Innovative Thinking Skills for Effective Leadership in Public Universities in Delta State

ABSTRAC

The study investigated innovative thinking skills for effective leadership in public universities in Delta State. The study adopted the descriptive survey research design. The population of the study comprised 4231 of academic staffs of public universities in Delta State. The Sample for this study was 846 academic staff. It was determined using 20% of the total population of the study. The instrument used in this study was a self-developed questionnaire titled "Innovative thinking skills for effective leadership Questionnaire (ITSELQ)". The instrument was structured on a modified 4-point scale of Very High Extent, (VHE), High Extent (HE), Low Extent (LE), Very Low Extent (VLE) for the research questions. The reliability of the instrument was ascertained using Cronbach Alpha Statistics. The reliability index yielded a result of α= 0.87, 0.82, and 0.77 respectively which showed that the responses were consistent and the instrument considered reliable and adopted for the study. Mean and Standard Deviation Statistics was used to answer the research questions while t-test inferential statistics was used to test the null hypotheses at 0.05 level of significance. The study concluded that through innovative approaches, leaders can navigate the complex challenges facing higher education institutions, foster creativity, adaptability, and resilience among staff, and students. It was recommended among others that Public universities should invest in technology infrastructure and provide continuous training opportunities to faculty and staff to enhance their technological literacy skills and Universities should establish efficient resource management

Keywords: *Innovative Thinking Skills, Effective Leadership, Technological Literacy, Innovative Resource Management Skill and Problem-solving.*

Yellowe Annette N. PhD
Department of Educational Management,
Ignatius Ajuru University of Education, Nigeria.
annette.yellowe@gmail.com

ThankGod James Nwuke PhD
Institute of Education,
Faculty of Education,
Rivers State University, Nigeria.
thankgod.nwuke@ust.edu.ng

I.   Introduction

Education in the 21st century is changing more rapidly than most experts would have ever imagined and technology seems to advance almost on a daily basis. Academic instruction and student service delivery methods that did not exist a decade ago are now common in our schools. Today's educational leader is dealing with complex issues on a daily basis and economic realities are forcing the educational leadership to become more creative and innovative to enable them meet up globally. Leadership can be termed as a relationship that involves mobilizing, influencing, and guiding team members toward the desired goals. The modern leader is a democratic and innovative organizer who worked with staff member, rather than ahead of the member.

Over the past decade, the way and manner in which education is given and acquired has gone

through series of re-evaluation and changes to meet the demand for knowledge and skill sets peculiar to the present dispensation. In developing nations, Nigeria in particular, efforts and attempts to upgrade and implement practically innovative techniques in classrooms have produced minimal results. This is due to the fact that the effort of the Ministry of Education and other bodies responsible for the Nigerian educational system has been confronted with several challenges. One of which is the commitment to traditional/conventional instead of contemporary innovative thinking skills

Innovative leaders are creative thinkers who are able to generate creative ideas that become the basis of innovation in the school system Innovation leadership in improving the quality of education is an effort to influence the students' academic and non-academic performance at all levels. it can be done if there is readiness to change, because of the innovation itself requires passion and interest to new ways of managing educational activities. When viewed from the organization / institution of the school, the leadership position of the principal is very important; the effects of the implementation of roles and duties will affect all aspects of school organizational life. Leaders need innovative leadership skills as they learn to operate in challenging and unpredictable circumstances.

In addition, they need to create an environment for innovation within the school setting. On the other hand, academic performance is the out-put by a learner having complete designed academic curriculum measured. The academic performance could be measured in different ways, thus terminally by teachers or a standard body as the case may be. Agharuwhe (2013) asserted that students' academic performance is the main focus in the overall educational performance. Academic performance is referred to as educational outcome. However, education as a concept is the bases for of every aspect of life, for quality education today, there is need for innovation in the area of pedagogy. For innovation to take place in schools there is need for innovative leadership techniques that can be used to influence the students' academic performance.

Innovative ideas emerge as a result of research findings from research institutes. Innovation is defined as incremental, radical and revolutionary changes in thinking, products, processes or organization, (Akomolafe 2011). In the view of Oteh and Akuma (2011), innovation is a decisive operation carried out with a view to introduce a given change to be accepted and used. It is the process whereby, a new product is made available, spread through the system and infused into other operesponses practices. Innovation is therefore, a change that is deliberate, purposeful and can be on a small or large scale. It is a departure from an existing practice that can be sustained for some time, and is situational and relevant to a group in time or place Innovation is very necessary in education institutions, because of the dynamic nature of knowledge. Knowledge is constantly growing and changing. There is knowledge explosion especially in the area of science and communicative technology. New scientific discoveries have rendered much of the existing knowledge obsolete. In the field of education, there have been new approaches to teaching, like team teaching, micro teaching, individualized instruction and computer assisted instruction among others. Since one of the functions of education is to expose learners to worthwhile and authentic knowledge, innovations help to fulfill such, (Oteh and Akuma 2011). Innovation has facilitated and promoted educational media that can facilitate teaching and learning and research presentations. Many software and hardware media are now available in the market. Whenever there are new researches, innovation helps in using the findings to expose learners to problem-solving situations.

Current researches in the fields of education, psychology of learning and development, intellectual development and much more have revealed new innovations on how learning occurs. Institutions are recognized as centers of knowledge generation and dissemination. It maintains triple mission of teaching, research and community service. The roles of these component aspects of education are all meant to develop the human society, be it at individual, national or international level. It is very evident that research occupies the main center stage in the mission of institutions. Research is a scientific

approach to the solution of problems. According to Imo (2015), it is the strategy adopted to answer questions raised about the world and the processes going on in it. In his view, Eric (2009) sees research to be the process of systematic inquiry by which humankind increases knowledge of how things are, why things are the way they are and how they could be improved. Research seeks to discover the truth about the world. It is goal – oriented, systematic and logical. It is becoming increasingly evident that research is extremely critical and important, if institutions are to serve as engines of development. Research is necessary for direct contribution of the universities for sustainable development and knowledge creation, (Michaela 2012).

Innovative thinking skills refer to a set of cognitive abilities and attributes that empower individuals to approach problems and challenges in novel, creative, and forward-thinking ways. These skills are essential in fostering a culture of innovation within educational institutions and can be instrumental in addressing the evolving needs of the education sector. As defined by experts in the field, "innovative thinking skills encompass a range of competencies that enable individuals to generate inventive ideas, adapt to change, and contribute to the development of new solutions in diverse contexts" (Smith et al., 2021, p. 45).

One key aspect of innovative thinking is the ability to embrace and navigate uncertainty. According to Robinson and Brown (2017), innovative thinkers demonstrate a high tolerance for ambiguity and a willingness to explore uncharted territories. This aligns with the idea that "innovative thinking involves a comfort with ambiguity and the ability to view uncertainty as an opportunity for exploration and discovery" (Robinson & Brown, 2017, p. 112). Design thinking, a popular approach to problem-solving, is often cited as a crucial component of innovative thinking skills in educational leadership. Tim Brown, a prominent advocate of design thinking, emphasizes the importance of "empathy, ideation, and prototyping" in addressing complex challenges (Brown, 2008, p. 36). This approach encourages leaders to understand the perspectives of stakeholders, generate a wide range of creative solutions, and test those solutions through prototyping.

In the context of educational leadership, innovative thinking skills involve not only individual creativity but also collaborative and adaptive capacities. As noted by Fullan (2020), "innovative educational leaders exhibit a collective intelligence that values collaboration, shared learning, and a continual commitment to improvement" (p. 78). This emphasizes the importance of fostering a collaborative culture within educational institutions to harness the collective innovative thinking of the entire community.

Innovative thinking skills in educational leadership encompass a multifaceted set of competencies, including the ability to navigate ambiguity, embrace design thinking principles, and foster collaboration. By cultivating these skills, educational leaders can effectively address the challenges of a rapidly changing educational landscape and contribute to the continuous improvement of teaching and learning experiences.

II.   Statement of the Problem

The educational system in Delta State faces considerable challenges in adapting to the demands of the 21st century, particularly in cultivating innovative thinking skills within educational leadership. A critical problem arises from the absence of well-defined frameworks and guidelines for educational leaders to systematically develop and integrate innovative thinking skills into their practices. Without a structured approach, leaders may find it challenging to incorporate these skills effectively into the educational culture.

Compounding this issue is the limited availability of professional development opportunities tailored to the cultivation of innovative thinking skills. Educational leaders in Delta State may struggle to access programs that specifically address the dynamic and evolving nature of educational innovation. The lack of such opportunities can hinder leaders' ability to stay updated on best practices and emerging

trends. A pervasive resistance to change within the educational system poses another significant challenge. Institutionalized practices and traditional mindsets may act as formidable barriers, impeding leaders from embracing new methodologies and hindering the development of a culture that encourages creative problem-solving. Overcoming this resistance is crucial for the successful integration of innovative thinking skills.

Resource constraints present yet another obstacle. Educational institutions in Delta State may face financial limitations and a lack of technological infrastructure, hindering the implementation of innovative initiatives and the integration of technology into the learning environment. These constraints pose a challenge to the development of students' future-ready skills. Moreover, the absence of a collaborative culture within educational institutions further compounds the challenges. Effective innovation often necessitates collaborative efforts among educators, administrators, parents, and the community. The current lack of such collaboration hinders the sharing of ideas and collective intelligence needed for innovative thinking to flourish.

Lastly, inadequate measurement metrics for assessing innovative thinking skills contribute to the problem. The absence of comprehensive metrics makes it difficult to evaluate the effectiveness of strategies implemented by educational leaders. Without standardized methods for assessment, gauging the impact of innovative thinking initiatives on student outcomes remains a complex and unresolved issue. Addressing these interconnected challenges is imperative for educational leaders in Delta State to foster an environment that encourages and develops innovative thinking skills. By understanding and mitigating these obstacles, interventions and strategies can be formulated to propel educational leadership toward a more innovative and adaptable future.

III.   Aim and Objectives of the Study

The aim of this study is to investigate innovative thinking skills for effective leadership in public universities in Delta State. Specifically, the study sought to:

Examine the extent to which technological literacy skill enhance effective leadership in public universities in Delta State.

Investigate the extent to which innovative resource management skill enhance effective leadership in public universities in Delta State.

Determine extent to which problem-solving skills enhance effective leadership in public universities in Delta State.

Research Questions

The following research questions guided the study:

To what extent does technological literacy skill enhance effective leadership in public universities in Delta State?

To what extent does innovative resource management skill enhance effective leadership in public universities in Delta State?

To what extent does problem-solving skill enhance effective leadership in public universities in Delta State?

Hypotheses

The following null hypotheses were formulated to guide the study at 0.05 level of significance

H01: There is no significant difference between the mean responses of male and female staff on the extent technological literacy skill enhances effective leadership in public universities in Delta State

H02: There is no significant difference between the mean responses of male and female staff on the extent innovative resource management skill enhances effective leadership in public universities in Delta State

H03: There is no significant difference between the mean responses of male and female staff on the extent problem-solving skill enhances effective leadership in public universities in Delta State.

IV.   Conceptual Review

Technological literacy as an Innovative Skill

Technological literacy, as a crucial innovative skill, plays a pivotal role in shaping the educational landscape of Nigeria. Scholars and educational leaders alike underscore the significance of technological literacy for both educators and students, emphasizing its transformative impact on teaching, learning, and overall educational outcomes. Okonkwo and Ogunmakin (2019) provide a comprehensive definition of technological literacy, highlighting its multifaceted nature. They describe it as the ability not only to use technology but also to comprehend and evaluate its implications for various aspects of life, education, and society. This comprehensive understanding aligns with the evolving demands of the 21st century, where technology is deeply interwoven into every facet of our lives.

Adebanjo (2018), an advocate for educational technology and digital transformation, emphasizes the need for educators to possess technological literacy skills. Adebanjo argues that technological literacy is not merely about incorporesponses gadgets into classrooms but entails a deeper understanding of how technology can enhance pedagogical approaches and engage students meaningfully (Adebanjo, 2018). Technological literacy stands as a cornerstone in the arsenal of innovative skills for educational leaders in Nigeria collectively advocate for a holistic approach to technological literacy, one that goes beyond basic technical skills and encompasses a deep understanding of technology's multifaceted impact on education and society. As Nigeria continues to navigate the challenges and opportunities presented by the digital age, technological literacy remains a linchpin for shaping a future-ready educational system.

Innovative Resource Management Skill

The innovative resource management skill has emerged as a critical competency for educational leaders. This skill encompasses the ability to strategically and creatively allocate, utilize, and optimize available resources to enhance the educational experience and outcomes. Scholars and educational leaders alike emphasize the importance of innovative resource management in addressing the challenges posed by resource constraints and fostering sustainable development within educational institutions. Okebukola (2017) asserted that innovative resource management is essential for navigating the resource challenges faced by educational institutions in Nigeria. In the context of limited financial resources. The innovative resource management skill is integral to the sustainable development and successes of educational institutions collectively underscore the significance of adopting innovative approaches to resource management. As Nigeria seeks to overcome resource constraints and enhance the quality of education, the cultivation of innovative resource management skills among educational leaders becomes imperative for building resilient and adaptable educational institutions.

Problem-Solving as an Innovative Skill

Problem-solving is a fundamental and integral aspect of innovation, and its significance in various fields, including education, has been extensively explored in the literature. This literature review synthesizes key insights from scholarly works that discuss problem-solving as an innovative skill, examining its role in different contexts and the strategies employed for its development. Problem-solving is often described as the capacity to identify, analyze, and develop effective solutions to challenges or obstacles (Jonassen, 2011). In the educational context, it is considered a critical skill that fosters creativity, critical thinking, and adaptability (Dewey, 1933). According to Barron (2003), problem-solving involves not only finding solutions to well-defined problems but also navigating complex and ill-defined situations.

Various strategies have been proposed for developing and enhancing problem-solving skills. Jonassen (2011) suggests employing instructional methods that emphasize real-world problem-solving scenarios, allowing learners to apply their knowledge in authentic contexts. Additionally, collaborative learning approaches, as highlighted by Johnson and Johnson (2009), can foster the exchange of diverse perspectives, enhancing problem-solving abilities. The relevance of problem-solving extends beyond the educational setting to the workplace. In a study by D'Zurilla and Nezu (2007), problem-solving is

considered a vital skill for effective coping and adaptation in professional environments. Organizations increasingly value employees who can navigate challenges, propose innovative solutions, and contribute to continuous improvement (Garmston & Wellman, 1992).   Despite its importance, scholars recognize challenges and barriers to effective problem-solving. Gick and Holyoak (1980) discuss the phenomenon of functional fixedness, where individuals struggle to see unconventional uses for familiar objects. Moreover, social and cultural factors can influence problem-solving approaches (Nisbett et al., 2001), highlighting the need for a diverse and inclusive problem-solving environment.

The integration of technology in problem-solving has gained attention in recent literature. Chen, Chen, and Kinshuk (2005) explore how educational technologies can be leveraged to support problem-solving skills, providing tools and environments that facilitate collaborative problem-solving activities. Researchers have also developed frameworks and methodologies for assessing problem-solving skills. For instance, the work of Ennis (1985) introduces taxonomy for critical thinking and problem-solving skills, offering a systematic approach to evaluate these competencies.

I.   Methodology

The study adopted the descriptive survey research design. The population of the study comprised 4231 of academic staffs of public universities in Delta State. These includes 2387 male and 1844 Female in the 4- public universities in Delta State. The sample for this study was 846 academic staff. It was determined using 20% of the total population of the study. To achieve this, simple random sampling technique was used to select 381 female academic staff and 465 male academic staff from public universities in Delta State University. The instrument for data collection that was used in this study is a self-developed questionnaire titled "Innovative thinking skills for effective leadership Questionnaire (ITSELQ)" and was used for data collection. The instrument was structured on a modified 4-point scale of Very High Extent, (VHE), High Extent (HE), Low Extent (LE), Very Low Extent (VLE) for the research questions. The reliability of the instrument was ascertained using Cronbach Alpha Statistics. Twenty (20) copies of the instrument were administered to 20 respondents who are outside the sample of the study but were part of the population of the study. The reliability index yielded a result of $\alpha = 0.87$, 0.82, and 0.77 respectively which showed that the responses were consistent and the instrument considered reliable and adopted for the study. The researcher administered 846 copies of the instrument to the respondents with the help of three (3) trained research assistants who were trained on the modalities of administering instruments. The respondents were properly briefed on how to fill the instrument. They were pleaded to attend to the questionnaire items at the instance of administration to ensure maximum return rate. Those who were unable to complete the questionnaire at the instance of administration were visited after few days for their collection. However, due to poor accessibility and availability on several visits to the respondents for collection, only 694(82% rate) were retrieved and this proportion was used for the analysis. Data analysis for this study was done using Mean and Standard Deviation Statistics to answer the research questions while t-test inferential statistics was used to test the null hypotheses at 0.05 level of significance. Statistical analysis was done using the statistical package of the social science SPSS version 25.

Results
Research Question 1

To what extent does technological literacy skill enhance effective leadership in public universities in Delta State?

Table 1. Summary of Descriptive Statistics on the Extent Technological Literacy skill enhance effective Leadership in Public Universities in Delta State

SN	Extent technological literacy skill enhance effective leadership in public universities in Delta State	$\bar{X}$	S.D.	Remark

1	University leaders use technology to inform and support their decision-making processes	3.82	0.49	VHE
2	University leaders utilize communication technologies to facilitate transparent and timely communication with various stakeholders	3.52	0.55	VHE
3	University leaders use data analytics and other technological tools to inform strategic decision-making	3.04	0.70	HE
4	University leadership implement cybersecurity measures to protect sensitive information and digital infrastructure	2.74	0.95	HE
5	They use technology to inform and support their decision-making processes	2.86	1.00	HE
	Grand mean	3.20	0.74	HE

Criterion mean = 2.50. Guide: 0 - 1.49 = very low extent (VLE); 1.50 - 2.49 = low extent (LE); 2.50 – 3.49 = high extent (HE); 3.50 – 4.00 = very high extent (VHE)

Table 1 revealed the extent technological literacy skill enhance effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that University leaders use technology to inform and support their decision-making processes (3.82+0.49), University leaders utilize communication technologies to facilitate transparent and timely communication with various stakeholders (3.52+0.55), University leaders use data analytics and other technological tools to inform strategic decision-making (3.04+0.70), University leadership implement cybersecurity measures to protect sensitive information and digital infrastructure (2.74+0.95) and they use technology to inform and support their decision-making processes (2.86+1.00). Thus, the answer to research question one states that to a high extent technological literacy skill enhance effective leadership in public universities in Delta State.

Research Question 2

To what extent does innovative resource management skill enhance effective leadership in public universities in Delta State?

Table 2. Summary of Descriptive Statistics on the Extent Innovative Resource Management Skill enhance effective Leadership in Public Universities in Delta State

SN	Extent innovative resource management skill enhance effective leadership in public universities in Delta State	$\overline{\mathbf{X}}$	S.D.	Remark
6	Explore and adopt cost-efficient technologies to streamline operations and reduce expenses	3.74	0.65	VHE
7	Strategically allocate financial resources to align with the institution's overall goals and priorities	3.54	0.71	VHE
8	Flexible budgeting practices that allow for adjustments based on changing priorities and needs	3.32	0.87	HE
9	Promote and implement sustainability initiatives to reduce environmental impact and resource consumption	2.88	0.96	HE
10	Engage in partnerships and collaborations with other institutions to share resources and achieve mutual benefits	2.95	0.88	HE
	Grand mean	3.29	0.81	HE

Table 2 revealed the extent innovative resource management skill enhances effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that Explore and adopt cost-efficient technologies to streamline operations and reduce expenses (3.74+0.65), Strategically allocate financial resources to align with the institution's overall goals and priorities

(3.54+0.71),Flexible budgeting practices that allow for adjustments based on changing priorities and needs (3.32+0.87), Promote and implement sustainability initiatives to reduce environmental impact and resource consumption (2.88+0.96) and Engage in partnerships and collaborations with other institutions to share resources and achieve mutual benefits(2.95+0.88). Thus, the answer to research question three states that to a high extent innovative resource management skill enhance effective leadership in public universities in Delta State.

Research Question 3: To what extent does problem-solving skill enhance effective leadership in public universities in Delta State?

Table 3. Summary of Descriptive Statistics on the Extent Problem-solving Skill enhance effective Leadership in Public Universities in Delta State

SN	Extent problem-solving skill skill enhance effective leadership in public universities in Delta State	$\overline{X}$	S.D.	Remark
11	Identify and prioritize key challenges and issues within the institution	3.03	0.88	VHE
12	Leaders use analytical thinking to thoroughly assess problems and understand their underlying causes	3.00	0.89	VHE
13	Transparent and inclusive is the decision-making process led by university leaders when addressing complex issues	2.91	0.77	HE
14	Leaders encourage and implement innovative solutions to address challenges and improve university operations	2.73	0.97	HE
15	Foster collaboration among different departments and stakeholders to solve complex problems	2.76	1.13	HE
	Grand mean	2.89	0.93	HE

Table 3 revealed the extent problem-solving skill enhances effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that identify and prioritize key challenges and issues within the institution (3.03+0.88), Leaders use analytical thinking to thoroughly assess problems and understand their underlying causes (3.00+0.89), Transparent and inclusive is the decision-making process led by university leaders when addressing complex issues (2.91+0.77) and Foster collaboration among different departments and stakeholders to solve complex problems (2.76+1.13). Thus, the answer to research question four states that to a high extent problem solving skill enhance effective leadership in public universities in Delta State.

Test of Hypotheses
Hypotheses 1
There is no significant difference between the mean responses of male and female staff on the extent to which technological literacy skill enhances effective leadership in public universities in Delta State.

Table 4. t-test Summary Showing Significant Difference in the Mean Responses on the Extent to which Technological Literacy Skill enhances effective Leadership in Public Universities in Delta State.

Category	N	Mean	SD	Df	t-cal	p-value	Decision
Male Staff	472	3.69	0.46	692	2.43	0.00*	Ho1 Rejected
Female Staff	222	3.51	0.55				

*Significant; $p<0.05$

Table 4 showed the t-test summary of the significant difference in the mean responses on the extent to which technological literacy skill enhances effective leadership in public universities in Delta State. The result of the study showed that there was a significant difference at (t-cal = 2.43, df = 692, p = 0.00) as the $p<0.05$. Therefore, the null hypothesis which stated that there is no significant difference in

the mean responses on the extent to which technological literacy skill enhances effective leadership in public universities in Delta State was rejected.

Hypotheses 2

There is no significant difference between the mean responses of male and female staff on the extent to which innovative resource management skill enhances effective leadership in public universities in Delta State.

Table 5. t-test Summary Showing Significant Difference in the Mean Response of Male and Female Staff on the Extent to which Innovative Resource Management Skill enhances effective Leadership in Public Universities in Delta State

Category	N	Mean	SD	df	t-cal	p-value	Decision
Male Staff	472	3.00	0.64	692	0.54	0.04*	Ho2 Rejected
Female Staff	222	3.05	0.70				

*Significant; $p < 0.05$

Table 5 showed the t-test summary of the significant difference in the mean responses of male and female staff on the extent to which innovative resource management skill enhances effective leadership in public universities in Delta State. The result of the study showed that there was a significant difference at (t-cal = 0.54, df = 692, p = 0.04) as the $p < 0.05$. Therefore, the null hypothesis which stated that there is no significant difference in the mean responses of male and female staff on the extent to which innovative resource management skill enhances effective leadership in public universities in Delta State was rejected.

Hypotheses 3

There is no significant difference between the mean responses of male and female staff on the extent to which problem-solving skill enhances effective leadership in public universities in Delta State

Table 6: t-test Summary Showing Significant Difference in the Mean Responses of Male and Female Staff on the Extent Problem-solving Skill enhances effective Leadership in Public Universities in Delta State

Category	N	Mean	SD	df	t-cal	p-value	Decision
Male Staff	472	2.44	0.95	692	2.50	0.03*	Ho3 Rejected
Female Staff	222	2.75	0.94				

*Significant; $p < 0.05$

Table 6 showed the t-test summary of the significant difference in the mean responses of male and female staff on the extent problem-solving skill enhances effective leadership in public universities in Delta State. The result of the study showed that there was a significant difference at (t-cal = 2.50, df = 692, p = 0.03) as the $p < 0.05$. Therefore, the null hypothesis which stated that there is no significant difference in the mean responses of male and female staff on the extent problem-solving skill enhances effective leadership in public universities in Delta State was rejected.

Discussion of Findings

Table 1 revealed the extent technological literacy skill enhances effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that University leaders use technology to inform and support their decision-making processes (3.82+0.49), University leaders utilize communication technologies to facilitate transparent and timely communication with various stakeholders (3.52+0.55), University leaders use data analytics and other technological tools to inform strategic decision-making (3.04+0.70), University leadership implement cybersecurity measures to protect sensitive information and digital infrastructure (2.74+0.95) and they use technology to inform and support their decision-making processes (2.86+1.00). Thus, the answer to research question two states that to a high extent technological literacy skill enhance effective leadership in public universities in Delta

State.

Adebanjo (2018), an advocate for educational technology and digital transformation, emphasizes the need for educators to possess technological literacy skills. Adebanjo argues that technological literacy is not merely about incorporesponses gadgets into classrooms but entails a deeper understanding of how technology can enhance pedagogical approaches and engage students meaningfully (Adebanjo, 2018). Within the global economic context, leaders like Ngozi Okonjo-Iweala have also acknowledged the crucial role of technological literacy. As an influential economist, Okonjo-Iweala stresses the importance of technological literacy in preparing the Nigerian workforce for a technology-driven global economy. Her insights echo the broader societal impact of technological literacy, emphasizing its role in fostering economic development and global competitiveness (Okonjo-Iweala, 2021).

Table 2 revealed the extent innovative resource management skill enhances effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that Explore and adopt cost-efficient technologies to streamline operations and reduce expenses (3.74+0.65), Strategically allocate financial resources to align with the institution's overall goals and priorities (3.54+0.71),Flexible budgeting practices that allow for adjustments based on changing priorities and needs (3.32+0.87), Promote and implement sustainability initiatives to reduce environmental impact and resource consumption (2.88+0.96) and Engage in partnerships and collaborations with other institutions to share resources and achieve mutual benefits(2.95+0.88). Thus, the answer to research question three states that to a high extent innovative resource management skill enhance effective leadership in public universities in Delta State. Okebukola (2017) asserts that innovative resource management is essential for navigating the resource challenges faced by educational institutions in Nigeria. In the context of limited financial resources, Okebukola argues that leaders must exhibit innovative thinking in identifying alternative funding sources, exploring cost-effective solutions, and maximizing the impact of available resources on educational outcomes. Adeniran and Adeyemo (2019) delve into the intricacies of innovative resource management in the Nigerian educational context. They emphasize the need for leaders to adopt a proactive and forward-thinking approach to resource utilization, in correspondence innovative financial models and exploring collaborations with external stakeholders to mitigate resource constraints.

Table 3 revealed the extent problem-solving skill enhances effective leadership in public universities in Delta State. The result showed that to a high extent the respondents agreed that identify and prioritize key challenges and issues within the institution (3.03+0.88), Leaders use analytical thinking to thoroughly assess problems and understand their underlying causes (3.00+0.89), Transparent and inclusive is the decision-making process led by university leaders when addressing complex issues (2.91+0.77) and Foster collaboration among different departments and stakeholders to solve complex problems (2.76+1.13). Thus, the answer to research question four states that to a high extent problem solving skill enhance effective leadership in public universities in Delta State. According to Barron (2003), problem-solving involves not only finding solutions to well-defined problems but also navigating complex and ill-defined situations. Educational scholars emphasize the importance of integresponses problem-solving into curricula to prepare students for the challenges of the modern world. In a study by Hmelo-Silver (2004), problem-solving is positioned as a central component of inquiry-based learning, enhancing students' ability to construct knowledge, engage in critical thinking, and develop innovative solutions. The cognitive processes involved in problem-solving have been explored by numerous researchers. Mayer (1992) identifies the key cognitive skills, including representation, planning, execution, and evaluation, which contribute to effective problem-solving. Additionally, the work of Sternberg (2003) introduces the concept of "successful intelligence," emphasizing the importance of analytical, creative, and practical thinking in problem-solving.

II. Conclusion

It was concluded that innovative thinking skills are paramount for effective leadership in public universities in Delta State. Through innovative approaches, leaders can navigate the complex challenges facing higher education institutions, foster creativity, adaptability, and resilience among faculty, staff, and students. By promoting a culture of innovation, leaders can enhance academic excellence, drive institutional growth, and contribute to the socio-economic development of Delta State. Embracing innovative thinking not only ensures the sustainability of public universities but also positions them as dynamic hubs of learning, research, and community engagement in the ever-evolving landscape of higher education.

III. Recommendations

Based on the findings of this study, the researcher recommended as follows:

Public universities should invest in technology infrastructure and provide continuous training opportunities to faculty and staff to enhance their technological literacy skills.

Universities should establish efficient resource management systems focusing on sustainable practices, strategic allocation of funds, and optimization of physical infrastructure.

Public universities should foster a culture of problem-solving by encouraging collaborative problem-solving initiatives, providing support for research projects addressing real-world challenges, and recognizing innovative solutions.

References

Achuonye. K.A. (2008). Trends in Nigerian educational innovations. Pearl publishers.

Adepoju, T.L. & Olaniyi, G.B. (1999). Innovations in primary school administration study. Studies in Pre-Primary Education, 1(1), 77-84.

Agbaruwhe, A. A. (2013). Teachers' effectiveness and students' academic performance in public secondary schools, Delta state, Nigeria. Study home course section. 3(2) 107-113

Ajuonuma, J.O., Asodike, J.D. &Anyaogu, R.O. (2015). Issues and trends in change and innovation in Nigerian educational system. Pearl publishers.

Alabi, A. O. & Okemakindo, T. (2010).Effective planning as a factors of education reform and innovation in Nigeria. Current Research Journal of Social Sciences 2(6), 316-320.

Crowston, K. (1997). A coordination theory approach to organizational process design. Journal of organizational science, 2(2), 52 166.

Dairai, D.D., Winnet, C. & Joseph, G.M. (2013). Curriculum Innovation or Renovation: Feasibility in Zimbabwean Secondary Schools. Academic Research International, 4(1), 314-319.

Eliot, T. S., & Henry, D. (2013). An Innovation Leadership Revolution is Brewing. Forbes Entrepreneurs. Retrieved from www.forbes.com/sites/henrydoss/ 21/02/18

Imogie, A.(2014). Education in Nigeria: development and challenges in innovation in Nigeria education system. Lagos: the CIBN.

Jack Z., & Joseph, F. (2014). 10 Traits of innovative Leaders Retrieved from https://hbr.org/2014/12/research-10-traits-of-innovative-leaders 21/02/18

Jekayinfa, A.A., Mofoluwawo, E.O. &Oladiran, M.A. (2011). Implementation of civic education curriculum in Nigeria: challenges for social studies teachers. Nigerian Journal of Social Studies, 6(1), 147-155.

New and Improved, LLC Newsletter (2013). The Innovative Brain. Retrieved from www.newandimproved.com/newsletter/2120.php 21/02/18

Nicholls, A. (2006). Social entrepreneurship: New models of sustainable social change. Oxford

University Press.

Nnabuo, P.O.M., Okorie, N.C. &Agabi, O.C. (2004).Introduction to school management. Eagle Lithograph Press.

Nwakwaola, H.N.L. (2018). Process of policy implementation: implication for educational administrators in N.P Ololube (Ed.), Handbook of research on educational planning and policy analysis. Pearl Publishers.

Nwankwo, J.I. (1999). Educational administration and supervision. Heinemann Publishers.

Yusuf, M.O. (2005). Information and communication Education: analyzing the Nigerian National Policy for Information Technology. International Education Journal, 6(3), 316-321.