

**STUDENTS' PERCEPTION ON THE IMPACT OF GROUP AND INDIVIDUALIZED
PROBLEM BASED LEARNING STRATEGIES ON MOTIVATION AND
ENGAGEMENT IN LEARNING BIOLOGY SUBJECT IN ZAMFARA STATE,
NIGERIA**

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Abstract

This study investigated students' perception on the impact of group problem-based learning strategy and individualized problem-based learning strategy on motivation and engagement in learning in biology in zamfara state, Nigeria. A descriptive design was employed, with a target population of 6,940 and a sample of 355 students obtained from six public senior secondary schools. The instrument used for data collection is students' perception questionnaire (spq), which is developed by the researcher, and is validated by the experts and obtained the cvi of 0.78 and reliability coefficient as indicated by cronbach's alpha value of 0.80. Paired sample t-test was used to test hypotheses one and two. Findings revealed that group problem-based learning strategy motivate student in learning sense organs concept than the individualized problem-based learning strategy, similarly, both individualized and group problem-based learning strategies engaged students in learning sense organs concepts. The study concluded that group problem based learning strategy in teaching and learning of sense organs concepts engaged and motivated biology students at the senior secondary school level. The study recommended that biology and other science subject teachers at secondary school level should use group problem-based learning strategy during instruction as it engaged and motivated students, which enhance their academic achievement

Keywords: Individualized, Group Problem-Based, Instructional Strategies, Motivation.



Introduction

Biology is a core science subject contained in the senior secondary school curriculum in Nigeria, provides students with knowledge to understand living organisms, their interaction with environment and scientific basis of life processes (NERDC, 2012). Among the topics in biology, sense organs concepts is among the fundamental because it explains how organisms detect and respond to stimuli through structures such as the eye, ear, nose, tongue, and skin. Understanding this topic is essential for building foundational knowledge in physiology and human biology.

However, studies and examination reports have indicated that students often perceive some biology topics as abstract and difficult when taught using conventional lecture methods, leading to low interest of students and their participation in the lesson (WAEC Chief Examiners' Reports, 2022–2024). In addition, Aliyu and Umar, (2023), stated that most biology teachers rely heavily on talk-chalk method, which limit students' engagement. Similarly, Eze, (2022), stated that conventional method promotes memorization of concept rather than motivating and engaging students during instruction. In order to address these challenges associated with traditional teaching methods, educators have emphasized the use of learner-centered approach that actively involves students in the learning process. Therefore, Problem based-learning is an instructional strategy in which students learn by engaging with real-life or simulated problems, thereby constructing knowledge through inquiry, collaboration and reflection (Bello & Muhammad, 2025). Also, constructivist and social constructivist theories supported this because the theory says learners actively build knowledge through interaction with their environment and peers (Vygotsky,

1978; Piaget, 1970). Furthermore, Problem based learning strategy is a learning approach in which the teacher serves as a vehicle that motivate and encourage students participation during teaching and learning process as opposed to direct presentation of facts and concepts, (Tortorella & Cauchick, 2018). Problem based-learning strategy can be implemented using different modes, thus, include individualized and group-based approaches.

Major, (2021), stated that, one of the strength of individualized learning strategy is that it promotes self-paced learning, in which the fast learners progress quickly while allowing the slow learners the time they need to understand the concept. Therefore, Adeyemi (2017) stated that individualized learning strategy support learner autonomy, as the students take responsibility of their learning decisions. This aligns with constructivist view of learning, which emphasizes active participation. Similarly, Cerezo et al., (2019) stated that, in individualized problem-based learning strategy, each student works independently to identify, research, and solve given problems at their own pace, promoting autonomy, self-regulation, and personal accountability which usually motivate the learner. In addition, Bello and Muhammad (2025) described individualized problem-based learning strategy as a strategy that motivated and encourages student to actively participate in learning, in order to manage the problem, students investigate it and make a schedule for their own actions. Through this investigation, students can assess their abilities and knowledge

While group problem-based learning strategy encourages team work, share ideas and motivation which enhance better understanding and active participation. Similarly, Barrows and Tamblyn (2010) stated that, group problem-based learning



emphasizes collaboration, discussion, and shared responsibility among students working in team to address a problem. In addition, Bello and Muhammad (2025) described group problem based learning strategy as a student-centered approach that places an emphasis on shared accountability, active engagement, and teamwork during the learning process which arouse their curiosity. Furthermore, Hmelo and Eberbach (2012), stated that, the purposes of group problem-based learning strategy include assisting students in developing knowledge, effective problem-solving skills, effective self-directed learning skills, effective collaboration skills, and intrinsic motivation. Also, Olawale and Musa (2024) indicated that group problem-based learning encourages classroom participation and students motivation. At the same time, Tiara (2022) stated that both individualized and group based learning strategies are effective learning strategies that motivate and engaged students during instruction.

Motivation and engagement are determinants of academic achievement. Motivation refers to the internal and external factors that stimulate students' desire to learn, while engagement involve behavioral, emotional, and cognitive involvement in learning activities (Awofala&Akinoso, 2024). When students are motivated and actively engaged, they are more likely to participate meaningfully in classroom activities and achieve better learning outcomes. Similarly, less motivation often results in poor participation and limited understanding of the learnt concepts, (Inoru, 2024). In learning biology, motivation is very significant, because the subject requires both theoretical understanding and practical application. For instance, for students to perform well in biology, they need to be motivated not only to memorize facts but also to develop critical thinking, engage in experiments and

understand complex biological process. This is because studies indicated that, students who are motivated to learn are more likely to overcome challenge and perform better in their academic performance, (Awolu&Kabara, 2021).

Therefore, effective teaching and learning of Biology at the secondary school level remain a major concern to educators, particularly in topics that require conceptual understanding such as sense organs. Despite the importance of this topic in understanding human physiology and response to stimuli, students often demonstrate low interest, limited participation, and inadequate engagement during lessons. Also, evidence from preliminary interaction and WAEC Chief Examiners' Reports (2022–2024), indicated that students sometimes show lack of deep understanding of biological concepts when taught using predominantly lecture-based methods, which may negatively affect students' motivation and overall learning outcomes in Biology. The need to adopt learner-centered instructional strategies such as Problem-Based Learning (PBL) has been emphasized in teaching and learning process. Group problem-based learning encourages collaboration, peer interaction, and shared problem-solving, while individualized problem-based learning promotes self-directed learning and independent thinking. Although these approaches are theoretically linked to increased motivation and engagement, it remains unclear how students themselves perceive the impact of these two strategies, particularly in the context of learning sense organs.

Also, numerous studies have examined the impact of PBL on students' academic performance, retention and critical thinking in biology, but there is inadequate of clear evidence on students' perception of how group and individualized PBL strategies



influence their motivation and engagement, particularly in learning sense organs. Students' perception is significant because it shapes their attitude toward instructional strategies and can influence the effectiveness of teaching methods. Therefore, this study seeks to investigate students' perception of the impact of group problem-based learning strategy and individualized problem-based learning strategy on their motivation and engagement in learning sense organs. The findings of this study will provide empirical evidence that may guide biology teachers, curriculum planners, and policymakers in selecting instructional strategies that enhance students' interest, participation, and overall learning experience in biology

Statement of the Problem

Effective teaching and learning of Biology at the secondary school level remain a major concern to educators, particularly in topics that require conceptual understanding such as sense organs. Despite the importance of this topic in understanding human physiology and response to stimuli, students often demonstrate low interest, limited participation, and inadequate engagement during lessons. Also, evidence from preliminary interaction and WAEC Chief Examiners' Reports (2022–2024), indicated that students sometimes show lack of deep understanding of biological concepts when taught using predominantly lecture-based methods, which may negatively affect students' motivation and overall learning outcomes in Biology. There is need to adopt learner-centered instructional strategies such as Problem-Based Learning (PBL) in teaching and learning process. Furthermore, PBL can be applied to individual and group based learning. Although these approaches are theoretically linked to increased motivation and engagement, it remains unclear how students themselves perceive the

impact of these two strategies, particularly in the context of learning sense organs.

Objectives of the Study

Specifically the study:

- i. Determine the difference between students' perception on the impact of individualized and group problem-based learning strategies on their motivation in learning sense organs in Zamfara State, Nigeria.
- ii. Determine the difference between students' perception on the impact of individualized and group problem-based learning strategies on their engagement in learning sense organs in Zamfara State, Nigeria.

Research Questions

The following research questions guided the study:

- i. What are the differences between students' perception on the impact of individualized and group problem-based learning strategies on their motivation in learning sense organs in Zamfara State, Nigeria?
- ii. What are the differences between students' perception on the impact of individualized and group problem-based learning strategies on their engagement in learning sense organs in Zamfara State, Nigeria?

Hypotheses

The Hypothesis were formulated and tested at 0.05 levels of significance

1. H_{01} : There is no significant difference between students' perception on the impact of individualized and group problem-based learning strategies on their motivation in learning sense organs in Zamfara State, Nigeria
2. H_{02} : There is no significant difference between students' perception on the impact of



individualized and group problem-based learning strategies on their engagement in learning sense organs in Zamfara State, Nigeria

Methodology

This study employs a descriptive survey research design. The descriptive survey design is considered appropriate because the study seeks to obtain and analyze students' perceptions regarding the impact of group problem-based learning strategy and individualized problem-based learning strategy on their motivation and engagement in learning sense organs, without manipulating any variables. The design enables the researcher to collect data from a representative sample of students using a structured questionnaire and to describe their opinions, attitudes, and experiences as they relate to the instructional strategies used. According to Creswell (2014), a survey design is suitable when the purpose of a study is to describe trends, attitudes, or opinions of a population by studying a sample of that population

The target population which consisted of SS (III) biology students enrolled in 181 public schools across the State. The data obtained from Ministry of Education, Science and Technology, Zamfara State (2025) revealed that, there are 181 public senior secondary schools in Zamfara State with the target population of 6,940 SS 3 biology students enrolled in 181 public senior secondary schools. Similarly, research advisory table was used in selecting the sample of 364 students from the sample schools.

Instrument used in this study is students' perception questionnaire, which is developed by the researcher. The Students' Perception Questionnaire (SPQ) comprised (20) items that describe their opinions, attitudes, and experiences as they relate to the instructional strategies used, the instrument contains likert scale.

The instrument was validated by the experts. There feedback and comments were computed and obtained the CVI of 0.78. Similarly, the instrument is reliable for determining students' perception on the impact of IPBLS and GPBLS on motivation and engagement, with a strong internal consistency as indicated by the Cronbach's alpha value of 0.80. After the selection of the six sample schools, the Students' Perception Questionnaire (SPQ) was shared to the students. After they have finished filling the questionnaire, there response was computed and used for analysis.

The study used descriptive statistics to find the mean, standard deviation, and mean difference for each of the two research questions and provide them in the table. The paired sample t-test was used to test the null hypothesis one and two at alpha=0.05 level of significance with the help of the statistical packages known as SPSS.

Results

H₀₁: H₀₁: There is no significant difference between students' perception on the impact of individualized and group problem-based learning strategies on their motivation in learning sense organs in Zamfara State, Nigeria

Table 1: Summary of Paired sample t-test Analysis of the difference between Students' perception on the impact of IPBLS and GPBLS on their motivation in learning sense organs

Variable	N	$\bar{X}$	SD	Df	t-Cal	P-Value	Decision
GPBLS	182	3.88	0.63	363	2.64	.001	H ₀₁ Rejected
IPBLS	182	3.32	0.57				

Table 1 shows that the P-value of 0.000 is less than the ≤ 0.05 ($p=0.000 < 0.05$) indicating that null hypothesis one (H₀₁) is therefore rejected. It implies that there is a significant difference between students' perception on the impact of IPBLS and GPBLS on students' motivation in learning sense organs among senior secondary schools in Zamfara State.

H₀₂: There is no significant difference between students' perception on the impact of individualized and group problem-based learning strategies on students engagement in learning sense organs in Zamfara State, Nigeria

Table 2: Summary of Paired sample t-test Analysis of the difference between Students' perception on the impact of IPBLS and GPBLS on their engagement in learning sense organs

Variable	N	$\bar{X}$	SD	Df	t-Cal	P-Value	Decision
GPBLS	182	3.74	0.61	363	2.74	.061	H ₀₁ Accepted
IPBLS	182	3.72	0.60				

Table 2 shows that the P-value of 0.001 is less than the ≤ 0.05 indicating that null hypothesis two (H₀₂) is therefore accepted. It implies that there is no significant difference between students' perception on the impact of individualized and group problem-based learning strategies on students' engagement in learning sense organs among senior secondary schools in Zamfara State.

Discussion of the Findings

The first finding of the study indicates that Group problem based learning strategy improved students' motivation in learning sense organs concept more than individualized problem based learning strategy. This finding is in agreement with the finding of Abdulwahab and Hashim, (2020), who conducted a research on the

effect of cooperative strategy on engagement in architectural education. The result revealed that, students who were taught using cooperative learning strategy, enhance social skills, willing to learn and become more motivated than those taught using the individualized learning strategy. Similarly, the finding is also in line with the finding of Thakur, Dutts and chauhan, (2018) that revealed GPBL makes learning an enjoyable experience, by exploring new knowledge, increasing curiosity and creating interest among the learners. Therefore, the higher motivation observed in group problem based learning strategy is due to the combination of autonomy, teamwork and peer support among the learners.



The second finding of the study indicates that Individualized problem based learning strategy and group problem based learning strategy improved students engagement in learning sense organs concept. Therefore, the finding shows that there is no significance differences between students' engagement in learning sense organs using Individualized problem based learning strategy and group problem based learning strategy. This finding is in agreement with the finding of Kayode, Sunday and Olusola, (2018), who conducted a research on effects of group interactive engagement and individualized instruction on students' academic performance in secondary school biology. The result revealed that, students who were taught using group interactive and individualized instruction were all engaged in learning sense organs concepts. Similarly, the finding of Usman (2020), revealed that both GPBL and IPBL engaged students in learning. Therefore, the results of the study as revealed may be due to the active engagement of students whether they worked in groups or individually.

Conclusion

The results of the findings in this study, indicates that group problem based learning strategy improved students' motivation in learning sense organs concept more than individualized problem based learning strategy. Similarly, Individualized and group problem based learning strategy improve students engagement in learning sense organs concept, without significant differences. Therefore, it can be concluded that using group problem based learning strategy in the teaching and learning of sense organs concepts motivate biology students. Similarly, both IPBLs and GPBLs engaged biology students in learning sense organs

Recommendations

Based on the findings of this study, the researcher recommends, among others, that:

1. Biology teachers should use group problem based learning strategy to enhance senior secondary school students' motivation and engagement of sense organs concepts.
2. Schools administrators should encourage and support the use of group problem base learning strategy and provide conducive environment that promote group interaction
3. Curriculum planners should include group problem-based learning strategy into biology curriculum in order to promote students' motivation as it enhance academic achievement

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