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ADMINISTRATION OF INDUSTRIAL TECHNOLOGY EDUCATION IN THE ERA OF UNCERTAINTIES IN NIGERIA

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Abstract

The administration of Industrial Technology Education is faced with obstacles in the era of uncertainty in Nigeria. However, the obstacle are surmountable if the administrators of ITE deployed strategies such as collaboration with industry partners and stakeholders, seek funding and support from government and private sources, develop innovative and flexible programs, invest in instructor training and development, leverage technology and digital resources, fostering partnerships with other educational institutions, promote entrepreneurship and innovation among students and instructors. The study was guided by four (4) objectives and research questions as well as one (1) hypothesis. Descriptive survey research design was used for the study. The population of the study is twenty One (21) PhD students of industrial technology education, department of industrial technology, faculty of Technology and Industrial Studies, Benue State University, Makurdi. Census sampling techniques was used for the study, because the population was manageable. The instrument for data collection was a self developed questionnaire named Administration of Industrial Technology Education in the Era of Uncertainties in Nigeria Questionnaire (AITEEUNQ). The data collected was analyesd using descriptive statistics and x^2 test as statistical tools. It was done with the aid of SPSS computer package at 0.05 level of significance. The findings shows that ITE in the era of uncertainty in Nigeria is faced with several challenge that are surmountable. The study recommended that government should develop flexible and adaptable curricula that can respond to changing industry needs and technological advancements; foster strong industry partnerships invest in instructor training and development; improve funding and resource allocation to address inadequate facilities, equipment and materials; enhance collaboration and networking among institutions to ensure high standards in Industrial Technology Education.

Introduction

Uncertainty refers to a state of doubt about the future, outcomes or results. It involves a lack of clarity, predictability or confidence in what may happen or what the consequences of a particular action may be. Uncertainty comes from various sources, such as unpredictable events or outcomes, limited information or data, complex systems or dynamics, human error or bias, changing circumstances or environments.

Arikpo (2019) states that in the context of Nigeria, uncertainty could be refer to as various challenges and issues such as, political instability and insecurity, economic volatility and recession, social and cultural changes, environmental degradation and climate change as well as infrastructure and resource constraints. According to Eze (2020) uncertainty significantly have impacts on individuals, organizations and societies by increased stress and anxiety, decreased confidence and trust difficulty making decisions or planning, increased risk and vulnerability, decreased economic growth and development. However, uncertainty can also present opportunities for growth, innovation and resilience which could be a score card for industrial technology education.

Adesua, (2022) states that Industrial Technology Education (ITE) is a field of study that focuses on the practical application of technology or technical skills and knowledge to design, develop and implement solutions for industrial and technological problems. It covers a broad range of disciplines. This includes automobile technology, metal work technology, building construction technology, electrical/electronic technology, communication technology, energy and power technology.

According to Federal Republic of Nigeria (FRN) (2013) ITE programs are aim to equip students with the technology or technical skills, knowledge and attitudes necessary to succeed in a rapidly changing technological environment. The curriculum typically involves technology or technical courses such as drafting, building construction, electrical/electronics, auto-mechanics; laboratory and hands on training; project-based learning; safety and quality control as well as management and entrepreneurship. Ikpe, (2010) opined that ITE graduates can pursue careers in various fields including, manufacturing and production, building construction and related trades, transportation and logistics, energy and utilities, telecommunications, information and technology, research and development.

The goals of Industrial Technology Education in Nigeria and anywhere in the world include: Preparing students for entry level positions in various industry, developing students who possesses problem solving and critical thinking skills, producing students who will foster innovation and entrepreneurship, providing a foundation for further education and training for the citizens, bringing up individuals who will meet the needs of industry and the economy (National Universities Commission NUC, 2022),. The success of this laudable objectives administrative capacity and economic ability of the nation to fund and implement the policies governing the industrial and technology education.

In Nigeria, ITE is crucial for addressing the country's industrialization and development challenges, such as skills gap and workforce development, infrastructure development and maintenance, economic diversification and growth, innovation and entrepreneurship, sustainable development and environmental management. According to Obilo, Sangoleye, and Urenyere (2021) the administration of Industrial Technology Education (ITE) refers to the management and organization of ITE programs, resources and personnel to achieve the goals and objectives of ITE. The administration of industrial technology education in Nigeria aims at planning and policy making, curriculum development and implementation, instructor training and development, student recruitment and counseling, budgeting and resource allocation, facilities and equipment management, safety and quality control, assessment and evaluation, industry partnerships and collaboration as well as improvement and innovation (Ugwu, 2019 and Okeke, 2020).

Okorafor and Nnajiofo, (2017) states that the administrators of industrial technology education are saddle with responsibility of effective implementation of the above mention aims. Effective administration of ITE is crucial. This implied high quality instruction and training, meeting efficiently, fostering innovation and entrepreneurship, promoting safety and environmental sustainability, encouraging lifelong learning and professional development.

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Okoro, (2018) and Udoudo (2021) asserts that in Nigeria, the administration of ITE may face with numerous challenges like limited resources and funding, inadequate infrastructure and equipment, shortage of qualified instructors, curriculum relevance and alignment with industry needs, access and equity issues, political and economic instability. The above mention challenges can only be address through collaboration with industry partners and stakeholders, seek funding and support from government and private sources, develop innovative and flexible programs, invest in instructor training and development, leverage technology and digital resources, fostering partnerships with other educational institutions, promote entrepreneurship and innovation among students and instructors (Eze, 2020). It is against this background that the study seeks to investigate the administration of industrial technology education in the era of uncertainties in Nigeria.

Purpose of the Study

The purpose of the study is administration of industrial technology education in the era of uncertainties in Nigeria. The study is guided by these research objectives;

1. The challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria
2. The extent to which external factors such as economic, political and social affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria
3. Strategies that can be employed to improve the administration of Industrial Technology Education in Nigeria amidst uncertainties
4. The impact of uncertainties on the quality of Industrial Technology Education in Nigeria

Research Questions

1. What are the challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria?
2. To what extent do external factors such as economic, political and social affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria?
3. What are the strategies to be employed by the administrators to improve the administration of Industrial Technology Education in Nigeria amidst uncertainties?
4. What is the impact of uncertainties on the quality of Industrial Technology Education in Nigeria?

Research Hypotheses

The following research are formulated and tested at 0.05 level of significance.

$H0_1$: Economic, Political and Social factors do not a significant impact on the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

Research Design

The study adopts descriptive survey research design. The descriptive research design is preferred for the study because it informs policy, practice and decision making by providing a clear understanding of a situation.

The population of the study is twenty One (21) PhD students of industrial technology education, department of industrial technology, faculty of Technology and Industrial Studies, Benue State University, Makurdi. The choice of the students is suitable for the study because they easily accessible and have adequate knowledge of the subject matter. The sample for the study is 21 PhD students using census sampling techniques, because the population is small and manageable. The instrument for data collection is a self developed questionnaire called Administration of Industrial Technology Education in the Era of Uncertainties in Nigeria

Questionnaire (AITEEUNQ). The researchers used the instrument to collect data from the respondents has two section with different response format of Strongly Agree (SA), Agree (A), Strongly Disagree (SD), Disagree (D) and High Extent (HE), Moderate Extent (ME) and Low Extent (LE) respectively. The mean scores of the following responses strongly agree, agree, disagree strongly disagree were summed up to get the mean score for each item on challenges facing the administration of Industrial Technology Education, strategies to be employed by the administrators to improve the administration of ITE and the impact of uncertainties on the quality of Industrial Technology Education in the era of uncertainty in Nigeria. The mean score of 2.50 was set as a bench mark to ascertain decision on indicators of challenges facing, strategies to be employed by the administrators to improve the administration and the impact of uncertainties on the quality of Industrial Technology Education in the era of uncertainty in Nigeria. The response of the respondents on each item will be significant at 2.00-2.50 for items with high extent to low extent response format and 2.50 mean score for items with the response format SA, A, SD, D and not significant when it is less than 2.00 and 2.50 respectively.

Content and face validity of instruments was carried out by two experts from the department of industrial technology, faculty of Technology and Industrial Studies, Benue State University, Makurdi. Cronbach Alpha formula was used to determine the reliability coefficient of the instruments which was found to be 0.89. The data collected was analyesd using descriptive statistics (mean, standard deviation and simple percentage) and x^2-test. It was done with the aid of SPSS computer package at 0.05 level of significance.

Results Presentation and Interpretation

Question One

What are the challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria?

Table 1: Mean scores of challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

S/No	Statement	SD	$\bar{x}$	Remarks
1	Funding constraints	0.00	4.00	Agree
2	Limited resources (e.g., equipment, facilities)	0.5	3.60	Agree
3	Shortage of qualified instructors	0.51	3.45	Agree
4	Curriculum relevance and alignment with industry needs	0.47	3.70	Agree
5	Access and equity issues	0.00	3.00	Agree
6	Political and economic instability	0.73	3.30	Agree

N=21

The response of the respondents on each item will be significant at 2.50 mean score and not significant when it is less than 2.50.

From table 1 item 1-6 shows agree, meaning that the respondents agree that funding constraints, limited resources, shortage of qualified instructors, curriculum relevance and alignment with industry needs, access and equity issues, political and economic instabilities are challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

Question Two

To what extent do external factors such as economic, political and social affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria?

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Table 2: Mean scores of the extent to which external factors such as economic, political and social affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

S/No	Statement	SD	$\bar{x}$	Remarks
	Changes in government funding affect the administration of Industrial Technology Education	0.73	2.30	M E
2	Economic downturn impact the availability of resources (e.g., equipment, materials) for Industrial Technology Education	0.51	2.45	M E
3	Devaluation of the Nigerian currency does not affect the cost of importing equipment and materials for Industrial Technology Education	1.02	2.10	M E
4	Changes in government policies on education affect the administration of Industrial Technology Education	0.67	1.85	L E
5	Political instability impact the smooth operation of Industrial Technology Education programs	0.73	1.70	L E
6	Corruption in the education sector affect the administration of Industrial Technology Education	0.47	2.70	H E
7	Societal attitudes towards Industrial Technology Education impact enrollment and participation	0.75	2.55	HE
8	Migration of skilled professionals (Brain drain) affect the availability of qualified instructors for Industrial Technology Education	0.71	2.25	ME
9	Growing demand for technological skills in the workforce impact the administration of Industrial Technology Education	0.47	2.30	ME

N=21

The decision rule is that from 1.00-2.00 is Low Extent (LE), 2.00-2.50 Moderate Extent (ME) and 2.50-3.00 High Extent (HE) the responses of the respondents on each item will be significant at 2.00 mean score above and not significant when it is less than 2.50.
From table 2 items 1-3, 6, 7, 8 and 9, shows moderate and high extent, while item 4 and 5 indicate low extent. This means that the respondents agree that extent external factors such as economic, political and social factors affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

Question Three
What are the strategies to be employed by the administrators to improve the administration of Industrial Technology Education in Nigeria amidst uncertainties?
Table 3: Mean scores of the strategies to be employed by the administrators to improve the administration of Industrial Technology Education in Nigeria amidst uncertainties.

S/No	Statement	SD	$\bar{x}$	Remarks
1	Diversification of funding sources	1.30	2.85	Agree
2	Collaboration with industry partners and stakeholders	0.51	3.55	Agree
3	Developing contingency plans	0.00	3.00	Agree
6	Political and economic stability	0.51	3.45	Agree

N=21
From table 3 items 1-6 shows agree, meaning that the respondents agree that diversification of funding sources, collaboration with industry partners and stakeholders, developing contingency plans, ensuring political and economic stability are strategies to be employed by

the administrators to improve the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

Question Four
What is the impact of uncertainties on the quality of Industrial Technology Education in Nigeria?

Table 4: Mean scores of the impact of uncertainties on the quality of Industrial Technology Education in Nigeria.

S/No	Statement	N	SD	$\bar{x}$	Remarks
1	Uncertainty impact curriculum relevance	21	0.47	3.30	Agree
2	Uncertainty impact instructor expertise	21	0.47	3.30	Agree
3	Uncertainty impact availability of resources	21	0.51	3.45	Agree
4	Uncertainty impact student engagement and motivation	21	0.47	3.30	Agree
5	Uncertainty impact industry partnerships and collaborations	21	0.73	3.70	Agree
6	Uncertainty present opportunities for growth, innovation and resilience	21	1.23	2.05	disagree

From table 4 items 1-5 shows agree, while item 6 indicate disagree. Meaning that the respondents agree that curriculum relevance, instructor expertise, availability of resources, student engagement and motivation, industry partnerships and collaborations impact negatively the administration of Industrial Technology Education in Nigeria. The respondents disagree that uncertainty does not present opportunity for growth, innovation and resilience for administration of Industrial Technology Education in Nigeria.

Hypothesis One
$H0_1$: Economic, Political and Social factors do not have a significant impact on the administration of Industrial Technology Education in the era of uncertainty in Nigeria

Table 5: Chi-square test on the Economic, Political and Social factors on the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

Response	O	E	x^2	*df*	Sig	Decision Rule
HE	3	6.7				
ME	4	6.7	12.100	2	0.002	Rejected
LE	14	6.7				
Total	**21**					

Table 5 shows that the Chi-square calculated value of 12.100 with a *df* of 2 and a significant value of 0.002. This result shows that the null hypothesis which states that Economic, Political and Social factors does not have a significant impact on the administration of Industrial Technology Education in the era of uncertainty in Nigeria is rejected at the significance value of 0.05 level. This implied that Economic, Political and Social factors have a significant impact on the administration of Industrial Technology Education in the era of uncertainty in Nigeria.

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Discussion of Findings

From table 1 revealed that funding constraints, limited resources, shortage of qualified instructors/teachers, curriculum relevance and alignment with industry needs, access and equity issues, political and economic instabilities are challenges facing the administration of Industrial Technology Education in the era of uncertainty in Nigeria. This agrees with the view of Okoro, (2018) and Udoudo (2021) which states that in Nigeria, the administration of ITE is face with numerous challenges like limited resources and funding, inadequate infrastructure and equipment, shortage of qualified instructors, curriculum relevance and alignment with industry needs, access and equity issues, political and economic instability. However, Eze, (2020) is of the view that these challenges can overcome through collaboration with industry partners and stakeholders, seek funding and support from government and private sources, develop innovative and flexible programs, invest in instructor training and development, leverage technology and digital resources, fostering partnerships with other educational institutions, promote entrepreneurship and innovation among students and instructors. In the era of uncertainty, the administrators of industrial technology education in Nigeria should focus more on ways of overcoming these challenges than accepting and living with the challenges to strive against ITE.

From table 2 and 5 revealed that extent external factors such as economic, political and social factors affect the administration of Industrial Technology Education in the era of uncertainty in Nigeria. This collaborates with the view of Arikpo (2019) which say that, political instability and insecurity, economic volatility and recession, social and cultural changes, environmental degradation and climate change as well as infrastructure and resource constraints have negative impact on the administration of ITE in Nigeria. The negative impact of external factors on ITE can be eliminated or mitigated by electing and pointing political leaders who are of integrity and positively intelligent that will reduce corruption and influence the society attitude towards embracing ITE to improve the economy of the nation.

From table 3 revealed that diversification of funding sources, collaboration with industry partners and stakeholders, developing contingency plans, ensuring political and economic stability are strategies to be employed by the administrators to improve the administration of Industrial Technology Education in the era of uncertainty in Nigeria. This agrees with the views of Okorafor and Nnajiofo, (2017) , Ugwu, (2019) and Okeke, (2020) which clearly states that the administration of industrial technology education in Nigeria aims at planning and policy making, curriculum development and implementation, instructor training and development, student recruitment and counseling, budgeting and resource allocation, facilities and equipment management, safety and quality control, assessment and evaluation, industry partnerships and collaboration as well as continuous improvement and innovation. The administrators of industrial technology education should sit up to their responsibility of effective implementation of the aims and objectives of ITE. Effective utilization of high quality instruction and training, meeting industry needs and standards, preparing students for the workforce, managing resources efficiently, fostering innovation and entrepreneurship, promoting safety and environmental sustainability, encouraging lifelong learning and professional development.

From table 4 revealed that the curriculum relevance, instructor expertise, availability of resources, student engagement and motivation, industry partnerships and collaborations impact negatively impact the quality of administration of Industrial Technology Education in Nigeria, the revelation by the study toll the same line with Eze (2020) which states that uncertainty significantly have impacts on individuals, organizations and societies by increased stress and anxiety, decreased confidence and trust, difficulty making decisions or planning, increased risk and vulnerability, decreased economic growth and development.

The study disagree that uncertainty does not present opportunity for growth, innovation and resilience for administration of Industrial Technology Education in Nigeria. However, uncertainty can present opportunities for growth, innovation and resilience which could be a score card for industrial technology education in Nigeria. Countries such as Singapore Germany, South Korea, Finland, Canada, Sweden, Denmark and New Zealand demonstrate how uncertainty can be leveraged to drive innovation, improvement and resilience in Industrial Technology Education through research and development, AI and industry collaboration among others.

Recommendations

In view of the four (4) findings above two recommendations were summarized presented below by the researchers

1. Government should develop flexible and adaptable curricula that can respond to changing industry needs and technological advancements; foster strong industry partnerships to provide students with practical skills, apprenticeships and job opportunities; invest in instructor training and development to ensure teachers are equipped with the latest technologies and pedagogies; improve funding and resource allocation to address inadequate facilities, equipment and materials; enhance collaboration and networking among institutions, industry and government to share resources and best practices; develop robust quality assurance mechanisms to ensure high standards in Industrial Technology Education.
2. The quality of the administration of ITE in Nigeria can be improve upon through mentorship programs, professional development opportunities, networking with peers, access to resources and expertise.

Conclusion

The importance of industrial technology education in Nigeria cannot be overemphasize for it is key for the growth and development of Nigeria, despite the challenges it might face in the era of uncertainty. It is expected of the administrators of ITE in Nigeria to adopt and utilize various strategies such as diversification of funding sources, collaboration with industry partners and stakeholders, developing contingency plans, investing in staff development and training to improve ITE.

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