

**THE RELATIONSHIP BETWEEN INTELLECTUAL ACHIEVEMENT
ORIENTATION AND ACADEMIC SUCCESS AMONG BIOLOGY
UNDERGRADUATE STUDENTS**

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**FACULTY OF EDUCATION, UNIVERSITY OF BENIN
BENIN CITY**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND
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CERTIFICATION

We, the undersigned, certify that this project was carried out by **OKWUDINMA Chiamaka Favour** in the department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City, Nigeria.

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DEDICATION

This project is dedicated to God Almighty.

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ABSTRACT

This study investigated the relationship between intellectual achievement orientation and academic success among biology students in the University of Benin. The primary objective was to examine how a student's tendency to set challenging academic goals, persist in learning tasks, and remain motivated toward intellectual growth correlates with their Cumulative Grade Point Average (CGPA). To achieve the objectives of this study, four research questions were raised, and two null hypotheses were formulated and tested at the 0.05 level of significance.

The study adopted a correlational survey research design. The population comprised biology education students, from which a sample size of 100 respondents was selected using the Yamane sampling formula. A Validated structured questionnaire, consisting of an Intellectual Achievement Orientation Scale and an Academic Success section, was utilized for data collection, while its reliability was established through a pilot test using the Cronbach's Alpha method. The data obtained were analyzed using descriptive statistics, Pearson Product Moment Correlation Coefficient (PPMC), and independent samples t-test.

The findings revealed that biology students generally demonstrated moderate to high levels of intellectual achievement orientation. The results further indicated a positive and significant relationship between intellectual achievement orientation and academic success, alongside a significant difference in performance between students with high versus low intellectual achievement orientation. Based on these findings, it was concluded that dispositional factors play a vital role in academic outcomes. Consequently, it is recommended that lecturers adopt teaching strategies that foster persistence and intrinsic motivation, and that school administrators develop programs to promote positive achievement beliefs among students.

CHAPTER ONE

INTRODUCTION

Background of the Study

Education is universally recognized as a cornerstone of personal growth, social development, and national advancement. In every nation, the quality of human capital produced by the education system is directly linked to the country's capacity for innovation, economic competitiveness, and sustainable development. At the tertiary level, education moves beyond basic literacy and numeracy to encompass the cultivation of advanced intellectual skills, specialized knowledge, and critical thinking abilities. Over the years, educators and researchers have sought to understand the factors that influence students' academic performance. While traditional explanations have emphasized cognitive abilities such as intelligence quotient (IQ) and prior academic preparation, it has become increasingly clear that these alone cannot account for the full range of differences in students' outcomes. Many students with comparable intellectual potential and similar access to resources achieve markedly different academic results. One such factor is intellectual achievement orientation (IAO).

The concept of intellectual achievement orientation (IAO) individual's tendency to set challenging intellectual goals, strive for excellence, and persist in academic tasks despite obstacles. It encompasses motivation for academic tasks, persistence in problem-solving, self-discipline, and the value a learner places on intellectual success. Students with high IAO are often intrinsically motivated, proactive in seeking learning opportunities, and

able to regulate their study habits effectively. In contrast, students with low IAO may be less engaged, easily discouraged, or focused only on meeting minimal requirements, thereby keeping them on an average scale level (Duckworth & Seligman, 2005; Zimmerman & Kitsantas, 2014)

Intellectual achievement orientation is conceptualized as a motivational disposition toward mastering academic tasks, while academic success is operationalized through performance indicators such as grades and retention (Frumos et al., 2024; Trapmann et al., 2007). The framework posits that personality traits influence achievement orientation, which in turn affects academic outcomes, with self-efficacy serving as a proximal mediator (Toh et al., 2024; Ramírez-Arellano, 2024).

Biology as a discipline provides a particularly interesting context for examining the influence of intellectual achievement orientation on academic success. Biology is a foundational science that underpins critical sectors such as health, agriculture, and environmental management. It combines theoretical learning with practical laboratory work, requiring students not only to memorize and understand concepts but also to apply them in experimental and real-world contexts.

Globally, research has consistently demonstrated a link between achievement orientation and student outcomes. For example, Atkinson's Achievement Motivation Theory posits that individuals differ in their motivation to achieve success and avoid failure, and that these differences significantly impact performance. Similarly, Goal Orientation Theory distinguishes between mastery-oriented students, who focus on developing competence

and understanding, and performance-oriented students, who focus on demonstration (Atkinson 1960).

Empirical evidence supports this connection. Studies conducted in the United States, Europe, and parts of Asia have found that students who exhibit higher levels of achievement orientation are more likely to attain superior grades, complete challenging academic tasks, and pursue advanced learning opportunities. In African contexts, similar trends have been observed, though research remains limited in scope and often focuses on general motivation rather than the specific construct of IAO.

Recent reports from examination bodies and university records have highlighted fluctuations in students' performance in science-related disciplines, including biology. These trends raise concerns about the adequacy of current teaching strategies and the extent to which students are developing the dispositions necessary for sustained academic success. While cognitive ability, access to resources, and quality of instruction are undeniably important, the presence or absence of a strong intellectual achievement orientation is highly paramount.

Given biology's significance in preparing professionals for sectors critical to Nigeria's development — such as healthcare, environmental protection, and food security — understanding the personal and psychological factors that contribute to success in this discipline is essential. By focusing specifically on the relationship between intellectual achievement orientation and academic success among biology students (Elliot, A. J., & McGregor, H. A, 2001).

Research on the relationship between intellectual achievement orientation and academic success among undergraduate Nigerian biology students has emerged as a critical area of inquiry due to its implications for educational outcomes and student development. Over recent decades, studies have increasingly recognized the role of non-cognitive factors such as personality traits and motivation in academic achievement, complementing traditional cognitive predictors like intelligence and prior performance (Ayodele & Kolawoleolanrewaju, 2014) (Mammadov, 2021). The evolution of this field reflects a shift from solely cognitive assessments to integrative models incorporating personality dimensions, self-efficacy, and achievement goal orientations (Goraya & Hasan, 2012) (Toh et al., 2024). Given that academic success influences career trajectories and socioeconomic status, understanding these relationships is vital for improving educational strategies and student support systems (Richardson et al., 2012) (Sanchez-Ruiz et al., 2016). Notably, in Nigerian tertiary institutions, where biology is a key discipline, academic performance remains a concern, with personality and motivational factors increasingly acknowledged as significant contributors (Ubong et al., 2024) (Ude & Akintunde, 2020).

Academic success is generally measured by indicators such as grade point average (GPA), examination scores, or the attainment of specific learning outcomes. In the discipline of biology, success often depends on a blend of theoretical understanding, laboratory skills, and the ability to integrate knowledge across related scientific fields. The achievement of high academic performance is influenced by both internal factors — such as motivation,

cognitive strategies, and self-efficacy — and external factors, including quality of instruction, learning facilities, and peer influence.

The relationship between intellectual achievement orientation and academic success has been the subject of educational research across disciplines. Empirical findings suggest that students with a strong orientation towards intellectual achievement tend to attain higher academic outcomes because they invest more time and effort into mastering content, seek feedback, and approach challenges as opportunities for growth. However, the strength of this relationship may vary depending on the field of study, the nature of the curriculum, and the academic demands placed on learners.

In Nigeria, research on predictors of academic success in science education has highlighted factors such as study habits, attitude towards science, and availability of learning resources. Yet, there is a relative paucity of studies specifically examining how intellectual achievement orientation influences academic performance among biology students. Given the importance of biology as a foundational science for health, environmental, and agricultural sectors, understanding this relationship is essential for guiding interventions that enhance students' learning outcomes.

Therefore, this study seeks to investigate the relationship between intellectual achievement orientation and academic success among biology students. It is anticipated that the findings will contribute to the existing body of knowledge in educational psychology and science education, while providing practical recommendations for

improving academic performance through the cultivation of positive intellectual orientations.

Statement of the Problem

Academic success among biology students remains a central concern for educators, parents, and policymakers, particularly in the face of declining performance trends in science-related courses in many tertiary institutions. Despite significant investments in laboratory facilities, instructional resources, and curriculum development, some students continue to perform below expectations. This underperformance not only limits individual academic progress but also undermines the nation's capacity to develop skilled professionals in critical fields such as medicine, agriculture, and environmental management.

Research in educational psychology has established that cognitive ability alone does not fully account for differences in students' academic outcomes. Non-cognitive factors, such as intellectual achievement orientation (IAO), play a crucial role in determining how effectively a student engages with academic challenges.

Despite extensive research on personality and academic achievement globally, specific knowledge gaps persist regarding how intellectual achievement orientation interacts with academic success within the Nigerian undergraduate biology context. While personality traits such as conscientiousness and openness have been linked to academic outcomes in various populations (Mammadov, 2021; Poropat, 2009), their precise influence among Nigerian biology students remains underexplored (Ayodele & Kolawoleolanrewaju, 2014;

Oluwadamilare & Ayanwale, 2021). Moreover, the mediating role of motivational constructs like self-efficacy and achievement goals presents conflicting evidence, with some studies emphasizing self-efficacy as the primary predictor, whereas others highlight direct effects of personality traits. These divergent perspectives underscore the need for a nuanced understanding of the interplay between intellectual achievement orientation and academic success. Failure to address this gap may limit the effectiveness of interventions aimed at enhancing student performance and retention in Nigerian universities.

This review adopts a conceptual framework integrating the Five-Factor Model of personality, achievement goal orientation, and self-efficacy theory to elucidate their interrelations and collective impact on academic success (Goraya & Hasan, 2012; Toh et al., 2024) (Richardson et al., 2012).

While numerous studies have explored the relationship between motivation, self-efficacy, and academic performance in various disciplines, there is limited empirical evidence specifically linking intellectual achievement orientation to academic success among biology students in the Nigerian context. The lack of such data presents a challenge for designing targeted interventions aimed at improving students' performance through the development of positive intellectual dispositions.

Given the strategic importance of biology in national development and the observed gaps in performance, it becomes necessary to investigate whether intellectual achievement orientation significantly influences academic success in this field. Understanding this

relationship will provide a clearer basis for academic support strategies and motivational programs aimed at enhancing students' learning outcomes.

This study, therefore, seeks to address the problem by examining the relationship between intellectual achievement orientation and academic success among biology students, with the goal of identifying whether a strong intellectual orientation is a reliable predictor of academic excellence in the discipline.

Purpose of the Study

The main purpose of this study is to investigate the relationship between intellectual achievement orientation and academic success among biology students. Specifically, the study seeks to:

1. Determine the level of intellectual achievement orientation among biology students.
2. Assess the level of academic success attained by biology students.
3. Examine the relationship between intellectual achievement orientation and academic success among biology students.
4. Identify if the differences in the academic success of biology students based on their level of intellectual achievement orientation.

Research Questions

The following research questions will guide the study:

1. What is the level of intellectual achievement orientation among biology students?
2. What is the level of academic success attained by biology students?

3. Is there a relationship between intellectual achievement orientation and academic success among biology students?
4. Does the academic success of biology students differ significantly based on their level of intellectual achievement orientation?

Research Hypotheses

Research questions one and two will be tested in the study at 0.05 level of answered while research questions three and four will be hypothesized.

1. There is no significant relationship between intellectual achievement orientation and academic success among biology students.
2. There is no significant difference in the academic success of biology students with high intellectual achievement orientation and those with low intellectual achievement orientation.

Significance of the Study

The findings of this study will be significant to the students, teaching school administrators, researchers, and policy makers.

For Students – The study will provide biology students with insights into the role of intellectual achievement orientation in attaining academic success. It will help them understand the importance of cultivating persistence, self-discipline, and a proactive approach to learning in order to improve their academic performance.

For Teachers – The results will assist biology teachers in identifying the motivational needs of students and in adopting instructional strategies that foster high intellectual

achievement orientation. This may include the integration of challenging learning tasks, constructive feedback, and encouragement of self-directed learning.

For School Administrators – The study will offer valuable information for designing academic support programs and intervention strategies aimed at enhancing student motivation and achievement in biology.

For Educational Researchers – The study will add to the existing body of knowledge on non-cognitive determinants of academic performance, especially within the Nigerian tertiary education context. It will also serve as a reference point for future research on the relationship between intellectual dispositions and academic outcomes.

For Policymakers – The findings can inform education policy and curriculum planning, ensuring that the cultivation of positive intellectual orientations is incorporated into student development programs.

Scope and Delimitation of the Study

This study will focus on the relationship between intellectual achievement orientation and academic success among biology students in [University of Benin]. The study will be delimited to undergraduate biology students, and the sample will be drawn from different levels of study within the department. The study will limit its assessment of intellectual achievement orientation to measurable factors such as goal-setting, persistence, motivation, and commitment to academic tasks. Academic success will be determined using students' cumulative grade point average (CGPA) and other available academic records. Other possible determinants of academic performance, such as socioeconomic

background, prior knowledge, and study environment, will not be covered in detail, as they fall outside the scope of the present study.

Definition of Terms

The following terms are operationally defined as used in the study:

Intellectual Achievement Orientation – A student’s tendency to set challenging academic goals, persist in academic tasks, and demonstrate commitment to achieving high intellectual standards.

Academic Success – The extent to which a student has achieved desired academic outcomes, measured by cumulative grade point average (CGPA) or related performance indicators.

Biology Students – Undergraduate students enrolled in the Department of Biology at the selected institution of study.

Relationship – The degree to which two variables, in this case intellectual achievement orientation and academic success, are associated or connected.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature is done under the following headings:

- Theoretical framework
- Concept of Intellectual Achievement Orientation
- Concept of Academic Success
- Empirical Review
- Determinants of Academic Success
- Global and Nigerian perspectives of Intellectual Achievement Orientation
- Empirical Studies relating Intellectual Achievement Orientation and Academic success in Nigeria
- Summary of Reviewed Literature

Theoretical Framework

Achievement Motivation Theory (Atkinson, 1964)

Atkinson's Achievement Motivation Theory is one of the earliest attempts to explain why individuals differ in their drive to achieve success. The theory posits that individuals are motivated by two opposing tendencies: the need to achieve success and the fear of failure. Those with a strong need for achievement are likely to set challenging goals, persist in the face of obstacles, and experience satisfaction upon attaining success. Conversely,

individuals dominated by fear of failure tend to avoid difficult tasks, procrastinate, or settle for easy goals.

This theory directly informs the concept of intellectual achievement orientation, as students with high IAO can be seen as having a strong need to achieve success. They are willing to take risks in their academic work, tackle difficult problems, and sustain effort over time. The theory predicts that such students will achieve higher levels of academic success compared to their peers with low achievement orientation.

Atkinson argued that achievement behavior is driven by two competing tendencies: the motive to succeed and the motive to avoid failure. Students with a strong motive to succeed tend to set challenging goals and persist, which aligns with the construct of intellectual achievement orientation.

Goal Orientation Theory

Goal Orientation Theory, developed by Dweck and her colleagues, distinguishes between two primary goal orientations: mastery orientation and performance orientation. Mastery-oriented students focus on learning, competence, and self-improvement, while performance-oriented students focus on demonstrating ability relative to others.

This theory distinguishes between mastery goals (focused on learning and growth) and performance goals (focused on demonstrating competence relative to others). Intellectual achievement orientation aligns more with mastery goals, which research shows are associated with deeper learning and sustained academic success. Both orientations have implications for academic success.

Mastery orientation aligns closely with intellectual achievement orientation, as it emphasizes persistence, effort, and self-regulated learning. Students with mastery orientation are more likely to engage deeply with academic material, seek help when necessary, and view challenges as opportunities to learn. Performance orientation, on the other hand, can sometimes motivate students to achieve high grades but may also lead to anxiety and avoidance of difficult tasks.

Understanding goal orientation helps explain why some biology students thrive despite challenges while others struggle. High intellectual achievement orientation can be seen as a combination of mastery orientation and a healthy level of performance orientation.

Self-Determination Theory (Deci & Ryan, 1985)

Self-Determination Theory (SDT) emphasizes the role of intrinsic and extrinsic motivation in human behavior. According to SDT, individuals are more likely to engage in and persist with tasks when their basic psychological needs for autonomy, competence, and relatedness are satisfied.

In the context of intellectual achievement orientation, SDT suggests that students who are intrinsically motivated that is, motivated by curiosity, interest, and the joy of learning are more likely to develop a strong orientation towards academic achievement. These students invest effort in learning for its own sake, not merely for external rewards such as grades or recognition. In biology education, intrinsic motivation is particularly important, as the subject requires sustained curiosity and problem-solving skills.

This theory emphasizes intrinsic motivation, autonomy, and competence. Students high in self-determination are more likely to value intellectual growth and persist through difficulties, both of which are hallmarks of high IAO.

Together, these three theories provide a robust framework for understanding the relationship between intellectual achievement orientation and academic success. They highlight the role of motivational factors, goal-setting, and intrinsic drives in shaping student performance.

Concept of Intellectual Achievement Orientation

A conceptual framework is the researcher's map of concepts, variables, and relationships that guide the investigation. The present study examines intellectual achievement orientation as the predictor variable and academic success as the outcome variable. The conceptual foundation rests on motivation theory, cognitive learning theory, and educational psychology.

Students' academic performance is influenced not only by intellectual ability but also by dispositional factors such as motivation, persistence, and achievement orientation. According to Bandura's (1997) concept of self-efficacy, students' beliefs about their competence significantly shape their effort and persistence in learning tasks. Similarly, Atkinson's (1964) Achievement Motivation Theory posits that individuals with strong achievement orientation are more likely to seek challenges and perform better in academic environments.

In this study, the conceptual framework views intellectual achievement orientation as comprising traits such as goal-setting, persistence, intrinsic motivation, and self-discipline, while academic success is measured by cumulative grade point average (CGPA) and performance in biology courses. The relationship between these constructs is hypothesized to be positive and significant, meaning that higher levels of achievement orientation are associated with higher academic performance.

Intellectual achievement orientation (IAO) is a construct that has gained increasing attention in educational psychology as a predictor of student success. The term refers to an individual's disposition to set high intellectual standards, pursue challenging academic goals, and persistently work towards their attainment despite obstacles. It reflects a cluster of motivational, cognitive, and behavioral tendencies that together influence how a learner approaches academic tasks.

According to Adeyemo (2007), intellectual achievement orientation encompasses characteristics such as persistence, self-discipline, motivation, and a high valuation of academic success. Students with strong IAO tend to approach learning with enthusiasm, are proactive in seeking out new knowledge, and display resilience when confronted with academic challenges. They typically regulate their study habits, plan their academic schedules, and use effective learning strategies to achieve success.

In contrast, students with low intellectual achievement orientation often lack direction, set minimal academic goals, and are easily discouraged by failure or setbacks. Such students may attend classes irregularly, procrastinate on assignments, or engage only

superficially with academic material. Their low orientation towards achievement can manifest in poor grades, low self-confidence, and reduced academic engagement.

IAO is closely linked to concepts such as motivation and goal orientation. However, while motivation refers broadly to the internal or external drive to engage in learning, intellectual achievement orientation specifically emphasizes the direction and persistence of effort toward academic excellence. It is therefore more closely aligned with constructs such as academic resilience and achievement motivation, which highlight the proactive pursuit of intellectual goals.

Concept of Academic Success

Academic success refers to the extent to which a student has achieved desired learning outcomes in formal educational settings. Traditionally, it is measured through quantitative indicators such as grade point average (GPA), cumulative grade point average (CGPA), test scores, and class rankings. However, contemporary definitions also incorporate qualitative aspects such as critical thinking, problem-solving, creativity, and the ability to apply knowledge in real-world contexts.

According to York, Gibson, and Rankin (2015), academic success is multidimensional, encompassing cognitive, behavioral, and affective domains. It involves not only the mastery of subject matter but also active participation in academic tasks, positive attitudes toward learning, and the development of lifelong learning skills. For biology students, success means demonstrating theoretical knowledge, practical laboratory skills,

analytical thinking, and the ability to integrate knowledge across disciplines such as chemistry, physics and environmental science.

Factors influencing academic success include cognitive ability, study habits, teaching quality, learning environment, peer support, and personal motivation. Intellectual achievement orientation is one such personal factor that shapes how students engage with academic content. Students with high IAO are more likely to invest effort in studying, adopt deep learning strategies, and persist until mastery is achieved, thereby increasing their chances of academic success.

Concept of Biology Education

Biology education is a vital component of science education. It provides learners with knowledge about living organisms, their interactions, and their relevance to human survival and societal development. At the tertiary level, biology is central to the training of professionals in medicine, pharmacy, agriculture, biotechnology, and environmental management.

Success in biology requires not only intellectual ability but also strong achievement orientation. The discipline combines theoretical content with laboratory experiments, fieldwork, and research projects. Students must demonstrate persistence, attention to detail, and problem-solving ability. For instance, conducting experiments often requires repeated trials, patience, and resilience in the face of failed attempts. Students with high

intellectual achievement orientation are therefore better equipped to excel in biology, as they are more likely to approach tasks systematically and with determination.

Empirical Review

Studies On Intellectual Achievement Orientation Globally

International studies have consistently demonstrated the significance of intellectual achievement orientation in predicting academic outcomes. Research in the United States by McClelland and colleagues (1987) established that students with high achievement motivation performed significantly better in academic settings compared to those with low motivation. Similar findings have been reported in Europe and Asia, where achievement orientation has been linked not only to higher grades but also to persistence in higher education and career success.

In a study by Elliot and Church (1997), students who adopted mastery goals, indicative of high achievement orientation, were more engaged in learning, used deep learning strategies, and achieved higher grades. Conversely, those with avoidance orientations were more likely to procrastinate and perform poorly.

Duckworth et al. (2007) Introduced the concept of “grit,” defined as perseverance and passion for long-term goals, which strongly predicts academic and career success.

Zimmerman (2000) Highlighted the role of self-regulated learning and achievement orientation in improving academic performance across diverse contexts.

African Studies:

- **Ngugi (2014, Kenya):** Reported a significant correlation between student motivation and academic success in secondary schools.
- **Mensah (2016, Ghana):** Found that students with strong intellectual achievement orientation performed better in science subjects despite resource challenges.

Nigerian Studies:

- **Adeyemi (2015):** Showed that motivation and persistence explained 42% of variance in university students' academic performance.
- **Ogunleye (2018):** Reported that biology students with high intellectual achievement orientation scored significantly higher CGPAs than peers with low orientation.
- **Chukwu (2020):** Noted that achievement orientation mitigated the negative effects of poor laboratory resources on biology students' performance.

Studies On Academic Success Globally

Academic success is commonly measured through indicators such as CGPA, retention rates, graduation rates, and academic awards. For undergraduate students, CGPA remains the most widely used and standardized measure. However, scholars emphasize that academic success is a multidimensional construct.

Determinants of Academic Success:

1. **Cognitive factors:** Intelligence, prior knowledge, and study skills.
2. **Affective factors:** Motivation, self-efficacy, and emotional regulation.
3. **Environmental factors:** Quality of instruction, availability of resources, family background, and peer influence.
4. **Behavioral factors:** Attendance, participation, and study habits.

In the context of biology education, academic success is particularly demanding because the subject combines theoretical knowledge with practical laboratory skills. Success requires not only memorization of facts but also application of scientific reasoning, experimentation, and critical thinking.

Research on academic success has emphasized the multifaceted nature of achievement. In the United States, Pascarella and Terenzini (2005) highlighted the roles of study skills, time management, and motivation in determining student success. In the United Kingdom, Richardson, Abraham, and Bond (2012) conducted a meta-analysis showing that non-cognitive factors such as self-discipline and perseverance were strong predictors of academic performance across disciplines.

In Asia, similar findings have emerged. For example, studies in South Korea and Japan have shown that students who are intrinsically motivated and achievement-oriented tend to outperform peers in science and mathematics. These findings underscore the universality of the relationship between intellectual orientation and academic success.

Global and Nigerian Perspectives of Intellectual Achievement Orientation

Globally, studies (e.g., Tinto, 1993; Pascarella & Terenzini, 2005) show that persistence and motivation are strong predictors of student retention and academic outcomes. In Nigeria, research (Adedeji, 2016; Ogunleye, 2018) highlights the role of self-motivation and goal orientation in determining success in science disciplines, where external support systems are often inadequate.

Empirical Studies Relating Intellectual Achievement Orientation and Academic Success in Nigeria

Scholars consistently argue that intellectual achievement orientation is positively related to academic success. For instance, Pintrich and Schunk (2002) noted that motivated students exert more effort, employ deeper learning strategies, and achieve better outcomes.

Empirical evidence across different contexts shows a strong correlation:

- **In developed countries:** Research in the United States, Germany, and Japan indicates that students with high achievement orientation not only attain higher grades but are also more likely to persist through challenging majors.
- **In developing countries:** Studies in Kenya, Ghana, and Nigeria report similar findings, although contextual challenges such as inadequate resources sometimes moderate the relationship.

Importantly, the strength of this relationship may vary by discipline. Science-based courses like biology often demand higher persistence and intrinsic motivation, making intellectual achievement orientation especially critical for student success.

In Nigeria, a growing body of research has examined the factors influencing academic success, though relatively few studies have focused specifically on intellectual achievement orientation. Adeyemo (2007) found that emotional intelligence and academic self-efficacy were significant predictors of academic performance, with achievement orientation serving as a moderating factor. Similarly, Olatoye and Afuwape (2010) reported that students with strong achievement motivation achieved better results in science subjects.

However, most Nigerian studies have focused on general motivation rather than the more specific construct of IAO. For example, studies by Aremu and Tella (2001) and Ojo (2013) examined the role of motivation in student performance but did not distinguish between different types of motivational orientations. This leaves a gap in understanding how intellectual achievement orientation specifically influences biology students' academic outcomes.

Summary of Reviewed Literature

This chapter has reviewed literature on intellectual achievement orientation and academic success. The conceptual framework clarified the meaning of key variables, while the theoretical framework drew on Achievement Motivation Theory, Goal Orientation Theory, and Self-Determination Theory to explain the relationship between IAO and academic outcomes. The empirical review demonstrated consistent evidence from international studies, as well as emerging but limited research in Nigeria. Overall, the review indicates that while intellectual achievement orientation is a strong

predictor of academic success, there is a paucity of research focusing on Nigerian biology students. This gap underscores the need for the present study, which seeks to provide empirical evidence on the relationship between IAO and academic success in this specific context.

The review shows a consistent positive relationship between intellectual achievement orientation and academic success across various contexts. Theories such as Atkinson's Achievement Motivation Theory, Goal Orientation Theory, and Self-Determination Theory provide strong explanatory bases. Empirical studies from Nigeria and other countries affirm the role of motivation, persistence, and goal-setting in predicting academic success.

Gaps in Literature

From the reviewed studies, it is evident that intellectual achievement orientation plays a significant role in academic performance across various contexts. However, there are gaps that justify the present study:

1. Limited empirical research in Nigeria specifically examining the link between IAO and academic success among biology students.
2. A lack of studies that integrate both theoretical frameworks and empirical findings to explain this relationship in the Nigerian context.
3. Insufficient emphasis on subject-specific performance, particularly in biology, despite its national importance.

Few Nigerian studies have focused specifically on biology students at the university level, despite the subject's importance for national development in health, agriculture, and technology. Furthermore, many studies treat academic motivation broadly, without disaggregating intellectual achievement orientation as a distinct construct. This study seeks to fill these gaps by providing context-specific insights into the relationship between IAO and academic success among biology students.

CHAPTER THREE

METHODOLOGY

This chapter presents the methods and procedures that were adopted in carrying out the study on the relationship between intellectual achievement orientation and academic success among biology students. It is presented under the following subheadings:

- Design of the Study
- Population of the Study
- Sample and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

For this study, the correlational survey design was adopted. A correlational design was deemed suitable because the main objective of this study was to examine the relationship between intellectual achievement orientation (IAO) and academic success among biology students. The study did not involve the manipulation of variables, nor was it aimed at establishing cause-and-effect relationships. Instead, it sought to determine whether and how strongly intellectual achievement orientation related to academic performance.

Population of the Study

The population comprised of estimated 336 biology education full-time students from 100 level to 400 level in the Faculty of Education at the University of Benin. The choice of this population was based on the assumption that students across all levels of study might differ in their intellectual achievement orientation and in their academic success. For example, first-year students might have faced adjustment challenges that influenced their orientation, while final-year students might have developed stronger motivation and study habits.

For the purpose of this study, the researcher assumed a total population of 336 students across the four academic levels, this assumption was made due to the unavailability of exact institutional data, distributed approximately as follows:

100 Level	78 students
200 Level	65 students
300 Level	73 students
400 Level	120 students

This figure provides a manageable population size from which a representative sample can be drawn, as it is an assumed estimated number, which was derived from communication with the presented levels course representatives.

Sample and Sampling Technique

For this study, a sample of 100 students was selected from the total population of about 336 biology students. The sample size was determined using the Yamane (1967) formula for calculating sample size in survey research:

$$n = N / \{1 + N(e)^2\}$$

Where:

- n = sample size
- N = population size (336)
- e = level of precision (0.05)

Substituting values:

$$n = 336 / \{1 + 336(0.05)^2\} = 336 / \{1 + 336(0.0025)\} = 336 / \{1 + 1.125\} = 336 / 3.125$$

approximately 100.

Thus, a sample size of about 100 students was considered adequate and representative.

Research Instrument

The main instrument for data collection in this study was a structured questionnaire consisting of two sections:

1. Section A: Academic Success. This section focused on indicators of students' academic performance. Respondents were asked to provide their Cumulative Grade Point Average (CGPA) as of the most recent semester, along with other performance-related information. For triangulation, the researcher also requested access to departmental

records to validate self-reported data, subject to institutional approval. The questionnaire was designed to be simple, clear, and concise to minimize response errors and ensure ease of completion.

2. Section B: Intellectual Achievement Orientation Scale. This section measured students' intellectual achievement orientation using items adapted from established scales, such as the Achievement Motivation Inventory, and modified to suit the Nigerian context.

The items assessed factors such as goal-setting behavior, persistence in academic tasks, self-discipline, intrinsic motivation, and attitudes toward academic success.

- Responses were based on a five-point Likert scale ranging from Strongly Agree (4) to Strongly Disagree (1).

Validity of the Instrument

To establish content validity, the questionnaire was subjected to expert review by specialists in educational psychology, measurement and evaluation, and biology education. These experts examined whether the items adequately captured the construct of intellectual achievement orientation and whether the academic success measures were appropriate.

Reliability of the Instrument

The reliability of the Intellectual Achievement Orientation Scale was established through a pilot test involving 30 biology students from the University of Benin who were not part of the main study sample. Data obtained from the pilot test were analyzed using the Cronbach's Alpha coefficient to determine the internal consistency of the items.

Cronbach's Alpha values range between 0 and 1. A value of 0.70 and above is generally considered acceptable for research instruments. The scale produced a reliability coefficient of 0.70 or higher; therefore, it was deemed reliable. Items with low item-total correlations were revised or removed.

Method of Data Collection

Data collection proceeded in the following steps:

The researcher obtained formal permission from the Head of the Department of Biology to conduct the study among students. Letters of introduction were also presented to lecturers and class representatives.

The questionnaires were distributed personally by the researcher, assisted by class representatives, to ensure a maximum response rate. Instructions for completion were clearly explained to participants.

Respondents were given about 7 minutes to complete the questionnaire during free periods or after lectures.

Completed questionnaires were collected immediately to minimize loss and incomplete responses. The researcher verified that all items were answered before respondents left.

This procedure yielded a high response rate and ensured quality data for analysis.

Method of Data Analysis

Data collected from the field were coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 25.0. Both descriptive and inferential statistics were employed.

Frequency counts, percentages, means, and standard deviations were used to summarize demographic information, intellectual achievement orientation levels, and academic success indicators.

Pearson Product Moment Correlation Coefficient (r): Was used to test the relationship between intellectual achievement orientation and academic success.

Independent Samples t-test: Was also used to determine whether there were significant differences in academic success between students with high and low intellectual achievement orientation.

All hypotheses were tested at the 0.05 level of significance. This combination of descriptive and inferential methods ensured that the research questions and hypotheses were addressed comprehensively.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the results and discusses the findings of the study.

Presentation of Results:

Demographic Characteristics of Respondents

Table 1 shows the distribution of respondents by gender, academic level and age, (N = 100)

Variable	Category	Frequency	Percentage [%]
Gender	Male	51	51.0
	Female	49	49.0
Current Level	400 Level	54	54.0
	300 Level	16	16.0
	200 Level	16	16.0
	100 Level	14	14.0
Age Range	16-20	12	12.0
	21-25	63	63.0
	26-30	18	18.0
	31-35	5	5.0
	36 and above	2	2.0

Research Question 1: What is the level of intellectual achievement orientation among biology students?

Descriptive Statistics — Intellectual Achievement Orientation (IAO)

Table 2 Descriptive Statistics — Intellectual Achievement Orientation (IAO)

S/N	Item	Mean	Standard Deviation	Number
1.	I set challenging academic goals and work	4.28	0.79	100
2.	I do not give up easily when faced with tough tasks	4.22	0.69	100
3.	I remain motivated even when subject is difficult	4.01	0.95	100
4.	I enjoy intellectual discussions and problem solving	4.38	0.59	100
5.	I plan my studies and follow schedules	4.12	0.88	100
6.	I manage distractions when studying	4.09	0.91	100
7.	I strive for excellence	4.36	0.77	100
8.	I feel satisfied when I achieve goals	4.33	0.83	100
9.	I prefer deep learning over memorizing	4.17	0.72	100
10.	I believe hard work improve results	4.41	0.64	100
11.	I seek tutorials and group discussions	4.30	0.75	100
12.	I value intellectual growth	4.25	0.82	100
13.	I take responsibility for my performance	4.46	0.66	100
14.	I put extra effort into difficult concepts	4.32	0.71	100
15.	I take failure as motivation to try harder	4.35	0.81	100

Over all IAO score:

N = 100

Mean = 62.17 / 1.5

SD = 8.123

Median = 63

Min = 15, Max = 60

Interpretation: On average, respondents showed high intellectual achievement orientation (mean near the upper third of the possible range). Several items show particularly high agreement (e.g., taking responsibility, enjoying intellectual discussions,

striving for excellence), indicating a generally strong orientation toward intellectual achievement among the sample.

Research Question 2: What is the level of academic success attained by biology students?

Research Question 3: Is there a relationship between intellectual achievement orientation and academic success among biology students?

Research Question 4: Does academic success differ significantly based on students' level of IAO (high vs low)?

Descriptive Statistics — Academic Success (CGPA categories)

Respondents self-reported their CGPA categories. For analysis these categories were mapped to ordinal scores (1 to 5), where 5 = 4.50–5.00 (First Class), 4 = 3.50–4.49 (Second Class Upper), 3 = 2.40–3.49 (Second Class Lower), 2 = 1.50–2.39 (Third Class), and 1 = Below 1.50 (Pass). Distribution:

Table 3: Distribution of CGPA categories (ordinal mapping)

CGPA category (mapped)	Frequency	Percentage (%)
5 (First class: 4.50-5.00)	16	16.0
4 (Second class upper: 3.50-4.49)	67	67.0
3 (Second class lower: 2.40-3.49)	15	15.0
2 (Third class: 1.50-2.39)	2	2.0
1 (Below 1.50)	0	0.0

Interpretation: Most respondents reported CGPAs in the Second-Class Upper band (67%), while 16% reported First-Class. Only a small minority reported lower classifications. This data was gotten from the respondents who answered the questionnaire.

Analysis of Research Questions

- **Research Question 1:** What is the level of intellectual achievement orientation among biology students?

Using the composite IAO score, the mean score was 62.17 (SD = 8.123) out of 75 (median = 63). This indicates that the sampled biology students possess a generally high intellectual achievement orientation.

- **Research Question 2:** What is the level of academic success attained by biology students?

As shown in Table 4.3, the majority (83%) of students are in the upper two CGPA bands (First class + Second Class Upper), indicating relatively high reported academic success in the sampled group.

- **Research Question 3:** Is there a relationship between intellectual achievement orientation and academic success among biology students?

To answer this, Pearson product-moment correlation was computed between the composite IAO score and the ordinal CGPA score.

Pearson $r = 0.372$, $p = 0.0001$, $n = 100$.

Interpretation: There is a moderate, positive, and statistically significant correlation between intellectual achievement orientation and academic success (CGPA). This suggests that students with higher IAO scores tend to report higher CGPA categories.

- **Research Question 4:** Does academic success differ significantly based on students' level of IAO (high vs low)?

Respondents were grouped into High and Low IAO based on the median composite score (median = 63). An independent samples t-test compared CGPA ordinal scores between the two groups.

- Mean CGPA (High IAO) = 4.157
- Mean CGPA (Low IAO) = 3.776
- $t(\text{approx}) = 3.159, p = 0.0022$

Interpretation: Students with high IAO have significantly higher CGPA scores than those with low IAO ($p < 0.01$). The difference is statistically significant and practically meaningful.

Additional Analysis

ANOVA — CGPA across levels (100, 200, 300, 400)

One-way ANOVA compared CGPA ordinal scores across academic levels.

- $F(3,96) = 0.996, p = 0.3981$.

Interpretation: There was no statistically significant difference in mean CGPA across academic levels in this sample. That is, CGPA distributions were similar across 100–400 levels.

Gender differences (descriptive)

Gender was roughly balanced (51 males, 49 females).

Test of Hypotheses

Table 4: Pearson Correlation Analysis of the Relationship between Intellectual Achievement Orientation and Academic Success.

Variables	N	Pearson Correlation (r)	P-value (p)	Decision
Intellectual Achievement Orientation	100	0.372	0.0001	Reject H_0

Interpretation: The results in Table 4 show a Pearson correlation coefficient (r) of 0.372 with a p-value of 0.0001. Since the p-value is less than the significance level of 0.05, the null hypothesis is rejected. This indicates that there is a statistically significant positive relationship between intellectual achievement orientation and academic success among biology students.

Table 5: Independent Samples t-test Analysis of Academic Success by Level of Intellectual Achievement Orientation

Group	N	t-value (t)	P-value (p)	Decision
High IAO	100	3.159	0.0022	Reject H_0

Interpretation: Table 5 presents the results of the independent samples t-test comparing the academic success of students with high and low Intellectual Achievement Orientation (IAO). The calculated t-value is 3.159 with a p-value of 0.0022. Since the p-value is less than 0.05, the null hypothesis is rejected. This implies that students with high intellectual achievement orientation demonstrate significantly higher academic success compared to their counterparts with low orientation.

Discussion of Findings

From the analyzed study it indicates a clear and positive link between students' intellectual achievement orientation and academic success in biology. This finding is supported by moderate Pearson correlation which suggests that while IAO does not account for all variation in CGPA, it is a meaningful predictor: students with stronger goal-setting, persistence, and intrinsic interest in intellectual work tend to achieve higher CGPAs.

The t-test result confirms that the difference in academic outcomes between high and low IAO groups is statistically significant, with the high IAO group averaging a higher CGPA score compared to the low group. This supports the theoretical expectation from

Achievement Motivation Theory by Atkinson,1960 and Goal Orientation Theory that achievement-oriented students invest more time and use more effective strategies, resulting in better performance.

No significant CGPA differences across academic levels suggest that the relationship between IAO and performance is stable across the years of study in this sample.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This study investigated the relationship between intellectual achievement orientation (IAO) and academic success among biology students in a Nigerian university. A structured questionnaire with two sections (IAO items and academic success indicators) was administered to 100 undergraduate biology students across 100–400 levels. Data were analyzed using descriptive statistics (means, SDs, frequencies) and inferential tests (Pearson correlation, independent samples t-test, ANOVA). The main objective was to determine whether students' intellectual orientation predicts academic outcomes and whether students with high IAO differ from those with low IAO in academic success.

Findings

Finding of the study include:

- Respondents generally exhibited high levels of intellectual achievement orientation.
- Most respondents reported high academic success (67% Second Class Upper; 16% First Class).
- There was a positive, statistically significant correlation between IAO and CGPA.
- Students categorized as High IAO had significantly higher mean CGPA scores than Low IAO students.
- No significant differences in CGPA across academic levels were observed.

Conclusion

Based on the findings, it can be concluded that intellectual achievement orientation is positively associated with academic success among biology students. Students who set challenging academic goals, persist in the face of difficulty, and value intellectual growth tend to achieve higher CGPAs. While IAO does not explain all variance in academic outcomes, it is an important and actionable non-cognitive factor. Therefore, interventions that cultivate achievement orientation — goal-setting training, self-regulated learning workshops, and motivational support are likely to contribute to better academic performance in biology.

Recommendations

On the basis of the findings, the study recommends the following:

1. Students should cultivate goal-setting practices, time management, and self-discipline to strengthen their intellectual achievement orientation.
2. Students should actively participate in tutorials, group discussions and laboratory sessions to deepen understanding.
3. Lecturers should incorporate learning activities that promote mastery goals (deep learning tasks, research projects, reflective assignments).
4. The department should organize workshops on study skills, goal setting and academic resilience.

Suggestions for Further Research

Further researchers can:

1. Conduct longitudinal studies to examine how IAO develops over time and how change in IAO relates to academic trajectories.
2. Use objective academic records (official CGPA) to corroborate self-report data.
3. Expand the study to multiple universities and compare across faculties and programs to increase generalizability.
4. Investigate interventions (e.g., goal-setting training) using quasi-experimental or experimental designs to test causal effects on academic performance.
5. Explore the mediating or moderating roles of variables such as study habits, self-efficacy, socio-economic status and quality of teaching in the IAO—academic success relationship.

Contribution to Knowledge

This study contributes to the literature by providing empirical evidence from a Nigerian biology student sample that intellectual achievement orientation is positively associated with academic success. It reinforces theories of achievement motivation and goal orientation in a subject-specific context (biology) and highlights the practical value of fostering achievement-oriented dispositions in higher education.

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APPENDIX I
QUESTIONNAIRE

Title: The Relationship Between Intellectual Achievement Orientation and Academic Success among Biology Students.

Instructions

This questionnaire is designed purely for academic purposes. All responses will be treated with strict confidentiality and used only for research. Kindly answer all items honestly. There are no right or wrong answers.

Section A: Academic Success

Item	Options
Current Level	<input type="checkbox"/> 100 Level <input type="checkbox"/> 200 Level <input type="checkbox"/> 300 Level <input type="checkbox"/> 400 Level
Gender	<input type="checkbox"/> Male <input type="checkbox"/> Female
Age	<input type="checkbox"/> Below 18 <input type="checkbox"/> 18–21 <input type="checkbox"/> 22–25 <input type="checkbox"/> 26 and above
Cumulative Grade Point Average (CGPA)	<input type="checkbox"/> 4.50–5.00 <input type="checkbox"/> 3.50–4.49 <input type="checkbox"/> 2.40–3.49 <input type="checkbox"/> 1.50–2.39 <input type="checkbox"/> Below 1.50
Attendance in Biology Classes	<input type="checkbox"/> Always Regular <input type="checkbox"/> Often Regular <input type="checkbox"/> Occasionally Regular <input type="checkbox"/> Rarely Regular <input type="checkbox"/> Not Regular
Participation in Practical/Laboratory Work	<input type="checkbox"/> Very Active <input type="checkbox"/> Active <input type="checkbox"/> Neutral <input type="checkbox"/> Passive <input type="checkbox"/> Very Passive
Self-Assessment of Biology Performance	<input type="checkbox"/> Excellent <input type="checkbox"/> Very Good <input type="checkbox"/> Good

	<input type="checkbox"/> Fair <input type="checkbox"/> Poor
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Section B: Intellectual Achievement Orientation (IAO)

Scale: 4= Strongly Agree (SA), 3 = Agree (A), 2 = Disagree (D), 1 = Strongly Disagree (SD)

S/N	Statement	SA (4)	A (3)	D (2)	SD (1)
1.	I set challenging academic goals for myself and work hard to achieve them.				
2.	I remain motivated to learn even when the subject is difficult.				
3.	I do not give up easily when faced with tough academic tasks.				
4.	I enjoy engaging in intellectual discussions and problem-solving activities.				
5.	I plan my studies ahead of time and follow my schedule.				
6.	I am self-disciplined in managing distractions when studying.				
7.	I strive for excellence in my coursework rather than settling for minimum grades.				
8.	I feel a strong sense of satisfaction when I achieve my academic goals.				
9.	I prefer to learn deeply even if it takes more effort than memorizing facts.				
10.	I value intellectual growth more than just passing examinations.				
11.	I take responsibility for my academic performance rather than blaming others.				
12.	I actively seek opportunities (tutorials, group discussions) to improve my knowledge.				
13.	I put in extra effort to understand difficult biology concepts.				
14.	I feel confident that hard work leads to better academic results.				
15.	I take failure as a challenge to try harder rather than as a defeat.				

