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EFFECT OF IMMEDIATE FEEDBACK ON ACADEMIC MOTIVATION OF SECONDARY SCHOOL STUDENTS IN BIOLOGY IN AWKA EDUCATION ZONE, ANAMBRA STATE

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ABSTRACT

The study examined the effect of immediate feedback on the academic motivation of secondary school students in Awka Education Zone, Anambra State. The aim of the study was to examine the mean academic motivation of SSII students in biology when assessed using feedback timing and those assessed without feedback timing, and assess the mean academic motivation of male and female SSII students in biology when assessed using feedback timing and those assessed without feedback timing. Two research questions and two hypotheses were raised for the study. Non-equivalent control group pretest–posttestquasi-experimental design was adopted. Population of the study comprised 4,996 (2100 male and 2896 female) senior secondary school students in the study area. 92 respondents were used for the study. The study used a multistage sampling technique. First, purposive sampling was used to drawpublic secondary schools that met the study requirements. Next, simple random sampling was used to select the participating students from the chosen schools. Self-structured questionnaire was used for data collection. The data collected were analysed using mean and standard deviation, while the hypotheses were tested at 0.05 level of significance using the Analysis of Covariance (ANCOVA). The findings of the study showed that students in Biology assessed using feedback timing had higher mean gain in academic motivation than students assessed without feedback timing. This indicated that there is a significant difference in the mean academic motivation scores of students assessed with feedback timing and those assessed without feedback timing; also, the academic motivation of both male and female students in Biology are the same. However, there is no significant difference in the mean academic motivation score of male and female students assessed in biology using feedback timing and those assessed without feedback timing. The study concluded that immediate feedback encourages active participation and helps students improve their academic motivation. The study, hence, recommended that teachers should provide immediate feedback to students during classroom activities, assignments, and tests to improve their academic motivation; more so, school should encourage teachers to adopt teaching methods that include prompt and constructive feedback as part of regular classroom practice.

Introduction

Education is an important tool for the development of individuals and society. It equips learners with knowledge, skills, attitudes, and values that enable them to contribute positively to national growth. For students to achieve meaningful learning outcomes, they must remain motivated throughout the teaching and learning process. Academic motivation refers to the inner desire, interest, and willingness of students to participate actively in

learning activities and strive for academic success. Students who are academically motivated are more likely to attend classes regularly, complete assignments, participate in classroom discussions, and perform better in examinations. According to Ryan and Deci (2020), academic motivation is the force that initiates, guides, and sustains students' learning behaviours toward achieving educational goals.

In recent years, educators have become increasingly concerned about the declining level of academic motivation among secondary school students in Nigeria. Many students show little interest in classroom activities, fail to complete assignments, and often perform below expectation in internal and external examinations. Factors such as poor teaching methods, inadequate learning resources, lack of encouragement, delayed assessment results, and ineffective feedback have contributed to this situation. Okeke (2021) explained that when students receive little or no encouragement regarding their academic performance, they gradually lose confidence and interest in learning. This situation has become a major concern because motivated students are essential for effective teaching and meaningful learning. One important classroom practice that can improve students' motivation is immediate feedback. Feedback refers to the information given to learners about their performance after completing a learning task. It helps students understand what they have done correctly, identify their mistakes, and know the areas that require improvement. Immediate feedback is feedback provided shortly after a student completes a learning activity or assessment. According to Hattie and Clarke (2019), immediate feedback enables learners to recognize their strengths and weaknesses while the learning experience is still fresh in their minds. This timely response helps students correct errors quickly and reinforces correct understanding.

Immediate feedback plays a significant role in improving students' academic motivation. When students receive prompt responses to their classroom activities, they become more confident and interested in learning. Immediate feedback helps learners realize that their efforts are noticed and appreciated, thereby encouraging them to participate actively in future learning activities. It also reduces uncertainty and anxiety because students do not have to wait for long periods before knowing whether their answers are correct or incorrect. Eze and Obi (2022) observed that students who regularly receive immediate feedback develop higher levels of confidence, commitment, and enthusiasm toward academic tasks. Another importance of immediate feedback is that it improves learning outcomes by helping students identify and correct their mistakes immediately. Delayed correction often allows misconceptions to remain in students' minds, making learning more difficult. Immediate feedback strengthens memory retention because students are able to connect the teacher's corrections with the task they have just completed. According to Shute (2018), timely feedback supports meaningful learning by guiding students toward better performance and increasing their willingness to continue learning.

Immediate feedback also promotes positive teacher-student relationships. Students feel supported when teachers respond quickly to their classroom efforts. This creates an atmosphere of trust, openness, and encouragement, making learners more willing to ask

questions and seek clarification whenever necessary. A supportive classroom environment enhances students' confidence and reduces fear of making mistakes during learning activities. As noted by Yusuf (2023), students perform better academically when they perceive their teachers as responsive and supportive. Furthermore, immediate feedback encourages active participation in classroom activities. Students become more willing to answer questions, engage in discussions, and complete classroom exercises when they know they will receive quick responses from their teachers. It also helps teachers identify students who require additional assistance and enables instructional adjustments before learning difficulties become severe. According to Nwankwo (2021), continuous and timely feedback improves classroom interaction and strengthens students' commitment to learning, especially in subjects like Biology.Biology provides knowledge about the human body, health, diseases, reproduction, nutrition, genetics, and ecological systems. According to Campbell et al. (2020), biology enables students to understand life processes and the interactions that occur among organisms and their environments. The subject also develops important skills such as observation, experimentation, critical thinking, problem-solving, and scientific reasoning. These skills are useful not only in science-related careers but also in everyday decision-making. Therefore, effective biology education contributes to scientific literacy and prepares students for future academic and professional pursuits. Thus, the relevance of biology can strengthen students' academic motivation by increasing their interest, confidence, and willingness to learn.

Despite these benefits, many secondary schools in Nigeria still experience challenges in providing immediate feedback during teaching and assessment. In many classrooms, teachers delay marking assignments and tests because of large class sizes, heavy workload, inadequate instructional materials, and insufficient time. As a result, students often receive their scores and corrections several weeks after completing assessments. This delay reduces the effectiveness of feedback because students may have forgotten the learning activity or lost interest in improving their performance. Ojo (2022) observed that delayed feedback weakens students' motivation and limits opportunities for meaningful learning improvement. The problem of poor academic motivation among secondary school students remains a serious concern in Anambra State. Many students display low interest in learning, poor classroom participation, declining academic confidence, and weak commitment to schoolwork. Although several factors contribute to this situation, inadequate and delayed feedback from teachers has continued to receive attention among education researchers. Immediate feedback has the potential to improve students' motivation by providing timely guidance, encouragement, and correction during the learning process. However, many public secondary schools have not fully adopted this instructional practice due to various classroom challenges.

Academic motivation consists of different dimensions that influence students' willingness to learn. According to Ryan and Deci (2020), academic motivation includes intrinsic motivation and extrinsic motivation. However, the present study will concentrate on intrinsic motivation and extrinsic motivation, starting with intrinsic motivation. Intrinsic motivation

refers to the internal desire to learn because the learner finds the activity enjoyable, interesting, or personally satisfying. Students who are intrinsically motivated participate in learning because they genuinely enjoy acquiring knowledge rather than seeking external rewards. Deci and Ryan (2020) explained that intrinsically motivated students demonstrate greater curiosity, persistence, creativity, and academic achievement because their learning is driven by personal interest. Immediate feedback strengthens intrinsic motivation by helping students experience progress, competence, and satisfaction during learning activities. Intrinsic motivation contributes significantly to academic success because students willingly invest effort in their studies without constant supervision. Such learners are more likely to solve problems independently, participate actively in class, and continue learning despite challenges. Immediate feedback supports intrinsic motivation by reinforcing students' sense of achievement whenever they perform well and providing constructive guidance whenever improvement is needed. According to Adeyemi (2022), students who receive timely and encouraging feedback develop stronger self-confidence and greater interest in learning.

Extrinsic motivation refers to learning that is driven by external rewards or consequences such as praise, grades, certificates, recognition, or avoidance of punishment. Students who are extrinsically motivated often work hard because they desire positive outcomes or wish to avoid negative consequences. Schunk (2021) explained that external incentives can encourage students to remain focused and complete academic tasks successfully. Immediate feedback enhances extrinsic motivation because students receive prompt recognition for their efforts and understand how their performance relates to expected standards.

Intrinsic and extrinsic motivation are important components of students' academic motivation because they influence learners' interest, persistence, confidence, and commitment to educational activities. Immediate feedback can strengthen both forms of motivation by providing timely correction, encouragement, and recognition. However, inadequate use of immediate feedback in many secondary schools may negatively affect students' academic motivation, with possible differences in how male and female students respond to such feedback. The present study therefore seeks to examine the effect of immediate feedback on the academic motivation of male and female secondary school students in Awka Education Zone, Anambra State.

Statement of the Problem

Academic motivation among secondary school students in Biology in Awka Education Zone, Anambra State has continued to decline despite various efforts made to improve the quality of teaching and learning. Many students show little interest in classroom activities, fail to complete assignments, participate poorly during lessons, and perform below expectations in examinations. This low level of motivation affect students' willingness to learn and limits their academic achievement. As a result, many students fail to develop the knowledge, skills, and attitudes needed for personal growth and future success. The effect

of poor academic motivation are evident in many secondary schools within Awka Education Zone. Students who lack motivation often skip classes, lose confidence in their academic abilities, and become easily distracted during lessons. Some eventually develop negative attitudes toward education, leading to poor academic performance, increased examination failure, and school dropout. These challenges reduce the effectiveness of the teaching and learning process and make it difficult for schools to achieve their educational objectives.

One important factor that may be responsible for the low level of academic motivation is the inadequate use of immediate feedback during classroom instruction. In many secondary schools, teachers do not always provide prompt responses to students'classwork, assignments, and tests. Instead, students often wait for several days or weeks before receiving corrections and comments on their performance. This delay reduces students' interest in learning because they are unable to identify their mistakes and improve while the learning experience is still fresh in their minds.

The inadequate use of immediate feedback also limits students' confidence and willingness to participate actively in classroom activities. When students receive little or delayed feedback, they may feel that their efforts are not valued, leading to frustration and loss of interest in learning. Immediate feedback is expected to encourage students by helping them understand their strengths, correct their weaknesses, and remain committed to their academic goals. However, where such feedback is lacking, students may gradually lose the motivation needed for effective learning. To address this problem, there is a clear need to examine the effect of immediate feedback on the academic motivation of secondary school students in Awka Education Zone, Anambra State.

Purpose of the Study

The main purpose of this study was to examine the effect of immediate feedback timing on academic motivation in Biology among senior secondary school student in Awka Education Zone, Anambra State. Specifically, the study sought to:

1. Examine the mean academic motivation of SSII students in biology when assessed using feedback timing and those assessed without feedback timing
2. Assess the mean academic motivation of male and female SSII students in biology when assessed using feedback timing and those assessed without feedback timing

Research Questions

The following questions guided the study:

1. What is the mean academic motivation of SSII students in Biology when assessed using immediate feedback timing?
2. What is the mean academic motivation of male and female SSII students in Biology when assessed using feedback timing and those assessed without feedback timing?

Hypotheses

The following null hypotheses will be tested at 0.05 level of significance:

1. There is no significant difference in the mean academic motivation scores of SSII students in Biology when assessed using feedback timing and those assessed without feedback timing
2. There is no significant difference between mean academic motivation scores of male and female SSII students in Biology when assessed using feedback timing and those assessed without feedback timing

Method

The study adopted non-equivalent control group pretest–posttest quasi-experimental design because it was investigating the effect of feedback timing on academic motivation of students in biology in the Senior Secondary schools in Awka Education Zone. Quasi-experimental research is method that involves the use of intervention and outcome measurement without random assignment of subjects. The experimental design is presented below thus;

E: O_1 X O_2

C: O_1 ~X O_2

The symbols are explained as follow:

E = experimental group.

C = control group

O_1 = first observation or pre-test

O_2 = second observation or post-test.

X = treatment or experimental variable.

~X = control variable (No Treatment)

The study was carried out in Awka Education Zone, Anambra State. Awka Education Zone is one of the six education zones in Anambra State, Nigeria. The zone plays a key role in implementing educational policies, supervising schools, and ensuring that teaching and learning standards are maintained. It also helps in organizing examinations and training programmes for teachers to improve the quality of education.

The population of the study comprised 4,996 (2100 male and 2896) senior secondary school students in SS II in co-educational schools in the 61 public secondary schools in Awka Education zone, Anambra State (Post Primary Schools Service Commission, Awka, 2024).

The sample size of 92 students was deemed sufficient for the study, as it provided a good balance between representation and manageability. The study's focus on SS2 Biology students was deliberate, as this group was considered to be at a critical stage in their academic journey.

The study used a multistage sampling technique. First, purposive sampling was used to draw public secondary schools that meet the study requirements. Next, simple random sampling was used to draw the participating students from the chosen schools. This technique was suitable because it gave every eligible student an equal chance of being draw, reduced selection bias, and ensures that the sample fairly represented the target population.

The instruments used for data collection was a self-structured questionnaires tagged Academic Motivation in Biology of Senior Secondary School Students Questionnaire (AMBSSSQ). A four point Likert scale was used in weighting the responses from the sample subjects as follows: Strongly Agree = 4 points, Agree = 3 points, Disagree = 2 points and Strongly Disagree = 1 point.

The instrument was trial-tested with 20 students in Onitsha Education Zone because it has the same educational settings; and the reliability coefficient yielded 0.71, to this end, it was accepted that the instrument was reliable and consistent in measuring what it sought to measure

Experimental Procedure:An Academic Motivation Questionnaire (AMQ) was used to obtain information on the academic motivation of students. The instrument, which was researcher-structured, consisted of 15 items arranged in clusters. Motivation questionnaire was administered before treatment during normal teaching, and was administered the same questionnaire after treatment for the effect to be studied.

The data collected for answering research questions were analysed using mean and standard deviation, while the hypotheses were tested at 0.05 level of significance using the Analysis of Covariance (ANCOVA). SPSS version 27 was used to analyze the data.

Results

The results of this study were presented in tables according to the research questions and hypotheses that guided the study.

Research Question 1

What is the mean academic motivation of students in Biology when assessed using feedback timing and when assessed without feedback timing?

Table 1:

Mean and Standard deviation (SD) of pretest motivation and posttest motivation scores of students in Biology

Variable	Pretest Motivation	Posttest Motivation	Mean

Method of Teaching	N	$\overline{X}$	SD	$\overline{X}$	SD	Gain
Feedback Timing	50	45.46	3.81	53.78	2.55	8.32
Without feedback timing	42	40.38	7.49	44.45	6.94	4.07

Table 1 revealed that biology students assessed using feedback timing had academic motivation pretest mean of 45.46 and academic motivation posttest mean of 53.78. The difference between the pretest and post test mean was 8.32. The biology students assessed without feedback timing had academic motivation pretest mean of 40.38 and an academic motivation post test mean of 44.45. The difference between the pretest and posttest mean was 4.07. However, for each of the groups the posttest means were greater than the pretest means with group assessed in Biology using feedback timing having a higher mean gain in academic motivation. This is an indication that using feedback timing to assess Biology improved academic motivation of students than those assessed without feedback timing.

Research Question 2

What is the academic motivation of male and female students in Biology when assessed using feedback timing and those assessed without feedback timing?

Table 2:

Mean and SD of pretest and posttest motivation of male and female students in Biology.

Variable		Pretest motivation			Post test motivation		Mean
	Gender	N	$\overline{X}$	SD	$\overline{X}$	SD	Gain
With feedback timing	Male	20	46.55	4.161	55.05	2.328	8.50
	Female	30	44.73	3.453	52.93	2.377	8.20
Without feedback timing	Male	24	35.63	6.099	40.17	4.146	4.54
	Female	18	46.72	3.268	50.17	5.711	3.45

Analysis in Table 2 indicated that male students had a pretest motivation score of 46.55 and a post test motivation score of 55.05. The difference between the pretest motivation and posttest motivation mean score for male students was 8.50. The female students had a

pretest motivation score of 44.73 and post test motivation score of 52.93. The difference between the posttest motivation mean score for female students was 8.20.

Mean while, for each of the groups, the post test mean motivation score was greater than the post test motivation score with the male students having (0.3) higher mean gain. This indicated that both male and female students have similar academic motivation in Biology.

Hypothesis 1

There is no significant difference in the mean of academic motivation score of students in Biology when assessed using feedback timing and when assessed without feedback timing.

Table 3: Analysis of Covariance (ANCOVA) of the significant difference in the mean of academic motivation of students assessed Biology using feedback timing and those assessed without feedback timing.

Source	Type III sum of squares	Df	Mean square	F	Sig
Corrected Model	2889.955[a]	2	1444.978	92.188	0.000
Intercept	1057.109	1	1057.109	67.443	0.000
Premotivation	903.983	1	903.983	57.673	0.000
Group	818.943	1	818.943	52.248	0.000
Error	1395.001	89	15.674		
Total	229906.000	92			
Corrected Total	**4284.957**	**91**			

Significant at 0.05 level

[a.]R squared=.674(adjusted R squared=.667)Dependent Variable=Posttest Motivation

The result in Table 3 depicted that with regards to the group assessed Biology using feedback and those assessed Biology using feedback timing and those assessed biology without feedback timing, an F- ratio of 52.248 was obtained with associated probability value of .000. Since the associated value of 0.000 was less than 0.05 level of significance, the null hypothesis of no significant difference in the mean academic motivation score of students assessed in Biology using feedback timing and those assessed without feedback timing was rejected. The result indicated that there is a significant difference in the mean academic motivation scores of students assessed using feedback timing and those assessed without feedback timing.

Hypothesis 2

There is no significant difference in the mean academic motivation score of male and female student assessed Biology using feedback timing and those assessed without feedback timing.

Table 4: Analysis of Covariance (ANCOVA) of the significant difference in the mean academic motivation of male and female students assessed biology using feedback timing and those assessed without feedback timing.

Source	Type III sum of squares	of	Mean square	F	Pvalue
Corrected Model	2114.000[a]	2	1057.000	43.333	.000
Intercept	573.086	1	573.086	23.494	.000
Premotivation	1548.318	1	1548.318	63.474	.000
Gender	42.988	1	42.988	1.762	.188
Error	2170.957	89	24.393		
Total	229906.000	92			
Corrected Total	**4284.957**	**91**			

Significant at 0.05 level

Table 4 revealed that with respect to mean academic motivation of male and female students in Biology assessed using feedback timing an F-ratio of 1.762 was obtained with associated probality value of .188. Since the associated probability value of .188 was greater than 0.05 level of significance, the null hypothesis of no significant difference in the mean score of academic motivation of male and female students assessed Biology with feedback timing and those without feedback timing was not rejected. Nonetheless, there is no significant difference in the mean academic motivation score of male and female students assessed in Biology using feedback timing and those assessed without feedback timing

Discussion of Findings

The findings of this work were discussed under the following headings:

Academic motivation of students in biology when assessed using feedback timing and when assessed without feedback timing

The study showed that students in Biology assessed using feedback timing had higher mean gain in academic motivation than students assessed without feedback timing. This suggests academic motivation is strongly connected to how students perceive their learning progress. When students receive quick and clear feedback, they see evidence of their effort and performance, which increases their drive to achieve more. This is inline with the assertion

of Ali (2022) who explained that in Biology, a subject that requires both conceptual understanding and practical application, timely feedback helps learners consolidate knowledge and build confidence. On the other hand, students who do not get feedback on time may become discouraged, uncertain about their performance, and less motivated to engage in future learning activities.

Academic motivation of male and female students in biology when assessed using feedback timing and when assessed without feedback timing

The findings of the study showed that both male and female students appear to have similar academic motivation in Biology. However, there is no significant difference in the mean academic motivation score of male and female students assessed in Biology using feedback timing and those assessed without feedback timing. This finding suggests that that gender does not strongly influence how motivated students become when learning the subject. Motivation in Biology seems to be shaped more by teaching strategies, such as feedback timing, than by whether the learner is male or female. This shows that when the learning environment provides equal opportunities, both genders can be equally motivated to succeed. It also suggests that Biology as a subject attracts interest and effort from students regardless of gender differences. This is in line with the assertion of Olu (2019) who stated that while feedback timing increases overall motivation, it does not favour one gender over the other. Both boys and girls benefit equally from timely feedback in terms of motivation.

Conclusion

Immediate feedback plays an important role in improving the academic motivation of secondary school students. When students receive feedback promptly, they understand their strengths and weaknesses better, become more confident, and show greater interest in learning. Immediate feedback also encourages active participation and helps students improve their academic motivation. Therefore, it is important that teachers should make it a regular practice to provide timely and constructive feedback during teaching and assessment to promote higher motivation and better learning outcomes among these students.

Recommendations

Based on the findings, the following recommendations were made:

1. Teachers should provide immediate feedback to students during classroom activities, assignments, and tests to improve their academic motivation.
2. School principals should encourage teachers to adopt teaching methods that include prompt and constructive feedback as part of regular classroom practice.
3. The Ministry of Education should organize workshops and training programmes to equip teachers with effective feedback strategies that promote students' motivation and learning.

4. Students should be encouraged to pay attention to the feedback they receive and use it to improve their academic performance and learning habits.

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