

Challenges of ICT Integration in the Teaching of Business Statistics in Cross River State's Colleges of Education and Polytechnics



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ABSTRACT: This study's primary goal was to investigate the obstacles that stand in the way of ICT inclusion in the teaching of business statistics in colleges of education and polytechnic in Cross River State. The pertinent literature was examined. This study used a survey research approach, with 93 participants, including 63 male and 40 female business educators. The researchers used no representative group in this research as all of the participants were sufficient in size to be invested in their entirety. The necessary data were gathered using one study instrument known as the "Challenges of ICT Integration and Teaching of Business Statistics Questionnaire". Three experts—one in measurement and assessment and two in business statistics—validated the questionnaires. Cronbach Alpha statistics were used to test its reliability, and the results showed that the instrument had a reliability index of 0.84 and 0.81, respectively. Mean statistics were utilized to analyze the data collected following the distribution of the questionnaires, and an independent t-test was employed to assess the hypotheses at the .05 level of significance. The study's analysis of the data revealed no statistically significant differences between male and female business educators in their mean ratings of teacher-level and institutional-level impediments to ICT integration in the teaching of business statistics. In light of its discoveries, the investigation recommends the following: Business educators should encourage training on digital tools pertinent to the teaching of business statistics. Educational leaders should promote the incorporation of electronic devices in teaching, by allocating enough funds for the purchase and upkeep of ICTs and other resources that support their use.

KEYWORDS: Challenges, ICT Integration, Teaching, Business Statistics

I. INTRODUCTION

Information and Communication Technology (ICT), has evolved into one of the fundamental pillars of contemporary society. Both in rich and emerging nations, the rapid technological transition has had a profound impact on a variety of segments. Hence, the exponential expansion of ICT use in education around the world is not surprising. Information and Communication Technology has a higher influence than any other innovation in education (Fluck, 2013). Digital technologies provide a variety of devices that function in conventional in addition to virtual learning environments and help in creating an engaging learning atmosphere (Jogezai et al., 2021). In the same way, technological innovations have altered the field of learning and walked educational practices into further collaboration and efficiency (Lin et al., 2017). Today, almost all nations view ICT proficiency as a basic component of education that helps students build their capacity for teamwork, problem-solving, analytical reasoning, and learning for themselves, among other abilities (Yuen, Law, & Wong, 2013).

According to Kozma and Anderson (2012), technological innovations in education are changing educational settings through the implementation of innovative curricula that focus on contemporary problems, providing scaffolding and instruments for better education, giving learners and instructors a tone of opportunities to contribute ideas as well as the capacity to think critically, and establishing worldwide and local networks which involve learners, instructors, households, engaged investigators, and various stakeholders. According to Hepp (2014), information and communication technologies can be utilized within school systems in instructional, social, technological, expert, and managerial aspects. The word "ICT" refers to a wide variety of technologies and assets that are utilized to organize and produce knowledge (Fluck, 2013). These devices, which offer a range of useful instruments to promote transformation and improvement, include television broadcasts as well as radio and more modern electronic devices including systems and the World Wide Web. Information and communications technology (ICT) is a generic term for satellite links, software, computers, networks, and other related devices that allow individuals to obtain, analyse, generate, trade, and apply information, expertise, and data in manners which were not possible before (Grimus, 2010).

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Educational institutions use technology like videoconferencing, shared software, digital photography, video walls for image projection, editing tools, and online learning communities to develop and transmit ideas with greater efficiency. Additionally, simulated art galleries, virtual museums, chat and instant messaging, and other great tools for sharing knowledge are used in classrooms. Livetext is yet another innovative application that enables online learning and allows lecturers to submit material on web pages. Technologies for online learning are useful for electronically preserving content. Using whiteboards that interact, conventional blackboards are changed into an altogether novel learning device. Condie and Munro (2017) identify handheld devices, instructional platforms, and online schools as sharing tools that are currently swiftly seizing the spotlight in a variety of devices supporting instructional endeavours. Additionally, educational websites and digital portfolios provide a range of ICT-based resources for instructional design, interaction and cooperation, and material preservation. E-portfolios are larger, more exclusive digital environments where individuals may keep, organise, and customise information in addition to interacting and receiving input (Becta, 2015). A range of resources and applications, such as blogs, forums, email, and chat, may also be crucial.

Applications of cutting-edge technologies have the potential to affect every aspect of school operations. In light of this, educational institutions can no longer be considered basic arenas due to swiftly evolving technological transformation. Participants within the educational sector are currently encouraging the productive application of ICT to stimulate creative methods to classroom instruction, handling data, career advancement, innovation and so on. Education offerings and outcomes could potentially be enhanced in an array of methods by developing an arsenal of ICT-based practices for capturing emerging information, configuring and storing it in numerous forms, communicating it properly for fast understanding, as well as applying it in novel manners. This could particularly aid students in reaching their full ability. The method of determining when and the way technologies complement in an educational context is termed information and communication technology incorporation (Rosnaini & Mohammed, 2008). According to Chen et al. (2018), technology-mediated pedagogical practices allow learners to grow their abilities, increase their drive to learn, and improve their comprehension of material in an effective manner in addition to improving the standard of education (Akram et al., 2021a). Additionally, for the past few years, it has become widely acknowledged that using technology in the classroom is essential to improving the efficacy of teaching practices (U.S. Department of Education, 2017). A number of investigations also emphasized the importance of ICT-incorporated learning strategies in satisfying the demands of learners by maintaining their interest as well as fostering greater concentration, which is regarded as an essential indicator of their progress in school (Xu et al., 2021). Technology-integrated education improves learners' mental awareness and academic performance, according to Liu et al. (2022). Additionally, ICT-integrated learning-teaching practices assist learners in overcoming their educational obstacles while ensuring that these individuals are fully involved in their studies (Liu Z. et al., 2021). This is done by enabling people to remain in touch with their classmates and teachers.

The integration of technological advances in information and communication into teaching has grown into a core component of the modern industrial culture at an incredible (Rampersad, 2011); alarming rate (Olaofe, 2015). Currently, many countries put a great priority on understanding the basic tenets and capabilities of technological innovation (Rampersad, 2011). According to Eadie (2010), the majority of schools in Australia, the United States of America, England, and Hong Kong have incorporated state-of-the-art ICT tools to improve teaching practices. This is because the application of information and communication technology is an issue of immense significance to all people (Olaofe, 2015). Every person gets the power to use the World Wide Web's free content by accessing internet pages from any place at any moment. Every time people chat on a cell phone writes electronic mail, go to a financial institution, enter a book store, hear sports broadcasts on the airwaves, follow news programmes on the screen, perform duties in a workplace, see a physician, travel, they are utilizing information and communication technologies.

Today, everyone agrees that information and communication technology is a crucial tool for 21st-century education. It is noteworthy that almost all educators have positive views of ICT and claim to utilize technological devices for management, scheduling, producing workbooks along with additional teaching resources, evaluating learners, and keeping track of their academic achievement (Ofsted, 2014). Appropriate ICT use boosts academic impact in fully networked classrooms, improves learning outcomes, and expands access to schooling (Tinio, 2013). Technology, as demonstrated by Kimble (1999), can boost learners' self-confidence and enthusiasm to learn. According to Balanskat, Blamire, and Kefala (2016), information and communication technology can positively impact learners' learning outcomes, zeal, focus, collaboration, conversation, and operational understanding. On the contrary side, it offers plenty of evidence for how ICT has increased educators' enthusiasm, efficacy, and collaboration.

Information and communication technology has a favourable impact on curriculum, pedagogy, student learning, and learning environments, as demonstrated in the Newhouse (2012) report. According to Newhouse (2012), using ICT in the classroom can boost independent learning, collaborative effort, higher-order thinking, efficiency, and scholastic deficiencies. Appropriate use of technology in educational settings, according to Newhouse, Trinidad, and Clarkson (2012), enables educators to utilise an

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appropriate educational strategy that balances a learner-centred collaborative approach with instructor-centred teaching. According to Bailey, Day, Day, Gryphon, Howlett, Kane, Kirk, McCullough, McKieman, McMullen, Perfect, Ramsey, and Wood (2014), teachers' efficiency has grown as a result of their usage of ICT. This is due to the fact that ICT has enhanced the management, storage, and upkeep of work in higher educational institutions.

ICT-based techniques have improved the standard of studies and inventions, creation of curricula, management, engagement with students, and strategic planning in Indian higher learning institutions, claim Kumar and Kumar (2016). Yet, past studies have highlighted the negative consequences of technology in school settings. The bulk of adverse consequences, according to Kimble (1999), are associated with how technologies are employed in the school, the technological expertise and competence of the educators, and the corresponding expenses of obtaining the equipment. In emerging economies, including Nigeria variables like a shortage of technology facilities (Akram et al., 2021a), broadband connectivity and power (Akram et al., 2021b), technical proficiency (Asad et al., 2020), as well as a lack of teacher preparation, also hinder the effective application of ICT in school settings, (Abbasi et al., 2021). Notwithstanding the reality, there are considerable barriers on the road. Information and communication technology has been included in the curriculum at various higher education institutions in some nations, changing how teaching and learning are done.

Unfortunately, a lot of institutions worldwide are currently struggling to embrace ICT because of significant barriers (Becta, 2015). For one to create practical and thorough remedies for the issues, it is essential to pinpoint the reasons why educational institutions are not utilizing ICT to its maximum benefit. Balanskat (2016) divided the idea of hurdles faced by educators into two distinct groups: teacher-level barriers and school-level barriers. The challenges faced by instructors at the instructional levels encompass factors like a shortage of ICT expertise, a lacking of excitement and trust, and inadequate training for instructors, all of these are connected to how instructors view and use ICT. School-level barriers include those imposed by the educational setting, including low-quality technology facilities, restricted possession of technology resources, a campus's inadequate project-related background, a lack of instructional project-based knowledge, and a lack of computer technology integration into education methods. Unquestionably, the aforementioned has an impact on how school subjects are taught including business statistics and how students learn it.

Business statistics refers to the application of statistics to business data (Weil, 2023). According to Higherd (2023) "Business statistics" is an approach which employs statistics to glean intelligence that is helpful using the data that a company is privy to. It is a method for using data that has been compiled from several sources (Higherd, 2023); to provide ideas to assist in better choice-making in the face of uncertainty (Ukpong and Undie, 2014). The data may come from surveys, testing, or other company information technologies. It helps businesses predict what is to come and comprehend the reasons behind many current occurrences. It may be used in a variety of contexts, including business development, budgeting, and managing employees. No one can perform these functions in a technology-driven society without the knowledge of various statistical methods and principles including basic knowledge of modern technologies like statistical packages for social science (SPSS), Mini tap, Spreadsheet etc.

Today's world demands the use of technological devices for profitable business statistics instruction. This is due to the wide variety of instruments offered by current technologies which can be applied in education to improve the standard of education. Bransford, Brown, and Cocking (2010) contend that technological advances can also assist students in preparing for modern-day lifestyles. Individuals must therefore develop the abilities required to face challenges in a technology-driven society (Grimus, 2000). This is necessary so that learners can use cutting-edge technologies to widen the breadth of their understanding, raise their interest, and develop relevant skills. While new technologies have become an essential aspect of instruction, learning, and school administration, numerous obstacles have rendered this ineffectual in the majority of nations including Nigeria (Tubin, 2013).

The Nigerian educational system is aimed at training learners to be future staff members that are proficient in technology, imaginative, and knowledgeable. This corresponds to globalization and the digital superhighway. To be successful in today's globalization, the country must be inventive and imaginative. Educators are considered critical participants in integrating ICT into traditional teaching environments and preparing students for today's digital world. This is due to the fact that ICT can provide engaging and innovative educational experiences. Unfortunately, the investigators saw that lecturers, particularly business educators, are constrained in their ability to present a variety of learning resources as a result of the difficulties mentioned in the paragraph that preceded them. Against this backdrop, this research was undertaken.

II. PURPOSE OF STUDY

The primary goal of this study was to look into the impediments to ICT incorporation in the teaching of Business Statistics in Cross River State's colleges of education and polytechnics.

This study specifically aims to determine the difference in:

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1. The mean ratings of male and female business educators on the extent to which teacher-level impediments limit ICT integration in the teaching of Business Statistics in colleges of education and polytechnics in Cross River State.
2. The mean ratings of male and female business educators on the extent to which school-level obstacles inhibit ICT integration in the teaching of Business Statistics in colleges of education and polytechnics in Cross River State.

III. RESEARCH QUESTIONS

The following study questions gave direction to the study:

1. To what extent do male and female business educators differ in their mean ratings of the extent to which teacher-level hurdles prohibit ICT integration in the teaching of business statistics in Cross River State colleges of education and polytechnics?
2. To what extent do male and female business educators differ in their mean ratings of the extent to which school-level hurdles prohibit ICT integration in the teaching of business statistics in Cross River State colleges of education and polytechnics?

IV. STATEMENT OF HYPOTHESES

The investigation was guided by the following null hypotheses:

1. There is no significant difference in the ratings of male and female business educators on teacher-level impediments to ICT incorporation in the teaching of Business Statistics in colleges of education and polytechnics in Cross River State.
2. There is no significant difference in the mean ratings of male and female business educators on school-level barriers to ICT integration in the teaching of Business Statistics in colleges of education and polytechnics in Cross River State.

V. METHOD

This study used a survey research approach, with 93 participants, including 63 male and 40 female business educators from two colleges of education and two polytechnics in Cross River State (Academic Planning Unit, 2022). Since the population was small enough to be researched as a whole, the entire population was investigated. Hence, the respondents were chosen using the census approach. The researchers created one research tool titled: Challenges of ICT Integration and Teaching of Business Statistics Questionnaire" (CICTITBSQ). Items assessing barriers to ICT integration were created on a four-point scale with Very Great Extent (VGE), Great Extent (GE), Little Extent (LE), and Very Little Extent (VLE) whereas items assessing the teaching of Business Statistics were created on a scale with the same four-point scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). There were two sections to the CICTITBSQ. Whereas section A had seven items created to measure each of the first and second independent sub-variable, section B featured 10 items created to measure the dependent variable, giving the instruments a total of 24 items. Three experts—one in measurement and evaluation and two in business education—validated the questionnaire. The face validity was carried out by a measurement and evaluation expert, and the content validity was carried out by two business education specialists. Before the instrument's updated version was distributed to the respondents, the three experts' comments were used to improve it. All copies of the questionnaire that were distributed were retrieved. The instrument underwent a pilot test to verify internal consistency to provide data for a reliability test. Thirty respondents who were not an integral component of the study's participants were used to accomplish this. Using Cronbach Alpha statistics, the instrument's reliability was evaluated, and the results showed reliability coefficients of 0.84 and 0.81. For the researchers to analyze the data obtained after the completion of the survey and to address the research objectives, mean statistics were used. An independent t-test was then used to evaluate the null hypotheses at the .05 level of significance. The following choices helped to shape how the results of the data analysis were interpreted. The mean values of the items were interpreted for the study questions using the real limits of numbers. Hence, any items with mean values between 3.50 and 4.00 were classified as VGE, and items with mean scores between 2.50 and 3.49 were classified as GE. Similarly, to this, any item with a mean score of 1.50 to 2.49 was considered LE, while things with a mean score of 1 to 1.49 were considered VLE. For the hypotheses, if the value determined was more significant than the threshold at the .05 level of significance, the null hypothesis was considered; if not, it was discarded.

VI. RESULT

Table 1. Mean ratings of male and female business educators on the extent to which challenges at the instructor level inhibit ICT integration in the teaching of business statistics in colleges of education and polytechnics in Cross River State

S/N	Educator-level limitations	X	S.D	Remarks
1	Worry regarding cutting-edge innovations	3.54	0.81	Very Great Extent
2	ICTs-related difficulties with self-drive	3.55	0.82	VGE

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3	Inadequate education for teachers regarding the efficient use of digital technologies in the classroom	3.60	0.83	VGE
4	Lack of ICT skills	3.76	0.85	VGE
5	Apprehension of compromising one's expert independence when instructing	3.52	0.80	VGE
6	Resistance to innovative approaches to teaching	3.63	0.84	VGE
7	Being unable to stay up with current computer technology advances	3.56	0.83	VGE
	Grand mean	3.59	0.82	

The results in Table 1, show that the mean values varied from 3.52 to 3.76 with a grand mean of 3.59, which is within the cutoff range of 3.50 to 4.00, indicating that full ICT integration into the teaching of business statistics in colleges of education and polytechnics in Cross River State, Nigeria, is very much hindered by barriers at the teacher-level. The respondents' views on items one through seven did not differ, according to the standard deviation, which was in the range of 0.80 to 0.85.

Table 2. Mean ratings of male and female business educators on the extent to which school-level impediments limit ICT incorporation in the teaching of business statistics in colleges of education and polytechnics in Cross River State

S/N	School-based obstacles	X	S.D	Remarks
8	Lack of Internet connectivity	3.55	0.83	Very Great Extent
9	Insufficient digital literacy aids for instructor manuals	3.50	0.81	VGE
10	Unreliable source of power supply	3.74	0.86	VGE
11	Poor maintenance culture	3.82	0.87	VGE
12	Failure to keep business studies educators who are technologically proficient	3.69	0.85	VGE
13	Limited access to ICT equipment	3.67	0.84	VGE
14	Absence of ICT mainstreaming into schools' strategies.	3.56	0.82	VGE
	Grand mean	3.64	0.84	

The results shown in Table 2 demonstrate that the mean values varied between 3.50 and 3.82 with a grand mean of 3.64, which is within the cutoff range of 3.50 to 4.00, and that this suggests that school-level barriers significantly impede full ICT integration in the teaching of business statistics in colleges of education and polytechnics in Cross River State, Nigeria. The standard deviation varied from 0.81 to 0.87, showing that the respondents' opinions on items 8 to 14 were consistent.

Table 3. Independent t-test analysis of the difference in the mean ratings of male and female business educators on instructor-level constraints to ICT integration in the teaching of business statistics in colleges of education and polytechnics in Cross River State.

Variable	N	X	S.D	Df.	t-cal.	t-crit.	Decision
Male	63	3.84	0.87	91	1.347	1.984	Not significant
Female	40	2.64	0.78				

The computed t-value of 1.347 is less than the threshold value of 1.984 at a 0.05 level of significance with 91 degrees of freedom, according to the data in Table 3. Because the calculated figure is smaller than the crucial value, the null hypothesis was adopted. This demonstrates that there are no discernible differences between male and female business educators in their mean ratings of teacher-level obstacles to ICT integration in business statistics delivery in Cross River state colleges of education and polytechnics.

Table 4 . Independent t-test analysis of the difference in the mean ratings of male and female business educators on school-level setbacks to ICT integration in the teaching of business statistics in colleges of education and polytechnics in Cross River State.

Variable	N	X	S.D	Df.	t-cal.	t-crit.	Decision
Male	63	3.79	0.85	91	0.173	1.984	Not significant
Female	40	2.59	0.76				

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With 91 degrees of freedom and a 0.05 threshold of significance, Table 3's analysis shows that the computed t-value of 0.173 is less than the critical value of 1.984. Since the calculated value is lower than the important value, the null hypothesis was approved. This reveals that there are no significant differences between male and female business educators in terms of school-level limitations to ICT integration in the teaching of business statistics in colleges of education and polytechnics in Cross River State, Nigeria.

VII. DISCUSSION

The findings of the current research indicate that there exists no significant difference between male and female business educators' mean judgements of how teacher-level barriers prevent full digital inclusion in the teaching of business statistics in Cross River State's colleges of education and Polytechnics. This result suggests that there are limitations at the instructor level that prohibit ICT from fully being incorporated into the teaching of business statistics in the schools aforementioned. This finding is in line with Balanskat et al. (2006) who opinionated that instructor-level barriers include factors related to educators' views and strategies about technological advances, among them a dearth of knowledge regarding ICT, a lack of inspiration to use and trust with ICT, and inadequate education for educators. The result of this research is consistent with Akram et al. (2021a) finding that inadequate supply of electronic devices including energy impedes the successful utilization of digital technologies in education environments in developing nations such as Nigeria. This finding is in line with their opinion. This outcome could be what it is as many educators tend to be more accustomed to conventional approaches to instruction and gadgets, whereas some are still struggling to comprehend the critical significance of electronic devices for education in a culture which is mostly dependent on technological advances.

The results of the present investigation show that there is no significant difference between male and female business educators' average assessments of how much school-level barriers hinder digital technologies from being fully integrated into the classroom instruction of business statistics in colleges of education and polytechnics in Cross River State, Nigeria. This research demonstrates how ICT cannot be utilized to teach business statistics in the institutions mentioned above due to limitations at the institution's level. This result is in agreement with Balanskat et al. (2006)'s theory that educational variables like a shortage or low quality of technologies, restricted usage of technological tools, inadequate academy project-related expertise, and the failure to incorporate technological innovations into schools' approaches are school-level constraints to integrating ICT. This outcome may be explained by the fact that a few institutions that are ICT-equipped lack an independent supply of electricity, connectivity to the web, an effective upkeep tradition, control over modern technology, and the latest technology inclusion to educational institutions' instructional methods. The vast majority of educational institutions are still in the infancy phase of implementing technological tools.

VIII. CONCLUSION AND RECOMMENDATIONS

Technological innovations have arisen as an essential tool in education and the job market, especially in the modern era. Learners at all levels—primary, secondary, and university—benefit from its full integration into the educational system. As such, there is increasing emphasis on the application of digital gadgets in instructional settings. Electronic device utilization is frequently emphasized in conventional business statistics education, as was already mentioned. As a consequence, in contemporary settings, a curriculum which promotes proficiency and productivity as well as the appropriate use of technological tools is today desired. The reason is that technological innovations act as an effective catalyst which can change a variety of academic practices. This makes it evident that unless purposeful actions are taken by important actors in the academic sector to ensure the widespread use of communications technologies in instruction, educators might not be capable of generating digital natives for the world's marketplace in the not-too-distant future. In light of the study's outcomes, the study recommends among others that: Training on educational advanced technology pertinent to the teaching and learning of business statistics should be encouraged by business educators. Educational leaders should support the use of ICTs in the classroom by allocating enough funds for the purchase and upkeep of ICTs and other tools that make their use easier.

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