

Effect of ADDIE Instructional Strategy on Junior Secondary School Students' Motivation in Information Technology

IRORITERAYE-ADJEKPOVU, Janice Imizuokena (Ph.D)

ORCID I.D: 0000-0002-7563-445X.

Department of Science Education, Delta State University, Abraka.

iroriterayeadjekpovu@delsu.edu.ng

+2348037580882

Abstract: *This study investigated the effect of the ADDIE instructional strategy on students' motivation in Information Technology. The study adopted a quasi-experimental pretest-posttest non-equivalent control group design. The population comprised 82,712 Upper Basic Two (JS2) students in public secondary schools in Delta Central Senatorial District of Delta State, from which a sample of 291 students was selected through a multistage sampling procedure. Data were collected using the Students' Motivation towards Information Technology Questionnaire (SMITQ), which yielded a Cronbach Alpha reliability coefficient of 0.72. The experimental group was taught using the ADDIE instructional strategy, while the control group received instruction through the lecture method over a six-week period. Mean and standard deviation were used to answer the research questions, whereas ANCOVA and the independent-samples t-test were employed to test the hypotheses at the 0.05 level of significance. The findings revealed that students taught using the ADDIE instructional strategy achieved a higher mean gain in motivation than those taught using the lecture method, and the difference was statistically significant. The study further showed that there was no significant difference between the motivation of male and female students taught using the ADDIE instructional strategy. It was concluded that the ADDIE instructional strategy effectively enhances students' motivation in Information Technology irrespective of sex. The study recommends increased adoption of the strategy through teacher training and curriculum implementation.*

Keywords: ADDIE instructional strategy, Information Technology, motivation, lecture method, instructional design.

Introduction

The rapid expansion of digital technologies has continued to reshape educational systems by redefining the knowledge, skills, and competencies expected of learners in the twenty-first century. Information Technology (IT) has consequently emerged as a fundamental component of secondary school education because of its role in developing digital literacy, computational thinking, problem-solving ability, and technological competence required for lifelong learning and participation in a knowledge-driven society (Voogt *et al.*, 2018). Beyond equipping learners with technical skills, Information Technology provides opportunities for creativity, innovation, collaboration, and informed decision-making in an increasingly digital environment (Bates, 2019). However, the extent to which students benefit from Information Technology instruction depends not only on curriculum content but also on the quality of instructional experiences that sustain learners' willingness to participate actively in classroom learning, thereby bringing motivation to the forefront of educational discourse.

Motivation has long been recognised as one of the most influential determinants of students' engagement, persistence, and academic success across different learning contexts. It represents the internal and external processes that energise, direct, and sustain learners' behaviour towards the attainment of educational goals (Ryan & Deci, 2020). Students who are highly motivated are generally more willing to invest effort, persevere when confronted with learning difficulties, and demonstrate greater confidence in completing academic tasks than their less motivated counterparts (Schunk & DiBenedetto, 2020). Similarly, expectancy-

value perspectives suggest that students' beliefs about their competence and the value they attach to learning activities substantially influence their level of commitment and classroom participation (Eccles & Wigfield, 2020). Since motivation shapes the manner in which learners respond to instructional experiences, attention increasingly shifts to instructional practices capable of stimulating and sustaining students' interest in learning.

The nature of classroom instruction has been identified as a significant contributor to students' motivational disposition. Contemporary educational research increasingly advocates learner-centred instructional approaches that actively engage students in meaningful learning experiences rather than positioning them as passive recipients of information (Darling-Hammond *et al.*, 2020). Evidence indicates that instructional strategies encouraging collaboration, inquiry, active participation, and authentic problem-solving enhance students' enthusiasm for learning and strengthen their classroom engagement (Hattie, 2017). Likewise, studies on problem-based, collaborative, inquiry-based, and activity-based instruction have consistently reported improvements in students' motivation across different subject areas (Aina & Langenhoven, 2018; Akanbi & Iortim, 2021; Azode & Okoli, 2024). These developments underscore the importance of systematic instructional approaches capable of integrating effective learning experiences into classroom practice, thereby directing attention to instructional design models.

Among contemporary instructional design frameworks, the ADDIE model has gained considerable acceptance because of its systematic and iterative approach to planning, developing, implementing, and evaluating instruction. The model comprises five interconnected phases—Analysis, Design, Development, Implementation, and Evaluation—which collectively guide the development of structured learning experiences that align instructional objectives with learners' needs (Aldoobie, 2015). Rather than viewing instruction as isolated classroom activities, the ADDIE framework promotes careful planning, continuous improvement, and evidence-based decision-making throughout the teaching-learning process (Branch, 2017). Its systematic nature has consequently made it one of the most widely recognised instructional design models across educational and training settings (Molenda, 2015). Appreciating the strengths of the ADDIE model therefore requires consideration of the theoretical foundations that support systematic instructional design.

The effectiveness of the ADDIE instructional strategy is closely associated with established learning theories that emphasise active learner participation and purposeful instructional support. Constructivist perspectives argue that learners construct knowledge through meaningful interaction with learning experiences and social environments (Piaget, 1972; Vygotsky, 1978). Similarly, instructional design theorists contend that effective instruction should be deliberately organised to facilitate progressive learning while accommodating learners' characteristics and instructional goals (Reigeluth & Carr-Chellman, 2009; Dick *et al.*, 2015). Contemporary instructional design literature equally portrays ADDIE as a flexible framework capable of integrating diverse pedagogical approaches while maintaining systematic instructional quality (Morrison *et al.*, 2019; Reiser & Dempsey, 2018). Consequently, interest has grown in examining how such systematic instructional planning may influence learners' motivational outcomes in school subjects, including Information Technology.

Increasing empirical attention has been devoted to the relationship between instructional strategies and students' motivation. Studies have shown that instructional approaches designed around meaningful participation, collaborative learning, and personalised experiences tend to improve learners' interest and commitment to academic activities (Awofala, 2016; Olatoye & Aderogba, 2017). Similarly, team-assisted learning and blended learning strategies have demonstrated positive effects on students' motivation in Nigerian classrooms (Lawal & Awofala, 2021; Yusuf & Afolabi, 2020). Within technology-related education, learners' motivation has also been linked to opportunities for authentic engagement and effective classroom interaction (Emeri, 2022). These findings suggest that instructional approaches characterised by systematic planning and learner engagement deserve further scholarly attention within Information Technology education.

Information Technology presents distinctive instructional demands because students are expected to acquire conceptual understanding alongside practical digital competencies. Teaching such content through

predominantly teacher-centred approaches may not sufficiently stimulate learners' interest or sustain their participation throughout the learning process. Educational technology scholars have therefore argued that carefully designed instructional experiences are essential for supporting meaningful learning in digital environments (Martin *et al.*, 2019; Bates, 2019). Furthermore, systematic instructional planning has become increasingly relevant as schools seek to develop learners capable of functioning effectively in technologically driven societies (Peterson, 2016; Wlodkowski, 2017). As instructional design assumes greater prominence in technology education, consideration of learner characteristics that may influence instructional outcomes also becomes important.

Among learner-related variables frequently examined in educational research is sex. Although several studies have reported differences in students' motivation and participation across male and female learners, findings remain inconsistent across disciplines and instructional contexts. Some investigations suggest that appropriately designed instructional environments can minimise motivational differences between male and female students (Vekiri, 2017; Yusuf & Afolabi, 2020), whereas others continue to highlight gender-related disparities in technology-oriented learning environments arising from stereotypes, access, and perceptions of competence (Master *et al.*, 2016; Stoilescu & McDougall, 2021). Broader international reports similarly indicate that equitable instructional practices remain essential for encouraging sustained participation in science and technology education among all learners (UNESCO, 2020; Wang & Degol, 2017). These mixed perspectives imply that sex continues to warrant empirical consideration whenever innovative instructional strategies are implemented.

Despite growing recognition of systematic instructional design and the educational importance of learner motivation, evidence regarding the influence of the ADDIE instructional strategy on students' motivation in Information Technology within Nigerian junior secondary schools remains relatively limited. Existing studies have focused predominantly on achievement or on instructional strategies other than ADDIE, leaving comparatively less attention to motivational outcomes in Information Technology classrooms. Furthermore, available findings concerning possible differences in motivation among male and female learners remain inconclusive across instructional settings. Against this background, there is a need to examine the extent to which the ADDIE instructional strategy influences students' motivation in Information Technology and whether motivation differs between male and female students exposed to the strategy.

Statement of the Problem

Motivation remains a fundamental factor in students' learning because it influences their interest, participation, persistence, and willingness to engage in academic tasks. In Information Technology, where learners are expected to develop both conceptual understanding and practical digital competencies, maintaining high levels of motivation is particularly important for meaningful learning. Although Information Technology has assumed greater importance in preparing students for participation in a technology-driven society, classroom instruction in many secondary schools continues to rely largely on conventional teacher-centred approaches that may not sufficiently stimulate learners' active engagement. Consequently, many students appear to participate passively during lessons, exhibit declining interest in classroom activities, and demonstrate limited enthusiasm for learning Information Technology, thereby raising concerns about the effectiveness of prevailing instructional practices.

The growing emphasis on learner-centred instruction has led to increased advocacy for systematic instructional design models such as the ADDIE instructional strategy, which seeks to organise learning experiences in ways that promote active participation and sustained learner engagement. While previous studies have examined the influence of various innovative instructional strategies on students' motivation, relatively little empirical evidence exists regarding the use of the ADDIE instructional strategy in motivating junior secondary school students to learn Information Technology, particularly within the Nigerian context. In addition, findings on whether male and female students respond differently to such instructional approaches remain inconclusive. The problem of this study, therefore, is the limited empirical evidence on the effect of the

ADDIE instructional strategy on junior secondary school students' motivation in Information Technology and whether motivation differs between male and female students taught using the strategy.

Purpose of the Study

The purpose of this study was to determine the effect of the ADDIE instructional strategy on junior secondary school students' motivation in Information Technology. Specifically, the study sought to:

1. determine the effect of the ADDIE instructional strategy and lecture method on students' motivation in Information Technology; and
2. determine the difference in the motivation of male and female students taught Information Technology using the ADDIE instructional strategy.

Research Questions

The following research questions guided the study:

1. What is the effect of the ADDIE instructional strategy and lecture method on students' motivation in Information Technology?
2. What is the difference between the motivation of male and female students taught Information Technology using the ADDIE instructional strategy?

Hypotheses

The following null hypotheses further guided the study:

1. There is no significant effect of the ADDIE instructional strategy and lecture method on students' motivation in Information Technology.
2. There is no significant difference between the motivation of male and female students taught Information Technology using the ADDIE instructional strategy.

Methods

This study adopted a quasi-experimental research design, specifically the pretest–posttest non-equivalent control group design. The design was considered appropriate because intact classes were used and random assignment of students to treatment groups was not feasible within the normal school setting. The study comprised an experimental group taught Information Technology using the ADDIE instructional strategy and a control group taught using the lecture method. Both groups were administered the Students' Motivation towards Information Technology Questionnaire (SMITQ) before and after the six-week treatment period.

The population consisted of 82,712 Upper Basic Two (JS2) students in 473 public secondary schools in Delta Central Senatorial District of Delta State during the 2025/2026 academic session. A sample of 291 students drawn from four purposively selected public secondary schools participated in the study through a multistage sampling procedure involving the selection of schools with functional computer laboratories and qualified Information Technology teachers, followed by the use of intact JS2 classes. The sample comprised 130 male and 161 female students.

Data were collected using the Students' Motivation towards Information Technology Questionnaire (SMITQ), a 25-item four-point Likert-type instrument adapted from Ryan and Deci (2020) and modified to suit the Information Technology context. The instrument was subjected to face and content validation by experts in Science Education, Educational Measurement and Evaluation, and Information Technology education. Its reliability was established through a pilot study involving students outside the study area, and Cronbach's Alpha yielded a reliability coefficient of 0.72, indicating acceptable internal consistency.

Prior to the treatment, Information Technology teachers who served as research assistants were trained on the implementation of the instructional procedures. Students in the experimental group were taught selected Information Technology topics using the five stages of the ADDIE instructional strategy (Analysis, Design, Development, Implementation, and Evaluation) while those in the control group received instruction using the conventional lecture method. The treatment lasted six weeks, after which the SMITQ was re-administered as a posttest. Mean and standard deviation were used to answer the research questions, while Analysis of

Covariance (ANCOVA) and the independent-samples *t*-test were used to test the hypotheses at the 0.05 level of significance. Pretest scores served as covariates where appropriate to control for initial group differences.

Results

Table 1: Descriptive Statistics of Comparing the Mean Pretest and Posttest Motivation Scores of Students Taught Information Technology Using ADDIE Instructional Strategy and Lecture Method

Group	Testing	N	$\bar{x}$	MD	SD
ADDIE	Pretest	146	23.45	33.84	9.45
	Posttest		57.29		7.11
Lecture	Pretest	145	22.66	32.63	9.61
	Posttest		55.29		9.95

As presented in Table 1, students taught Information Technology using the ADDIE instructional strategy had a pretest mean motivation score of 23.45 (SD = 9.45) and a posttest mean score of 57.29 (SD = 7.11), resulting in a mean gain of 33.84. In contrast, students taught using the lecture method recorded a pretest mean motivation score of 22.66 (SD = 9.61) and a posttest mean score of 55.29 (SD = 9.95), with a mean gain of 32.63. Although both instructional strategies improved students' motivation towards Information Technology, the ADDIE instructional strategy produced a slightly higher mean gain than the lecture method, suggesting that it was relatively more effective in enhancing students' motivation.

Table 2: ANCOVA Comparison of the Mean Motivation Scores of Students Taught Information Technology Using ADDIE Instructional Strategy and Lecture Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	299.406 ^a	2	149.703	1.999	.137
Intercept	135467.572	1	135467.572	1808.815	.000
Pretest	6.992	1	6.992	.093	.760
Methods	295.677	1	295.677	3.948	.048
Error	21569.178	288	74.893		
Total	944102.000	291			
Corrected Total	21868.584	290			

The ANCOVA result in Table 2 indicates that there was a significant effect of instructional strategy on students' motivation in Information Technology, $F(1, 288) = 3.948$, $p = .048$. Since the probability value (.048) is less than the 0.05 level of significance, the null hypothesis was rejected. This implies that the instructional strategy adopted significantly influenced students' motivation in Information Technology, with the ADDIE instructional strategy producing a significantly different motivational outcome compared with the lecture method after controlling for pretest motivation scores.

Table 3: Descriptive Statistics Comparing the Mean Motivation Scores of Male and Female Students Taught Information Technology Using ADDIE Instructional Strategy

Sex	N	$\bar{x}$	MD	SD
Male	66	57.09	0.37	7.36
Female	80	57.46		6.94

The result presented in Table 3 shows that male students taught using the ADDIE instructional strategy obtained a mean posttest motivation score of 57.09 (SD = 7.36), whereas their female counterparts obtained a slightly higher mean score of 57.46 (SD = 6.94). The mean difference of 0.37 indicates only a negligible

difference in motivation between male and female students exposed to the ADDIE instructional strategy. This suggests that the strategy enhanced the motivation of both sexes to a similar extent.

Table 4: Independent Samples t-test Comparison of the Mean Motivation Scores of Male and Female Students Taught Information Technology Using ADDIE Instructional Strategy

Sex	N	$\bar{x}$	MD	SD	df	t_{cal}	Sig.(2-tailed)	Remark
Male	66	57.09	0.37	7.36	144	0.313	0.755	HO ₆ is not rejected
Female	80	57.46		6.94				

The independent-samples *t*-test result in Table 4 shows that there was no significant difference between the motivation scores of male and female students taught Information Technology using the ADDIE instructional strategy, $t(144) = 0.313$, $p = .755$. Since the probability value (.755) is greater than the 0.05 level of significance, the null hypothesis was not rejected. Therefore, it was concluded that male and female students did not differ significantly in their motivation towards Information Technology when taught using the ADDIE instructional strategy.

Discussion of Results

The findings of the study revealed that students taught Information Technology using the ADDIE instructional strategy recorded a higher mean gain in motivation than those taught using the lecture method. Although both instructional strategies improved students' motivation, the ANCOVA result further showed that the difference between the two instructional strategies was statistically significant. This finding suggests that the systematic and learner-centred nature of the ADDIE instructional strategy contributed to improved motivation among the students. The finding agrees with Aina and Langenhoven (2018), who reported that instructional strategies that actively engage learners in meaningful learning experiences significantly enhance students' motivation. It is also consistent with the findings of Lawal and Awofala (2021), who found that learner-centred instructional strategies significantly improved students' motivation to learn Mathematics. Similarly, Akanbi and Iortim (2021) observed that inquiry-based instructional strategies increased students' motivation and classroom participation in Basic Technology. The result further supports the position of Ryan and Deci (2020) that instructional environments capable of satisfying learners' needs for autonomy, competence, and relatedness promote higher levels of intrinsic motivation. The finding equally corroborates the assertion of Darling-Hammond et al. (2020) that learning experiences deliberately designed to promote active engagement and collaboration enhance students' motivation and overall learning outcomes. The superior performance of the ADDIE instructional strategy may therefore be attributed to its systematic planning, structured learning activities, continuous evaluation, and emphasis on active learner participation throughout the instructional process.

The study also found that there was no significant difference between the motivation of male and female students taught Information Technology using the ADDIE instructional strategy. Although female students obtained a slightly higher mean motivation score than their male counterparts, the observed difference was not statistically significant. This finding implies that the ADDIE instructional strategy provided a learning environment that motivated both male and female students almost equally. The finding is in agreement with Yusuf and Afolabi (2020), who reported that gender did not significantly influence students' motivation when learner-centred instructional approaches were adopted. The result also supports the work of Vekiri (2017), which indicated that appropriately designed instructional practices could reduce gender differences in students' motivational beliefs during technology-related learning. Furthermore, the finding lends support to UNESCO (2020), which advocates equitable instructional practices capable of encouraging the participation and motivation of both boys and girls in technology education. The result, however, differs from the findings of Master et al. (2016) and Stoilescu and McDougall (2021), who reported that gender stereotypes and perceptions of competence could influence students' motivation and participation in computing-related disciplines. The absence of a significant gender difference in the present study suggests that the systematic and inclusive

features of the ADDIE instructional strategy may have minimised gender-related disparities in students' motivation towards Information Technology.

Conclusion

Based on the findings of this study, it was concluded that the ADDIE instructional strategy is an effective instructional approach for enhancing junior secondary school students' motivation in Information Technology. Students exposed to the strategy demonstrated significantly higher motivational outcomes than those taught using the conventional lecture method. The study also established that the motivational benefits of the ADDIE instructional strategy were comparable for both male and female students, indicating that the strategy promotes equitable learning experiences irrespective of sex. The findings therefore underscore the value of systematic instructional design in improving students' motivation towards Information Technology.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Information Technology teachers should adopt the ADDIE instructional strategy to enhance students' motivation and active participation during classroom instruction.
2. Ministries of Education and school administrators should organise regular workshops, seminars, and in-service training programmes to equip teachers with the knowledge and skills required for effective implementation of the ADDIE instructional strategy.
3. Curriculum planners should integrate learner-centred instructional design approaches such as the ADDIE model into Information Technology curriculum implementation guidelines to promote effective classroom practice.
4. Since the ADDIE instructional strategy benefits both male and female students equally, teachers should employ it as an inclusive instructional approach capable of motivating all learners regardless of sex.

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