International Journal on Integrated Education (IJIE)

e-ISSN: 2620 – 3502
p-ISSN: 2615 – 3785

Volume: 8 Issue: 3 | September 2025

https://journals.researchparks.org/index.php/IJIE

Article

Building a Knowledge-Based Economy through "Sciencing": The University of Abuja Students' Experiences

B.G. Aregbesola[1], Y. Barau[2], A. Abdulkarim[3]

1. Department of Science & Environmental Education
2. Department of Science & Environmental Education
3. Department of Educational Foundations, Faculty of Education, University of Abuja, Nigeria

* Correspondence: -

Abstract: This study explores building a knowledge-based economy through "sciencing": the University of Abuja students' experiences with a focus on developing critical thinking, problem-solving, and technical skills in students. The research aims to evaluate how "Sciencing" can better prepare students for STEM employment by fostering hands-on, inquiry-based learning experiences. Additionally, the study examines the role of university-industry collaborations in aligning academic curricula with industry needs, thereby contributing to Nigeria's transition to a knowledge-based economy. It also investigates the importance of faculty professional development to support the effective implementation of "Sciencing" in teaching practices. A mixed-methods approach, combining quantitative and qualitative data, is employed to assess the impact of this approach on student learning outcomes and industry readiness. The findings revealed among others that students develop essential skills, such as critical thinking, problem-solving, and technical skills which are vital for success in STEM fields with the implementation of "Sciencing" This hands-on approach allows students to better connect theoretical concepts to real-world applications for knowledge based economy. Moreover, it strengthens university-industry partnerships, ensuring that curricula are more closely aligned with the evolving demands of the STEM workforce. The paper recommendations include ongoing faculty member development, increased collaboration with industry partners, and the integration of technology to further enhance experiential learning which fosters "Sciencing" approach.

Citation: Aregbesola, B. G. Building a Knowledge-Based Economy through "Sciencing": The University of Abuja Students' Experiences. International Journal on Integrated Education (IJIE) 2025, 8(2), 103-113.

Received: 20th Mar 2025
Revised: 27th Apr 2025
Accepted: 21th May 2025
Published: 30th Jun 2025

Keywords: knowledge-based economy, "sciencing" and students' experiences

1. Introduction

In the context of modern science education, innovative teaching approaches are crucial to enhancing experiential learning and preparing students for the evolving demands of the job market, particularly in STEM (Science, Technology, Engineering, and Mathematics) fields. One such approach is "Sciencing," an approach that emphasizes hands-on, inquiry-based learning experiences, enabling students to engage deeply with scientific concepts through experimentation, observation, and practical application. "Sciencing" equips students with a robust understanding of scientific principles, the ability to apply them in real-world settings, and the critical thinking skills needed to solve complex problems. Also is an approach with a dynamic of integrating scientific inquiry and practices into the learning process, with the ultimate goal of bridging the gap between theoretical knowledge and practical application.

Nigeria is endow with wealth of mineral resources that are well sufficient to make her stands among developed nations of the world, but today we are yet to grasp the core values of science education, rather we rarely battling with the technicalities, which are the applicability, workability, and the relevant of science education to the society [1]. This act set the nation back among the resources endowed nations of the world. Thus, a growing need for innovative pedagogical strategies that bridge the gap between theoretical knowledge and practical application, particularly in STEM education. “Sciencing” approach does not only enriches students' experiential learning but also prepares them for the complex demands of the modern workforce, where there is an urgent need for skill development in science and technology sectors, so the transmission of knowledge-based economy [1].

A knowledge-based economy (KBE) is one where knowledge generation and technological innovation play a central role in economic development, with universities positioned as the key drivers of research, skills development, and human capital formation [2]. For universities in developing countries Nigeria for instance, the demands are even higher, as institutions serve as the engines of socio-economic development. Pradhan, et al submitted that countries with abundant natural resources, and still suffering from economic crisis need a re-think of the educational sectors. University of Abuja, one of Nigeria's leading tertiary institutions as with many universities across Africa, faces the ongoing challenge of enhancing teaching approaches to better prepare students for an increasingly complex and technology-driven world. "Sciencing," in its essence, bridge the gap between active learning through the scientific, critical thinking, and innovation [3].

“Sciencing” encourages students to apply scientific concepts across disciplines and connect academic knowledge with real-world problems. This approach is particularly valuable in contexts where education systems face challenges related to outdated curricula, limited industry collaboration, and a disconnect between academia and market demands. As Nigeria strives to build a KBE, the University of Abuja is exploring how "sciencing" can transform the educational landscape by fostering deeper scientific understanding, promoting curriculum-industry alignment, and enhancing the professional development of faculty members. Therefore, this study examines building a knowledge-based economy through “sciencing”: the University of Abuja students’ experiences.

Statement of the Problem

Despite the growing emphasis on building a knowledge-based economy (KBE) in Nigeria, there remains a significant gap between university education and the practical demands of the job market. Traditional teachings, especially in science disciplines, often fail to equip students with the critical thinking, problem solving, and practical skills needed to thrive in today’s dynamic economic landscape [1]. Additionally, sustainable partnerships between the university and key industries are insufficient, resulting in a misalignment between academic programs and the needs of employers. Faculty members also face challenges in adopting innovative teaching approaches like "sciencing," which integrates scientific inquiry, creativity, and problem solving into learning. Without targeted professional development, many instructors struggle to incorporate dynamic teaching approach into their teaching, limiting the potential to foster deeper scientific understanding among students.

Therefore, this study seeks to assess how the "sciencing" approach can develop critical thinking, problem-solving, and technical skills in students, to meet industry demands and boost STEM employment readiness. To enhance university-industry collaborations to align academic curriculum with industry needs for supporting Nigeria’s transition to a knowledge-based economy. And to examine how faculty professional development can support the effective implementation of "sciencing" at the University of Abuja. Addressing

these issues is critical to preparing students for meaningful contributions to Nigeria's knowledge-based economy.

Objectives

1. To develop critical thinking, problem-solving, and technical skills in students through "Sciencing" to meet industry demands and boost STEM employment readiness.
2. To enhance university-industry collaborations through "Sciencing" to align academic curriculum with industry needs for supporting Nigeria's transition to a knowledge-based economy.
3. To examine how faculty professional development can support the effective implementation of "sciencing".

Research Questions

1. How does "Sciencing" improve critical thinking, problem-solving, and technical skills in students to meet industry demands and boost STEM employment readiness?
2. In what ways can university-industry collaborations through "Sciencing" align academic curriculum with industry needs thereby supporting Nigeria's transition to a knowledge-based economy?
3. How can faculty professional developments support the effective implementation of "sciencing"?

Literature Review

The Concept of "Sciencing"

The concept of a knowledge-based economy (KBE) has gained significant traction in recent years, particularly in the context of developing nations striving to enhance their economic competitiveness. This concept emphasizes the importance of intellectual capabilities over physical inputs or natural resources in driving economic growth. In this context, universities play a pivotal role in fostering innovation, research, and the production of skilled graduates who can contribute to economic development. Higher institutions are critical in building a knowledge-based economy by producing skilled labour, fostering innovation, and conducting research that drives technological advancements [4]. One emerging educational strategy to achieve a knowledge-based economy is "Sciencing," which involves integrating scientific inquiry and approaches across various disciplines to enhance critical thinking, creativity, and problem-solving skills.

"Sciencing" is a dynamic approach to science education that integrates creativity, innovation, and critical thinking and mitigate the loophole in economy. This approach aims to engage students more deeply, foster a love for scientific inquiry, and equip them with the skills needed for the rapidly evolving scientific and technological world. The approach depicts brain wave in science; that is, science with the use of super brain for solving complex problem. It is a colloquial expression for the scientific process, which is the actual teaching of science (from the start to the measure of workability) in the classroom and practical placement of learning from (companies or industries experts) with industrial perspectives. "Sciencing" here (as coined) means, "doing science" which apply to the teaching of science from education perspectives in collaboration with technical expertise to unveil knowledge of witty invention like that of Micheal Fardays to the students.

This approach encourages students to engage actively with content, apply scientific approaches to problem solving, and develop skills that are transferable across disciplines and hands-on experimentation. Rather than relying solely on theoretical instruction, "Sciencing" encourages students to engage in scientific exploration, conduct experiments, and apply theoretical knowledge to solve real-world problems [5]. This approach fosters

critical thinking, innovation, and collaboration, all of which are essential in today's knowledge-driven economy. At the University of Abuja, the implementation of "Sciencing" is aimed at improving students' understanding of scientific concepts and equipping them with practical skills for the workforce. By moving beyond traditional rote learning. "Sciencing" promotes creativity and prepares students to meet the challenges of industries that demand innovative and technologically savvy professionals.

Development of Critical Thinking, Problem-Solving, and Technical Skills

One key objectives of "Sciencing" is to develop students' critical thinking, problem-solving, and technical skills and competencies that are highly sought after by employers in the STEM sector. The current global emphasis on preparing students for STEM careers highlights the need for education systems to go beyond traditional lecture-based methods and instead focus on developing practical, employable skills [6]. According to Siregar and Wahyuni, fostering these skills is essential for boosting STEM employment readiness, as industries increasingly demand graduates who can solve complex problems, think critically, and possess the technical expertise to navigate modern technological environments [7].

In Nigeria, where the unemployment rate among graduates remains high, there is an urgent need for educational strategies that equip students with the skills required to compete in a technology-driven economy. The integration of "Sciencing" into the academic curriculum at the University level can assist to close this gap by offering students opportunities to apply theoretical knowledge in practical contexts, thus aligning their skills with industry demands. Research has demonstrated that students who engage in problem-based learning environments are more likely to exhibit enhanced cognitive abilities, particularly in critical thinking and problem-solving [8].

The role of "Sciencing" in developing essential cognitive and technical skills cannot be overstated. In a globalized world where STEM professionals are expected to meet ever-changing industry demands, higher education institutions must ensure that students acquire critical thinking, problem-solving, and technical competencies that are directly transferable to the workplace [6]. "Sciencing" has been shown to facilitate these outcomes by immersing students in real-life scenarios where they must analyze problems, devise solutions, and apply their technical knowledge. Aregbesola notes that students who engage in this approach display improved problem-solving capabilities, as they are continuously challenged to think on their feet and adapt to new information [9].

The development of these skills is particularly crucial in Nigeria, where unemployment rates among graduates remain high due to a mismatch between academic training and industry requirements. By integrating "Sciencing" into the University of Abuja's STEM programs, the institution aims to address this skills gap, better preparing students for careers in STEM fields where these competencies are in high demand. As highlighted by Aregbesola, such an approach ensures that graduates are not only knowledgeable in their fields but also equipped with the practical skills required to excel in a competitive job market [9].

The "Sciencing" Approach and Deeper Understanding of Scientific Principles

The "sciencing" approach represents a shift from traditional, lecture-based learning toward an active learning model that emphasizes hands-on experimentation, critical inquiry, and the application of scientific principles to solve real-world problems. According to constructivist learning theory, students learn best when they can actively engage with the material, test hypotheses, and receive immediate feedback Brown, [10]. This process of inquest learning is at the heart of "sciencing," as it encourages students to take ownership of their learning, develop a deeper understanding of core scientific principles, and apply these principles in novel contexts. There exists well-documented studies demonstrating positive impact of active learning in science education, on students' conceptual understanding, retention of knowledge, and problem-solving skills [11].

In addition, Brown, submitted that active learning engages students directly in the learning process, encouraging them to inquire, think critically, and develop skills for lifelong learning [12]. While Smith & Jones, agreed that exploration of the relationship between teaching approaches and student aftermaths, helps to gain a deeper comprehension of the intricate dynamics that contribute to successful teaching and learning experiences [13]. From the findings it shows that adopting of "Sciencing", may aims to address critical challenges in STEM education, as to equip students with the necessary skills to thrive in a knowledge-based economy. Science education in Nigeria has historically focused on rote memorization and passive learning, but the "sciencing" approach offers a valuable alternative. By shifting the focus from content delivery to experiential learning, "sciencing" allows students to actively engage with scientific principles, conduct experiments, and explore the practical applications of their knowledge.

"Sciencing" emphasizes practical skills and real-world applications; this approach is ensuring that graduates are not just academically proficient but also industry-ready. In a rapidly evolving job market, theoretical knowledge alone is not enough. "Sciencing" equips students with practical and drilling skills that employers crave. From machinist, data analysis to project management, students are gaining real-world experience that makes them stand out in the job market. This study explored how the concept of "Sciencing" a dynamic, hands-on approach to teaching science is applied at the University of Abuja to prepare students for active participation in Nigeria is evolving knowledge-based economy.

Education and the Knowledge-Based Economy

Education is essential in driving a knowledge-based economy, as it helps develop the skills and competencies required for innovation, research, and technological advancement. Universities, in particular, play a crucial role by fostering research, promoting collaboration with industries, and aligning their curricula with the demands of a fast-evolving labor market [14]. Nigeria's higher education sector, however, faces several challenges, including outdated curricula, insufficient infrastructure, and limited industry partnerships, which hinder its ability to produce graduates with the requisite skills for a knowledge-based economy [15]. At the heart of the transition to a knowledge economy is science, technology, engineering, and mathematics (STEM) education, which forms the foundation for innovation and industrial growth. Presently, Nigeria is at the edge to harness its potential, through innovative teaching approaches like "Sciencing" which may be integrated into the STEM curriculum to enhance students' engagement, creativity, and problem-solving skills. "Sciencing" focuses on experiential learning through inquiry, experimentation, and real-world problem solving, which are critical for fostering the innovation needed in a tech-driven economy [16].

Transforming Nigeria into a knowledge-based economy necessitates a comprehensive reform of the education system, particularly focusing on strengthening STEM education, fostering research, and promoting university-industry collaborations. According to Aregbesola, et al (2023), the "Sciencing" approach at the University of Abuja offers a dynamic and innovative approach for preparing students to meet the demands of a knowledge-driven economy. This approach cultivates critical thinking, creativity, and problem-solving skills, which are essential for thriving in the evolving job market. By emphasizing hands-on learning, fostering industry partnerships, and integrating research into the curriculum, "Sciencing" equips students with the practical skills needed to contribute to Nigeria's economic growth and sustainable development. However, realizing the full potential of "Sciencing" demands sustained investment in education infrastructure, research funding, enduring industry collaborations, and continuous professional development for faculty members [17]. These foundational elements are essential for creating a dynamic learning environment that prepares students to tackle the

challenges of a knowledge-based economy [17]. As Nigeria continues to prioritize higher education as a key driver of economic progress, the "Sciencing" approach has the potential to play a significant role in producing skilled graduates, fostering innovation, and contributing to the nation's transition towards a knowledge-based economy.

Fostering Innovation and Research

Research and innovation are key pillars of a knowledge-based economy. Universities play a critical role in producing new knowledge and developing technological advancements that can lead to the creation of new industries and job opportunities [18]. At the University of Abuja, the "Sciencing" approach encourages students to engage in research-driven projects that address societal challenges, thus fostering a culture of innovation. By promoting interdisciplinary research and collaboration, "Sciencing" allows students to explore a variety of fields, from engineering to health sciences, and develop comprehensive solutions to complex problems. The emphasis on research helps students acquire the skills necessary to become innovators and entrepreneurs who can contribute to Nigeria's economic transformation. Additionally, students are encouraged to collaborate with faculty members on research projects, further promoting a research culture that supports innovation and knowledge creation [19].

Enhancing University-Industry Collaboration

A successful knowledge-based economy requires strong partnerships between universities and industries. Such collaborations enable the transfer of knowledge, foster innovation, and ensure that university graduates are equipped with the practical skills needed in the labor market [20]. The "Sciencing" approach promotes university-industry collaboration by incorporating real-world problems into the curriculum and encouraging students to work on projects that address industry challenges. At the University of Abuja, partnerships with industries allow students to participate in internships, collaborative research projects, and innovation hubs that provide practical exposure to the demands of the job market. For example, students may engage in projects related to green energy, agricultural technology, or software development, which directly contribute to the knowledge economy. These collaborations also allow industries to benefit from university research and innovations, thereby driving economic growth [15].

By collaborating with industries, the university can ensure that its curricula are designed to meet the needs of employers, thereby improving graduates' employability and contributing to the development of a knowledge-based economy. "Sciencing" also plays a pivotal role in enhancing university-industry collaborations, a critical component for aligning academic curricula with industry needs. In Nigeria, where the transition to a knowledge-based economy is a national priority, effective collaboration between academic institutions and industries is essential. Collaborations are key to advancing Nigeria's knowledge-based economy, as they help produce graduates who are not only academically prepared but also industry-ready. According to Aregbesola, university-industry partnerships also foster innovation by aligning research agendas with industry priorities, thus contributing to national development. Aregbesola, et al, underscores the importance of such collaborations, noting that they enable students to gain practical experience while still in school, making them more attractive to employers upon graduation [5].

"Sciencing" Industry Partnerships and Curriculum Alignment

One of the key factors in the success of the "sciencing" approach is the establishment of sustainable partnerships between universities and industry. These partnerships provide students with opportunities to apply their academic knowledge in real-world settings, thus enhancing the relevance of their education and preparing them for the workforce. In the context of a knowledge-based economy, the alignment of academic curricula with industry needs is essential for ensuring that graduates possess the skills and knowledge required by employers. According to Marginson, universities play a critical role in

fostering innovation and driving economic growth by producing skilled graduates and conducting research that addresses industry challenges. Thus, growing recognition of the need to align academic programs with the demands of the local and global job markets [4].

Industry partnerships are a key component of this effort, as they provide valuable insights into the skills and competencies that are most in demand. The "sciencing" approach facilitates this alignment by incorporating industry-led experiences into the learning process. Hence, students are exposed to the practical applications of their academic knowledge and gain valuable industry experience. This approach not only enhances students' technical skills but also fosters entrepreneurial thinking and innovation. As students work alongside industry professionals, they develop a deeper understanding of how scientific principles that are applied in various sectors, from manufacturing and technology to healthcare and environmental science. The success of these industry partnerships depends on their sustainability and the extent to which they are integrated into the academic curriculum. Long-term, mutually beneficial collaborations between the University and key industries can ensure that students receive ongoing opportunities to engage with industry challenges and apply their scientific knowledge in meaningful ways. These partnerships also provide a framework for continuous curriculum improvement, as industry feedback can be used to refine academic programs and ensure that they remain relevant in a rapidly changing job market.

2. Materials and Methods

This study was conducted using a qualitative research approach, involving a thorough review of existing literature, policy documents, and economic reports related to the development of a knowledge-based economy. Data were collected from academic journals, government publications, and international economic organizations to ensure a comprehensive understanding of the subject. The methodology also included comparative analysis, examining case studies of countries that have successfully transitioned to a knowledge-based economy. The data were systematically analyzed using content analysis techniques to identify key trends, challenges, and policy recommendations.

3. Results

The paper revealed the building a knowledge-based economy through "sciencing": the university of Abuja students' experiences with a focus on how to develops critical thinking, problem-solving, and technical skills in students and preparing them for STEM careers. It also looks into how to foster university-industry collaboration by aligning curricula with industry needs and supporting Nigeria's knowledge-based economy. Lastly, it unveils how continuous faculty development is essential for effectively implementing this innovative teaching approach. Specifically, the study disclosed that:

1. The integration of "Sciencing" into teaching significantly enhances student engagement by fostering active learning through inquiry-based activities. Students develop essential skills, such as critical thinking, creativity, and problem-solving, which are vital for success in STEM fields This hands-on approach allows students to better connect theoretical concepts to real-world applications.
2. Students who experience "Sciencing" are better prepared to meet industry demands and enter the workforce. The practical skills gained through hands-on experimentation, coupled with critical thinking and problem-solving abilities, align with the competencies required in STEM industries, thereby improving employment readiness.
3. The "Sciencing" approach enhances collaboration between universities and industries by aligning academic curricula with industry needs. These partnerships enable the development of programs and projects that mirror real-world industry challenges, allowing students to gain relevant experience and preparing them for the job market.
4. Successful implementation of "Sciencing" depends on continuous faculty professional development. Educators require training in inquiry-based teaching methods, the

integration of digital tools, and interdisciplinary collaboration to fully adopt the "Sciencing" approach. Without this ongoing development, the potential of "Sciencing" to transform STEM education may not be fully realized.

5. The use of educational technologies, such as simulations and virtual labs, in conjunction with "Sciencing" has been shown to improve student learning outcomes. Technology enables more interactive and immersive learning experiences, which further enhances students' ability to apply theoretical knowledge in practical settings.

4. Discussion

Faculty Professional Development and the Integration of "Sciencing" into Teaching

The integration of "Sciencing" into STEM education requires not only a shift in teaching approaches but also a sustained commitment to faculty professional development. As "Sciencing" focuses on inquiry-based, experiential learning, educators need to continuously update their pedagogical approaches to foster active student engagement, problem-solving, and critical thinking. For many faculty members, especially those accustomed to traditional teaching methods, this transformation demands extensive training and support. Professional development programs play a pivotal role in equipping educators with the tools and strategies necessary to successfully implement "Sciencing" in their classrooms [21]. Okebukola et al. asserted that pre-service and in-service training of science teachers should begin to reflect more on providing teachers with some form of technical experience in the quest for culturally and contextually relevant of effective delivery of science. In this context, the implementation of "Sciencing" as a teaching approach presents an intriguing area for research [22].

According to Guskey, effective professional development programs should be ongoing, collaborative, and focused on practical strategies for improving teaching and learning. For the University, this means providing faculty with training on how to implement the "sciencing" approach in their classes, as well as opportunities to collaborate with industry partners on research and curriculum development. One of the challenges of integrating "sciencing" into teaching is the need to shift from traditional, content-driven instruction to a more student-centered, inquest approach. Faculty development is ensuring that educators understand the principles of experiential and inquiry-based learning that underpin "Sciencing." In this approach, students are encouraged to engage directly with scientific concepts through experimentation, exploration, and reflection, rather than relying solely on theoretical instruction [23].

Partrick, emphasizes that experiential learning is most effective when students actively participate in the learning process, constructing knowledge through experience [24]. To facilitate this, faculty must be trained in designing learning activities that allow students to explore scientific phenomena, hypothesize outcomes, and solve problems collaboratively. Moreover, professional development should focus on helping faculty members integrate "Sciencing" with digital tools and educational technology. The use of multimedia, simulations, and interactive platforms enhances the practical aspects of "Sciencing" by providing students with opportunities to engage in virtual labs and simulations that mimic real-world scientific scenarios [9]. Training faculty to utilize these technologies effectively ensures that they can create more interactive and engaging learning experiences, whether in physical classrooms or online environments. This is especially important in the context of modern STEM education, where technology plays an increasingly central role in both teaching and learning processes.

Another critical component of faculty professional development is fostering interdisciplinary collaboration. "Sciencing" often requires the integration of multiple STEM fields, and faculty members may need to work together across disciplines to design comprehensive learning experiences that reflect real-world scientific challenges. Professional development programs that encourage interdisciplinary teamwork can help faculty members break down traditional academic silos, collaborate on innovative projects,

and share best practices for implementing "Sciencing" [25]. This collaboration enriches the learning environment, offering students a more holistic and multifaceted understanding of scientific concepts. In addition, ongoing professional development helps educators remain current with evolving industry needs and educational trends. As STEM industries rapidly evolve, the skills and knowledge required for success in these fields are constantly changing. Faculty members need to stay informed about these shifts to ensure that their teaching remains relevant and aligned with industry demands. According to Chiu and Wang, professional development that links faculty with industry experts can provide valuable insights into the latest technological advancements, enabling educators to better prepare students for the workforce. This also strengthens university-industry collaboration, a core objective of the "Sciencing" approach.

Finally, faculty development must include reflective practices that encourage educators to evaluate and refine their teaching approaches. Continuous reflection allows educators to assess the effectiveness of their "Sciencing" practices, identify areas for improvement, and make necessary adjustments to enhance student outcomes. Research shows that when educators engage in reflective practice, they are more likely to adopt innovative teaching methods and continuously improve their pedagogical skills [26]. Professional development programs that incorporate reflective exercises help educators to critically evaluate their "Sciencing" approaches and adapt to the evolving needs of their students.

Challenges and Opportunities

Despite the potential benefits of "Sciencing," its implementation may faces several initial challenges in the Nigerian context. These challenges include inadequate funding for education and research, poor infrastructure, and a shortage of well-trained lecturers capable of delivering this innovative teaching approach [27]. Limited access to modern technologies and laboratory facilities also poses a significant barrier to the successful implementation of "Sciencing" in university setting. However, these challenges present opportunities for reforms and investment in education. Addressing the infrastructural and financial barriers to "Sciencing" requires a concerted effort from the government, private sector, and international organizations to invest in modernizing educational facilities, training lecturers, and promoting research funding. Additionally, fostering international collaborations can help Nigerian universities adopt best practices in STEM education and further integrate innovative teaching like "Sciencing" [16].

5. Conclusion

Therefore, the paper concludes based on the findings that:

1. "Sciencing" plays a pivotal role in fostering critical thinking, problem-solving, and technical skills among students. These competencies are vital for meeting the demands of the modern workforce and enhancing STEM employment readiness, ensuring that students are equipped to solve real-world challenges in their future careers.
2. By enhancing university-industry collaborations, "Sciencing" ensures that academic curricula are aligned with the evolving needs of industries. This alignment bridges the gap between education and the labor market, better preparing students for immediate entry into a competitive and innovation-driven job market.
3. "Sciencing" contributes to Nigeria’s transition to a knowledge-based economy by equipping students with the skills necessary for technological advancement and innovation. This approach supports the nation’s efforts to develop a skilled workforce capable of driving sustainable economic growth through scientific and technological innovation.
4. The effective implementation of "Sciencing" relies on continuous faculty professional development. Training and equipping educators with the necessary

tools and methodologies to teach using hands-on, inquiry-based techniques are essential for ensuring that students gain maximum benefit from this innovative approach.

5. Through its emphasis on experiential learning and industry collaboration, "Sciencing" leads to improved student engagement, retention, and academic success. Students are not only more prepared for the job market but also better able to apply theoretical knowledge in practical settings, enhancing their overall educational experience and future employability.

Recommendations

Based on findings, the paper recommends that:

1. The University should establish continuous professional development programs for faculty members to equip them with the skills needed to effectively implement "Sciencing" teaching approach.
2. Institutions should formalize and expand collaborations with industries to align academic curricula with real-world job market needs, enhancing student employability in STEM fields.
3. Institutions should invest in advanced technologies, such as simulations and virtual labs, to support hands-on learning and experiential education, crucial for the successful implementation of "Sciencing."
4. Faculty from different STEM disciplines should collaborate in curriculum design and teaching practices, ensuring that students gain a holistic understanding of scientific concepts through integrated learning experiences.
5. Universities should create opportunities for students to engage in industry-related research projects and problem-solving tasks, fostering critical thinking, creativity, and real-world application of knowledge through the "Sciencing" approach.

REFERENCES

[1]. B. G. Aregbesola, I. A. Ojelade, and D. T. Haastrup, "Teaching Science Education in Nigeria University for Innovation, Group Collaboration, Job Creation, Accessing Bank Loans and Creativity Society for Young Inventors," Int. J. Orange Technol., vol. 5, no. 10, pp. 26–43, 2023.

[2]. World Bank, "The Changing Wealth of Nations 2021: Managing Assets for the Future." 2021. [Online]. Available: https://documents1.worldbank.org/curated/en/721941635406968765/pdf/Executive-Summary.pdf

[3]. R. P. Pradhan, M. B. Arvin, M. S. Nair, J. H. Hall, and S. E. Bennett, "Sustainable economic development in India: The dynamics between financial inclusion, ICT development, and economic growth," Technol. Forecast. Soc. Change, vol. 169, p. 120758, 2021, doi: 10.1016/j.techfore.2021.120758.

[4]. S. Marginson, "The role of universities in the knowledge economy," High. Educ. J., vol. 72, no. 5, pp. 655–671, 2016.

[5]. B. G. Aregbesola and B. E. Edinoh, "Impact of Economic Hardship on the Job Performance of Academic Staff in Nigerian Universities: Implications for Science Educators," Synergy Cross-Discip. J. Digit. Investig., vol. 2, no. 10, pp. 13–21, 2024.

[6]. National Academy of Sciences, "Call to Action for Science Education." 2020. [Online]. Available: https://nap.nationalacademies.org/read/25733/chapter/1#ii

[7]. N. Siregar and M. Wahyuni, "Strengthening university-industry collaboration in STEM education: Pathways to a knowledge-based economy," J. Sci. Educ. Innov., vol. 27, no. 3, pp. 101–113, 2021.

[8]. K. Adamu and A. Adeleke, "Leveraging technology for effective STEM education in developing economies," Int. J. Technol. Educ., vol. 28, no. 2, pp. 78–90, 2022.

[9]. I. A. Ojelade and B. G. Aregbesola, "The Future of Teaching and Learning in Nigeria: 3-D Computer Simulation an Innovative Strategy for Learning Chemistry," Acad. J. Res. Dev., vol. 17, no. 1, 2023.

[10]. D. Brown, E. Rocco, and A. Wegmann, "How does proximity affect marketing cooperation? A study of agribusiness clusters in a Latin-American emerging economy," 2013, [Online]. Available: https://www.balas.org/BALAS_2013...data/.../p636496.pdf
[11]. S. Freeman et al., "Active learning increases student performance in science, engineering, and mathematics," Proc. Natl. Acad. Sci., vol. 111, no. 23, pp. 8410–8415, 2014.
[12]. D. Brown, "Corporate Rescue: Insolvency Law in Practice," in Wiley Series in Commercial Law, J. Wiley, Ed., New York, 1996, p. 10.
[13]. J. Smith, M. Jones, and K. Brown, "The impact of targeted training on individual and organizational outcomes," J. Appl. Psychol., vol. 107, no. 4, pp. 563–580, 2022.
[14]. [14] OECD, "OECD Economic Outlook, Volume 2020 Issue 2." 2020. [Online]. Available: https://www.oecd.org/en/publications/oecd-economic-outlook/volume-2020/issue-2_39a88ab1-en.html
[15]. Y. Akhuemonkhan and Y. Raimi, "Problem Facing Research Programme in Nigeria Tertiary Institutions," Eur. J. High. Educ. Acad. Adv., vol. 5, no. 11, 2020.
[16]. F. Awofala, "Bridging the gap between education and industry: A focus on STEM skills," J. STEM Educ. Res., vol. 19, no. 1, pp. 35–48, 2021.
[17]. A. E. B. Ubom, I. A. Ojelade, and B. G. Aregbesola, "Efficacy of Functional Science Education in Sustaining National Development in Nigeria," in A Discourse on Educational Issues: FESTSCHRIFT in honour of five retiring professors, A. M. Maisamari, F. E. Ocholi, N. D. Rinji, O. B. Onyilo, G. Olowonefa, and A. F. Akintunde, Eds., University of Abuja Press, 2019.
[18]. W. Bank, "Scaling Climate Finance in Developing Economies." 2022. [Online]. Available: https://www.worldbank.org/
[19]. I. Okeke and Nwankwo, "Inquiry-based learning as a tool for enhancing STEM education outcomes in Nigeria," Afr. J. Sci. Educ., vol. 21, no. 4, pp. 89–99, 2021.
[20]. H. Etzkowitz and S. Zhou, "Barriers to Faculty Pedagogical Change: Lack of Training, Time, Incentives, and Tensions with Professional Identity," Sci. Educ., vol. 11, no. 4, 2021.
[21]. I. A. Ojelade and B. G. Aregbesola, "Teacher's Experience and Students' Academic Performance in Secondary School Chemistry Final Examination in Ido LGA of Ibadan Nigeria," Res. J. Contemp. Educ. Res., pp. 1–9, 2018.
[22]. P. A. O. Okebukola et al., "Exploring the impact of Culturo-Techno-Contextual Approach (CTCA) in tackling underachievement in difficult concepts in biology," in Proceedings of the 2016 Conference of the National Association of Research in Science Teaching (NARST), Baltimore, USA, 2016.
[23]. T. R. Guskey, "Professional development and teacher change," Teach. Teach., vol. 8, no. 3, pp. 381–391, 2012.
[24]. I. A. Ojelade, B. G. Aregbesola, T. G. Olatunde-Aiyedun, and D. T. Haastrup, "'Sciencing' and Nigeria Tertiary Institutions for the Present and Future Graduates," J. Educ. Res. Dev., vol. 15, no. 1, p. 130, 2022.
[25]. L. Wang, F. Li, and J. Brown, "Digital customer relationship management and its impact on firm performance," Ind Mark Manag, vol. 85, pp. 123–134, 2020, doi: 10.1016/j.indmarman.2020.01.005.
[26]. D. A. Schön, The Reflective Practitioner: How Professionals Think in Action. Basic Books, 2020.
[27]. R. Ogunleye, "Employee Engagement and Performance of Lecturers in Nigerian Tertiary Institutions," J. Educ. Entrep., vol. 9, no. 1, 2020.