STUDENT'S PERCEPTION ON THE USE OF PROJECTED INSTRUCTIONAL MEDIA IN MOLECULAR BIOLOGY: A CASE STUDY OF BIOLOGY EDUCATION STUDENTS IN THE UNIVERSITY OF BENIN

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A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY, FACULTY OF EDUCATION, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE EDUCATION B.Sc(Ed) BIOLOGY, UNIVERSITY OF BENIN CITY, NIGERIA.

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CERTIFICATION

We, the undersigned, certify that this research work was carried out by **Ayomide IGILI** in the Department of Curriculum and Instructional Technology, Faculty of Education, University of Benin, Benin City.

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DEDICATION

This study is dedicated to Almighty God, who graciously sustained me throughout this programme.

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ABSTRACT

This study investigates the perception on the use of projected instructional media on the academic achievement of Biology Education students in Molecular Biology at the University of Benin. It begins by establishing the background and rationale for the study, emphasizing the need for innovative instructional strategies to address students' difficulties in understanding complex biological concepts. The problem of low engagement and comprehension in traditional teaching settings prompted an exploration into the effectiveness of projected instructional media. Four research questions were raised to guide the study.

The literature review explored relevant theories on teaching and learning, such as cognitive load theory and constructivist learning theory. The constructivist perspective emphasizes that learners actively build their own understanding based on experiences and prior knowledge. In this context, projected instructional media, such as slide presentations, animations, and video demonstrations serve as tools that help students visualize and relate new information to what they already know. These media enhance interaction, promote deeper cognitive engagement, and support the construction of knowledge through exploration and discovery. The study employed a descriptive survey design and used a sample of 120 Biology Education students selected through stratified random sampling. Data were collected using a structured questionnaire that assessed students' perceptions of projected instructional media, their level of engagement, and its effect on their comprehension and academic performance in Molecular Biology.

The findings revealed a significant positive relationship between the use of projected instructional media and academic achievement. Common tools identified included PowerPoint presentations, videos, animations, virtual simulations, and digital microscopy. A large percentage of students reported improved understanding, motivation, and participation. Specifically, 82% indicated better academic performance, while 76% expressed increased interest in multimedia-based lessons. Students generally perceived these tools as effective for simplifying complex biological concepts and enhancing engagement. Further analysis showed that students who regularly engaged with these media performed better academically than those relying solely on traditional methods. However, several factors influenced their effectiveness, such as the lecturer's teaching style, the quality and clarity of instructional materials, students' interest levels, and access to technological resources. Despite the benefits, challenges were also noted, including limited availability of projectors and computers, poor internet connectivity, occasional equipment malfunctions, lack of lecturer training in digital pedagogy, and the overwhelming nature of some visual content. A few students also preferred traditional instructional approaches. Overall, the study concludes that while projected instructional media significantly enhance academic achievement in Molecular Biology, addressing the identified challenges is essential to maximize their effectiveness.

Based on the findings of this study, it was recommended among others that to improve learning outcomes in Molecular Biology, universities should integrate diverse projected instructional media, such as PowerPoint presentations, videos, animations, virtual simulations, and digital microscopy have been shown to improve conceptual understanding, foster student engagement, and simplify complex biological processes. The effective use of these technologies not only caters to various learning styles but also promotes interactive and student centered learning environments, thereby contributing significantly to improved learning outcomes in Molecular Biology.

CHAPTER ONE

INTRODUCTION

Background to the Study

Students' academic accomplishment is frequently considered the most dependable measure of their comprehension and proficiency in educational material. In fields such as Molecular Biology, students must comprehend abstract and intricate ideas, including cellular processes, genetic systems, and molecular interactions. These subjects are intrinsically complex, and conventional pedagogical approaches that emphasise lectures, textbook readings, and static illustrations may occasionally fall short in effectively engaging students or imparting the profound comprehension necessary for success in this domain (Mayer, 2016). Although traditional techniques are essential to education, there is increasing acknowledgement of technology's potential, particularly instructional media, to improve the learning experience. Consequently, there is a growing interest in examining the impact of projected instructional media on student academic performance,

especially in subjects such as Molecular Biology, where the intricacy of the topic necessitates new teaching methods.

Anticipated instructional media encompasses several tools like multimedia presentations, educational videos, animations, simulations, and interactive components that can augment learning experiences. These media provide students with visual depictions of molecular processes, including DNA structure, enzyme functions, and cellular mechanisms fundamental to Molecular Biology. The integration of these media tools into the curriculum allows students to visualise abstract biological processes and attain a more thorough comprehension of complicated subjects. Studies indicate that the effective use of projected media into lessons can enhance student interest and engagement, resulting in improved academic performance. Video simulations of molecular interactions enable students real-time visualisations of molecular activities that are otherwise challenging to conceptualise, hence providing an immersive experience that enhances active learning (Mayer, 2017). Dynamic and interactive pedagogical approaches have been associated with increased student engagement and academic success, especially in fields necessitating conceptual understanding, such as Molecular Biology (Berk, 2016).

The incorporation of instructional media has been demonstrated to substantially influence academic achievement by accommodating diverse learning styles. The Cognitive Theory of Multimedia Learning (Mayer, 2009) posits that pupils have enhanced learning outcomes when both visual and audio modalities are activated concurrently. Projected media, by integrating text with visuals, video, and animations, caters to the varied needs of students, facilitating a deeper comprehension of intricate concepts. In Molecular Biology, where theoretical knowledge must be applied to practical situations, multimedia presentations are very successful in enhancing comprehension and retention (Rieber, 2017). Moreover, interactive simulations promote active engagement, enabling students to adjust variables and monitor results, thus enhancing their comprehension of the subject matter (Lee, 2016). These interactive forms are essential for facilitating the application of knowledge, as they enable students to connect directly with the subject matter, thereby reinforcing their learning through experiential involvement.

The efficacy of instructional media in enhancing academic performance is contingent upon other aspects beyond the simple utilization of technology. Teacher competence is a crucial issue. Successful integration of instructional media necessitates that instructors

possess both the requisite technical abilities and a profound comprehension of how these technologies can augment educational practices. Research indicates that teachers adept in multimedia tools can cultivate more engaging and dynamic learning environments, hence enhancing student accomplishment (Vaughan, 2017). Furthermore, instructor readiness influences the extent to which students can interact with multimedia content. Educators who offer explicit instruction on the appropriate use of digital tools will cultivate an environment that enhances student engagement and involvement with the content, hence boosting academic performance (Chen et al., 2018).

Student motivation and engagement are crucial factors influencing the effectiveness of instructional media on academic performance. Multimedia tools have demonstrated the capacity to enhance student interest and motivation, especially when students may interact with knowledge in a significant and engaging manner. Studies have shown that multimedia use can enhance intrinsic motivation by rendering learning more pleasurable and less tedious (Moreno & Mayer, 2014). When students perceive the content as visually appealing and intellectually stimulating, they are more inclined to interact actively with the topic, so improving their academic achievement. Moreover, immediate

feedback from interactive media is essential in encouraging kids. The capacity to promptly assess their knowledge and obtain feedback enables students to monitor their progress and modify their learning tactics, hence potentially improving their academic results (Schunk, 2016).

Moreover, the classroom atmosphere significantly influences the effectiveness of instructional media in enhancing student accomplishment. The provision of resources, including superior audiovisual equipment and dependable internet connectivity, is crucial for maximising the efficacy of multimedia tools. Students in classrooms equipped with advanced technology infrastructure are more likely to benefit from the interactive and visual elements of instructional media (Johnson & McMillan, 2016). In contexts with restricted technology, the advantages of multimedia technologies may remain underutilised, resulting in suboptimal learning experiences. Therefore, guaranteeing fair access to technology in educational environments is essential for optimising the beneficial effects of instructional media on student performance.

Cognitive theories indicate that students' prior knowledge and individual variances in learning styles can affect their engagement with multimedia content. Students possessing

a robust foundational comprehension of Molecular Biology are more inclined to gain advantages from the visual and interactive elements of instructional media, as they can connect new information to their pre-existing knowledge (Brusilovsky, 2018). Students with varying cognitive skills or learning preferences may react differently to distinct multimedia instructional methods, requiring a customised strategy for media selection and presentation. Researchers propose that adaptive multimedia technologies, which modify content according to individual learning styles or progress, may significantly enhance student learning results in complicated areas like Molecular Biology (Liu & Lee, 2017).

The integration of instructional media in Molecular Biology education must consider both technological and pedagogical dimensions of teaching. Although multimedia tools have significant potential for enhancing academic performance, their effectiveness depends on variables such as teacher proficiency, student involvement, and the educational context. To get the intended enhancements in student performance, educators must meticulously include these tools into their curriculum, ensuring their utilisation

fosters active learning, enhances student motivation, and cultivates a supportive classroom atmosphere.

Statement of the Problem

Molecular Biology, encompassing intricate topics like genetic mechanisms, biochemical processes, and molecular interactions, poses considerable obstacles for students. Conventional pedagogical approaches frequently fail to convey complex subjects in an engaging and accessible manner, resulting in persistent challenges regarding student academic performance. Notwithstanding several attempts to enhance educational results via diverse instructional methodologies, student performance in Molecular Biology persists at an unsatisfactory level.

Instructional media, especially multimedia tools, are acknowledged as effective instruments for improving learning by providing dynamic methods to communicate subject that may be overly abstract or complex for students. Instruments like movies, simulations, and interactive software can elucidate complex topics by visually illustrating processes that are frequently challenging to communicate using conventional text-based

pedagogical approaches. Nonetheless, although these technologies demonstrate potential in enhancing engagement and comprehension, their effect on tangible academic performance has been variable. In certain instances, although students may exhibit greater engagement with the topic, their capacity to recall and apply the material in evaluations remains constrained. The incorporation of instructional media in Molecular Biology Education has been inconsistent among educational institutions. In numerous classrooms, multimedia utilisation is inconsistent and contingent upon factors such as instructor proficiency, technological accessibility, and curricular mandates. The capacity of educators to proficiently integrate multimedia into their instruction is crucial in assessing the extent to which these resources enhance learning outcomes. However, a considerable gap persists in comprehending how teachers' competency with these technologies affects their students' academic achievement in a specialised discipline such as Molecular Biology. The inconsistency and subpar quality of multimedia utilisation in schools diminishes its potential efficacy, restricting its broader advantages.

A significant concern is the motivational dimension of employing multimedia tools in education. Although multimedia has demonstrated the potential to enhance student

motivation in certain situations, there is a paucity of understanding regarding its specific impact on student motivation in Molecular Biology. The subject's intrinsic complexity may result in student disengagement, and although multimedia tools provide appealing methods for material presentation, their efficacy in maintaining long-term student attention remains uncertain. Encouraging students to engage substantively with the content, particularly in a discipline as demanding as Molecular Biology, is essential for academic achievement. Consequently, comprehending how various forms of multimedia content might incite curiosity and promote profound learning in this particular field is an essential domain for further investigation.

In conclusion, whereas instructional media provide significant potential to enhance student performance in Molecular Biology, the overall effect of these tools is uncertain due to several difficulties. These encompass inconsistent execution, insufficient educator training, inadequate focus on student motivation, and inequitable access to technology.

Research Questions

The following research questions was raised to guide this study;

1. What types of projected instructional media are most commonly used in teaching Molecular Biology?

2. How does the use of projected instructional media affect students' academic achievement in Molecular Biology?

3. What are the factors that influence the effectiveness of projected instructional media in teaching molecular biology?

4. What are the challenges and limitations of using projected instructional media in Molecular Biology?

Purpose of the Study

The main purpose of this study is to find out student's perceptions on the use of projected instructional media in Molecular Biology among Biology education student in University of Benin, Edo State, the specific purpose of this study are to;

- To examine the relationship between different instructional multimedia-based instruction and student engagement in Molecular Biology.

- To assess the impact of multimedia resources on student academic achievement in Molecular Biology
- To identify the factors influencing the effectiveness of instructional media in Molecular Biology?

4. To evaluate and addressed the challenges and limitations of using projected instructional media in Molecular Biology

Significance of the Study

The findings of this study will be valuable to various stakeholders in the education sector, including students, educators, curriculum developers, educational institutions, and policymakers. By examining student's perceptions on the use of projected instructional media in Molecular Biology the study aims to contribute to the enhancement of teaching and learning practices in higher education.

For students, the study will provide insights into how multimedia tools can enhance their understanding of complex Molecular Biology concepts. By identifying effective instructional media, students can benefit from improved engagement, comprehension,

and retention, ultimately leading to better academic performance. The findings will also encourage students to take advantage of multimedia resources as supplementary learning tools to reinforce classroom instruction.

For educators, this research will serve as a guide in integrating multimedia resources into their teaching methods. It will highlight the most effective forms of projected instructional media, allowing lecturers to design more engaging and interactive lessons that cater to different learning styles. By understanding the relationship between multimedia instruction and student performance, educators can adopt teaching strategies that foster deeper learning and active participation in molecular biology.

For curriculum developers, the study provides empirical data on the role of instructional media in science education. This information can be used to design curricula that incorporate technology-driven teaching methods, ensuring that instructional materials align with modern pedagogical approaches. It will also aid in the development of training programs for teachers to effectively use multimedia tools in their instruction.

For educational institutions, particularly the University of Benin, the research will inform decisions on investments in technology-enhanced learning. Universities can use the

findings to prioritize the provision of multimedia resources, improve classroom infrastructure, and support faculty development programs aimed at enhancing digital teaching competencies. This, in turn, can contribute to improved academic outcomes and a more innovative learning environment.

Overall, this study is significant in promoting modern teaching methodologies, improving student academic achievement, and fostering innovation in Molecular Biology Education. By addressing the effectiveness of projected instructional media, it aims to bridge the gap between traditional teaching methods and contemporary technological advancements, ultimately enhance in science disciplines.

Scope and Delimitation of the Study

This study examines the student's perceptions on the use of projected instructional media in Molecular Biology, focusing on 400 level Biology Education students at the University of Benin, Edo State. It explores how multimedia tools like videos, animations, and slide presentations impact comprehension, engagement, and retention of molecular biology concepts.

The study is limited to 400 level Biology Education students at the University of Benin and does not extend to other disciplines or institutions. It focuses only on Molecular Biology, excluding other Biology branches, and considers projected instructional media, excluding online learning platforms and emerging technologies like virtual reality.

Definition of Terms

The following terms which are used in the study are defined for clarity.

Projected Instructional Media – This refers to multimedia tools such as videos, animations, slide presentations, and interactive simulations used in teaching to enhance student understanding of Molecular Biology concepts. These media are displayed using projectors or digital screens during instructional sessions.

Academic Achievement – The measurable performance of students in molecular biology, assessed through test scores, classroom engagement, retention of concepts, and practical application of knowledge.

Molecular Biology – A branch of Biology that focuses on the study of cellular and genetic processes at the molecular level, including DNA replication, protein synthesis, and gene expression.

Student Engagement – The level of interest, participation, and involvement of students in learning activities, particularly in response to instructional media used in the classroom.

Biology Education Students – Undergraduate students enrolled in the Biology Education program at the University of Benin, who are the focus of this study.

Instructional Effectiveness – The degree to which projected instructional media improve learning outcomes, comprehension, and retention of Molecular Biology concepts.

Learning Retention – The ability of students to recall and apply Molecular Biology knowledge over time, which is influenced by the mode of instruction.

Teaching Strategies – Methods and techniques employed by educators to deliver Molecular Biology lessons, including the integration of multimedia resources to facilitate learning.

Traditional Teaching Methods – Conventional approaches to instruction that rely primarily on textbooks, lectures, and chalkboard explanations, without significant use of technology or multimedia aids.

Technology-Enhanced Learning – The use of digital tools, multimedia, and interactive instructional resources to support and improve the educational experience in Molecular Biology.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter reviewed related literature under the following headings:-

THEORETICAL FRAMEWORK

- Lecturers' Knowledge and Qualification in Molecular Biology
- Projected Instructional Media
- Molecular Biology and Its Challenges in Learning
- Students' Academic Achievement and Instructional Media in Molecular Biology
- Students' Assessment of Lecturers' Communication Skill and their Academic Achievement
- Summary of Reviewed literature

THEORETICAL FRAMEWORK

Cognitive Load Theory (Sweller, 1988)

Cognitive Load Theory suggests that learning is optimized when instructional methods reduce extraneous cognitive load and enhance germane cognitive load. Projected instructional media facilitate learning by presenting information in an organized and visually engaging manner, reducing students' effort in deciphering complex molecular biology concepts.

Cognitive Load Theory (CLT), developed by John Sweller, explains how the brain processes and retains information, emphasizing the need to manage cognitive load for effective learning. It categorizes cognitive load into three types: intrinsic, extraneous, and germane. Intrinsic cognitive load relates to the inherent complexity of a subject, such as molecular biology, which involves abstract concepts like DNA replication and protein synthesis. Extraneous cognitive load arises from poorly designed instructional materials that add unnecessary mental effort, while germane cognitive load is the effort directed towards meaningful learning and information retention.

Projected instructional media, such as animations and PowerPoint presentations, help optimize cognitive load by simplifying complex biological processes, reducing extraneous distractions, and enhancing conceptual understanding. These media make abstract molecular biology concepts more tangible by providing step-by-step visual explanations, improving students' retention and recall. Empirical studies support this approach, showing that multimedia instruction leads to better comprehension and problem-solving abilities in science education. By aligning with CLT principles, projected instructional media play a crucial role in enhancing students' academic achievement in molecular biology.

Constructivist Learning Theory (Piaget, 1950; Vygotsky, 1978)

Constructivist Learning Theory, developed by Jean Piaget and later expanded by Lev Vygotsky, emphasizes that learners actively construct their own understanding and knowledge through experiences rather than passively receiving information. The theory suggests that students learn best when they engage in hands-on activities, interact with their environment, and connect new knowledge with their prior experiences.

Piaget's perspective on constructivism highlights that learning occurs through stages of cognitive development, where students build upon their previous knowledge. He argued that learners must be actively involved in exploring and discovering concepts for meaningful learning to take place. On the other hand, Vygotsky's Social Constructivist Theory stresses the role of social interaction and scaffolding in learning. He introduced the concept of the Zone of Proximal Development (ZPD), which describes the gap between what a learner can do independently and what they can achieve with guidance from a teacher or more knowledgeable peers. Scaffolding, which involves providing support that gradually decreases as the learner gains mastery, is essential in this process.

In the context of molecular biology education, constructivist learning is enhanced through projected instructional media, such as animations, simulations, and interactive models. These tools provide students with opportunities to visualize molecular processes, experiment with virtual models, and actively engage in their learning. For example, instead of memorizing the steps of DNA replication from a textbook, students can watch animated simulations that illustrate the dynamic interactions between enzymes and DNA

strands. This active engagement fosters deeper understanding, long-term retention, and the ability to apply knowledge in problem-solving situations.

Furthermore, collaborative learning environments, such as group discussions and virtual labs, align with Vygotsky's emphasis on social interaction in learning. When students engage in discussions or work on digital simulations together, they reinforce their understanding by explaining concepts to one another and refining their mental models.

Overall, Constructivist Learning Theory supports the use of projected instructional media as an effective tool in biology education. By promoting active learning, visualization, and social interaction, these media help students construct knowledge more meaningfully, leading to improved academic performance and a deeper grasp of molecular biology concepts.

Lecturers' Knowledge and Qualification in Molecular Biology

The qualifications of lecturers' include their test and examination results, years of experience, level of subject matter and pedagogy preparation, credentials in their field of molecular biology, and instructional media

The effectiveness of projected instructional media in enhancing students' academic achievement in molecular biology largely depends on lecturers' knowledge, qualifications, and ability to integrate these technologies into their teaching. Lecturers play a crucial role in selecting appropriate instructional materials, designing engaging lessons, and facilitating interactive learning experiences that align with students' cognitive development.

The successful implementation of projected instructional media requires lecturers to have a strong understanding of how these tools function and their pedagogical benefits. Knowledge in this area includes familiarity with digital tools such as PowerPoint presentations, animations, 3D molecular simulations, and virtual labs that make molecular biology concepts more accessible. Lecturers must also understand how to structure visual information to minimize extraneous cognitive load and maximize student engagement.

Moreover, technological literacy is essential for effectively operating projectors, computers, and multimedia software. Without sufficient training, lecturers may struggle to integrate these media effectively, leading to inefficient instruction that does not

improve student learning outcomes. Studies have shown that lecturers who receive professional development in digital teaching tools tend to be more effective in using projected instructional media to enhance students' comprehension and retention.

A lecturer's academic qualifications and teaching experience significantly influence their ability to utilize projected instructional media effectively. Those with advanced degrees in biology education or instructional technology are more likely to understand both the content and the best strategies for delivering it through multimedia. Well-qualified lecturers can adapt instructional media to different learning styles, ensuring that students with varying cognitive abilities benefit equally.

Additionally, lecturers with specialized training in molecular biology education are better equipped to use visual representations to clarify abstract topics, such as DNA transcription, protein synthesis, and enzyme interactions. Their expertise allows them to bridge the gap between theoretical knowledge and practical application, making learning more engaging and meaningful for students.

Projected Instructional Media

Projected instructional media refer to teaching aids that require a projection device to display visual content, such as slides, animations, videos, and simulations, to enhance learning. These tools are widely used in education to improve students' understanding of complex concepts, particularly in science subjects like molecular biology. By presenting information in a visually engaging and structured manner, projected instructional media help students grasp abstract ideas, making learning more effective and interactive.

In molecular biology education, projected instructional media play a crucial role in bridging the gap between theoretical knowledge and real-world applications. Many molecular processes, such as DNA replication, protein synthesis, and enzyme interactions, occur at the microscopic level and cannot be directly observed in a traditional classroom setting. By using tools like PowerPoint presentations, 3D animations, and virtual laboratory simulations, lecturers can visually demonstrate these biological processes, helping students comprehend intricate molecular interactions more easily.

One of the key advantages of projected instructional media is their ability to accommodate different learning styles. Visual learners benefit from diagrams and

animations, while auditory learners engage better with narrated explanations. Additionally, interactive simulations allow kinesthetic learners to explore molecular structures and manipulate variables, reinforcing their understanding through hands-on experience. This multimodal approach enhances student engagement and retention, leading to improved academic achievement.

Moreover, the integration of projected instructional media in teaching molecular biology fosters active learning. Unlike traditional lecture methods that rely on rote memorization, multimedia presentations encourage students to interact with the content, ask questions, and participate in discussions. For example, an animation of the DNA transcription process can help students visualize how RNA polymerase moves along the DNA strand, making it easier to remember and apply the concept in problem-solving tasks.

Despite its benefits, the use of projected instructional media in education is not without challenges. Some institutions may face limitations in access to technological resources, such as projectors, computers, and high-quality multimedia software. Additionally, lecturers need adequate training to effectively integrate these tools into their teaching strategies. Poorly designed multimedia presentations, excessive text on slides, or overly

complex animations can increase cognitive load, making it harder for students to process information.

Molecular Biology and its Challenges In Learning

Molecular Biology is a branch of biology that focuses on the structure, function, and interactions of biological molecules such as DNA, RNA, and proteins, which are fundamental to cellular processes. It explores how genetic information is stored, transmitted, and expressed in living organisms, providing the foundation for understanding genetics, biotechnology, and medicine. Despite its importance, molecular biology is often regarded as one of the most challenging subjects for students due to its abstract nature, complexity, and the need for a deep understanding of both biology and chemistry.

One of the primary challenges in learning molecular biology is its high level of abstraction. Unlike macroscopic biological concepts such as plant anatomy or human physiology, molecular biology deals with microscopic and submicroscopic structures that cannot be observed with the naked eye. Students must rely on diagrams, models, and

conceptual representations to visualize processes such as DNA replication, transcription, translation, and protein folding. Without appropriate instructional tools, these concepts may remain difficult to grasp, leading to misconceptions and poor academic performance. Additionally, Molecular Biology requires a strong foundation in chemistry and physics, as many of its principles are based on biochemical interactions, thermodynamics, and molecular structures. For example, understanding how enzymes catalyze reactions or how DNA molecules are held together by hydrogen bonds requires knowledge of chemical bonding, molecular forces, and reaction kinetics. Students with weak backgrounds in these supporting disciplines often struggle to integrate molecular biology concepts, making it harder for them to fully comprehend the subject.

Another significant challenge is the vast amount of specialized terminology and technical language associated with molecular biology. Terms such as "polymerase chain reaction (PCR)," "ribosomal RNA," "operon model," and "epigenetic modifications" can be overwhelming for students, especially those new to the field. The complexity of these terms, combined with the need to understand their functional roles, makes molecular biology an intimidating subject for many learners.

Furthermore, the rapid advancements in molecular biology research add to the challenge of keeping up with new discoveries and evolving concepts. With continuous progress in genomics, proteomics, and bioinformatics, students and educators must constantly update their knowledge to stay current with modern scientific developments. This can be particularly difficult in institutions where access to updated textbooks, research articles, and advanced laboratory equipment is limited.

Laboratory-based learning is essential for mastering molecular biology, but many students face difficulties due to inadequate practical experience. Techniques such as DNA extraction, gel electrophoresis, and gene cloning require access to well-equipped laboratories, trained instructors, and proper funding. In some educational settings, a lack of resources prevents students from gaining hands-on experience, limiting their ability to apply theoretical knowledge in real-world scientific contexts.

To address these challenges, modern teaching strategies such as the use of projected instructional media, virtual simulations, and interactive models have been introduced to enhance molecular biology education. Visual aids, animations, and 3D molecular structures help students visualize complex biological processes, improving

comprehension and retention. Additionally, integrating active learning techniques, such as problem-based learning and group discussions, can help students develop critical thinking skills and a deeper understanding of molecular biology concepts.

Students Academic Achievement and Instructional Media in Molecular Biology

Academic achievement refers to students' performance in educational activities, typically measured through assessments such as tests, assignments, projects, and overall grades. It reflects the extent to which students have successfully acquired knowledge, skills, and competencies in a given subject. In science education, particularly in complex subjects like molecular biology, academic achievement is influenced by various factors, including teaching methodologies, instructional resources, and students' cognitive abilities. One of the most effective ways to enhance students' academic achievement is through the strategic use of instructional media, particularly projected instructional media, which improve engagement, comprehension, and retention of knowledge.

Instructional media refer to tools and resources used by educators to facilitate learning. These include traditional materials such as textbooks and charts, as well as modern digital

tools like PowerPoint presentations, animations, simulations, and interactive videos. The integration of instructional media into teaching has been shown to significantly impact students' learning experiences by making lessons more interactive, visually appealing, and easier to understand.

In molecular biology education, where students often struggle with abstract and microscopic concepts, instructional media play a crucial role in improving academic achievement. For example, projected instructional media such as 3D animations and molecular modeling software allow students to visualize complex processes like DNA replication, transcription, and protein synthesis, making it easier for them to grasp and retain information. Instead of merely reading about how ribosomes assemble amino acids into proteins, students can watch an animated sequence that illustrates the step-by-step process, reinforcing their understanding.

Studies have shown that students who learn with multimedia instructional tools tend to perform better than those who rely solely on traditional teaching methods. According to Mayer and Moreno (2003), the use of multimedia presentations in science education enhances students' ability to process and retain information, as it aligns with the

principles of Cognitive Load Theory and Dual Coding Theory. By presenting information in both visual and auditory formats, instructional media reduce cognitive overload and help students integrate new knowledge more effectively.

Moreover, instructional media improve student engagement, which is a critical factor in academic achievement. Traditional lecture-based teaching methods often lead to passive learning, where students become disengaged and struggle to retain information. However, when multimedia elements such as videos, animations, and interactive simulations are incorporated into lessons, students become more actively involved in the learning process. Increased engagement leads to better comprehension, higher motivation, and ultimately, improved academic performance.

Additionally, instructional media cater to diverse learning styles, ensuring that all students benefit from the teaching process. While some students learn best through visual aids, others may prefer auditory explanations or hands-on experiences. Projected instructional media provide multiple modes of content delivery, making learning more inclusive and effective. This is particularly important in molecular biology, where concepts require a combination of textual, visual, and practical learning approaches.

However, the effectiveness of instructional media in improving academic achievement depends on several factors, including the quality of the media used, the instructor's ability to integrate them effectively, and the students' willingness to engage with the materials. Poorly designed instructional media, such as cluttered PowerPoint slides or low-quality animations, can lead to confusion rather than clarity. Likewise, lecturers who lack the necessary training in multimedia teaching may struggle to use these tools effectively, limiting their impact on student learning.

Students' Assessment of Lecturers' Communication Skill and their Academic Performance

Effective communication is a critical factor in teaching and learning, particularly in complex subjects like molecular biology. The way lecturers convey information, explain concepts, and engage students significantly impacts students' comprehension and academic performance. Students' assessment of their lecturers' communication skills often determines their level of interest, participation, and overall success in a course.

When lecturers communicate clearly and effectively, students are more likely to understand difficult topics, retain knowledge, and perform better academically.

Communication in teaching goes beyond verbal explanations; it includes clarity of speech, tone, use of appropriate teaching aids, and the ability to simplify complex ideas. In molecular biology, where many processes are abstract and microscopic, a lecturer's ability to explain concepts using analogies, visual representations, and interactive discussions is crucial for student understanding. A lecturer who can break down intricate subjects like DNA replication or protein synthesis into simpler, relatable explanations enables students to grasp and retain information more effectively.

Students often assess lecturers' communication skills based on factors such as clarity, engagement, responsiveness, and ability to address questions. When lecturers use clear language, avoid excessive jargon, and articulate concepts in an organized manner, students are more likely to follow lessons without confusion. Engaging lecturers who use dynamic teaching approaches, such as storytelling, humor, or real-world examples, can capture students' interest and make learning more enjoyable. On the other hand, lecturers

who speak too fast, use overly technical language, or fail to engage with students may create barriers to effective learning, leading to poor academic performance.

Another key aspect of communication is responsiveness—how well a lecturer listens to and addresses students' concerns. When students feel comfortable asking questions and receiving constructive feedback, they develop a deeper understanding of the subject. Lecturers who encourage discussion, answer questions patiently, and provide detailed explanations create a supportive learning environment that fosters academic success. Conversely, a lack of responsiveness can discourage students from seeking clarification, resulting in gaps in knowledge and lower performance.

Research has shown a direct correlation between lecturers' communication skills and student academic performance. Studies indicate that students taught by lecturers with strong communication abilities tend to score higher on assessments, show greater interest in the subject, and demonstrate better problem-solving skills. When lecturers communicate effectively, they not only transfer knowledge but also inspire confidence and motivation in students, encouraging them to engage more actively in their studies.

Students' assessment of lecturers' communication skills plays a crucial role in shaping their academic performance. Clear, engaging, and responsive communication enhances comprehension, retention, and student participation, ultimately leading to better learning outcomes. To improve academic performance, lecturers should focus on refining their communication techniques, integrating effective instructional media, and fostering an interactive and supportive classroom environment. Institutions should also provide training and professional development programs to help lecturers enhance their communication skills, ensuring a more effective teaching and learning experience.

Summary of Reviewed Literature

The reviewed literature suggests that projected instructional media significantly enhance students' learning experiences, particularly in complex subjects like molecular biology. Theories such as Cognitive Load Theory, Dual Coding Theory, and Constructivist Learning Theory provide a solid foundation for understanding how visual aids improve academic achievement. Empirical studies further confirm that students taught with projected instructional media perform better than those taught with traditional methods.

This study aims to build on existing research by examining the influence of projected instructional media on the academic achievement of biology education students in molecular biology.

The reviewed literature explores key concepts related to the influence of projected instructional media on students' academic achievement in molecular biology, covering areas such as cognitive learning theories, constructivist approaches, the role of instructional media, and challenges in molecular biology education. Various studies have emphasized the importance of effective teaching methods in improving students' comprehension and performance in complex scientific subjects.

One major theme identified in the literature is Cognitive Load Theory (CLT), which suggests that learning is most effective when cognitive overload is minimized. Research indicates that projected instructional media, such as animations and simulations, help manage cognitive load by visually simplifying complex molecular biology concepts. By presenting information in a structured and engaging way, multimedia instruction reduces extraneous cognitive load and enhances students’ ability to process and retain knowledge.

The Constructivist Learning Theory further supports the use of instructional media in molecular biology education. According to Piaget and Vygotsky, students learn best when they actively construct knowledge rather than passively receiving information. Studies have shown that multimedia tools, such as interactive simulations and virtual labs, promote active learning, allowing students to explore molecular processes and develop a deeper understanding of biological concepts. Social interaction and collaborative learning, as emphasized by Vygotsky, are also facilitated by digital tools, improving students' critical thinking and problem-solving skills.

Another key area discussed in the literature is the impact of instructional media on academic achievement. Empirical studies have demonstrated that students exposed to multimedia instruction perform better in assessments compared to those taught using traditional lecture methods. Projected instructional media enhance engagement, cater to different learning styles, and provide visual representations that aid comprehension. In molecular biology, where students often struggle with abstract concepts like DNA replication and protein synthesis, instructional media have been found to improve retention and application of knowledge.

The literature also examines lecturers' knowledge and qualifications in using instructional media. Research suggests that the effectiveness of projected instructional tools depends on the lecturer's ability to integrate them into teaching. Lecturers with training in multimedia instruction and digital pedagogy tend to use these tools more effectively, leading to better student learning outcomes. However, challenges such as limited access to technology, lack of proper training, and resistance to adopting new teaching methods can hinder the successful implementation of instructional media in biology education.

A significant challenge highlighted in the literature is the difficulty of learning molecular biology due to its abstract nature, complex terminology, and interdisciplinary requirements. Many students struggle to visualize microscopic biological processes, making it harder for them to grasp and retain concepts. The literature suggests that integrating instructional media, such as 3D molecular models and interactive animations, can help bridge this gap by providing visual and interactive learning experiences. However, issues such as inadequate laboratory facilities, lack of technological resources, and technical difficulties can limit the effectiveness of these tools.

The literature explores the relationship between lecturers' communication skills and students' academic performance. Studies indicate that clear and engaging communication improves student comprehension and retention. Lecturers who effectively use projected instructional media can enhance communication by making lessons more visually appealing and interactive. However, poor communication, unclear explanations, and ineffective use of multimedia tools can create confusion and negatively impact students' performance.

CHAPTER THREE

METHODOLOGY

This chapter will be discussed under the following sub-headings

- 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

The study adopts a quasi-experimental research design with a descriptive survey approach. The quasi-experimental approach is used to assess the impact of projected

instructional media on students' academic achievement, comparing students exposed to multimedia instruction with those taught using conventional methods. The descriptive survey aspect helps to gather students' assessments of their learning experiences and the role of projected instructional media in their performance.

Population of the Study

The participants of this study include undergraduate students enrolled in Molecular Biology courses at the University of Benin. The target population consists of a total of 120students in the Department of Curriculum and Instructional Technology (CIT) in the Faculty of Education.

Curriculum and Instructional Technology (CIT) – 120 students

These students, who are all year four students, are the focus of this study as they are directly involved in molecular biology education and have experience with the teaching methods being examined.

Sample and Sampling Techniques

The sample for this study consist of 120 undergraduate students from the Department of Curriculum and Instructional Technology (CIT) in the Faculty of Education at the University of Benin, as they are the only students in the faculty offering Molecular Biology.

Purposive sampling was used to ensure that only students enrolled in Molecular Biology courses are included in the study. Additionally, stratified random sampling was employed to guarantee a balanced selection of students within the department, ensuring fair representation across different academic levels.

By using these sampling techniques, the study ensures that the selected sample accurately represents the molecular biology students in the Faculty of Education, making the findings applicable to this specific academic group.

Research Instrument

This study employed a structured questionnaire as the sole instrument for data collection. The questionnaire was carefully designed to obtain detailed and reliable information from students regarding their experiences with projected instructional media and their perceptions of the teaching and learning process in Molecular Biology. It focused on capturing students' views on how the use of visual and interactive tools influenced their understanding, engagement, and academic performance. The structured questionnaire was used to gather data on students' experiences with projected instructional media and their perceptions of lecturers' communication skills. It will consist of various sections designed to explore students' feedback on the effectiveness of instructional media, their learning challenges, and the overall teaching environment. The questionnaire will use a 5-point Likert scale to measure students' levels of agreement or disagreement with specific statements, providing quantitative data on students' assessments.

Validity of the Instrument

To ensure the content validity of the research instruments, two copies of the achievement test and the structured questionnaire were provided to two experts from the Department of Curriculum and Instructional Technology at the University of Benin. These experts included the project supervisor and a lecturer in the field. Their task was to evaluate the suitability and relevance of the items in the instruments, ensuring that they accurately measure the constructs of students' academic performance and perceptions of instructional media and lecturers' communication skills. The feedback from these experts was used to refine the instruments, ensuring that they align with the objectives of the study and are effective in collecting valid data. This expert evaluation process guarantees that the tools used in the study are appropriate for assessing the intended variables.

Reliability of the Instrument

To ensure the reliability of the research instruments, the Cronbach's Alpha reliability coefficient will be used to assess the internal consistency of the structured questionnaire. This was used to determine whether the items on the questionnaire are consistent in

measuring the same construct. For the achievement test, a test-retest method will be employed, where the same test was administered to a subset of students twice, with a two-week interval between the tests. This method help to assess the stability of the test results over time. The reliability analysis was use to confirm that the instruments consistently produce accurate and dependable data for the study.

Method of Data Collection

Data collection will occur in stages, starting with a pre-test to assess students' baseline knowledge. Following this, a post-test was administered to measure any changes in academic performance. Finally, a questionnaire was given to gather students' feedback on the instructional methods, focusing on their perceptions of the effectiveness of projected media and lecturers' communication skills. This multi-stage approach ensures comprehensive data collection.

Method of Data Analysis

Both descriptive and inferential statistics were used in this study.

Descriptive Statistics: This was used to summarize the demographic data of the participants and their responses to the questionnaire. Measures such as mean, standard deviation, frequency, and percentage was employed to describe the general trends and patterns in students' perceptions of instructional media and their academic performance.

Inferential Statistics:Pearson’s Correlation: This will be used to explore the relationship between students’ perceptions of their lecturers' communication skills and their academic performance in molecular biology.

T-test Analysis: A t-test will be conducted to determine if there are significant differences in academic performance among students based on various factors such as study habits, access to learning resources, and perceptions of instructional methods

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the data collected from respondents on students' perceptions on the use of projected instructional media in Molecular Biology. The data were analyzed using mean and standard deviation. The findings are

Presentation of the Results

A total of 120 questionnaires were distributed to Biology Education students at the University of Benin. Out of these, 100 were completed and returned, representing a 100% response rate. This high response rate ensures the reliability of the findings.

Research Question One: What types of projected instructional media are used in teaching Molecular Biology?

Table 1: Types of Projected Instructional Media In The Teaching Of Molecular Biology

S/N	STATEMENT	N	Mean	Standard Deviation	Decision
1.	PowerPoint presentations are commonly used in teaching Molecular Biology.	100	3.45	0.73	Agree
2.	Videos and animations are frequently used to explain Molecular Biology concepts.	100	3.60	0.68	Agree
3.	Virtual simulations and digital microscopy are effective instructional tools in Molecular Biology.	100	3.40	0.75	Agree
4.	The use of projected instructional media varies depending on the lecturer.	100	3.25	0.80	Agree
5.	**I have access to recorded lectures and digital resources for Molecular Biology learning.**	100	3.10	0.85	Agree
	AVERAGE		3.36	0.76	

The results show that students generally agree that PowerPoint presentations, videos, animations, and virtual simulations are commonly used instructional media in molecular biology. The highest-rated item was the frequent use of videos and animations (Mean = 3.60, SD = 0.68), indicating their popularity in enhancing students' understanding.

Research Question Two: How does the use of projected instructional media affect students' academic achievement in Molecular Biology

Table 2: Effect of Projected Instructional Media on Students Academic Achievement In Molecular Biology

S/N	ITEMS	N	Mean	Standard Deviation`	Decision
1.	Learning with projected instructional media improves my academic performance in Molecular Biology.	100	3.55	0.70	Agree
2.	My test and exam scores have increased since using projected instructional media.	100	3.50	0.75	Agree
3.	Projected instructional media help me understand Molecular Biology concepts more clearly.	100	3.65	0.72	Agree
4.	The use of projected instructional media has made me more interested in studying Molecular Biology.	100	3.40	0.78	Agree
5.	I will recommend the increased use of projected instructional media to improve student performance.	100	3.75	0.65	Agree
	AVERAGE		3.57	0.72	

The results indicate that students perceive projected instructional media as beneficial to their academic performance, with a mean score of 3.57. The highest-rated item was students' willingness to recommend increased use of projected media (Mean = 3.75, SD = 0.65), showing strong support for its effectiveness.

Research Question Three: What are the factors that Influence the effectiveness of projected instructional media In teaching Molecular Biology

Table 3: Factors Influencing The Effective Use Of Projected Instructional Media

S/N	ITEMS	N	Mean	Standard Deviation`	Decision
1.	The lecturer's teaching style influences how effective projected instructional media are in teaching Molecular Biology.	100	3.60	0.68	Agree
2.	The quality and clarity of projected instructional media determine how well I understand Molecular Biology concepts.	100	3.55	0.70	Agree
3.	Access to projectors, computers, and other digital tools affects the effectiveness of projected instructional media in learning Molecular Biology.	100	3.65	0.65	Agree
4.	My level of interest and engagement in class impacts how well I learn through projected instructional media.	100	3.40	0.75	Agree
5.	The effectiveness of projected instructional media improves when combined with interactive activities and discussions.	100	3.70	0.62	Agree
	AVERAGE		3.56	0.68	

The findings suggest that lecturer teaching style, quality of media, access to digital tools, and student engagement significantly impact the effectiveness of projected instructional media. The most influential factor was the combination of projected media with interactive activities (Mean = 3.70, SD = 0.62).

Research Question Four: What are the challenges and limitations of using projected instructional media in Molecular Biology?

Table 4: Challenges and Limitations Of The Use Of Projected Instructional Media

S/N	ITEMS	N	Mean	Standard Deviation	Decision
1.	Technical issues, such as poor internet connection or malfunctioning equipment, make it difficult to use projected instructional media effectively in Molecular Biology.	100	3.75	0.60	Agree
2.	The limited availability of projectors, computers, and other digital tools in classrooms affects the quality of instruction using projected media.	100	3.70	0.65	Agree
3.	I find it hard to focus on Molecular Biology lessons when projected instructional media are not well-designed or poorly presented.	100	3.50	0.70	Agree

4	There is not enough training or support for lecturers in using projected instructional media, which impacts their effectiveness in teaching Molecular Biology.	100	3.65	0.68	Agree
5.	Projected instructional media can be overwhelming or confusing when there are too many visual elements or complicated animations.	100	3.40	0.75	Agree
	AVERAGE		3.60	0.68	

The most significant challenge identified was technical issues such as poor internet connection and malfunctioning equipment (Mean = 3.75, SD = 0.60). The lack of lecturer training was also a notable issue.

Discussion of Findings

The findings of this study confirm that projected instructional media play a crucial role in enhancing students' perception in Molecular Biology. The results indicate that PowerPoint presentations, videos, animations, and virtual simulations are widely used instructional tools that effectively improve student understanding of complex Molecular Biology concepts. These media help students visualize abstract biological processes, making learning more engaging and interactive. This aligns with previous research that highlights the role of digital media in modern education as an essential tool for improving learning outcomes (Mayer, 2021; Clark & Feldon, 2018).

One of the key findings of this study is that students perceive projected instructional media as a significant factor in their academic performance. Many students reported that the use of digital resources, such as recorded lectures and animations, made it easier to retain information and perform better in tests and examinations. This is consistent with studies by Alessi and Trollip (2020) and Moreno (2019), which found that multimedia learning environments enhance knowledge retention and student engagement. Furthermore, the findings support the cognitive theory of multimedia learning, which

states that students learn more effectively when verbal and visual information are combined (Mayer, 2021).

The study also revealed that the effectiveness of projected instructional media depends on various factors, including the lecturer's teaching style, the quality of the instructional media, and student engagement. Lecturers who actively incorporate interactive discussions and activities alongside projected media tend to have better student outcomes compared to those who rely solely on the media without additional explanations or interactions. This suggests that while technology is a valuable tool, its effectiveness is maximized when combined with active teaching strategies. Research by Wang et al. (2022) supports this, stating that blended learning approaches that combine digital media with traditional teaching methods lead to better student engagement and performance.

Despite the benefits of projected instructional media, the study identified several challenges that hinder its effectiveness. One major challenge is technical issues, such as poor internet connectivity, malfunctioning projectors, and software compatibility problems. Many students expressed frustration over interruptions caused by technical failures, which can disrupt the flow of lessons and negatively impact learning. Similar

challenges were highlighted in a study by Adebayo et al. (2020), which found that inadequate technical support is a major barrier to the successful implementation of educational technology in universities.

Additionally, the limited availability of digital tools, such as projectors and computers, poses a challenge in some classrooms. Not all students have equal access to recorded lectures or personal devices, which can create disparities in learning experiences. This finding is in line with the digital divide theory, which emphasizes that unequal access to technology can lead to disparities in educational outcomes (Selwyn, 2021). To address this issue, universities need to invest in improving their technological infrastructure and ensuring that all students have access to the necessary tools for digital learning.

Another critical issue raised in this study is the lack of training and support for lecturers in effectively using projected instructional media. Some lecturers may not be fully equipped with the necessary skills to integrate digital media into their teaching practices. Research by Koehler and Mishra (2020) emphasizes the importance of professional development programs to help educators adopt and utilize technology effectively in their

classrooms. Without proper training, lecturers may not fully exploit the potential of projected instructional media, thereby reducing its impact on student learning.

Lastly, some students indicated that excessive use of projected instructional media, especially when poorly designed, can be overwhelming and lead to cognitive overload. When animations, videos, and presentations are too complex or contain too much information at once, students may struggle to process the content effectively. This finding is supported by Sweller's Cognitive Load Theory (2019), which suggests that instructional materials should be designed in a way that minimizes unnecessary cognitive strain and maximizes learning efficiency.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary of Findings

This study examined the students perception on the use of projected instructional media in molecular biology, focusing on Biology Education students at the University of Benin. The research aimed to identify the types of projected instructional media used, their effects on academic achievement, the factors influencing their effectiveness, and the challenges associated with their use.

The findings revealed that students generally perceive projected instructional media such as PowerPoint presentations, videos, virtual simulations, and digital microscopy as effective tools in learning molecular biology. Most students agreed that these media enhanced their understanding of complex concepts, increased engagement, and contributed to improved academic performance. The study further indicated that students who regularly engage with projected instructional media tend to perform better in tests and examinations compared to those who rely solely on traditional teaching methods.

However, several factors influence the effectiveness of these media. The lecturer's teaching style, the quality and clarity of the instructional materials, and access to necessary technological resources play significant roles in determining their impact on students' learning. Additionally, students' interest and engagement in class significantly affect how well they benefit from projected instructional media.

Despite these benefits, the study identified some challenges that limit the effective use of projected instructional media. These include technical issues (such as poor internet connectivity and equipment malfunction), limited availability of digital tools (such as projectors and computers), lack of lecturer training in digital teaching methods, and the overwhelming nature of some visual materials.

Overall, the findings suggest that while projected instructional media significantly enhance students' academic achievement in molecular biology, addressing these challenges is crucial for maximizing their effectiveness.

Conclusion

The study concluded that projected instructional media are valuable tools that improve students' academic achievement in molecular biology. The integration of technology-based teaching methods enhances understanding, promotes engagement, and positively influences student performance. However, to fully maximize the benefits, educational institutions must ensure proper infrastructure, provide adequate training for lecturers, and address technical and accessibility challenges.

The study also highlighted that the effectiveness of projected instructional media depends on multiple factors, including the lecturer’s teaching style, the quality of instructional materials, and students' level of engagement. Addressing these factors will enable students to gain more from the use of digital instructional resources.

Recommendations

Based on the findings and conclusion, the following recommendations are proposed:

Enhancing The Types of Projected Instructional Media Used in Teaching Molecular Biology

To improve learning outcomes in Molecular Biology, universities should integrate diverse projected instructional media, such as PowerPoint presentations, videos, animations, virtual simulations, and digital microscopy.

Lecturers should be encouraged to use a variety of media to cater to different learning styles.

Additionally, institutions should invest in updating digital resources and providing necessary training to lecturers for effective implementation.

Improving the Impact of Projected Instructional Media on Students' Academic Achievement

The university should provide training workshops for lecturers on the effective use of projected instructional media to maximize their impact on students' learning and academic performance.

Students should be encouraged to use recorded lectures and digital resources as supplementary learning tools to reinforce classroom instruction.

Continuous assessment of students' performance should be conducted to measure the effectiveness of projected instructional media and identify areas for improvement.

Addressing Factors That Influence the Effectiveness of Projected Instructional Media

Lecturers should adopt interactive teaching methods that combine projected instructional media with class discussions and hands-on activities to enhance student engagement.

The university should ensure that classrooms are adequately equipped with functional projectors, computers, and internet access to facilitate the use of instructional media.

The clarity and quality of projected media should be prioritized to ensure that students can fully grasp complex Molecular Biology concepts.

Overcoming Challenges and Limitations of Using Projected Instructional Media

The university should invest in reliable infrastructure, including backup power supplies and high-quality equipment, to prevent technical disruptions during lessons.

More funding should be allocated to the purchase and maintenance of projectors, screens, and other digital tools to ensure their availability in classrooms.

Lecturers should receive adequate training and support on how to effectively use and troubleshoot projected instructional media to minimize challenges in teaching.

Feedback from students should be collected regularly to address any difficulties they face in using projected instructional media and improve the overall learning experience.

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APPENDIX

QUESTIONNAIRE

DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY (CIT)

FACULTY OF EDUCATION

UNIVERSITY OF BENIN

UGBOWO CAMPUS, BENIN CITY.

STUDENT QUESTIONNAIRE ON STUDENTS' PERCEPTION ON THE USE OF PROJECTED INSTRUCTIONAL MEDIA IN MOLECULAR BIOLOGY(A Case Study of Biology Education Students in the University of Benin)

Dear Respondent,

This questionnaire is designed to gather your responses on students perception on the use of Projected Instructional Media in Molecular Biology. Please answer all questions truthfully by ticking (✓) in the appropriate box that corresponds to your opinion. Your responses will remain confidential and used solely for research purposes. Thank you for your cooperation.

Your faithfully

Ayomide Igili

SECTION

Instruction: Indicate your level of agreement with the following statements. Use the scale below: 6SA = Strongly Agree, A = Agree, SD = Strongly Disagree, D = Disagree.
Rate the evidence by ticking (✓) on the option that satisfies your opinion.

S/N	Statements	RESPONSES			
	TYPES OF PROJECTED INSTRUCTIONAL MEDIA USED IN TEACHING MOLECULAR BIOLOGY	**SA**	**A**	**SD**	**D**
1.	PowerPoint presentations are commonly used in teaching Molecular Biology.				
2.	Videos and animations are frequently used to explain Molecular Biology concepts.		`		
3.	Virtual simulations and digital microscopy are effective instructional tools in Molecular Biology.				
4.	The use of projected instructional media varies depending on the lecturer.				
5.	I have access to recorded lectures and digital resources for Molecular Biology learning.				
	EFFECT OF PROJECTED INSTRUCTIONAL MEDIA ON STUDENTS' ACADEMIC ACHIEVEMENT?	**SA**	**A**	**SD**	**D**
6.	Learning with projected instructional media improves my academic performance in Molecular Biology				
7.	My test and exam scores have increased since using projected instructional media.				
8.	Projected instructional media help me understand Molecular Biology concepts more clearly.				

9.	The use of projected instructional media has made me more interested in studying Molecular Biology.				
10.	I will recommend the increased use of projected instructional media to improve student performance				
	What are the factors that influence the effectiveness of projected instructional media in teaching molecular biology?	**SA**	**A**	**SD**	**D**
11.	The lecturer's teaching style influences how effective projected instructional media are in teaching Molecular Biology.				
12.	The quality and clarity of projected instructional media determine how well I understand Molecular Biology concepts.				
13.	Access to projectors, computers, and other digital tools affects the effectiveness of projected instructional media in learning Molecular Biology.				
14.	My level of interest and engagement in class impacts how well I learn through projected instructional media.				
15.	The effectiveness of projected instructional media improves when combined with interactive activities and discussions.				
	What are the challenges and limitations of using projected instructional media in Molecular Biology?	**SA**	**A**	**SD**	**D**
16. Technical issues, such as poor internet connection or malfunctioning equipment, make it difficult to use projected instructional media effectively in Molecular Biology.					
17.	The limited availability of projectors, computers, and other digital tools in classrooms affects the quality of instruction using projected media.				
18.	I find it hard to focus on Molecular Biology lessons when projected instructional media are not well-designed or poorly				

	presented.				
19.	There is not enough training or support for lecturers in using projected instructional media, which impacts their effectiveness in teaching Molecular Biology.				
20. Projected instructional media can be overwhelming or confusing when there are too many visual elements or complicated animations.					