evolving landscape of education, technology has increasingly become a cornerstone of teaching and learning strategies (Ogunsola & Adekola, 2021). Among the most transformative technological innovations is Artificial Intelligence (AI), which has the potential to revolutionize various sectors, including education.

However, the awareness of AI among educators, particularly preschool teachers, remains an area of concern. As AI begins to find its way into classrooms, its successful integration into teaching and learning practices requires that educators not only understand its fundamental concepts but also recognize its potential tools and benefits. Artificial Intelligence refers to machines or systems designed to mimic human cognitive functions, such as learning, problem-solving, and decision-making (Collins et al., 2021). In the context of education, AI can take on various roles, from personalizing learning experiences to assisting teachers in administrative tasks. Despite the growing recognition of AI's potential in enhancing learning experiences, its application in early childhood education is still in its infancy (López et al., 2021). AI tools in preschool classrooms could range from robots that interact with children to applications that provide personalized learning pathways. However, research indicates that teachers' awareness of the deeper functionalities and capabilities of AI remains varied and often superficial (Plass et al., 2018).

Understanding AI in the context of preschool education is crucial for its integration into teaching practices. Preschool teachers' awareness of AI can influence how they incorporate such technologies into their pedagogy. Previous studies have shown that many educators have a limited understanding of AI, often only associating it with simple concepts such as automation or robotics (Sullivan, 2020). In early childhood education, where play-based learning and all-round development of the child are key (Ojoko, 2019), AI's potential to support or enhance these processes remains underutilized due to lack of awareness. This gap in knowledge hinders the effective use of AI tools, such as smart learning environments, robotic assistants, or adaptive learning platforms, which can be valuable resources in preschool classrooms.

The integration of AI tools into early childhood education could be transformative. Tools like Bee Bot, Miko 3, and Toca Boca are designed to support cognitive, emotional, and social development by providing interactive learning experiences. Bee Bot, for example, introduces young children to basic programming concepts through interactive play, while Miko 3 helps with emotional learning and Toca Boca encourages imaginative play (Kaye et al., 2021). Despite the promising potential of these AI tools, many preschool teachers remain only marginally aware of their capabilities and applications. For example, teachers may recognize Bee Bot as an educational tool but may not fully understand how it can be used to teach coding or problem-solving skills (O'Bannon & Thomas, 2017). This limited awareness could prevent the full potential of such tools from being realized in the classroom.

AI holds significant potential to enhance preschool teaching practices in a variety of ways. Personalized learning, one of the most recognized benefits of AI, can adapt educational content to meet the individual needs of each child, ensuring that learning is tailored to their unique pace and abilities. Additionally, AI can assist teachers by automating time-consuming tasks like grading, tracking students' progress, and even identifying areas where individual students may require additional support (Baker & Siemens, 2018). In inclusive classrooms, AI can also help create a more accessible environment by supporting children with special needs, offering personalized strategies and resources that address diverse learning styles (Kim & Lee, 2019). Despite these potential advantages, there is a noticeable gap in teachers' awareness of how these benefits can be integrated into their teaching practices effectively.

While studies have begun to explore the integration of AI in education, there remains limited research on the specific awareness levels of preschool teachers regarding the meaning of AI, the AI tools available for early childhood education, and the potential benefits AI offers in preschool teaching practices. Research has suggested that teachers' awareness of AI tools and their benefits can influence their willingness to adopt these technologies (López et al, 2021).

Given the significant role that preschool teachers play in shaping young children's learning experiences, it is crucial to explore the extent of their awareness and understanding of AI to ensure that they can fully leverage its potential. This study aims to address these gaps by exploring preschool teachers' awareness of the meaning of AI, AI tools in early childhood education, and the potential benefits AI holds for preschool teaching practices.

1.1 Research Questions

1. To what extent is the awareness of preschool teachers' in Ondo Town on what Artificial Intelligence entails?
2. What level of awareness do the preschool teachers have about different Artificial Intelligence tools that are relevant in early childhood education?
3. To what extent is the awareness of preschool teachers on the potential benefits of Artificial Intelligence in early childhood education?

2. METHODOLOGY

The study adopted the descriptive survey research design. Population for the study comprised all preschool teachers in both public and private primary schools in Ondo Metropolis. Random sampling technique was used to select eighty-three (83) preschool teachers from fifteen (15) public primary and twelve (12) private primary schools across Ondo Metrolpolis. The research instrument used for data collection is a questionnaire developed by the researchers and titled Preschool Teachers' Artificial Intelligence Awareness Questionnaire (PTAAQ).

The instrument has two sections. Section A determined the demographic background of the respondents such as gender, qualifications and school type while section B contained 15 items that measured preschool teachers' awareness as well as integration of AI into early childhood education programme. The response type adopted for section B is a 3- point Likert Scale of 'Not Aware', 'Somewhat Aware' and 'Very Much Aware', measured at 1, 2 and 3 respectively for positive statements. The instruments were administered by the researchers and some research assistants. Data collected were analysed using descriptive statistics of percentage, mean and standard deviation.

3. RESULTS

Table 1: *Demographic Profile of Teachers*

Variable		Frequency	Percentage
School Type	Private	21	25.3
	Public	62	74.7
	Total	83	100.0
Gender	Male	10	12.0
	Female	73	88.0
	Total	83	100.0
Qualification	NCE	36	43.4
	B.A Ed/B.Sc. Ed/B.Ed	21	25.3
	PGDE	24	28.9
	M.Ed	1	1.2
	Ph.D	1	1.2
	Total	83	100.0

Table 1 presents the demographic profile of the 83 teachers that were used as sample for the study. The table indicates that a total of 21 teachers, representing 25.3% work in private schools while the remaining 62 which represent 74.7% were selected from public schools. Also shown in the table is the teachers' gender with only 10, making up 12% being male while the other 73 which constitute 88% were female. Further, the table shows a larger group of the teachers making up 36(43.4%) holds an NCE and 21(25.3%) possess a B.A Ed/B.Sc. Ed/B.Ed. A significant proportion 24(28.9%) have a PGDE. Only a small number of teachers have advanced degrees such as M.Ed (1.2%) or a Ph.D. (1.2%).

Research Question 1: To what extent is the awareness of preschool teachers' in Ondo Town on what Artificial Intelligence entails?

Table 2: *Pre-school Teachers' Awareness of Artificial Intelligence*

Item	NA	SA	MA	Mean	Std. D	Remark
Artificial Intelligence (AI) is a computer based tool that can perform tasks that require human intelligence.	6 (7.2)	14 (16.9)	63 (75.9)	2.69	.60	MA
AI can understand and interpret data, speech, images and text.	6 (7.2)	12 (14.5)	65 (78.3)	2.71	.60	MA
AI can take physical or digital actions, such as teaching, explanation, moving, writing in text and so on.	24 (28.9)	15 (18.1)	44 (53.0)	2.24	.88	SA
AI can learn from data, experiences and interactions to enable it improve future performance.	7 (8.4)	33 (39.8)	43 (51.8)	2.43	.65	SA
AI can reach a conclusion that is drawn from evidence in order to solve problems.	13 (15.7)	28 (33.7)	42 (50.6)	2.35	.74	SA
Weighted Mean				**2.48**		

Key: NA = Not Aware, SA = Somewhat Aware, VMA = More Aware
Cut of point: 0.00- 1.94 = Low Extent, 1.95.00-3.00 = Large Extent.

Note on Cut-off-Point

All mean values were added and divided by the number of items in the table, i.e. 5. The result is the weighted mean. When the weighted mean falls between 0.00 and 1.84, it is regarded as Low Extent while it is regarded as Large Extent when it falls between 1.85 and 3.00.

Table 2 depicts the extent of preschool teachers' awareness of what Artificial Intelligence entails. The table reveals that the teachers were only very much aware that Artificial Intelligence is a computer-based tool that can perform tasks that require human intelligence ($\bar{x}$ = 2.69, SD = 0.60) and that AI can understand and interpret data, speech, images and text ($\bar{x}$ = 2.71, SD = 0.60). The table shows however that the preschool teachers' awareness is somewhat limited on the following items: AI can take physical or digital actions, such as teaching, explanation, moving, writing in text and so on. ($\bar{x}$ = 2.24, SD = 0.88), AI can learn from data, experiences and interactions to enable it improve future performance ($\bar{x}$ = 2.43, SD = 0.65) and AI can reach a conclusion that is drawn from evidence in order to solve problems ($\bar{x}$ = 2.35, SD = 0.74). To answer the research question, reference is made to the cut-off point along with the weighted mean. Therefore, based on the weighted mean ($\bar{x}$ = 2.48), it can be inferred that, to a large extent, the preschool teachers are aware of what Artificial Intelligence entails.

Research Question 2: What level of awareness do the preschool teachers have about different Artificial Intelligence tools that are relevant in early childhood education?

Table 3: *Preschool Teachers' Awareness of Relevant AI Tools in Early Childhood Education*

Item	NA	SA	MA	Mean	Std. D	Remark
Bee bot is an AI tool that introduces young children to basic concepts.	34 (41.0)	28 (33.7)	21 (25.3)	1.84	.80	Average
Endless Alphabet is an AI instrument that helps children build their vocabulary in a fun and enjoyable way.	31 (37.3)	15 (18.1)	37 (44.6)	2.07	.91	Average
Miko 3 as an AI instrument can interact with children and helps with emotional learning.	23 (27.7)	37 (44.6)	23 (27.7)	2.00	.75	Average
Toca Boca is as an AI instrument encourages imaginative play and cognitive development.	29 (34.9)	26 (31.3)	28 (33.7)	1.99	.83	Average
Class Dojo is an AI instrument that helps teachers track and manage children behaviour and learning.	28 (33.7)	31 (37.3)	24 (28.9)	1.95	.80	Average

Note on Remark

A mean value of 3.00 can be obtained for each item in the table. Any item with mean value of 0.00-0.94 is taken to be Low Level which the one from 0.95 to 1.94 is taken to be Average Level. When the mean falls between 1.95 and 3.00, it is regarded as High Level.

Table 3 shows the level of awareness that the preschool teachers have about different Artificial Intelligence tools that are relevant in early childhood education. The table depicts that the preschool teachers only have average level of awareness about Bee Bot being an AI tool that introduces young children to basic concepts ($\bar{x}$ = 1.84, SD = 0.80), Endless Alphabet being an AI instrument that helps children build their vocabulary in a fun and enjoyable way ($\bar{x}$ = 2.07, SD = 0.91), Miko 3 as an AI instrument that can interact with children and helps with emotional learning ($\bar{x}$ = 2.00, SD = 0.75), Toca Boca being an AI instrument that encourages imaginative play and cognitive development ($\bar{x}$ = 1.99, SD = 0.83) and Class Dojo as an AI instrument that helps teachers track and manage children behaviour and learning ($\bar{x}$ = 1.95, SD = 0.84). To answer the research question, reference is made to the remark for each item. Therefore, it can be concluded that the preschool teachers only have average level of awareness about Bee Bot, Endless Alphabet, Miko 3, Toca Boca and Class Dojo as AI tools that are relevant in early childhood education.

Research Question 3: To what extent is the awareness of preschool teachers on the potential benefits of Artificial Intelligence in early childhood education?

Table 4: *Preschool Teachers' Awareness of Potential Benefits of AI in Early Childhood Education*

Item	NA	SA	MA	Mean	Std. D	Remark
AI can help with individualized/personalized learning among children.	34 (41.0)	28 (33.7)	21 (25.3)	2.54	.69	High
AI can help the teacher grading of pupils	31 (37.3)	15 (18.1)	37 (44.6)	2.23	.80	High
AI can assist teachers in creating more engaging and interactive learning materials.	23 (27.7)	37 (44.6)	23 (27.7)	2.63	.66	High
AI can help preschool teachers to adjust learning content to the level of each child.	29 (34.9)	26 (31.3)	28 (33.7)	2.51	.74	High
AI can make education inclusive, considering special needs of each child.	28 (33.7)	31 (37.3)	24 (28.9)	2.46	.80	High
Weighted Average					**2.47**	

Table 4 shows the extent of preschool teachers' awareness on the potential benefits of Artificial Intelligence in early childhood education. The table depicts that the preschool teachers have high level of awareness on the following: AI can help with individualized/personalized learning among children ($\bar{x}$ = 2.54, SD = 0.69), AI can help the teacher grading of pupils ($\bar{x}$ = 2.23, SD = 0.80), AI can assist teachers in creating more engaging and interactive learning materials ($\bar{x}$ = 2.63, SD = 0.66), AI can help preschool teachers to adjust learning content to the level of each child ($\bar{x}$ = 2.51, SD = 0.74), AI can make education inclusive, considering special needs of each child ($\bar{x}$ = 2.46, SD = 0.80). To answer the research question, the same principle in table 2 is applied. Therefore, based on the weighted mean ($\bar{x}$ = 2.47), it can be inferred that the extent of awareness of preschool teachers on the potential benefits of Artificial Intelligence in early childhood education is high.

4. DISCUSSION OF FINDINGS

The data from Table 2 suggests that preschool teachers in Ondo Town have a reasonable level of awareness of what Artificial Intelligence (AI) entails, with a weighted mean of 2.48. This implies that, on average, they are somewhat aware of AI's capabilities. The teachers showed a higher awareness of the general concept of AI, particularly that it is a computer-based tool capable of performing tasks requiring human-like intelligence, and that AI can understand and interpret various forms of data. These findings are supported by the fact that AI's ability to perform specific, often complex, tasks is widely acknowledged and understood, even among non-experts in various fields (Brynjolfsson & McAfee, 2014). However, the teachers' awareness was limited regarding AI's more nuanced abilities, such as its potential to take physical or digital actions, learn from data, and make evidence-based decisions to solve problems. These findings indicate that while the general concept of AI is grasped, the more sophisticated applications of AI are still somewhat beyond the current understanding of many teachers. This aligns with findings in other studies (Chien, Dauzère-Pérès, Woonghee & Morrison, 2020) where educators demonstrated basic knowledge of AI but lacked deeper understanding of its more advanced applications in teaching and learning.

The data in Table 3 reveals that preschool teachers have an average level of awareness of AI tools relevant to early childhood education, such as Bee Bot, Endless Alphabet, Miko 3, Toca Boca, Class Dojo, receiving average ratings in terms of awareness. With the mean values ranging from 1.84 to 2.07, the teachers seem to have only a basic understanding of these AI tools. Previous studies have shown similar findings, where educators have limited exposure to specific AI tools despite recognizing the potential benefits of technology in early childhood education (Sparks, 2018). For instance, tools like Bee Bot, Endless Alphabet, and Toca Boca, while recognized, may not yet be widely incorporated into the daily teaching practices of many preschool educators. This gap in awareness and usage of AI tools highlights a need for professional development programs focused on technology integration and tools that support cognitive and emotional development in early childhood education (Bers, 2018).

The results from Table 4 indicate a high level of awareness among preschool teachers regarding the potential benefits of AI in early childhood education. The weighted mean of 2.47 suggests that teachers are generally cognizant of AI's benefits, particularly in areas such as personalized learning, grading, creation of interactive materials, adjusting content to child-specific needs, and making education more inclusive. This finding aligns with the literature, which highlights AI's ability to support individualized learning experiences and provide personalized feedback for children (Luckin et al, 2016). Additionally, the awareness of AI's potential to support inclusive education and cater to children with special needs is consistent with studies that emphasize AI's role in making education more equitable by offering tailored support (Almalki, 2020). However, it is worth noting that while teachers recognize these benefits, the practical integration of AI into early childhood education may still be limited due to factors such as resource constraints, lack of infrastructure, and the need for further training. Studies like Selwyn (2019) have suggested that while awareness of AI's benefits is growing, the actual application in classroom settings remains slow, particularly in regions with limited access to technology. Research could explore the barriers that prevent the full integration of AI tools into early childhood education settings, including factors such as infrastructure, teacher training, and access to technology.

5. CONCLUSION

Arising from the findings of this study, the preschool teachers' in Ondo Town demonstrate a reasonable understanding of what Artificial Intelligence entails, it's general capabilities and its potential benefits in early childhood education. However, their awareness of specific AI tools and more advanced applications is relatively limited. Thus, this study concludes that the integration of AI into early childhood education practices in Ondo Town may still be far from being realized. There appear to be a gap between the preschool teachers' theoretical knowledge and intended practical application of AI in early childhood education

6. RECOMMENDATIONS

1. Preschool teachers should go for professional or short time training on AI to become aware of all relevant AI tools that can be employed in early childhood education teaching and learning activities. They should ensure that such training is imbued with hands-on experiences with AI tools and operations.
2. By extension, actors such as school owners and government, through State Universal Basic Education Board (SUBEB) should organize targeted workshops and training sessions to improve preschool teachers' practical knowledge of specific AI tools like Bee Bot and Miko.
3. Likewise, the government, through her relevant bodies like National University Commission (NUC) and National Commission of Colleges of Education (NCCE) should ensure the incorporation of foundational knowledge about AI into teacher training curricula to bridge gaps between theoretical understanding and practical application.

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