

Innovations

Influence of Instructional Materials in Teaching and Learning Foundry Craft Practice in Enugu State, Nigeria

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Abstract: *Instructional materials play a very important role in teaching and learning foundry craft practice in Nigeria technical colleges. Foundry craft practice plays vital roles for national development in the area of science and technology. The study analyzed the influence of instructional materials in teaching and learning foundry craft practice in Government Technical Colleges in Enugu State, Nigeria. Three research questions and three null hypotheses guided the study. The study adopted survey research design. Primary data were collected through a structured questionnaire administered on 38 purposively sampled teachers and students across the technical colleges that do foundry craft practice. The questionnaire was face-validated by three experts. Reliability test was carryout using Cronbach Alpha approach, which yielded an index of 0.85. Copies of the questionnaire were administered on the respondents through direct contact. The return rate of the instrument was 100%. The data collected for the study were analyzed with mean, standard deviation and t-test. Mean and standard deviation were used to answer the research questions, while t-test was used to analyze the null hypotheses. The major finding was that instructional materials play vital and positive impacts in the teaching and learning of foundry craft practice in technical colleges in Enugu State, Nigeria. Based on the finding, it was recommended that the government should give enough funds to the technical colleges for the provision of the needed instructional materials for effective teaching and learning of foundry craft practice.*

Keywords: *Instructional materials, foundry, teaching and learning*

Introduction

Instructional materials are the tools that teachers use to engage students in learning. When used effectively, they help students to master the content and skills more

efficiently. Folu (2018) opined that instructional materials are powerful tools and strategy to bring about effective teaching and learning.

The importance of quality and adequate instructional materials in teaching and learning can occur through their effective utilization during classroom teaching. Instructional materials here include all the tools that the teachers can use to make teaching and learning more interesting and memorable (Adebuyeje, 2018). Instructional materials serve as a channel between the teachers and the students in delivering instructions. They also serve as the motivation on the teaching and learning process. It is use to get the attention of the students and eliminate boredom. Instructional materials are important for teaching and learning (Dodge, 2017).

Creswell (2018) opined that the use of instructional materials during teaching and learning process can appeal to the individual's attention among students by creating interest in order to attain the goal for the learner. The use of instructional materials can facilitate the decision of a person towards learning by taking the right actions. Learning is facilitated when learners make use of their sense organs for seeing, hearing, and touching. Creswell (2018) pointed out that instructional materials are normally chosen to meet the teaching requirements of an approved curriculum.

According to Faiz (2017), instructional materials include books, audio-visual, software and hardware of educational technology. The availability and utilization of relevance of instructional materials in classrooms influence teaching and learning of foundry craft practice in technical colleges. It has positive effect on students' learning and academic performance. Its efficiency and high productivity in teaching and learning cannot be over emphases.

Instructional materials are valuable resources and teachers' strategic factor in organizing and providing better learning. It helps to elaborate a concept that the teacher could not without an instructional material. It helps students to learn more comfortably therefore influencing positively their academic performance (Oni 2019).

Instructional materials are very important in teaching and learning. Bloom (2018) opined that science and technology education programmes cannot be taught effectively without the existence of equipment for teaching. This is because instructional materials help those who learn to develop problem-solving skills and scientific attitudes. Also according to Alexander (2010), when instructional materials are provided to meet relative needs of teaching and learning process, students will have access to the reference materials mentioned by the teacher. This will help them have better academic performance.

According to Uwazi (2015) instructional materials are considered important in teaching and learning in technical colleges because they are the basic tools and resources

for good teaching and learning process. Absence or inadequacy of instructional materials makes teachers handle subjects in an abstract manner and the class will be non-exciting (Eshiwani, 2015). Instructional materials such as textbooks, charts, audio-visual and electronic instructional materials such as television, video and tape recorder contribute much in making teaching and learning interesting (Atkinson, 2019).

The importance of instructional materials is also evident in students' academic performance (Adeogun, 2015). According to Adeogun, schools whose teachers use more and better instructional resources perform better than schools whose teachers do not use instructional materials. This corroborated the study by Nwogu (2019) that most equipped missionary schools performed better than public schools because students and teachers are provided with sufficient and quality teaching and learning resources. Instructional facilities have a potent factor to qualitative education.

According to Farrant (2018) and Bloom (2018), availability of instructional materials can work best to influence the teaching and learning of foundry craft practice if other conditions are met such as the quality of classroom, quality of the laboratory and the quality of teachers to use these resources.

Theoretical framework

According to Mayer (2019) theory is a set of related statement that are arranged systematically so as to give foundational meaning to series of events. Theories guide practice and lead to application of knowledge to solve real world problems. Theoretically, this study is guided by two theories: Instructional material theories and socio-cultural theory of teaching, learning, and development.

According to Robert Mills Gagne (1916-2002), instructional material theory describe how to help students learn, develop, create conditions that boost the chance of learning and improve instruction. It helps instructional designers understand how people retain and recall information and stay motivated and engage in meaningful learning.

Instructional material theories assume that there is a direct link between the materials that the teachers use and the students' learning outcomes. It says that instructional materials have the capacity to develop into students the highest order of intellectual skills as they illustrate clearly, step by step how to follow the rules, principles and elaborate on the concepts (Ojimba 2016). It can be used to develop higher learning abilities to the learners through self-teaching or guided learning.

Socio-cultural theory of teaching, learning and development propounded by Lev Semyonovich Vygotsky in 1962 is the second theory that framed this study. This theory posits that human's minds develop as a result of constant interactions with the social material world. This theory says that human mind develop through interaction with materials in the learning process where people learn from each other and use their

experiences to successfully make sense of the materials they interact with. These experiences are crystallized in 'cultural tools' and the learners have to master such tools in order to develop specific knowledge and skills in solving specific problems and in the process, become competent in specific profession. In the classroom these tools are the instructional materials used for teaching and learning.

Learning by using such tools helps the mind to develop and leads to new and more elaborated forms of mental functioning. The socio-cultural allows for a synthesis of teaching, learning and cognitive development. This theory implies that instructional materials lead to cognitive development because they mediate learners' thinking through the tools and such mediation constitutes the very cornerstone of mental development. This study evaluates the influence of instructional materials in teaching and learning foundry craft practice in government technical colleges in Enugu State, Nigeria. Specifically, the study addressed the following research questions:

1. What are the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria?
2. What strategies do teachers use to minimize the challenges of attaining and using quality instructional materials for the teaching and learning of foundry craft practice in government technical colleges in Enugu State Nigeria?
3. What are the impacts of instructional materials on students' academic performance in foundry craft practice in government technical colleges in Enugu State Nigeria?

Hypothetical presumptions:

- There is no significant difference between the mean responses of teachers and the students on the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria.
- A significant difference does not exist between the mean responses of teachers and the students on the strategies the teachers can use to minimize the challenges of attaining and using quality instructional materials for the teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria.
- There is no significant difference between the mean responses of teachers and the students on the impacts of instructional materials on students' academic performance in foundry craft practice in government technical colleges in Enugu State Nigeria.

Methodology

The design adopted for this study was survey research approach. This in line with Uzoagulu (2011) who opined that a survey research design is one in which a group of people or items are studied by collecting and analyzing data from a few people or items considered to be representative of the entire population.

Quantitative data

The study collected data through a survey carried out in Enugu State, Nigeria. Enugu State which is located on the latitude of 6°30 North and on the longitude of 7° 30 East is one of the States in Nigeria and it is made up of 17 local government areas. The state has two main government technical colleges that offer foundry craft practice. Thirty-eight respondents made up of six teachers and thirty-two students were purposively selected as the respondents for the study. A structured questionnaire was used for data collection. The questionnaire had three sections. Section A had 10 items, section B had 8 items and section C had 10 items. Each of the items were assigned four response options of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) and were weighed at 4,3,2, and 1 respectively. The questionnaire was face validated by three experts contacted on Research Gate. A pilot study was carried out and the data were analyzed using Cronbach Alpha approach to establish the reliability and internal consistency of the items on the instrument, which yielded an index value of 0.85. Thirty-eight copies of the questionnaire were administered on the respondents through direct contact. All the distributed 38 copies were returned and duly completed for inclusion in the data analyses.

Data analysis

Data generated for the study were analyzed using SPSS version 22. Mean (\bar{x}) were used to analyze the nominally distributed data while standard deviation (SD) was used to analyze the level of disparity in the responses of the respondents. In taking decision for the three research questions, a cut-off point of 2.50 decision rule was set for the mean, thus, any item with a mean value higher or equal to 2.50 was regarded as Agree (A) while less than 2.50 was regarded as Disagree (D). For the standard deviation, a low value means convergence of responses therefore, similar response pattern while higher value means divergence of opinion on the same question among respondents.

Testing of hypotheses

t-test statistic was used to test the null hypotheses at 0.05 significance level. Reject the null hypotheses if the t-calculated (t-cal) exceed the t-table (t-crit). Otherwise do not reject the null hypotheses.

Results

Research Question One

- What are the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State?

Table 1: Mean Ratings of the Challenges Teachers face in Assessing Instructional Materials for Teaching and Learning of Foundry Craft Practice in Government Technical Colleges in Enugu State. N=38

S/N	Item statement	S	T	S	T	S	T
		X		SD		D	
1	Poor funding	3.83	3.94	0.37	0.24	A	A
2	Poor government policy	3.83	3.90	0.37	0.30	A	A
3	Lack of ICT	3.83	3.94	0.37	0.24	A	A
4	Poor salary	3.83	3.94	0.37	0.24	A	A
5	Lack of grant to technical teachers	3.83	3.97	0.37	0.20	A	A
6	Instructional material can be expensive	3.83	3.97	0.37	0.20	A	A
7	Poor maintenance culture	3.83	3.94	0.37	0.24	A	A
8	Poor continuing technical teachers education programme	3.83	3.94	0.37	0.24	A	A
9	Time consuming to find right instructional material	3.83	3.97	0.37	0.20	A	A
10	Lack of support from administration and authority	3.83	3.97	0.37	0.20	A	A
Cluster Mean		3.83	3.95	0.37	0.23	A	A

Note: T=Teachers, S=Students, X=Mean, SD=Standard deviation, A= Agree, D= Decision

Table 1 showed that the respondents agreed that all the items identified are the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria. The mean achievements score of the respondents which ranges from 3.83 to 3.97 were above the bench mark of 2.50

Research Question Two

- What strategies do teachers use to minimize the challenges of attaining and using quality instructional materials for the teaching and learning of foundry craft practice in government technical colleges in Enugu State?

Table 2: Mean Ratings on the Strategies Teachers can use to minimize the Challenges of attaining and using quality Instructional Materials for the Teaching and Learning of Foundry Craft Practice in Government Technical Colleges in Enugu State.

S/N	Item statement	N=38					
		S	T	S	T	S	T
		X			SD		D
1	Improvisation	3.83	3.94	0.37	0.24	A	A
2	Use simple devices	3.83	3.78	0.37	0.29	A	A
3	Use of ICT	3.83	3.94	0.37	0.24	A	A
4	Fund provision	3.83	3.94	0.37	0.24	A	A
5	Regular supervision	3.83	3.94	0.37	0.24	A	A
6	Organizing workshop for technical teachers	3.83	3.90	0.37	0.39	A	A
7	Use of newer technology	3.83	3.90	0.37	0.39	A	A
Cluster Mean		3.83	3.91	0.37	0.29	A	A

Table 2 showed that the respondents agreed that all the items identified are the strategies teachers can use to minimize the challenges of attaining and using quality instructional materials for teaching and learning of foundry craft practice in Government Technical Colleges in Enugu State, Nigeria. The mean achievements score of the respondents which ranges from 3.83 to 3.94 is above the bench mark of 2.50

Research Question Three

- What are the impacts of instructional materials on students’ academic performance in foundry craft practice in government technical colleges in Enugu State, Nigeria?

Table 3: Mean Ratings of the Impacts of Instructional Materials on Students’ Academic Performance in Foundry Craft Practice in Government Technical Colleges in Enugu State, Nigeria. N=38

S/N	Item statement	S	T	S	T	S	T
		X			SD	A	D
1	Improve students competence	3.83	3.94	0.37	0.39	A	A
2	Provides better understanding	3.83	3.90	0.37	0.30	A	A
3	Stimulates students desire to learn	3.83	3.94	0.37	0.24	A	A
4	Makes learning available to wider audience	3.67	3.94	0.23	0.24	A	A
5	Enhance teaching and learning	3.83	3.94	0.37	0.24	A	A
6	Makes learning effective	3.83	3.97	0.37	0.39	A	A
7	Provides concepts that improve learning skills	3.83	3.94	0.37	0.24	A	A
8	Makes learning interesting	3.67	3.94	0.23	0.24	A	A
9	Stimulates students interest during teaching and learning	3.83	3.91	0.37	0.39	A	A
10	Provide relevant source information to students and teachers	3.83	3.88	0.37	0.30	A	A
Cluster Mean		3.83	3.93	0.34	0.30	A	A

Table 3 showed that the respondents agreed that all the items identified are the impacts of instructional materials on students’ academic performance in foundry craft practice in Government Technical Colleges in Enugu State, Nigeria. The mean achievements score of the respondents which ranges from 3.67 to 3.83 is above the bench mark of 2.50.

Hypotheses testing

Hypotheses One

- There is no significant difference between the mean responses of teachers and the students on the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria.

Table 4: t-test Analysis of the Mean Responses of Teachers and the Students on the Challenges Teachers face in Assessing Instructional Materials for Teaching and Learning of Foundry Craft Practice in Government Technical Colleges in Enugu State, Nigeria.

	N	X	SD	Df	t-cal	t-crit	Decision
Respondents							
Teachers	6	3.95	0.23	36	1.10	±1.96	NS
Students	32	3.83	0.32				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

In table 4, data showed that t-cal of 1.10 is less than t-crit which is ±1.96, therefore there is no statically significant difference between the mean responses of teachers and the students on the challenges teachers face in assessing instructional materials for teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria

Hypotheses Two

- A significant difference does not exist between the mean responses of teachers and the students on the strategies the teachers can use to minimize the challenges of attaining and using quality instructional materials for the teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria.

Table 5: t-test Analysis of the Mean Responses of Teachers and the Students on the Strategies the Teachers can use to minimize the Challenges of Attaining and using quality Instructional Materials for the Teaching and Learning of Foundry Craft Practice in Government Technical Colleges in Enugu State, Nigeria.

	N	X	SD	Df	t-cal	t-crit	Decision
Respondents							
Teachers	6	3.91	0.29	36	0.59	±1.96	NS
Students	32	3.83	0.37				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

The data in table 5 showed t-cal of 0.59 is less than the t-crit which is ±1.96. This showed that a significant difference does not exist between the mean responses of teachers and the students on the strategies the teachers can use to minimize the challenges of attaining and using quality instructional materials for the teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria.

Hypotheses Three

- There is no significant difference between the mean responses of teachers and the students on the impacts of instructional materials on students’ academic performance in foundry craft practice in government technical colleges in Enugu State Nigeria.

Table 6: t-test Analysis of Mean Responses of Teachers and the Students on the Impacts of Instructional Materials on Students’ Academic Performance in Foundry Craft Practice in Government Technical Colleges in Enugu State Nigeria.

	N	X	SD	Df	t-cal	t-crit	Decision
Respondents							
Teachers	6	3.93	0.30	36	0.73	±1.96	NS
Students	32	3.83	0.34				

Note: N = number of respondents, X = mean, SD = standard deviation and NS = not significant

In table 6, data showed that t-cal of 0.73 is less than t-crit which is ±1.96, therefore there is no statically significant difference between the mean responses of teachers and the students on the impacts of instructional materials on students’ academic performance in foundry craft practice in government technical colleges in Enugu State Nigeria.

Discussion

Challenges that teachers face in accessing and using instructional materials

Teachers in technical colleges in Enugu State face some challenges in accessing instructional materials. One of the big challenges that teachers in technical colleges face in accessing instructional materials is meager funds provided by the government to technical colleges for purchasing instructional materials. Other challenges are that instructional materials can be expensive and it can be time-consuming to find the right instructional material for each lesson. Also, technical colleges depend to the large extent on the government for instructional material funding. (Uwazi, 2015).

However, while the number of students who are enrolled in technical colleges has been increasing each year, technical education grant and fund has been dropping. According to Onche (2014), government’s policy towards efficient provision of these aspects of educational resources has not been encouraging and well planned, monitored and supervised. Another challenge that teachers face is the lack of exposure and limited accessibility to modern instructional facilities. Some technical

colleges do not have access to information communication technology (ICT) which could alleviate shortage of instructional materials.

Other challenges include: problem of installation, maintenance, operation, network administration and local technicians to service and repair some instructional materials equipment and facilities. Oni (2019) opined that poor salary is also another challenge that teachers face. Technical teachers in Enugu State are poorly paid. This becomes a hindrance for them to purchase their own teaching materials and acquisition of new ideas, skills and knowledge by failure in enrolling for further technical educational programmes including Information and Communication Technology (ICT). With this, the academic and intellectual capacities of technical teachers and learners are bound to be affected during classroom interaction. According Onche (2014) Lack of sufficient skills and creativity may hinder technical teachers to improvise their own instructional materials.

Another challenge that teachers face in accessing instructional materials is lack of clear policy and monitoring mechanisms to ensure that enough funds are provided to technical colleges in Enugu State for purchasing instructional materials. Policy towards efficient provision of these aspects of educational resources has not been encouraging (Akande, 2017).

The finding of the study on research question one showed that the respondents agreed that teachers face some challenges in assessing instructional materials for teaching and learning foundry craft in technical colleges in Enugu State, Nigeria.

The finding agreed with Mayer (2021) who indicated that teachers found it difficult to access instructional for teaching and learning in Enugu State.

Strategies to minimize the challenges of attaining and using quality instructional materials

There are a number of strategies which can be used in order to minimize the challenges of attaining and using quality instructional materials. One of the strategies is improvisation of instructional materials. Oni (2019) states that improvisation involves sourcing, selection and deployment of relevant instructional materials into the teaching and learning due to the absence or shortage of standard materials for a meaningful realization of specified educational goals and objectives.

According to studies done by Abodelraheem and Al-Rabane (2010), Udosen (2015) and Ibe-Bassey (2020) the creation of some improvised media of low technological materials and resource-centered learning can enlarge the limited knowledge base of any course of study and enrich instruction to a guaranteed quality. It can also promote strategies that ensure the integration of technology in the teaching

and learning process of science and technical education. Their findings are in agreement with the findings of Dodge (2017) who observed that using technologies like simulation devices open new horizons for individual learning tools, the environment resources and services.

The use of Information and Communication Technology can also minimize some of the challenges in accessing instructional materials. According to UNESCO (2014), the use and rapid spread of electronic communications has the capacity to affect the quality and efficiency of technical education throughout the world. The ease with which teachers and students can gather information over the internet on virtually any topic has the potential to transform instructional content and pedagogical practice.

Moreover courses developed by the best teachers in one country can be made available to students across many countries. Newer technology-based instructional strategies, incorporating the internet and the web can also be used more to expand communication and increase access to resources. Clegg (2018), points out that information and communication technology has potentials in increasing access and improving relevance and quality of education in developing countries. He further states the potentials of information and communication technology as follows: information and communication technology greatly facilitate the acquisition and absorption of knowledge offering developing countries unprecedented opportunities to enhance educational systems.

The finding of the study on research question two showed that the respondents agreed that there are some strategies teachers can use to minimize the challenges in assessing and using quality instructional materials for teaching and learning foundry craft in technical colleges in Enugu State.

The finding was in harmony with the study conducted by Kelsey (2020) who indicated that teachers can use some strategies to minimize the challenges they have in attaining to instructional materials.

Role of instructional materials on students' academic performance

Instructional materials play an important role in students' academic performance. It is an important tool in teaching and learning. They provide a way for teachers to present information to students in a variety of formats and help students learn and retain information. Instructional materials are materials which assist teachers to make their lessons explicit to students. They are used to transmit information, ideas and notes to students (Ijaduola (2017).

Instructional materials provide a structure for learning. Ojimba (2016) opined that properly used instructional materials provide a framework that helps students learn more effectively. They help to make content more engaging. Instructional materials save time

for both teachers and students. Good instructional materials that are well-organized could be easily used to impart knowledge and information to the students. When teachers have quality instructional resources at their disposal, they can spend less time preparing lessons and more time actually teaching (Faize, 2017).

Instructional materials play an important role in the teaching and learning process. They provide a way for teachers to present information to their students in a more organized and concise manner. According to Ike (2020) instructional resources level the playing field among learners. Students who have access to quality instructional resources always have a better academic performance.

According to Bloom (2018) predictor variables and mediating variables influence students' academic performance. When the predictor variables and mediating variables are of high quality, then teaching and learning process would produce high academic performance. Good, availability and effective use of adequate and quality instructional materials in the process of teaching and learning produce higher performance among the students (Ike, 2020).

It is anticipated that if there were enough and quality instructional materials in the teaching and learning and well utilization of those materials, they would contribute to quality teaching and learning and therefore better students' academic performance. It is also hoped that students would be more motivated to learn when they are exposed to quality instructional materials because their motivation would determine their success.

The finding of the study on research question three showed that the respondents agreed that instructional materials make positive impacts in students' academic performance in foundry craft practice in government technical colleges in Enugu State, Nigeria. The finding was in harmony with Adeboyeje (2018) who found that Instructional Materials aid student for better academic performance.

Analysis of the hypotheses indicated that: There is no significant difference between the mean responses of teachers and the students on the challenges teachers face in assessing instructional materials, the strategies the teachers can use to minimize the challenges of attaining and using quality instructional materials and the impacts of instructional materials on students' academic performance in foundry craft practice in government technical colleges in Enugu State Nigeria.

Conclusion and Recommendation

The conclusion was made based on the findings of the study. The result of the study provided empirical evidence that instruction materials are vital tool for effective teaching and learning of foundry craft practice in government technical colleges in Enugu State, Nigeria. It makes positive impact in academic performance of technical college students in foundry craft practice. This study showed that the influence of instructional

material in teaching and learning foundry craft practice cannot be overemphasized. The study also revealed that teachers face some challenges in accessing instructional materials but there are some strategies they can use to minimize the challenges of attaining and using quality instructional materials.

Based on the result of this study, the following recommendations were made:

- The government should make enough funds available to the technical colleges for the provision of the needed instructional materials for effective teaching and learning.
- Technical teachers should be given standard 21st century training to acquire skills on the production and utilization of instructional materials.
- There should be regular seminars and workshop for technical teachers on effects of instructional materials.

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