



Barriers and Measures for Enhancing the Conduct of Transformative Research among Industrial and Technology Education Lecturers and Postgraduate Students in University

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ABSTRACTS

The study identified the barriers and measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria. The population for the study was 228 respondents. Findings from the study revealed among others that lack of motivation, research networking, peer mentoring, research related performance evaluation in Universities was found to be a barrier to the conduct of transformative research. Findings from the study also revealed among others that seeking an appropriate mentorship, making full use of the capacity-building workshop, and taking formal training were found to be measured for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria. The study recommended among others that the administrators of Universities in North-Central, Nigeria should set up the conduct of transformative research as a goal and organize capacity-building workshops for Industrial and Technology Education lecturers and postgraduate students to achieve the stated goal.

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1. INTRODUCTION

Universities are places of learning above the secondary school level where students are equipped with relevant knowledge and skills in different occupations for employment in the world of work. [Suryani & Hamdu \(2021\)](#) stated that universities provide professional training for high-level jobs, as well as the education necessary for sustainable development. Specifically, university education contributes to the production of high-level manpower in diverse professional callings as dictated by national development requirements. The most important role of Universities is the production of highly skilled manpower and research output to meet perceived targets. According to [Adebanjo & Chika \(2021\)](#), most of the research output from Nigerian Universities seems not capable of addressing the educational challenges in various fields of study including Industrial and Technology Education.

Industrial and Technology Education is a major component of Vocational and Technical Education which is obtainable at various institutes of learning including Universities ([Rosina et al., 2021](#); [Shaturaev, 2023](#)). This type of education is designed to prepare an individual to acquire practical skills, basic and scientific knowledge, and attitude required as craftsmen, technicians, technologists, and sub-professional level in automobile, building, electrical, metal, and wood technology trades among others ([Stephen et al., 2022](#)). Federal Republic of Nigeria revealed that the goals of Industrial and Technology Education shall be to 1. Provide the trained manpower, particularly at craft, advanced and technical levels 2. Provide the technical knowledge and vocational skills necessary for agricultural, commercial, and economic development 3. Give the necessary training and impart skills to individuals who shall be self-reliant. The attainment of these goals is easily attainable with quality teachings and research among Industrial and Technology Education lecturers and postgraduate students.

The lecturers and postgraduate students are considered the major stakeholders in the conduct of research in Universities. [Perović & Kosor \(2020\)](#) stated that the conduct of results-oriented research among lecturers and postgraduate students holds the potential to address the challenges of every technological field of learning that includes Industrial and Technology Education. According to [Uwaifo \(2010\)](#), Industrial and Technology Education is faced with numerous challenges that truncated the chances of realizing the stated goals among which is the lack of research ideas among lecturers and postgraduate students capable of changing the means of investigation. To improve on the existing research patterns, there is a need for Industrial and Technology Education lecturers and postgraduate students to adopt transformative research.

Transformative research involves ideas, discoveries, or tools that radically change our understanding of an important existing educational practice or lead to the creation of a new paradigm or field of education. Transformative research is defined as research driven by ideas that have the potential to radically change our understanding of an important existing scientific or engineering concept or lead to the creation of a new paradigm or field of science or engineering. Such research describes research that restructures and revolutionizes our means of inquiry and thereby enhances our knowledge base. [Trevors et al. \(2012\)](#) stated that transformative research can promote paradigm shifts, produce technological cascades, and leads to novel hypotheses and research approaches capable of enhancing research outcomes in educational fields, especially in Industrial and Technology Education.

However, the inability of Industrial and Technology Education lecturers and postgraduate students to conduct transformative research may result in persistent poor research outcomes without the potential to solve educational challenges. According to [Eshre \(2018\)](#), the inability

of stakeholders in research to embrace transformative research may adversely affect educational practices and future research. Hence, to ensure the quality of educational practices and future research, there is a need to identify the barriers and measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.

As a statement of the problem, universities in Nigeria and all over the world are designed to equip individuals with the necessary knowledge, skills, and right attitude capable of solving societal challenges through teachings and research. Unfortunately, the quality of most research in various fields of study including Industrial and Technology Education in the universities seems not capable of addressing our contemporary challenges.

Uwaifo (2010) confirmed that Industrial and Technology Education is faced with numerous challenges that truncated the chances of realizing the stated goals among which is the lack of research ideas with the potential to change the means of investigation or hold the capacity to improve existing technology. To enhance the quality of research in Industrial and Technology Education, there is a need to explore research methods such as transformative research capable of ensuring a paradigm shift in the conduct of research. Hence, this study sought to identify barriers and measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.

The study aimed at identifying the barriers and measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria. Specifically, the objectives of the study sought to identify the:

- (i) Barriers to the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.
- (ii) Measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.

The following research questions were raised to guide the study:

- (i) What are the barriers to the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria?
- (ii) What are the measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria?

The following null hypotheses were formulated and tested at a 0.05 level of significance:

- (i) HO1: There is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria.
- (ii) HO2: There is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria.

2. METHODS

A descriptive survey research design was used for this study. The descriptive survey research design was adopted for this study because it is aimed at casting light on current issues or problems through a process of data collection. The study was carried out in North-

Central, Nigeria. The population for the study was 228 respondents consisting of all 28 lecturers and 111 postgraduate students in the Department of Industrial and Technology Education at the Federal University of Technology, Minna, and all 22 lecturers and 67 postgraduate students in the Department of Vocational Education, Benue State University, Benue. The sample for this study was 162 consisting of 44 lecturers and 118 postgraduate students. A simple Random Sampling Technique was used to select the sample for the study. The sample of 162 respondents was selected for this study because they are considered sufficient to represent the population (Krejcie & Morgan, 1970).

The instrument for data collection was a structured questionnaire developed by the researcher and designed on a five-point Likert's scale of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA), and Strongly Disagree (SD) with numerical values of 5, 4, 3, 2, and 1, respectively was used to collect data for the study. The instrument contained three sections, A, B, and C. Section A sought information on the status of the respondents, Section B comprises barriers to the conduct of transformative research and section C comprises measures for enhancing the conduct of transformative research. The instrument was content validated by three Industrial and Technology Education experts from the Federal University of Technology, Minna. Cronbach Alpha method was used to determine the reliability of the instrument and yielded .88 and .89 coefficients. Data were collected for the study through hand delivery of the research instrument by two research assistants from the two Universities offering Industrial and Technology Education in the study. The study employed the use of a mean to answer the research questions and a z-test to test the null hypotheses. The z-test was used because it is considered most appropriate for testing the mean difference between two groups that are above 30 in number. The decision on research questions was based on the real limit of numbers and the decision on the hypotheses was based on comparing the z-value with the p-value at a 0.05 level of significance. All statistics were carried out using Statistical Package for Social Sciences (SPSS) version 22.

3. RESULTS AND DISCUSSION

3.1. Research Question One

What are the barriers to the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria? The result show in **Table 1**.

Table 1 revealed that six out of the items had average mean values between 3.51 to 3.74. This indicated that the respondents agreed with all six items to be barriers to the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.

3.2. Research Question Two

What are the measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria? **Table 2** revealed that all five items had average mean values between 3.51 to 3.74. This indicated that the respondents agreed with all five items to be measured for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria.

Table 1. Mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria (N1=50, N2=178).

S/N	Items	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_A$	Remark
1	Lack of awareness of transformative research	3.64	3.58	3.62	Disagreed
2	Lack of motivation to carry out transformative research	3.79	3.66	3.74	Agreed
3	Lack of transformative research skills	3.63	3.67	3.65	Disagreed
4	Lack of research networking	3.52	3.65	3.57	Agreed
5	Lack of peer mentoring	3.69	3.75	3.57	Agreed
6	Lack of research-related performance evaluation in Universities to promote transformative research	3.52	3.75	3.61	Agreed
7	Lack of career research support	3.40	3.66	3.51	Agreed
8	Lack of sharing of resources	3.48	3.60	3.53	Agreed
Grand Mean		3.58	3.66	3.60	Agreed

Keys: N1 = Number of lecturers, N2 = Number of postgraduate students, 1 = Mean response of lecturers, 2 = Mean response of postgraduate students, A = Average mean response of lecturers and postgraduate students.

Table 2. Mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria.

S/N	Items	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_A$	Remark
1	Setting up transformative research writing as a goal	3.69	3.75	3.57	Agreed
2	Seeking an appropriate mentorship on transformative research writing	3.52	3.75	3.61	Agreed
3	Making full use of capacity building workshop on transformative research	3.40	3.66	3.51	Agreed
4	Taking formal training in transformative research	3.48	3.60	3.53	Agreed
5	Embracing the iterative process of writing transformative research	3.53	3.54	3.53	Agreed
Grand Mean		3.52	3.66	3.55	Agreed

3.3. Hypothesis One

There is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria. **Table 3** revealed that the p-value > 0.5, which implies that there is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria. Hence, hypothesis one is retained.

3.4. Hypothesis Two

There is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria. **Table 4** revealed that the p-value > 0.5, which implies that there is no significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria. Hence, hypothesis two is retained.

Table 3. Z-test analysis for testing the significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria.

Respondents	N	$\bar{X}$	SD	df	z-value	p-value	Remark	Decision
Lecturers	50	3.23	0.56	152	0.67	0.13	Not Significant	Accepted
Postgraduate students	178	3.27	0.55					

Table 4. Z-test analysis for testing the significant difference between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria.

Respondents	N	$\bar{X}$	SD	df	z-value	p-value	Remark	Decision
Lecturers	50	3.57	0.56	226	0.71	0.23	Not Significant	Accepted
Postgraduate students	178	3.65	0.55					

Findings on the barriers to the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria revealed a lack of motivation to carry out transformative research, research networking, and integration, peer mentoring and support, research-related performance evaluation in Universities to promote transformative research, career research support and sharing of resources. The finding is related to the findings of [Liyanage et al. \(2018\)](#) that revealed a lack of motivation, peer mentoring, and research networking as the barrier to the conduct of research in higher institutions of learning. This implied that the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria is achievable if the identified barriers are overcome.

Furthermore, finding on the test for significant differences between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the barriers to the conduct of transformative research in Universities in North-Central, Nigeria revealed there was no significant difference. The finding is similar to the finding of [Liyanage et al. \(2018\)](#) which revealed no statistically significant difference between the responses of male and female lecturers on the barriers to research and innovation in disaster resilience in higher education institutions in Asia. This implied that both Industrial and Technology Education lecturers and postgraduate students hold similar opinions regarding the barriers to the conduct of transformative research in Universities in North-Central, Nigeria.

Findings on the measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria revealed setting up transformative research writing as a goal, seeking an appropriate mentorship on transformative research, making full use of capacity building workshop on transformative research, taking formal training in transformative research, and embracing the iterative process of writing transformative research. The findings are synonymous with the findings of [Li et al. \(2018\)](#) that revealed appropriate mentorship, making full use of capacity-building workshops, and taking formal training as measures for enhancing research publications and advancing scientific writing in health research collaborations. The findings implied that the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria is achievable if the identified measures are adhered to.

Moreover, finding on the test for significant differences between the mean responses of Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria revealed there was no significant difference. The finding concurs with the findings of [Li et al. \(2018\)](#) which revealed there was no significant difference between the responses of institutional and field experts on the measures for enhancing research publications and advancing scientific writing in health research collaborations. The findings entailed that the responses of both Industrial and Technology Education lecturers and postgraduate students on the measures for enhancing the conduct of transformative research in Universities in North-Central, Nigeria do not vary.

4. CONCLUSION

Based on the findings from the study, insight into the barriers and measures for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria is provided. The study revealed that both Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria holds similar opinion regarding the barriers and measures for enhancing the conduct of transformative research. Hence, it is concluded that the findings of this study are particularly important for enhancing the conduct of transformative research among Industrial and Technology Education lecturers and postgraduate students in Universities in North-Central, Nigeria. Based on the findings from the study, the following recommendations were made:

- (i) The administrators of Universities in North-Central, Nigeria should set up the conduct of transformative research as a goal and organize a capacity-building workshop for Industrial and Technology Education lecturers and postgraduate students to achieve the stated goal.
- (ii) The Industrial and Technology Education lecturers and postgraduate students should seek to embrace the iterative process of writing transformative research in Universities in North-Central, Nigeria.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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