



ASSESSING THE ACADEMIC READINESS AND PERFORMANCE OF THE INAUGURAL 100-LEVEL SCIENCE EDUCATION STUDENTS AT ABDULKADIR KURE UNIVERSITY, MINNA: CHALLENGES AND FUTURE OPPORTUNITIES

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Abstract

This study was conducted to assess the Academic Readiness and Performance of the Inaugural 100-Level Science Education Students at Abdulkadir Kure University, Minna: Challenges and Future Opportunities. Twenty-six (26) Inaugural 100-Level Science Education Students were purposively selected from Abdulkadir Kure University in Niger State, Nigeria. The instrument used for the study was Researcher's designed questionnaire which was divided into two sections to elicit information on Academic readiness and challenges for future opportunities. The questionnaire was validated by experts, and its internal consistency was assessed using Cronbach's Alpha, which yielded a reliability coefficient of 0.77. Data analysis was done using Mean and Standard deviation. A criterion means of 2.5 was set as the basis for judgment. The findings suggest that while students are somewhat prepared for Chemistry and Physics, their Mathematics readiness is a concern. It was therefore recommended that emphasis should be tailored towards academic support by the university management to address varied students' academic challenges.

Keywords: Assessment, Academic-Readiness, Challenges, Science-Education, Students', Performance

Introduction

The transition from secondary school to university is a defining stage in a student's educational journey. In Nigeria, this process requires students to meet specific academic benchmarks, including passing the Senior Secondary School Examination (SSSE) with at least five credits in key subjects such as Mathematics and English (Aliyu and Ali, 2021; Owoeye, Faleye and Jimoh, 2022). Additionally, students must excel in the Unified Tertiary Matriculation Examination (UTME), conducted by the

Joint Admissions and Matriculation Board (JAMB). This exam assesses students' knowledge in their chosen fields, with Mathematics being mandatory for all science students (Leyva, Walkington, Perera, & Bernacki, M. 2022; Azid, Ali, El Khuluqo, Purwanto, & Susanti, 2022). Achieving these milestones, along with meeting the cutoff scores set by their preferred universities, paves the way for admission into tertiary education (Onyeme, & Liyanage, 2024; Onebunne, & Igwe, 2021).



The tertiary level of education in Nigeria represents the final phase of the nation's 1-6-3-3-4 educational system, typically lasting a minimum of four years (Saadu, 2023; Ukpong, Alabekee, Ugwumba, & 2023; Fadokun, 2024). This level is offered through universities, polytechnics, and colleges of education, with Abdulkadir Kure University, one of the tertiary institutions in Niger State, admitting its first cohort of 100-level students into the Faculty of Education with a minimum UTME cutoff score of 160. Marking a historic moment, the students became pioneers of the newly established institution. Beyond academics, Abdulkadir Kure University seeks to align with global educational trends while promoting technical and vocational skills, much like other sister institutions worldwide. Her mission is to cultivate a community of learners who exemplify critical thinking and practical expertise, preparing them to contribute meaningfully to society and to meet the demands of a rapidly evolving global landscape. As Mohammed (2023) asserted, the university is dedicated to bridging the gap between theoretical knowledge and practical application, aims to cultivate critical thinkers rather than rote learners. This guiding principle reflects a commitment to foster well-rounded individuals capable of thriving in both academic and real-world environments. In light of the above, the integration of theoretical knowledge with practical application at Abdulkadir Kure University is grounded in a robust pedagogical framework informed by Experiential Learning Theory, Constructivist Theory, Problem-Based Learning, Pragmatism, and Social Constructivism. These theoretical paradigms underscore the importance of experiential engagement, collaborative problem-solving, and the application of knowledge to real-world contexts, thereby fostering critical thinking and equipping learners to address complex challenges (Kolb, 1984; Barrows & Tamblyn, 1980;

Vygotsky, 1978; Dewey, 1938). Within this framework, the university has established an academic environment that prioritizes independent thought, active engagement, and deep intellectual inquiry. This approach according to Ahsan, (2025) and Dighliya, (2025) not only enhances the educational experience but also cultivates the skills and mindset necessary for lifelong learning and adaptability in an evolving global landscape.

Empirical studies by Morris, Perry, and Wardle (2021), Wrigley-Asante, Ackah and Frimpong, (2023). Assem, Nartey, Appiah and Aidoo, (2023), Liou, (2021), Hardiansyah, Armadi and Wardi, (2024) and Wrigley-Asante, Ackah, and Frimpong (2023) support the above approach. Their findings revealed that students with strong foundational knowledge, particularly in science subjects, tend to achieve better outcomes in tertiary education. In Nigeria, those exposed to curricula emphasizing critical thinking and practical application transit more effectively into university life, while students from rote-learning backgrounds often struggle to adapt. (Hamzah, Oko-Joseph, & Mary 2025; Ibrahim & Ojo, 2022). These studies also highlight the need for tailored interventions, such as bridging programs, mentorship opportunities, and improved access to learning resources, to enhance academic readiness and performance (Lane, Morgan & Lopez, 2020). However, limited research exists on how these dynamics unfold in newly established institutions like Abdulkadir Kure University, which serves students from diverse and often under-resourced educational backgrounds. This study sought to address this gap by examining both the academic preparedness of its inaugural cohort and the institutional strategies required to support them effectively.

Academic readiness, academic performance, the challenges faced by students, and the influence of diverse educational backgrounds are

interconnected factors that significantly shape the educational journey. Academic readiness encompasses the foundational skills, knowledge, and attitudes students bring into their learning environment, which are critical for success (Musa, 2021). Academic performance reflects the measurable outcomes of their efforts and their ability to meet educational standards. Students may encounter various challenges, including adapting to new learning environments, managing workloads, and overcoming personal or academic barriers (Yusuf & Bello, 2020). Additionally, differences in educational backgrounds, shaped by varying curricula, teaching methods, and cultural contexts, can profoundly impact learning experiences and outcomes (Adamu, 2022). Understanding these factors is essential for educators and institutions seeking to design inclusive and effective strategies that support student success and close learning gaps.

It is against this backdrop that the researcher set out to address the challenges faced by the inaugural class of Abdulkadir Kure University. By identifying and tackling these barriers to success, the university can create a supportive environment that enhances students' educational experience while laying a solid foundation for future cohorts (Ogunleye, 2023). With thoughtful planning and targeted support, Abdulkadir Kure University can achieve her vision of becoming a center of excellence that produces critical thinkers, problem-solvers, and leaders equipped to make meaningful contributions to society.

Research Objectives

The objectives of this research are as follows:

1. To assess the academic readiness of the inaugural 100-level science education students at Abdulkadir Kure University, Minna, focusing on their preparedness in fundamental science subjects such as

Mathematics, Chemistry, and Physics.

2. To evaluate the academic performance of these students during their first year of study, identifying key areas where they excel or struggle.
3. To identify the challenges faced by the students in adapting to the university's academic environment, particularly in relation to critical thinking, problem-solving, and independent study skills.

Research Questions

1. What is the level of academic readiness of the inaugural 100-level science education students at Abdulkadir Kure University, particularly in key science subjects like Mathematics, Chemistry, and Physics?
2. How do the students perform academically during their first year, and what trends emerge in their academic achievements and challenges?
3. What specific academic challenges do these students face as they transition from secondary to tertiary education, particularly in the areas of critical thinking, problem-solving, and independent learning?

Methodology

This study employed a descriptive survey research design to assess the academic readiness and performance of the inaugural 100-level Science Education students with a focus on identifying academic challenges and exploring future opportunities for improvement. The sample consisted of 26 purposively selected students who were part of the first cohort in the Science Education program.

Data were collected using a researcher-designed questionnaire, divided into two sections: one assessing academic readiness in Chemistry, Physics, and Mathematics, and the other addressing students' challenges and perceptions of future opportunities. The questionnaire



was validated by science education experts, and its reliability was confirmed with a Cronbach's Alpha coefficient of 0.77.

The data were collected using the researcher-made questionnaire which was administered to the students by the researcher in the classrooms. Informed consent was obtained, and participants' responses were treated with confidentiality. Data analysis was performed using descriptive statistics, specifically the mean and standard deviation, with a criterion mean of 2.5

established to assess academic readiness.

Results

In this section, Table 1-3 are presented with their interpretations tailored towards providing answers to the research questions raised

Research Question 1

What is the level of academic readiness of the inaugural 100-level science education students at Abdulkadir Kure University, particularly in key science subjects like Mathematics, Chemistry, and Physics?

Table 1: Mean and standard deviation of level of academic readiness of the inaugural 100-level science education students in key science subjects like Mathematics, Chemistry, and Physics?

S/no	Items	N	Mean	SD
1	I have a strong foundation in mathematics necessary for university-level coursework	26	2.35	1.02
2	I feel confident in my knowledge of chemistry to tackle university-level courses.	26	3.08	.69
3	I am well-prepared for the demands of university-level physics.	26	2.92	.75
4	I can solve problems in mathematics without significant difficulty.	26	2.19	.85
5	I can conduct basic chemistry experiments and understand lab safety protocols.	26	2.46	.99
6	I can apply physics principles to solve practical problems in coursework.	26	2.50	.91
7	I'm sure of my self-assessed skill level in science subjects.	26	2.27	1.08
8	I often often did practice these subjects during my secondary school days	26	2.65	.94
Grand mean			2.55	

Decision mean = 2.50

Table 1 shows the mean and standard deviations of respondents on level of academic readiness of the inaugural 100-level science education students in key science subjects like Mathematics, Chemistry, and Physics. The survey results indicate that the inaugural 100-level science education students feel moderately prepared for university-level coursework in Mathematics, Chemistry, and Physics. The students showed moderate confidence in Chemistry (M = 3.08) and Physics (M = 2.92),

suggesting they felt somewhat ready for these subjects. However, their preparedness in Mathematics was lower, with mean scores of 2.35 for foundational knowledge and 2.19 for problem-solving ability. Students also reported moderate confidence in their lab skills and self-assessed science abilities, with mean scores of 2.46 for chemistry experiments and 2.27 for self-assessment. Prior practice in these subjects during secondary school was also limited (M = 2.65). The findings



suggest that while students are somewhat prepared for Chemistry and Physics, their Mathematics readiness is a concern, and tailored academic support is needed to strengthen their mathematical foundations before they engage fully with university-level science coursework.

The grand mean of 2.55 shows that the inaugural 100-level science education students at Abdulkadir Kure University are moderately prepared for university coursework. While students feel reasonably confident in Chemistry

and Physics, their Mathematics readiness is a concern, with lower preparedness scores. This indicates the need for targeted academic support, especially in Mathematics, to improve their foundational skills for success in science coursework.

Research Question 2:

How do the students perform academically during their first year, and what trends emerge in their academic achievements and challenges?

Table 2: Mean and standard deviation of academic performance during the first year of study.

Variable	M	SD
GPA (First Semester)	2.09	1.47
GPA (Second Semester)	2.36	1.66
Study Hours (per week)	8.8	2.68
Class Attendance (%)	81%	12%
Engagement (1-5)	3.3	1.06

Table 2 shows the mean and standard deviations of academic performance during the first year of study. The descriptive statistics for key academic variables showed notable variability among students. The average GPA increased slightly from M = 2.09 (SD = 1.47) in the first semester to M = 2.36 (SD = 1.66) in the second semester, indicating modest improvement but considerable variation in performance. Students reported an average of M = 8.8 hours (SD = 2.68) spent on academic work per week, with significant differences in study habits. Class attendance averaged M = 81% (SD = 12%), reflecting varied levels of attendance, likely influenced by factors such as motivation and external commitments. The average student engagement score was M = 3.3 (SD = 1.06), indicating moderate involvement in class but also significant individual differences. Overall, these findings highlight the diverse academic experiences of first-year students and emphasize the need for tailored

academic support to address their varied challenges.

Research Question 3:

What specific academic challenges do students face as they transition from secondary to tertiary education, particularly in critical thinking, problem-solving, and independent learning?

The findings reveal several interrelated challenges that hinder students' smooth transition into university-level science education.

Theme 1: Weak Foundational Knowledge (Especially in Mathematics)

Students consistently reported inadequate preparation in Mathematics during secondary school. Many struggled with understanding core concepts, relying instead on memorization. As one student noted, *"In Physics and Chemistry I can try, but Mathematics is where I'm always lost. We were only taught to memorize formulas, not to understand why they work"* (P3).

This weak foundation affected their confidence and limited their ability to engage in higher-order problem-solving required at the tertiary level.

Theme 2: Difficulty with Critical Thinking and Analytical Learning

Participants highlighted that secondary school learning was heavily exam-oriented, with little emphasis on inquiry or reasoning. At university, they encountered demands for justification, evaluation, and deeper analysis of scientific ideas. One student stated, *"In secondary school, if you cram past questions, you will pass. But here, lecturers ask us to explain 'why' or defend our answer. That thinking part is hard"* (P7).

Consequently, students struggled to critique arguments, interpret scientific evidence, and synthesize information from multiple sources.

Theme 3: Challenges in Independent Learning and Self-Regulation

The shift from teacher-directed learning to independent study posed a major difficulty. Students reported issues with time management, self-discipline, and seeking academic resources without guidance. As described by one participant, *"Nobody is forcing you to read here. If you don't plan yourself, you will fail. I'm still learning how to read on my own without waiting for the lecturer"* (P2).

Many lacked experiences in setting study schedules or conducting self-driven research.

Theme 4: Impact of Secondary

School Environment and Teaching

Quality

Several students attributed their challenges to poor teaching methods and inadequate resources during secondary education. Practical exposure, especially in science laboratories, was limited.

"We rarely did practical in my school. Just chalk and talk. Coming here where

practical is compulsory makes everything seem new" (P5).

While location (rural or urban) was not seen as a major factor, the quality of instruction strongly influenced their preparedness.

In view of aforementioned, the transition from secondary to tertiary education is marked by gaps in foundational knowledge, underdeveloped critical thinking, and weak independent learning skills. These issues stem largely from the limitations of secondary school preparation. To support student success, universities should implement academic bridging programs, mentorship initiatives, and strategies that build problem-solving and analytical competencies from the first year.

Discussion of the study

The study's findings shed light on the academic preparedness and challenges faced by the inaugural 100-level science education students at Abdulkadir Kure University, providing valuable insights into the students' readiness for university coursework and the obstacles they encountered due to their secondary school backgrounds.

The results from Table 1 revealed that the students felt moderately prepared for university-level coursework, particularly in Chemistry and Physics, where they reported higher levels of confidence (M = 3.08 for Chemistry and M = 2.92 for Physics). However, the students showed notable weaknesses in Mathematics, with foundational knowledge scoring a low mean of 2.35, and problem-solving ability rated at 2.19. This suggests that, while the students felt relatively confident in Chemistry and Physics, their mathematical readiness was a significant concern, requiring targeted academic support to build stronger foundations in these critical subjects. The students also reported limited practice in these subjects during their secondary school years (M = 2.65), which further highlighted the need for additional preparation, especially in Mathematics, to ensure they were fully



equipped to tackle the academic challenges of university-level science courses. The grand mean of 2.55 indicates a moderate level of preparedness, underscoring the importance of academic interventions, particularly in Mathematics, to improve students' readiness for their university education.

When examining academic performance, Table 2 shows a slight improvement in the students' GPA from the first semester ($M = 2.09$) to the second semester ($M = 2.36$), reflecting some progress in adapting to the demands of higher education. However, the considerable variability in performance, as shown by the high standard deviations, points to diverse academic experiences among the students. The average study hours of 8.8 hours per week and class attendance of 81% suggest that students had varied levels of commitment to their academic work, with some students struggling to engage fully. The moderate student engagement score ($M = 3.3$) further reflects the differences in how actively students participated in class, highlighting the need for more personalized engagement strategies and mentorship programs. These findings indicate that additional support during the first year could help students better manage their academic workload and boost overall performance. The study also explored the impact of secondary school backgrounds on academic preparedness. The qualitative findings reinforce the quantitative evidence indicating moderate to low preparedness among first-year science education students. Weak foundations in Mathematics particularly hinder the development of higher-order cognitive skills, including critical thinking and scientific problem-solving. The shift from guided instruction in secondary school to autonomous learning at university presents additional adaptation challenges. These findings align with existing literature Adeyemi and Adekunle, (2020), which highlights the

inadequacy of Nigerian secondary schools in preparing students for tertiary academic rigor.

Conclusion

The study indicates that first-year science education students demonstrate moderate preparedness for university, yet they face considerable challenges in Mathematics and independent learning. While they display confidence in subjects like Chemistry and Physics, their weak foundational skills continue to affect overall academic performance. These findings highlight the need for targeted support to improve their readiness for tertiary education. Looking ahead, there are valuable opportunities to implement remedial programs and mentorship initiatives aimed at strengthening core competencies and easing the transition into university life. Additionally, curriculum reforms that promote critical thinking and problem-solving can significantly enhance students' long-term academic success.

Recommendations

To address these challenges, several recommendations are proposed:

1. Strengthen Mathematics teaching at the secondary level and provide remedial support at university.
2. Enhance collaboration between secondary schools and universities to align expectations.
3. Enhance Secondary School education by partnering with local schools to improve resources and teaching quality.
4. Implement Personalized Academic Support in the first year, including mentorship and tutoring programs.
5. Improve engagement strategies by incorporating active learning and encouraging extracurricular academic activities.
6. Provide tailored resources for Science Education, such as updated textbooks and laboratory facilities.
7. Introduce transition programs to help students adapt to autonomous learning.



8. Monitor academic progress with regular assessments and feedback.
9. Facilitate the transition from secondary to tertiary education with orientation programs.
10. Strengthen Mathematics foundations through bridging programs and additional tutorials.

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