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Virtual learning in primary education: Roducate learning app and pupils' English language outcomes in Ondo State, Nigeria

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ABSTRACT

In today's rapidly evolving digital world, technologies remain essential to modern challenges. However, in Nigeria, these technologies have not gained the prominence they deserve, especially at the primary school level. This study examined the effectiveness of Roducate in Primary School Pupils' English Language Outcomes in Ondo State, Nigeria. Three research questions were answered and two hypotheses were tested. A quasi-experimental and descriptive survey research design were adopted for the study. The population consisted of all primary school pupils and their teachers. Through purposive sampling, 45 pupils and 30 primary school teachers were selected. Pupils with access to mobile devices were placed in the experimental group and those without access on the control group. The research instruments were the Teachers' Roducate Knowledge Questionnaire (TRKQ), r = 0.76, Level of Digital Competence Questionnaire (LDCQ), r = 0.79, and the Primary School Common Entrance Past Questions. Findings revealed that Roducate has a significant effect on pupils' achievement in English language. Similarly, primary school teachers do not know about Roducate learning app ($\bar{x}$ = 1.01). On the basis of these findings, the study recommends that there should be comprehensive teacher training programs focusing on building digital competence for primary school teachers.

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Introduction

The place of primary education in the Nigerian educational sphere is never in doubt. It is the springboard upon which other levels of education are built. Primary education is designed for children usually between age 6–11. The objectives of primary education as stated on the National Policy on Education (2013) include but not limited to: inculcating permanent literacy, numeracy and communicative skills in children; providing a solid foundation for scientific and reflective thinking; and serving as a platform for character building and

cultivation of positive attitudes. Additionally, primary education aimed to help children adapt to the evolving environment, develop manipulative skills that will enable them to function effectively in the society and provide the basic tools that are essential for further educational advancement. This includes preparing pupils for trades and crafts relevant to their local communities.

Primary education is indispensable because children are the future and the nation's legacy depend on them. Hence, the preparedness for their development – both intellectually and emotionally, begins with the foundational education they are exposed to at the primary education level. According to Emmanuel (2022, p. 5), when children are provided "with the right models and situations – of tenderness, kindness, tolerance, loveliness, compassion, confidence, affection, insight and other social values" at the primary education level, "there is a greater probability that they will learn correct behavior and if otherwise, society would continue to decry upsurge of juvenile delinquency, social anomalies among her evolving Leaders of Tomorrow". In the light of this, therefore, education designed with the children in mind should be geared towards finding a balance between the exocentric model which accentuates the role of multiple external influences – such as family, culture, and diverse social interactions and endocentric models which emphasized the importance of a central – such as national identity, language policy in shaping children's futures. It is apposite to mention, therefore, that whatever is invested in the education of children is not just an investment in individual futures; it is an investment in the sustainable development and prosperity of the nation as a whole.

Despite the lofty goals of education at the primary school education level in Nigeria, particularly as touching literacy skills via English language, extant studies revealed that the performance of primary school pupils falls short of expectations and fails to meet proficiency standard (Mustapha, 2022; UNICEF, 2022). The COVID-19 situation further compounded the problem of these pupils as all educational activities were grounded and many of them were out of schools. To ensure continuous learning, many developed nations of the world who have invested on their ICT transitioned to virtual learning but the situation was not the same in Nigeria; as learning came to a standstill in many parts of the country. The potential of using learning applications for educational purposes remains largely untapped as many Nigerian primary school teachers have not fully embraced or integrated digital tools into their teaching strategies. Though, it is over three years from COVID-19, "educational systems are back on track with face-to-face teaching & learning" Karaferye (2022, p. 809). However, it is crucial to reflect upon the past experiences so as to evaluate and learn and be better to face the future. It is believed that when teachers engage their pupils via some learning apps, teaching may go uninterrupted no matter the prevailing global challenges. In response to the challenges posed by the COVID-19 pandemic, one of the learning applications which was developed with Africans and Nigerian pupils in view is Roducate learning app.

Created by the EdTech company Fluorish Africa, Roducate learning app provides an educational technology platform where pupils and students across different levels of education could access educational contents. As published on their website, https://www.roducate.com/site-for-students/, Roducate learning platform offers curriculum-based contents approved by the Nigerian Educational Research and Development Council (NERDC), ensuring that pupils and students receive education aligned with national standards. On the Roducate learning app, there are podcasts, interactive quizzes, past exam

questions, video tutorials, and notes designed to meet the needs of primary school pupils in Nigeria. The App offers varieties of subjects, however, of significance to this study is the English language.

In Nigeria, English language is the official language and its acquisition serves as a basis of literacy. Similarly, English language is the medium of instruction and language of instruction at the primary education level. Therefore, any pupils who is deficient in English language may find it difficult to access information, resources and opportunities coded in English (Tom-Lawyer et al., 2021). For robust English language experience on Roducate learning app, lecture notes are accompanied with podcasts, tutorial questions as well as video tutorials for pupils. On this App, pupils could join an online session where they could learn collaborative with their peers from other schools. These efforts are targeted at supplementing in-class learning and also providing pupils with experience which will make transition to technology-driven learning environments smooth when situations demand. However, despite its potential, it has not gained widespread acceptance among Nigerians. More so, there are currently no studies assessing the effectiveness of this educational platform on the learning outcomes of Nigerian pupils – factored in this study. Several factors could be responsible for this. Firstly, primary school teachers in Nigeria may not be aware of the learning app and their digital competencies maybe an area of concern.

Teachers occupy an invaluable position in any educational settings (Ogunyemi & Emmanuel, 2020). Hence, they need to stay abreast of every novel solution to content delivery as through this, they could cure and bring healing to the system as occasion demands. When teacher adopt novel teaching pedagogy, use the state-of-the-art technologies for content delivery, more engaging and effective learning experiences are created. However, when there is gap in knowledge, pupils may fall behind in developing essential skills. In the light of the foregoing, this study sought the awareness of primary school teachers in Ondo state regarding Roducate learning app. Apart from this, another area of concern is teachers' digital competence.

While digital competence could be confused with digital literacy, however, digital competence starts where digital literacy ends. Digital literacy, according to Rubble & Bailey as cited in Imhanyehor (2021, p. 206), is concerned with the "ability of an individual to know when and how to use digital technology to access, process, evaluate, create and communicate information through writing and other media on various digital platforms". Therefore, anyone that has the ability to use technology to manage and share information across digital spaces is referred to as Digital literacy. However, digital competence, according to Ogunbodede et al. (2023, p. 2), refers to the "skills, understanding, and outlooks required to proficiently utilize digital tools for communication, problem-solving, and information management". As noted by the European Commission (2018), digital competence has to do with the capacity to interact with digital technologies confidently, critically, and responsibly in various contexts, such as education, employment, and social engagement. Studies indicated the digital competencies of academic staff in Nigerian universities (Noskova et al., 2021; Ogunbodede et al. (2023) but studies on the digital competencies of primary school teachers in Nigeria is relatively scanty. Therefore, this study also examined the digital competence of primary school teachers in Ondo State, Nigeria.

Several researchers have explored the concept of virtual learning at the primary school level. Imhanyehor (2020) investigated the prospects of integrating digital literacy in primary

schools and assessed the availability and accessibility of electronic gadgets. The study revealed that while teachers possessed personal computers and other electronic devices and were capable of using them, such devices were not readily available in schools. Similarly, Yeşilbağ and Korkmaz (2021) examined the impact of Voki, a Web 2.0 tool, on students' academic achievement and attitudes toward English courses. Meanwhile, Camilleri and Camilleri (2020) explored the use of mobile technologies in primary education. However, these studies primarily focused on general digital literacy skills and did not assess specific learning apps. To date, no studies have examined the use of the Roducate learning app in Nigeria, leaving a gap in the literature regarding its potential impact at the primary school level. Therefore, this study explored the state of virtual learning in Nigeria's primary education system with a specific focus on the use of the Roducate learning app for English language instruction in Ondo State, Nigeria.

Research questions of this article are what are the average scores of primary school pupils who were taught English language using the Roducate learning app, both before and after undergoing treatment, in both experimental and conventional methods in Ondo State, Nigeria? How primary school teachers in Ondo State explore Roducate learning app and its potential benefits for pupils' learning? and what is the level of digital competence among primary school teachers in Ondo State, Nigeria?

Method

This study employed both a quasi-experimental and descriptive survey research design. The population consisted of all primary school pupils in class 5 as well as their teachers in Ondo State, Nigeria. Using purposive sampling, 45 pupils from 10 public schools in Akoko South Local Government Area were selected. In each school, pupils with access to tablet mobile devices were placed in the experimental group while primary school teachers were randomly selected across the state. The instruments used for data collection were the Teachers' Roducate Knowledge Questionnaire, r = 0.76, the Level of Digital Competence Questionnaire, r = 0.79, and the Primary School Common Entrance Past Questions. The English language section of the common entrance exam assessed pupils' performance before and after the intervention.

The structured questionnaires were designed to evaluate teachers' knowledge of the Roducate learning app and their level of digital competence. The data collection process involved distributing 45 Airtel Roducate SIM cards to the selected schools which provided the mobile devices for the study. The researcher with the assistance of the teachers installed the Roducate learning app from the Play Store. Pupils in the experimental group were instructed to use the app to read lecture notes, watch videos, listen to podcasts, and attempt mock exams. After completing these activities, they took the final test. Meanwhile, the control group was taught using traditional methods. After data collection and scoring, both descriptive and inferential statistical analyses were conducted. Mean and standard deviation were used to address the research questions, while hypotheses were tested using Pearson Product-Moment Correlation (PPMC) and t-tests at a significance level of 0.05.

Results and discussion

Average scores of primary school pupils taught English language using the Roducate learning app

The following table reveals the scores of primary school pupils who were taught English language using the platform provided by Roducate learning app, both before and after undergoing treatment, in both experimental and conventional method in Ondo State, Nigeria.

Table 1

The Average Scores of Primary School Pupils

Methods	N	Pretest		Post-test		Mean
		X	*SD*	*X*	*SD*	
Roducate learning app	45	21.73	8.49	82.00	18.07	39.27
Conventional method	45	21.70	5.35	30.00	10.83	8.3

Table 1 demonstrates that the pre-test mean achievement scores for pupils taught English language using Roducate learning app and the conventional group were ($\bar{x}$ = 21.73 and 21.70) with standard deviations of 8.49 and 5.35, respectively. These findings suggest that both the experimental group and the control group were relatively at the same cognitive level before treatment. However, the post-test achievement means scores for the pupils in the Roducate learning app and the control groups were ($\bar{x}$ = 82.00 and 30.00) with standard deviations of 18.07 and 10.83 for the post-tests respectively.

Meanwhile, the achievement mean gain for the experimental group was ($\bar{x}$ = 39.27) over that of the control group ($\bar{x}$ = 8.3). The higher achievement gain score of the experimental group ($\bar{x}$ = 60.27) compared to the control group ($\bar{x}$ = 8.3) suggests that pupils' experience on Roducate learning app has a more significant relative effect on pupils' achievement in English language when compared to the conventional method.

Primary school teachers in Ondo state know about Roducate learning app and its potential benefits for pupils' learning

The following table shows what primary school teachers in Ondo state know about Roducate learning app and its potential benefits for pupils' learning.

Table 2

What Teachers Know about Roducate Learning App

Research items	N	Minimum	Maximum	Mean	Std. deviation	Decision
I am aware of the existence of the Roducate learning app for enhancing pupils' English language learning.	30	1.00	2.00	1.01	1.18	No idea
I am knowledgeable about the features of the Roducate learning app.	30	1.00	1.00	1.00	.76	No idea

I believe the Roducate learning app can significantly improve pupils' English language skills.	30	1.00	2.00	1.21	.41	No idea
I have used the Roducate learning app in my English language lessons.	30	1.00	1.00	1.00	.00	No idea
I find it easy to incorporate the Roducate learning app into my teaching methods.	30	1.00	1.00	1.00	.40	No idea
Valid N (listwise)	30					

Table 2 indicates that primary school teachers did not have any idea about the existence of Roducate learning app ($\bar{x}$ = 1.01) nor knowledgeable about the features of the Roducate learning app ($\bar{x}$ = 1.00). Similarly, the results revealed that primary school teachers do not have an idea that Roducate learning app could be incorporated and use to teach English language ($\bar{x}$ = 1.00).

The level of digital competence among primary school teachers in Ondo State, Nigeria

Table 3 below displays the level of digital competence among primary school teachers in Ondo State, Nigeria.

Table 3

Level of Digital Competence among Primary School Teachers in Ondo State, Nigeria

Research items	N	Minimum	Maximum	Mean	Std. deviation	Decision
I can confidently use digital tools (such as computers, tablets, and smartphones) to support my teaching activities.	30	1.00	4.00	3.01	1.18	Highly competent
Integration of digital technologies such as educational apps, online resources into my lesson plans effectively.	30	1.00	1.08	1.09	2.72	Not competent
I can troubleshoot basic technical problems that may arise while using digital tools during teaching.	30	1.00	2.00	1.01	1.43	Not competent
I regularly explore and learn new digital tools to enhance classroom instruction.	30	1.00	3.00	1.81	1.13	Slightly competent
I feel confident in guiding students on how to use digital resources for learning purposes.	30	1.00	3.00	1.75	1.40	Slightly competent
Valid N (listwise)	30					

Informed in Table 3, it was revealed that primary school teachers in Ondo state can confidently use digital tools such as computers, tablets, and smartphones to support teaching activities app ($\bar{x}$ = 3.01), but they are not competent in integrating digital technologies such

as educational apps into lesson effectively ($\bar{x}$ = 1.09). The results also revealed that primary school teachers cannot troubleshoot basic technical problems that may arise while using digital tools ($\bar{x}$ = 1.01) neither do they explore and learn new digital tools to enhance classroom instruction ($\bar{x}$ = 1.81). Similarly, the results reveal that primary school teachers are slightly confidence confident in guiding their pupil how to use digital resources for learning purposes ($\bar{x}$ = 1.75).

The different performance of pupils taught using Roducate learning app and the conventional method

The following table shows that the post-test means achievement score of pupils taught English language using Roducate learning app and those in the conventional group.

Table 4

T-test Analysis in the Different Performance

		N	$\bar{X}$	Std. deviation	df	t-cal	t-cri
Pair 1	Post-test scores for Roducate learning app	45	82.00	18.07	148	2.236	0.52
	Post-test scores for control group	45	30.00	10.83			

Table 4 shows that the post-test means achievement score of pupils taught English language using Roducate learning app and those in the conventional group were ($\bar{x}$ = 82.00) with standard deviation of 18.07 and the control ($\bar{x}$ = 30.00) and standard deviation 10.83, the t-calculated value of (2.236) which is greater than the t-cri (0.52) at 0.05 level of significance (2.236 > 0.00). Hence, the null hypothesis that says there is no significant difference in the mean achievement scores of pupils taught English language with Roducare learning app and conventional method was, thus, rejected. This shows there is significant difference of the students' post-test achievement in the Roducate learning app and the control group.

The relationship between the digital competence and their knowledge about Roducate learning platform

The table below shows the relationship between the digital competence of the primary school teachers surveyed and their knowledge about Roducate learning platform.

Table 5

Relationship between the Digital Competence and Knowledge

		Digital competence	Roducate knowledge
Digital competence	Pearson correlation	1	.441**
	Sig. (2-tailed)		.004
	N	30	30
Roducate knowledge	Pearson correlation	.441**	1
	Sig. (2-tailed)	.004	

N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5 informs that moderate positive relationship between digital competence and RoduCate knowledge among the primary school teachers (r.cal = .441). Therefore, the null hypothesis there is no significant relationship between the digital competence of the primary school teachers and their knowledge about Roducate learning platform is rejected.

The effect of Roducate in English learning

Research question one and null hypothesis one revealed that Roducate learning app has a significant effect on pupils' achievement in English language when compared to the conventional method. This could be as a result of exposure to a variety of interactive and engaging learning experiences through the Roducate learning app. Multimedia elements such as videos, podcasts, quizzes, and interactive exercises could have been instrumental in pupils' ability to absorb and retain information more effectively. The app's ability to present educational material in multiple formats likely contributed to a deeper understanding and mastery of the English language. The result of this study confirms the findings of Yeşilbağ and Korkmaz (2020) that learning apps increase achievement performance scores of students in English lessons. Similarly, the findings of this study corroborate that of Alneyadi et al. (2023). The result of their study indicated that smart learning application used was in favour of students in the experimental group. The result of this study aligns with growing consensus that integrating digital tools into the classroom not only enhances academic outcomes but also improves students' motivation and interest in learning. In the same vein, the study of Camilleri and Camilleri (2020) reported that engagement with educational apps improved students' competencies.

Primary school teachers' knowledge about Roducate

Research questions two and null hypothesis two, however, indicated that primary school teachers do not have any idea about Roducate learning app and its potential benefits for English language teaching. Despite being developed by a Nigerian educational technology company, this study revealed that Nigerian primary teachers do not have an inkling about the app and its potentials to revolutionize their teaching space. This finding suggests a gap in the adoption of digital tools in Nigerian classrooms and this underscores the fact that primary school teachers have not fully integrated the lessons from the COVID-19 pandemic which stressed the importance of incorporating technology into education. Ajani et al. (2022) and Abraham et al. (2023, p. 5486), however, identified factors such as "inadequate infrastructure, insufficient funding, lack of digital skills among teachers, and limited access to digital devices" as major hindrance to the incorporation of digital tools in the Nigerian schools. Ajayi et al. (2023, p. 17) listed other factors such as: "poor implementation of ICT policies, poor ICT literacy of students, high cost of ICT facilities, lack of technical support for repairs and maintenance of ICT facilities". While teachers have consistently decried government policies and a lack of funding as key barriers to integrating educational technology into their classroom instructions, the issue of low level of digital competence among teachers as deduced from this study is also an area of concern. Despite the fact that Roducate learning app is rooted in the Nigerian educational curriculum which makes it

significant and culturally appropriate for Nigerian pupils, significant number of Nigerian teachers remain ill-equipped on how to effectively integrate it into their classrooms. This deficiency may hinder teachers' ability to integrate innovative educational learning tools in their mainstream teaching. The findings of this study confirm the results of Ibhafidon and Ofeimu (2024) that quite a number of primary school teachers are not digitally literate and those who are, acquired it through self-exploration. In the same vein, the findings of this study are consonance with that of Sajidan et al. (2023). The result of their study indicated that teachers, especially those with lower qualifications, had low digital literacy. Similarly, the findings of this study are in line with the study of Nwafor et al. (2023) whose research indicated that teacher's competence in the utilization of digitalized learning tools such as zoom facilities, google classrooms, and video clips is very low. However, the results of Althubyani (2024) indicated that primary school teachers' level of digital competence was medium while Korkmaz and Akçay (2023) revealed that primary school teachers perceived themselves as highly proficient in various areas of digital literacy, mastering these competencies to a significant extent.

Conclusion

The finding of this study evidently revealed that the use of digital learning platforms such as Roducate can significantly enhance pupils' learning outcomes in English language. Despite the potential benefits of Roducate learning app, this study showed that primary school teachers in Ondo State have little or no knowledge of the app's existence. This gap in knowledge on the part of teachers may pose a critical barrier to the adoption of educational apps which could enhance pupils' learning experience at primary school educational level in Ondo State. Similarly, this study indicated that primary school teachers in Ondo State possess basic digital competence, such as using computers, tablets, and smartphones for teaching activities, however, they face difficulties in integrating digital tools such as Roducate educational apps into their lessons. Roducate learning app has demonstrated its potential to improve pupils' learning outcomes in English language; equipping teachers with the necessary skills to effectively use educational learning platforms such as Roducate learning app will be critical to maximizing the benefits of digital learning platforms and improving educational outcomes in Nigeria and beyond. Therefore, training programs should be organized to improve primary school teachers' digital competence, particularly in the use of educational apps like the Roducate learning app.

Teachers need to be proficient not only in basic digital skills but also in effectively integrating these tools into their daily teaching practices. Efforts should be made to raise awareness among educators about the existence and benefits of the Roducate learning app. Workshops, seminars, and informational campaigns should be conducted to introduce teachers to the app's features and demonstrate its potential for enhancing student learning outcomes, especially in English language instruction. Schools and educational stakeholders should ensure that both teachers and students have access to the necessary digital resources, such as tablets, computers, and reliable internet connections, to fully utilize educational learning platforms. The curriculum for pre-service teachers in Nigerian institutions should be revised to integrate digital learning as a core component, alongside traditional educational technology courses. This will better equip future teachers with the skills necessary to navigate and utilize modern digital tools in the evolving educational landscape. Quarterly workshops,

seminars, and conferences should be organized for primary school teachers to enhance their knowledge of emerging learning apps and their effective integration into classroom instruction.

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