

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

6-2022

Improving Students' Achievement in Physics Using Library Electronic Journals

Christian Ugwuanyi
ugwuanyics@ufs.ac.za

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>



Part of the [Scholarly Communication Commons](#)

Ugwuanyi, Christian, "Improving Students' Achievement in Physics Using Library Electronic Journals" (2022). *Library Philosophy and Practice (e-journal)*. 7084.
<https://digitalcommons.unl.edu/libphilprac/7084>

Improving Students' Achievement in Physics Using Library Electronic Journals

Christian S. Ugwuanyi (Ph.D)^{1,2} <https://orcid.org/0000-0003-2174-3674>

¹ Research Fellow, Faculty of Education, University of the Free State, Bloemfontein, South Africa. ² Department of Science Education, University of Nigeria, Nsukka. **Correspondence**

email: UgwuanyiCS@ufs.ac.za

Abstract

Electronic journals in libraries are essential for updating facilities and expanding services so that users can acquire the information they require. The modern epoch is marked by an information and knowledge revolution. Electronic materials are now available to libraries in a variety of formats. As a result of technology advancements and higher expectations in teaching and learning, 21st-century classrooms demand a lot from both teachers and students. Most parents nowadays purchase (smartphones, tablets, or laptops) for their children without realizing the educational benefits of these devices in allowing access to online learning materials. Electronic journals from libraries have proven to be quite useful to the growing number of students who have access to the internet. This is possible because to 21st-century technology, but it's concerning because there isn't much research on the subject in Nigeria. As a result, the impact of library electronic journals on students' academic achievement in physics was investigated in this study. This study used a quantitative research approach using a simple repeated measures strategy. The Physics Achievement Test ($\alpha = 0.891$) was used to collect the data, which had been rigorously validated and trial-tested. A mixed-design repeated measures analysis of variance was used to analyze the data. Students' physics grades were shown to be significantly improved when they read electronic publications from the library. As a result, in order to improve their academic performance, students should be exposed to the usage of library electronic journals.

Keywords: Achievement, Improving, Library electronic journals, Physics

Introduction

According to recent studies, learners' physics achievement is declining (Ugwuanyi et al., 2020; Ugwuanyi et al., 2021). Teachers' continuous use of antiquated teaching methods has been blamed for the low level of achievement (Adonu et al., 2021; Offordile et al., 2021). Despite the fact that we live in the twenty-first century, which is dominated by the use of contemporary technology, this terrible situation still exists. The information and communication technology era of the twenty-first century has brought significant changes to the way students study in schools. In this century,

teachers and students must adopt digitally enhanced teaching and learning approaches. Teachers in the twenty-first century have access to a wealth of instructional tools for imparting instruction (Kaminski, 2018). Library electronic journals are a form of resource that allows students to use a technologically advanced device to see a tale come to life. It has been shown that library electronic journals are as popular as the photocopier or word processor in writing term papers for today's students. The internet altered reference work by allowing transactions to take place outside of the library's walls. Students can also use the internet to look for various reference materials.

Students are more likely to engage in imaginative activities and learn about the world when they have access to technological tools like these (Kaminski, 2018). The transdisciplinary technology period of the twenty-first century developed a variety of Library electronic journals for educational delivery, among other things (Korat et al., 2014). In studies, electronic journals from the library have been demonstrated to be educationally advantageous. This position is supported by Korat et al. (2014), who found that Library electronic journals are particularly effective in helping the acquisition of word meaning at various stages of schooling. In today's culture, iPads, Smartphones/Android phones, and other digital devices are used to provide the majority of children's basic literacy experiences (Miller & Warschauer, 2014).

When compared to traditional or printed texts, digital texts significantly improved students' reading achievement and motivation during the Sustained Silent Reading condition (Snyder, 2016). The total emergent reading skills of youngsters exposed to Library electronic journals improved significantly from pre- to post-intervention (Shamir & Korat, 2008). It was discovered that an e-book-based educational activity had a significant impact on students' vocabulary development (Shamir et al., 2018). The use of digital storytelling in science teaching and learning is well received by students (Shemy, 2020). Using an e-book while learning, according to Jones et

al. (2011), made students feel more at ease, resulting in significantly higher reading achievement than students who used traditional textbooks.

Given the aforementioned, library electronic journals appear to be great educational resources, but teachers do not appear to use them in the classroom. Only one study used library electronic journals for scientific instruction, according to the empirical research reviewed. Library electronic journals are mostly used to teach reading and vocabulary, according to the empirical data analyzed. However, none of these studies was carried out in Nigeria, which prompted the current analysis. As a result, the researcher investigated how electronic publications from the Library influenced students' academic performance in Physics.

Methods

Research Paradigm, approach and design

This investigation was carried out using the scientific research paradigm. This is the situation because the research findings were obtained through hypothesis testing. As a result, because the participants' features were quantified and presented objectively, a quantitative research approach was adopted. A basic repeated measures research design based on this technique guided the experiment. This technique employs multiple measurements of the dependent measure before and after treatment at various test times. In research similar to this one, Ugwuanyi, Okeke et al. (2020), Ugwuanyi, Ede et al. (2020), Ugwuanyi (2022a), Ugwuanyi (2022b), Ugwuanyi (2022c) have adopted this design.

Participants

A total of 53 SS I students was recruited at random from two secondary schools in the Nsukka Education Zone for the study. Because the study's participants were exposed to the usage of library

electronic journals and other demands through secondary schools with computer and internet access, this sample was purposely drawn from two secondary schools.

Measure

The data for the study was gathered by administering a Physics Achievement Test that the researchers devised (PAT). On the test, there were 30 multiple choice questions with four options: A, B, C, and D, and only one correct answer. These items were made with the help of physics curriculum from SS I. Each correct answer was worth two points, for a total of 60 points with a minimum of 0 points.

Validation and reliability of the measure

Prior to trial testing, the PAT was properly contented and face validated. Due to the inclusion of a Table of Specifications, the contents of PAT were adequate for the study. Two physics education professionals and one measurement and assessment expert then performed face validation on PAT. These experts gave helpful feedback on the PAT, including phrasing, suitability for the student's ability level, and relevance to the research goal, among other things. The comments from the validators were then used to make adjustments to the PAT. After being face validated, the validated PAT was trial tested on 20 SS I physics students who were not part of the study. The data were exposed to Kuder-formula Richardson's 20 reliability estimate to determine the internal consistency dependability of the PAT items. The instrument passed the reliability test with an index of 0.891, indicating that it was reliable prior to usage.

Ethical consideration statement

The study's conduct was approved by the University of Nigeria's research ethics committee. Prior to the start of the trial, the participants were given informed consent papers. The informed consent papers were correctly filled out and signed by all persons involved.

Experimental procedure

One week before the start of the treatment, two sets of pre-testing were conducted. As a result, the researchers were able to gather the baseline data for the study. The treatment sessions began after that. Students were exposed to the use of Library electronic journals relevant to the physics principles presented to them throughout the teaching of physics fundamentals. Force, motion, work-energy, and power are some of the concepts taught to students by introducing them to library electronic journals. During the treatment sessions, students were exposed to a variety of library electronic journals that covered such issues. This exposure was repeated for a total of four weeks. At each session, students were encouraged to ask questions about the subjects they didn't understand. At the conclusion of the treatment, the subjects were given the reshuffled PAT for the first posttest. One week following the first posttest, the second posttest was administered. The multiple measurement scores obtained before and after therapy were then merged and cleaned in preparation for data analysis.

Data analysis

The data were examined using a mixed design repeated measures analysis of variance test the hypothesis. The research question was answered using bar charts. The hypothesis was tested using a basic repeated measures analysis of variance at 5% probability levels, with the mean being used to answer the research question.

Results

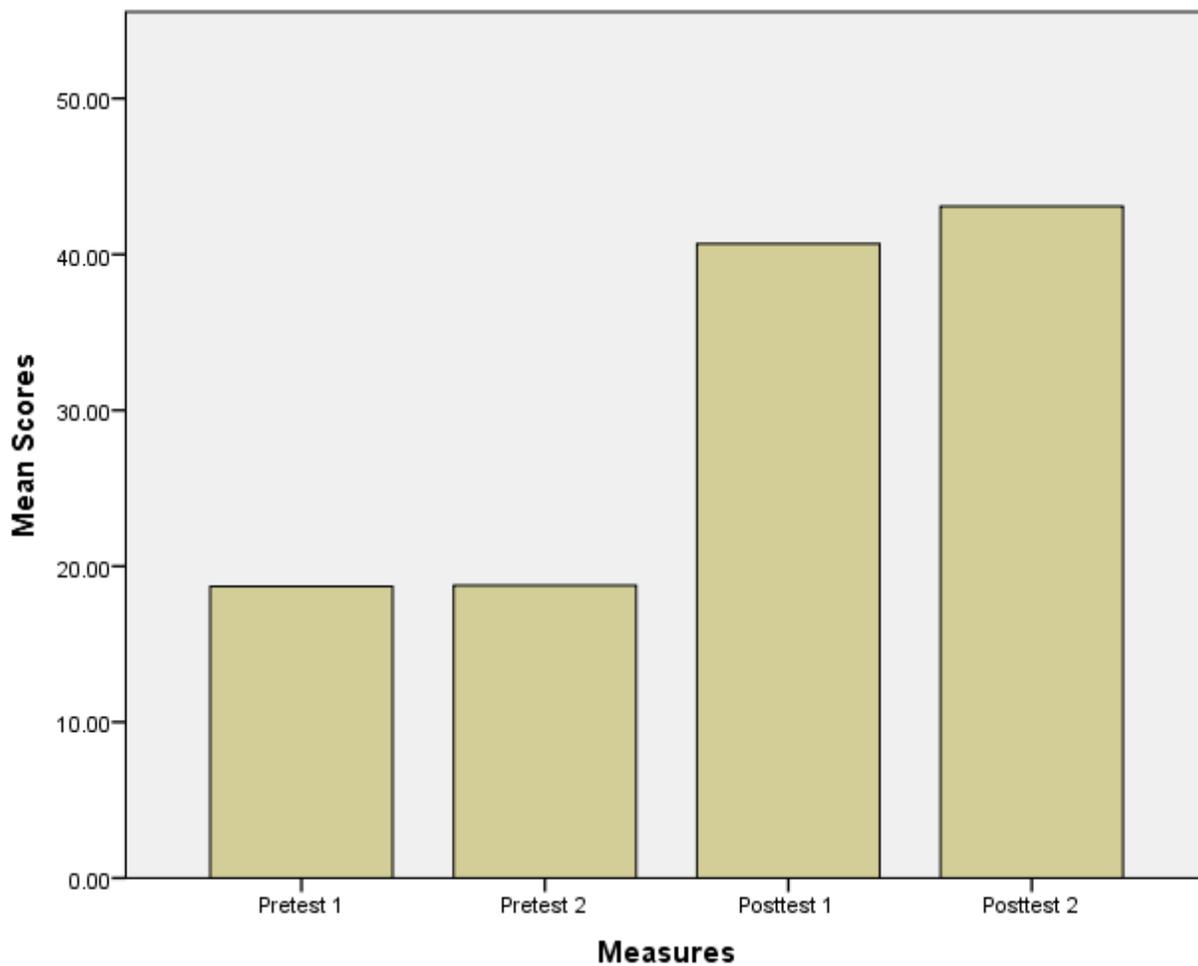


Figure 1: Bar chart representation of the mean scores of the students before and after exposure to library electronic journals

Figure 1 shows that at pretests 1 and 2, the students had mean achievement scores of ($M = 18.68$, $SD = 5.44$) and ($M = 18.77$, $SD = 5.29$) respectively, while at the posttests 1 and 2 their mean achievement scores are ($M = 40.67$, $SD = 20.92$) and ($M = 43.07$, $SD = 21.69$) respectively.

Table 1*Repeated measures analysis of variance of the difference in the test occasions*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	28535.373	3	9511.791	59.766	.000	.535
	Greenhouse-Geisser	28535.373	1.136	25108.829	59.766	.000	.535
	Huynh-Feldt	28535.373	1.145	24924.272	59.766	.000	.535
	Lower-bound	28535.373	1.000	28535.373	59.766	.000	.535
Error (Time)	Sphericity Assumed	24827.377	156	159.150			
	Greenhouse-Geisser	24827.377	59.096	420.117			
	Huynh-Feldt	24827.377	59.534	417.029			
	Lower-bound	24827.377	52.000	477.450			

Table 1 shows that students' achievement in physics was significantly improved after their exposure to library electronic journals, $F(3, 156) = 59.766, p = .000, \eta_p^2 = .535$. Furthermore, with an effect size of .535, students' exposure to library electronic journals causes a 53.5 percent positive variation in their physics achievement. Furthermore, the findings of the post hoc pairwise comparison test (Table 3) revealed that the mean difference between tests 4 and 1 contributed the most to the significant difference, followed by the mean difference between tests 4 and 2.

Table 2

Post-Hoc pairwise comparison test for the significant difference in the test occasions

(I) factor1	(J) factor1	Mean Difference			95% Confidence Interval for Difference ^b	
		(I-J)	Std. Error	Sig. ^b	Lower Bound	Upper Bound
1	2	-.075	.059	.755	-.238	.087
	3	-21.981*	2.918	.000	-29.962	-14.001
	4	-24.377*	2.988	.000	-32.550	-16.204
2	1	.075	.059	.755	-.087	.238
	3	-21.906*	2.916	.000	-29.880	-13.931
	4	-24.302*	2.987	.000	-32.472	-16.131
3	1	21.981*	2.918	.000	14.001	29.962
	2	21.906*	2.916	.000	13.931	29.880
	4	-2.396	1.076	.169	-5.339	.546
4	1	24.377*	2.988	.000	16.204	32.550
	2	24.302*	2.987	.000	16.131	32.472
	3	2.396	1.076	.169	-.546	5.339

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Sidak.

Discussion of the Findings

The goal of this study was to evaluate how four different test measures affected students' Physics scores from library electronic journals. When the students were exposed to library electronic articles, it was revealed that their physics achievement was initially low but quickly improved. This indicates that students' physics performance was greatly improved as a result of their use of library electronic journals. This discovery came as no surprise to the researchers, as pupils prefer graphical content on mobile devices to printed copy. During the study, researchers noted that students were far more involved and interactive in the learning process than they were in traditional teaching methods. Library electronic journals may include interactive elements such as animations, games, recorded narration, music, sound effects, and built-in dictionaries in addition to words and photos. When used for educational purposes, well-designed library electronic

journals can help children develop social, listening, language, and cognitive skills. This could have altered the observed e-book effect. These findings are in line with the results of other empirical studies.

According to Kaminski (2018), electronic tools allow learners to employ their creativity while learning about the world. According to Korat et al. (2014), electronic library resources are particularly effective in enhancing word meaning acquisition at various stages of schooling. According to Miller and Warschauer, most children's first literacy experiences are gained through the use of iPads, Smartphones/Android phones, and other digital devices (2014). It was discovered that an e-book-based educational activity had a significant impact on students' vocabulary development (Shamir et al., 2018). According to Kaminski (2018), electronic tools allow students to express themselves while learning about the globe. According to Korat et al. (2014), electronic library resources are very beneficial in enhancing word meaning acquisition at various stages of schooling. According to Miller and Warschauer, iPads, Smartphones/Android phones, and other digital devices provide the majority of children's early literacy experiences (2014). Students' vocabulary development was found to be impacted significantly by an e-book-based instructional activity (Shamir et al., 2018).

Conclusion and recommendations

The utilization of library electronic journals has been proven to be quite successful in boosting students' physics achievement, according to the conclusions of this study. As a result, library electronic journals are crucial for students' scientific advancement, especially during this Covid-19 period. As a result, during the teaching and learning of physics, secondary school teachers should make an attempt to introduce students to the use of library electronic journals. The

State Education Authority should provide training to teachers on how to use library electronic journals in the classroom.

References

- Adonu, C.J., Nwagbo, C.R., Ugwuanyi, C.S., & Okeke, C.I.O. (2021). Improving students' achievement and retention in biology using flipped classroom and powerpoint instructional approaches: implication for physics teaching. *International Journal of Psychosocial Rehabilitation*, 25(2), 234-247. <https://www.psychosocial.com/article/PR320026/37829/>
- Jones, T., & Brown, B. (2011). Reading engagement: a comparison between e-books and traditional print books in an elementary classroom. *International Journal of Instruction*, 4(2), 5–22. www.e-iji.net
- Kaminski, B. (2018). Teacher-Led Read Alouds and Electronic Books to Engage Students and Enhance Achievement in the Area of Comprehension. *Culminating Projects in Teacher Development*. 29. https://repository.stcloudstate.edu/ed_etds/29
- Korat, O., Levin, I., Atishkin, S., & Turgeman, M. (2014). E-book as facilitator of vocabulary acquisition: Support of adults, dynamic dictionary and static dictionary. *Reading and Writing*, 27(4), 613–629. <https://doi.org/10.1007/s11145-013-9474-z>
- Miller, E. B., & Warschauer, M. (2014). Young students and e-reading: Research to date and questions for the future. *Learning, Media and Technology*, 39(3), 283–305. <https://doi.org/10.1080/17439884.2013.867868>
- Offordile, E.E., Umeano, E.C., Adene, F.M., Obi, M.C., Ugwuanyi, C.S., Okeke, C.I.O., Adimora, D.E. (2021). Improving the academic achievement of low achieving secondary school students in physics using peer tutoring learning strategy: Implications for Engineering Career.

International Journal of Mechanical and Production Engineering Research and Development (IJMPERD), 11(3), 201–212. ISSN (P): 2249–6890; ISSN (E): 2249–8001.
<http://www.tjprc.org/publishpapers/2-67-1618048208-15IJMPERDJUN202115.pdf>.

Snyder, A.B. (2016). *The effect of using electronic books during sustained silent reading on the reading achievement and motivation of first grade students*. Unpublished M.Ed project. Graduate Programs in Education, Goucher College.

Shamir, A., & Korat, O. (2008). Computers in the Schools Developing an Educational E-Book for Fostering Kindergarten Students ' s Emergent Literacy Developing an Educational E-Book for Fostering Kindergarten Students ' s Emergent Literacy. *Computers in The Schools*, 0569(November 2011), 37–41. <https://doi.org/10.1300/J025v24n01>

Shamir, A., Segal-Drori, O., & Goren, I. (2018). Educational electronic book activity supports language retention among students at risk for learning disabilities. *Education and Information Technologies*, 23(3), 1231–1252. <https://doi.org/10.1007/s10639-017-9653-7>

Shemy, N. S. (2020). The Impact of Digital Storytelling on Motivation and Achievement in Teaching Scientific Concepts for Pre-School Students. *European Journal of Education Studies*, 7(12), 801–820. <https://doi.org/10.46827/ejes.v7i12.3627>

Ugwuanyi, C. S., Ede, M. O., Onyishi, C. N., Ossai, O. V., Nwokenna, E. N., Obikwelu, L. C., Ikechukwu-Ilomuanya, A., Amoke, C. V., Okeke, A. O., Ene, C. U., Offordile, E. E., Ozoemena, L. C., & Nweke, M. L. (2020). Effect of cognitive-behavioral therapy with music therapy in reducing physics test anxiety among students as measured by generalized test anxiety scale. *Medicine*, 99(17), e16406. <https://doi.org/10.1097/MD.00000000000016406>

Ugwuanyi, C. S., Okeke, C. I. O., & Agboeze, M. U. (2020). Management of Test Anxiety Among

Pupils in Physics Using Music-Based Cognitive Behavior Therapy Intervention: Implication for Community Development. *Journal of Rational - Emotive and Cognitive - Behavior Therapy*, 0123456789. <https://doi.org/10.1007/s10942-020-00371-2>

Ugwuanyi, C.S., Okeke, C.I.O., & Okeke, C.C. (2021). Information and communication technology tool and students' achievement in Physics: Implication for Evaluation of Library and Information Resources. *Library Philosophy and Practice (e-journal)*. 6097. <https://digitalcommons.unl.edu/libphilprac/6097>.

Ugwuanyi, C.S. (2022a). Developing Sound Knowledge of Basic Science Concepts in Children Using Flipped Classroom: A case of simple repeated measures. *Education and Information Technologies* <https://doi.org/10.1007/s10639-021-10850-3>

Ugwuanyi, C.S. (2022b). Enhancing Children's Achievement in Basic Science using Library Electronic Books: A Case of Simple Repeated Evaluation. *Library Philosophy and Practice (e-journal)*. 6573. <https://digitalcommons.unl.edu/libphilprac/6573>

Ugwuanyi, C.S. (2022c). Evaluating the Effectiveness of Internet Library Resources on Students' Achievement in Physics. *Library Philosophy and Practice (e-journal)*. 6949. <https://digitalcommons.unl.edu/libphilprac/6949>