Innovative Instructional Strategies for Enhancing the Teaching of Automobile Technology Education Coursesin Colleges of Education for Self-Employment in South East, Nigeria

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Abstract

The study ascertained innovative instructional strategies for enhancing the teaching of automobile technology education coursesin colleges of education for self-employment in South East, Nigeria. Two research questions were posed, and two null hypotheses postulated and tested at 0.05 level of significance guided the study. Descriptive survey research design was adopted. The entire population of 68 automobile technology educators in the eight public colleges of education in South East, Nigeria was studied without sampling. The instrument for data collection was validated by three experts and the reliability was established using Cronbach alpha statistic which yielded a coefficient of 0.77. Mean and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses at 0.05 level of significance. Findings of the study revealed that the automobile technology educators agree to a high extent that blended learning strategies and interactive multimedia instructional strategiesenhance the teaching of automobile technology education courses for self-employment. The study further revealed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of educationon the extent blended learning strategies and interactive multimedia instructional strategiesenhance the teaching of automobile technology education coursesfor self-employment in South East, Nigeria. The study concluded thatinnovative instructional strategies such as blended learning strategies and interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment to a high extent. Among others, it was recommended that automobile technology educators in Federal and State colleges of education in South East, Nigeria should upskill themselves on the utilization of blended learning strategies and interactive multimedia instructional strategies to not only increase their instructional efficiency but also prepare students for the automobile industry.

Keywords: Innovative instructional strategies, automobile technology education courses,colleges of education and self-employment

Introduction

Tertiary institutions are institutions of higher learning where advanced theories of knowledge, practical work skills and attributesare imparted to students in various fields of human endeavour to facilitate the

transformation of societies.In Nigeria, tertiary institutions consist of universities, polytechnics and colleges of education. Objectively, the tertiary institution established to produce qualified and competent primary and secondary school teachers in Nigeria is college of education. Holistically, Onokpaunu (2023) posited that colleges of education are teacher training institutions that provide full-time and remedial courses in instructional methodologies, learning styles, school management, behavioural and sociological dispositions of adolescents and adults, philosophical and theoretical underpinning of subject matters as well as curriculum development of programmes across all areas of learning. One of the specialized areas of learning offered in colleges of education in Nigeria is automobile technology education programme.

Automobile technology education programme is a specialized vocational and technical education that covers the design, construction, maintenance and repairs of automobiles with engines. Caixia, Xiaowei, Feng and Neng (2024) claimed that automobile technology education programme is connected with scientific principles and knowledge applied in the design and construction of old and modern vehicles. Ezeama (2016) remarked that graduates of automobile technology education programme are expected to test, diagnose, service and completely repair any fault relating to the old and modern vehicles and also assemble main units and systems of automobiles by following the manufacturers' specifications. Automobile technology education programme exposes students to the necessaryskills needed to start-up maintenance and repair workshops in the society.Upon graduation, Babayo, Babawuro, Adamu and Umar(2021) avowed those graduates of automobile technology education programmeare equipped with relevant skills and knowledge to be able to efficiently carry out maintenance work and repairs on highly automated engines and computerized automobiles.

In order to be able to produce competent graduates of automobile technology education programme that can service, repair and maintain all automobiles without mistakes, automobile technology educators must utilize innovative instructional strategies. In educational context, iinnovation is the introduction of new practices into educational processes while instructional strategies are the instructional approaches used to guide students understand the contents of a subject matter. Collectively, Akinyele, Oke and Bolarinwa (2017) posited that innovativeinstructional strategies integrate the use of modern technologies into instructional processes to provide students with authentic learning experiences. In addition, Ezeabii, Ekoh-Nweke and Agbo (2022) averred that innovative instructional strategiesare instructional approaches such as blended learning strategies, flipped classroom technique and interactive multimedia instructional strategies among others that educators adopt to achieve the instructional objectives of subject matters. The rationale behind the integration of innovative instructional strategies is to enable educators to engage students with creative instructional designs and perspectives for improved acquisition and retention of knowledge, skills and attributes embedded in automobile technology education programme.

It is believed that the application of innovative instructional strategies such as blended learning strategies, flipped classroom technique and interactive multimedia instructional strategiesin automobile technology education programme will equip students with creative thinking skills to create self-employment venture in the automobile industry upon graduation from colleges of education. Self-employment is an economic venture that has the potentials to generate revenue and investment. Onyebuenyi (2018)

submitted that self-employment refers to a situation where an individual begins and takes control of their own business entity rather than working for an employer. Eze, Ezenwafor and Igberaharha (2016) viewed self-employment as a situation whereby an individual operates a business or profession as a sole proprietor, partner in a partnership or corporation, independent contractor or consultant and draw income from the trade or business. In the context of this study, self-employment is the ability of graduates of automobile education technology programme to set up business ventures in the automobile industry for the purpose of making profit. Suffice to say that, when automobile technology educators engage their students withinnovative teaching methods, the students become active learners which facilitate the acquisition of technical and soft skillsto set-up their own maintenance and service workshops after graduation.

The innovative instructional strategies considered for this studyareblended learning and interactive multimedia teaching methodsbecause they may provide learning experiences capable of preparing graduates of automobile technology education to participate successfully in the knowledge based economy must acquire the requisite skills-set to set up entrepreneurial workshops for handling modern automobiles with hybrid engines and engineering systems. Blended learning strategy is an innovative concept that embraces both traditional teaching designs in the classroom and technology facilities providing offline learning and online learning experiences for students. Grabinski, Kedzior and Krasodomska (2015) posited that blended learning strategy has scope for collaborative learning, constructive learning and computer assisted learning.

According to Santosh in Ezekoka(2015), there are six types of blendedlearning strategy which include face-to-face driver model, rotation model, flex model, online lab, self-blend model and online driver. Face-to-face driver is a blended learning model in which educators deliver most of the curriculum. Educators lead the class in a lecture following an established protocol taking precedence and technology being a secondary thought. However, they also produce online resources to supplement or revise course material which students can study at home, in the classroom or in a technology lab.

Ezekoka(2015) posited that the rotation model, in which online engagement is combined or rather, embedded, withina range of face- to- face forms of instruction in a cyclical manner. In the rotation model of blended learning, a student rotates on a fixed schedulebetween learning online in a one-to-one, self-pacedenvironment and sitting in a classroom with a traditionalface-to-face teacher.Flex model of blended learning features an onlineplatform that delivers most of the curricula. It is the modelwhere most of the learning is done online and the face-to facemodel exists to provide on-site support for a flexibleand adaptive, as required basis through in-person tutoringsessions and small group sessions.Online lab is a model of blended learning thatcharacterizes programs that rely on an online platform todeliver the entire course but in a brick-and-mortar labenvironment. The entire course and teaching are doneonline. Educators interact with students through prerecordedvideos, audio and video conferences ordiscussion forums and email.The self-blend model is a fully individualizedapproach that allows students to choose to take one ormore courses online to supplement their traditionalschool's catalog. Maximum part of the learning is doneonline, but the student will still attend face-to-face classes.Online driver involves online platform as well aseducators to deliver the curricula. Students work fromremote locations most of the time and come to school foroptional or required face-to-face classes.

On the other hand, interactive multimedia instructional strategies are multimedia-based

applications that enable students to communicate information or ideas with digital and print elements. Interactive refers to a term where direct contact is maintained in between the user and the computer while media refers to the collection of text, audio, video, animations, graphics and sound (Kapi, Osman, Ramli &Taib, 2017). According to Son and Simonian (2016), interactive multimedia resources are conditioned to present instructional contents and materials with a more interesting andinformative display to facilitate and increase student's interest to learn subject matters. In educational literature, Putra (2018) posited that interactive multimedia instructional strategyentails the use of multiple media to createexciting learning environment with the presence of text, picture, sound, animation and video.

The examples of interactive multimedia instructional strategies, as outlined in Olise (2014), Ananga and Akayuure (2016) and Onokpaunu (2016)include but are not limited to the following;

Multimedia portfolios are electronic collection of evidence that show teachers and students academic journey over time that can be created and organized in the internet, CD ROMS, video, audio and even in animation format. They can be used for almost any subject and are easy to create using video editing software. Educators can use multimedia portfolios to enhance their lessons, or ask students to deliver reports in slideshow format.Webcasting or web streaming is an internet based technology that can be used for teaching and learning in audio and video form synchronously over the web. Webcasting is a system where two or more parties (lecturers and students) in different physical location can see and hear each other in real time over a regular high-speed internet connection.

Podcasts are audio or video files published online, which can be downloaded fromthe internet. The files themselves are portable and depending on their format, theycan be played back on a variety of mobile devices such as iPods, mobile phonesand personal digital assistant. Podcasts are usually included withinthe web 2.0 galaxy as another example of user generated content. If effectively utilized, educators can use podcasts for collaborative professional development as a means to enhance learning experiences. Online videoconferencing is the use of television, video and soundtechnology as well as computer networks via the internet to enable people indifferent locations to see, hear, and talk with one another. Educators can online videoconferencing to foster team building and provide hands-on experience with students. Here, three to five students are assigned to a team and make a short video on topics that will be shared in the classroom among their colleague to facilitate group learning.

Interactive whiteboard is a hug electronic whiteboards that is connected to a computer and also to a projector. So the projector shows the desktop of the same computer onto the surface of the interactive whiteboard (IWB) and the users of this kind of system can control the computer system with a pen, finger, or any other device. The computer generated images are projected on the electronic whiteboard by the projector enabling educators and students to take control of the instructional process and build interactive discussions on subject matters.Internet telephony is also known as Voice overInternet Protocol (VOIP). It is a technology for transmitting ordinary telephonecalls over the internet. It takes analog audio signals, like the type one's hear when talking on the phone, and turns them into digital data for transmission over theinternet. Because it bypasses the regular phone system, long distance calls areoften free and costs are restricted to the cost of network subscription. Internet telephony as a category of hardware and software enableeducators to

use the internet for voice conversation with microphone and speakers.

Based on the descriptions of blended learning strategy and interactive multimedia instructional strategies, the extent to which they enhance the teaching of automobile technology education courses for self-employmentin colleges of education in South East, Nigeria is unknown. This is the crux of the study.

Statement of the Problem

The teaching of automobile technology education courses in colleges of education provides a foundation for students to become automobile technicians. It is important therefore, that auto mechanics technicians are equipped with current skills and knowledge to be able to efficiently carry out maintenance work and repair modern automobiles through the use of innovative instructional strategies such as blended learning strategy and interactive multimedia instructional strategies by their educators. It is believed that the utilization of blended learning strategy and interactive multimedia instructional strategies will instill entrepreneurial intentions among graduates of automobile technology education programme to become active technicians and mechanics in the automobile marketplace in South East, Nigeria. The study, therefore, sought to collect the opinions of automobile technology educators on the extent to which blended learning strategy and interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment in colleges of education in South East, Nigeria

Purpose of the Study

Specifically, this study determined, the extent to which blended learning strategy and interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment in colleges of education in South East, Nigeria

Research Questions

The following research questions guided the study: In the opinion of automobile technology educators;

1. To what extent blended learning strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employmentin South East, Nigeria?
2. To what extent interactive multimedia instructional strategies enhance the teaching of automobile technology education courses in colleges of education for self-employment in South East, Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance

1. Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on theextent blended learning strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employmentin South East, Nigeria.
2. Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on the extent interactive multimedia instructional strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employmentin South East, Nigeria.

Methodology

The study adopted descriptive survey research design. Descriptive survey research design makes it possible for the researchers to have a broad view from a sample of automobile technology educators on theinnovative instructional strategies for enhancing the teaching of automobile technology education courses for self-employment in South East, Nigeria. The population of the study comprised 27

automobile technology educators in three Federal colleges of education and 41 automobile technology educators in five State colleges of education in South East, Nigeria. There was no sampling because the entire population was studied. A structured and validated questionnaire containing 19 items on a five-point rating scale of Very HighExtent(VHE), High Extent (HE), Moderate Extent(ME),Low Extent (LE) and Very Low Extent (VLE) was used for data collection.The reliability of the instrument was determined through a pilot test.Copies of the instrument were administered to 10 automobile technology educators in South South, Nigeria who were not part of the research population. Data collected were analyzed using Cronbach's alpha statistic to determine the internal consistency of the instrument and co-efficients of 0.83 and 0.70 for clusters B1 and B2 respectively were obtained. This is high enough for the instrument to be considered reliable as suggested by Nworgu (2015) that a reliability co-efficient of 0.70 and above is an acceptable reliability value.

Copies of the questionnaire were administered to the respondents in their offices personally by the researchers with five research assistants. Out of the 68 copies of the questionnaire administered, only 55 copies (representing 81 percent) were successfully retrieved and used for data analysis. Mean and standard deviation were used to answer the research questions and determine the homogeneity or otherwise of the respondents' views. Decisions on the research questions were based on the grand mean in relations to the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Very Low Extent, those with 1.50 - 2.49 are Low Extent, items with mean ratings of 2.50 - 3.49 are rated Moderate Extent, those with 3.50 - 4.49 are rated High Extentand items with mean ratings of 4.50 - 5.00 are rated Very High Extent. T-test was used to test the null hypotheses at 0.05 level of significance. A hypothesis was accepted where the p-value is greater than the alpha level of 0.05 ($p > 0.05$), at an appropriate degree of freedom; otherwise, the null hypothesis was rejected.

Results

Research Question 1

To what extent blended learning strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employment in South East, Nigeria?

Data relating to this research question were analysed and presented in Table 1

Table 1

Respondents' mean ratings on extent blended learning strategies enhance the teaching of automobile technology education courses for self-employment

S/N	Item Statements	$\bar{X}$	SD	Remarks
1	Face-to-face driver model of blended learning	3.61	.52	HighExtent
2	Rotational model of blended learning	3.80	.77	High Extent
3	Flex model of blended learning	4.03	.41	High Extent
4	Online lab model of blended learning	3.72	.60	High Extent
5	Self-blend model of blended learning	4.09	.48	High Extent
6	Online driver model of blended learning	4.22	.75	High Extent
7	Enriched virtual model	3.91	.50	High Extent
8	Flipped classroom model	3.76	.82	High Extent
9	Project-based model	3.83	.63	High Extent
Cluster Mean		**3.89**		

Data in Table 1 show that the nine blended learning strategies have mean scores ranging from 3.61 to 4.22meaning that the items on blended learning strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employment in South East, Nigeria. Therefore, the cluster mean of 3.89 indicates that automobile technology educators agree to a high extent that blended learning strategiesenhance the teaching of automobile technology education courses for self-employment. The standard deviations for all the items are within the same range showing that the respondents are not wide apart in their mean ratings

Hypothesis 1

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on the extent blended learning strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employment in South East, Nigeria.

Table 2

Summary of t-test analysis of respondents' mean ratingson theextent blended learning strategies enhance the teaching of automobile technology education courses for self-employmentbased based on institutional ownership

Variable	N	$\bar{x}$	SD	df	t-value	p-value	Decision
State COEs	32	81.43	6.37	53	1.015	0.122	Not Significant
Federal COEs	23	75.96	5.60				

Table 2 shows that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the extent blended learning strategies enhance the teaching of automobile technology education coursesfor self-employmentin South East, Nigeria. This is shown by the p-value of 0.122, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Research Question 2

To what extent interactive multimedia instructional strategies enhance the teaching of automobile technology education coursesin colleges of education for self-employmentin South East, Nigeria?

Data relating to this research question were analysed and presented in Table 3

Table 3

Respondents' mean ratings on extent interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment

S/N	Item Statements	$\bar{X}$	SD	Remarks
10	Multimedia portfolios	4.30	.38	High Extent
11	Webcast	4.23	.64	High Extent
12	Podcast	4.11	.42	High Extent
13	Online video-conferencing	3.91	.27	High Extent
14	Interactive whiteboards	3.82	.50	High Extent
15	Internet telephony	3.74	.61	High Extent
16	Live virtual classroom	3.88	.28	High Extent
17	Mobile telephony	3.65	.46	High Extent
18	Interactive television	3.93	.69	High Extent
19	Gaming	3.79	.30	High Extent
Cluster Mean		**3.94**		

Data in Table 3 show that the 10 interactive multimedia instructional strategies have mean scores ranging from 3.61 to 4.22 meaning that the items on interactive

multimedia instructional strategies enhance the teaching of automobile technology education programmein colleges of education for self-employment in South East, Nigeria. Therefore, the cluster mean of 3.94 indicates that automobile technology educators agree to a high extent that interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment. The standard deviations for all the items are within the same range showing that the respondents are not wide apart in their mean ratings

Hypothesis 2

Automobile technology educators in Federal and State colleges of education do not differ significantly in the mean ratings on the extent interactive multimedia instructional strategies enhance the teaching of automobile technology education courses in colleges of education for self-employment in South East, Nigeria

Table 4

Summary of t-test analysis of respondents' mean ratingson theextent interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employment based on institutional ownership

Variable	N	$\bar{x}$	SD	df	t-value	p-value	Decision
State COEs	32	85.046.38	53	0.293	0.154	Not Significant	
Federal COEs	23	73.635.54					

Table 4 shows that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of education on the extent interactive multimedia instructional strategies enhance the teaching of automobile technology education courses for self-employmentin South East, Nigeria. This is shown by the p-value of 0.154, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Discussion of findings

Findings of the study disclosed that automobile technology educators agree to a high extent that blended learning strategiesenhance the teaching of automobile technology education programme for self-employment. The study clearly shows that online driver model of blended learning, self-blend model of blended learning, flex model of blended learning, enriched virtual model, project-based model and rotational model of blended learningenhances the teaching of automobile technology education programme for self-employment in colleges of education in South East, Nigeria. This finding is agrees withRobinson and Njoku (2024) which reported the application of blended learning strategies expose students to different forms of practical learning experiences on subject matter.

In addition, the study revealed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of educationon the extent blended learning strategies enhance the teaching of automobile technology education programme for self-employment in South East, Nigeria. This finding means that automobile technology educators in colleges of education in South East, Nigeria, irrespective of their institutional ownership shared the same position that blended learning strategiesenhance the teaching of automobile technology education programme for self-employment to a high extent. This finding supports, Ahmad, Nordin, Ali, Nabil and Latip (2017) who discovered that educators collectively agree that blended learning strategies enhance instructional delivery because these strategies encourage students to

solve problems and have the intelligence to handle the demands of the workplace.

Findings of the study revealedautomobile technology educators agree to a high extent that interactive multimedia instructional strategies enhance the teaching of automobile technology education programme for self-employment. The study clearly shows that multimedia portfolios, webcast, podcast, online video-conferencing, interactive television, interactive television and gamingenhances the teaching of automobile technology education programme for self-employment in colleges of education in South East, Nigeria. This finding is in tandem with Amaechi and Thomas (2016) who discovered that presenting instructions with visual, audio, visual-audio and animation qualitiesimprove students' understanding and learning outcomes.The finding of this study agrees with Ngonso, Egielewa and Nyong (2018)that interactive multimedia instructional strategies enhance teaching because these strategies create opportunities for students to acquire the employable skills needed in the workplace

The study further revealed that there is no significant difference in the mean ratings of automobile technology educators in Federal and State colleges of educationon the extent interactive multimedia instructional strategies enhance the teaching of automobile technology education programme for self-employment in South East, Nigeria. This finding means that automobile technology educators in colleges of education in South East, Nigeria, irrespective of their institutional ownership shared the same position that interactive multimedia instructional strategies enhance the teaching of automobile technology education programme for self-employment to a high extent. The findings corroborate the findings ofDjamas, Timedi and Yohandri (2018)which reported that educators collectively agree that interactive multimedia instructional strategies enhance instructional deliverybecause they boost student motivation and academic performance in the classroom.

Conclusion

Innovative instructional strategies allow students to gain knowledge during instructional discussions and activities in the classroom, as opposed allowing them to merely listen to their educators. Based on the findings of the study, the researchers concluded that blended learning strategies and interactive multimedia instructional strategies enhance the teaching of automobile technology education programme for self-employment to a high extent.

Recommendations

Based on the findings of this study, the following recommendations were made;

1. Automobile technology educators in Federal and State colleges of education in South East, Nigeria should upskill themselves on the utilization of blended learning strategies and interactive multimedia instructional strategies to not only increase their instructional efficiency but also prepare students for the automobile industry
2. Management of Federal and State colleges of education in South East, Nigeria should allocate funds for adequate provision of hardware and software facilities to support the utilization of blended learning strategies and interactive multimedia instructional strategies by automobile technology educators. This would go a long way in facilitating the teaching of automobile technology education courses in digital and multimedia formats to increase students' enthusiasm to learn
3. The government should make it a priority to recruit automobile technology educators that are proficient in the utilization of blended learning strategies and interactive multimedia instructional

strategies in colleges of education in South East, Nigeria. This would go a long in ensuring that only competent automobile technology educators are employed in colleges of education to prepare students for the automobile workplace

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