

**METACOGNITIVE STRATEGIES AND INDEPENDENT LEARNING AMONG PUBLIC
SECONDARY SCHOOLS IN YENAGOA, BAYELSA STATE.**

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ABSTRACT

This study examined the relationship between metacognitive strategies and independent learning among public secondary school students in Yenagoa Local Government Area of Bayelsa State. The specific metacognitive strategies investigated were information management, planning, evaluation, monitoring, and debugging. A descriptive survey research design was adopted for the study. The population comprised 4,140 students from public secondary schools in the study area, out of which a sample of 200 students was selected using simple random sampling technique from ten public secondary schools. Data were collected using a researcher-developed questionnaire titled 'Metacognitive Strategies and Independent Learning among Public Secondary School Students Questionnaire (MSAILAPSS)', which was validated by experts in measurement and evaluation and tested for reliability using the Cronbach Alpha method. Data collected were analyzed using Pearson Product Moment Correlation coefficient. The findings revealed that students demonstrated a high level of metacognitive strategies across all dimensions examined, and these strategies showed a positive relationship with independent learning. Information management and planning enhanced students' organization and goal-setting abilities, while evaluation, monitoring, and debugging improved self-regulation and problem-solving skills. The study concluded that metacognitive strategies are critical determinants of independent learning among public secondary school students. Based on the findings, it was recommended that teachers should integrate metacognitive strategy instruction into classroom practices, encourage self-assessment and reflective learning, and provide learning environments that support students' independent and self-regulated learning skills.

KEYWORDS: *Metacognitive, Information Management, Independent Learning, Planning, Evaluation, Monitoring, Debugging.*

INTRODUCTION: Independent learning describes students taking charge of their own study habits and choices so they can plan time use, select strategies, monitor progress and evaluate outcomes without constant direction from a teacher (Muijs and Bokhove, 2020). For many senior secondary school students in Nigeria independence at study begins as a set of behaviours such as setting goals and organising revision but matures into habits of reflecting on what worked and what did not. When learners develop these habits they become able to approach new tasks with confidence, to allocate their effort where it is most needed and to regulate distractions so study time is effective rather than merely long (Education Endowment Foundation, 2020). This capacity matters because secondary school is where examination expectations increase and where the ability to learn independently separates merely memorising facts from understanding and applying knowledge in new situations (Muijs and Bokhove, 2020).

Students often report chaotic study schedules or reliance on last minute cramming which undermines deep learning and retention (Azubuike et al., 2020). A second difficulty is limited strategic repertoire. Without exposure to explicit strategies for planning and reviewing work students tend to repeat the same ineffective tactics, for example passive reading without summarising or testing themselves (Muijs and Bokhove, 2020). Third there are contextual barriers that make

independence harder to practise in Yenagoa. Researchers working in Bayelsa State have pointed to overcrowded classrooms and shortages of learning resources as factors that reduce opportunities for guided practice in study skills (Giami, 2023; Okodoko, 2025). Fourth the digital divide has left many learners unable to supplement school instruction with online resources outside school hours which in turn reduces student ability to pursue self directed tasks independently (Olanrewaju et al., 2021; Azubuike et al., 2020). Finally lack of parental or teacher guidance in how to study can mean that even well motivated students lack the practical know how to turn motivation into consistent, effective study routines (Kuroyefa, 2024). Taken together these limitations explain why many senior secondary students display the appearance of effort but achieve less than they could if they had better control over how they learned (Muijs and Bokhove, 2020).

Introducing metacognitive strategies changes the conversation from what students are doing to how they think about what they are doing. Metacognitive strategies are the planned techniques that help learners to plan study, to monitor their understanding as they work, and to evaluate the success of their approaches afterwards (Muijs and Bokhove, 2020). Research reviews and intervention studies show that teaching metacognitive skills explicitly produces measurable gains in achievement across subjects and ages when those skills are practised and supported by teachers (Education Endowment Foundation, 2020; Meta Analysis, 2024). In short metacognitive strategies are not tricks but systematic methods for making learning visible to the learner so that choices about study are based on evidence from one own progress rather than on hope or routine.

Despite the numerous studies conducted across different states in Nigeria such as Lagos, Abuja, Port Harcourt, Abeokuta, Abia, Ekiti, and Osun on the relationship between metacognitive strategies and independent learning (Okon, 2022; Ibrahim, 2021; Adeyemi, 2023; Johnson, 2022; Chukwu, 2021; Adebayo, 2023; Nwosu, 2022; Adesina, 2021; Musa, 2023; Eze, 2022; Bello, 2023; Ajayi, 2021; Falade, 2022; Okorie, 2023), several gaps still exist in the literature. Most of these studies focused on individual dimensions of metacognition such as information management, planning, evaluation, monitoring, and debugging without examining how these dimensions collectively influence independent learning. Moreover, the existing studies were limited in geographical scope, as none specifically investigated this relationship among senior secondary school students in Yenagoa, Bayelsa State, leaving a contextual gap in understanding how metacognitive strategies function within that learning environment (Okon, 2022; Adeyemi, 2023). Methodologically, many studies employed correlational designs with relatively small sample sizes, which restricts the generalizability of their findings (Ibrahim, 2021; Adesina, 2021). In addition, limited attention was given to qualitative insights that could explain *how* and *why* metacognitive strategies enhance learner autonomy (Musa, 2023; Eze, 2022). It is on this note that this study seeks to examine the relationship between metacognitive strategies and independent learning among public secondary school in Yenagoa, Bayelsa State.

STATEMENT OF THE PROBLEM

Many students in senior secondary schools today struggle to learn independently, relying heavily on teachers for guidance, explanations, and motivation. This dependence often limits their ability to think critically, manage their study time, and regulate their learning behaviors effectively. Independent learning is essential for success in modern education, where students are expected to take responsibility for their progress and develop skills that prepare them for higher education and lifelong learning (Zimmerman, 2015; Aregbeyen, 2020). However, in many Nigerian schools, especially at the senior secondary level, students often face challenges such as poor study habits, limited self-regulation, lack of goal-setting skills, and inadequate strategies for monitoring their

understanding during learning activities (Ogunleye, 2021). These limitations hinder their academic growth and reduce their ability to adapt to increasingly complex learning environments.

Independent learning does not occur automatically but develops through consistent use of strategies that promote awareness, control, and evaluation of one's own learning processes (Schraw & Dennison, 1994; Flavell, 1979). Students who can plan their studies, manage information effectively, monitor their understanding, and evaluate their progress are more likely to achieve better learning outcomes (Paris & Winograd, 1990; Yusuf, 2021). Unfortunately, many students lack such self-directed learning habits because instructional practices in most schools remain teacher-centered, offering few opportunities for learners to take initiative or reflect on their learning (Olatunji, 2022). This suggests that the problem of low independent learning among secondary school students may be linked to their limited awareness and application of metacognitive strategies that support learning autonomy.

Despite the numerous studies conducted across different states in Nigeria such as Lagos, Abuja, Port Harcourt, Abeokuta, Abia, Ekiti, and Osun on the relationship between metacognitive strategies and independent learning (Okon, 2022; Ibrahim, 2021; Adeyemi, 2023; Johnson, 2022; Chukwu, 2021; Adebayo, 2023; Nwosu, 2022; Adesina, 2021; Musa, 2023; Eze, 2022; Bello, 2023; Ajayi, 2021; Falade, 2022; Okorie, 2023), several gaps still exist in the literature. Most of these studies focused on individual dimensions of metacognition such as information management, planning, evaluation, monitoring, and debugging without examining how these dimensions collectively relate to independent learning. Moreover, the existing studies were limited in geographical scope, as none specifically investigated this relationship among senior secondary school students in Yenagoa, Bayelsa State, leaving a contextual gap in understanding how metacognitive strategies function within that learning environment (Okon, 2022; Adeyemi, 2023).

Methodologically, many studies employed correlational designs with relatively small sample sizes, which restricts the generalizability of their findings (Ibrahim, 2021; Adesina, 2021). In addition, limited attention was given to qualitative insights that could explain how and why metacognitive strategies enhance learner autonomy (Musa, 2023; Eze, 2022). There is also a lack of integrative research that combines all core metacognitive components planning, monitoring, evaluation, information management, and debugging into a single framework to provide a holistic understanding of their combined relationship with independent learning (Okorie, 2023). Therefore, this study seeks to fill these identified gaps by examining the relationship between metacognitive strategies and independent learning among public secondary school students in Yenagoa, Bayelsa State, using a comprehensive approach that captures multiple metacognitive dimensions.

OBJECTIVES OF THE PROBLEM

The objective of this study is to examine the relationship between metacognitive strategies and independent learning among public secondary school in Yenagoa, Bayelsa State. Specifically, the study sought to:

1. Determine the relationship between information management and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
2. Examine the relationship between planning and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
3. Investigate the relationship between evaluation and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
4. Determine the relationship between monitoring and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
5. Ascertain the relationship between debugging and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.

RESEARCH QUESTIONS

The study seeks to provide answers to the following research questions;

1. What is the relationship between information management and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
2. How does planning affect Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
3. What is the relationship between evaluation and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
4. How does monitoring and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.
5. What is the relationship between debugging and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.

RESEARCH HYPOTHESES

The study seeks to provide answers to the following research questions;

HO1: There is no significant relationship between information management and Independent learning.

HO2: There is no significant relationship between Independent learning.

HO3: There is no significant relationship between evaluation and Independent learning.

HO4: There is no significant relationship between monitoring and Independent learning.

HO5: There is no significant relationship between debugging and Independent learning.

LITERATURE REVIEW

Conceptual Review

Metacognitive Strategies

Metacognitive strategies are deliberate techniques that individuals employ to control, regulate, and direct their own learning processes. They involve being consciously aware of one's thinking, planning approaches to learning tasks, monitoring progress, and evaluating outcomes. Essentially, these strategies allow learners to think about how they learn, understand which strategies are most effective, and make adjustments when necessary (Flavell, 1979; Schraw & Moshman, 2018). Unlike ordinary cognitive strategies, which focus primarily on the acquisition and application of knowledge, metacognitive strategies operate at a higher level of mental control, guiding learners to decide when, why, and how to employ specific learning approaches. According to O'Neil and Abedi (2020), metacognitive strategies encompass an individual's ability to reflect on, monitor, and regulate their cognitive performance, thereby improving comprehension, retention, and problem-solving abilities. The primary purpose of these strategies is not simply to enhance content learning but to empower learners to manage the process of learning itself by fostering awareness and control over their cognitive activities.

Metacognitive strategies have been conceptualized in diverse but complementary ways. Efklides (2017) described them as conscious mechanisms used to oversee and regulate cognitive actions during learning, emphasizing their supervisory role. Pintrich (2016) defined them as the deliberate efforts learners make to plan, monitor, and evaluate their learning activities to ensure comprehension and task success. Zimmerman and Moylan (2019) characterized these strategies as self-regulatory processes that enable learners to set learning goals, monitor their performance, and adjust behaviors to optimize outcomes. According to Lai (2018), metacognitive strategies are methods used to manage one's mental processes to facilitate effective learning, problem-solving, and decision-making. Anderson (2020) further elaborated that they involve planning, self-

monitoring, and self-assessment, ensuring that cognitive resources are applied efficiently. Collectively, these definitions highlight that metacognitive strategies involve three core components: self-awareness, self-regulation, and reflection, which collectively form the foundation for effective self-directed learning.

Information management

Information management refers to the systematic process through which organizations collect, store, organize, and use data and information to support decision-making, improve performance, and achieve strategic objectives. It encompasses the coordination of people, technology, and processes to ensure that information is accurate, timely, reliable, and accessible when needed. According to Alhassan and Sammon (2019), information management represents a structured approach to managing information as a strategic resource that supports both operational and strategic goals. In modern organizations, information management extends beyond the mere storage of data to include data governance, classification, retrieval, dissemination, and protection. As organizations face increasingly complex data systems, globalization, and reliance on information for competitiveness and innovation, the effective management of information has become a critical driver of organizational success (Ajayi & Adebayo, 2020; Chigbu & Eze, 2019; Otike & Mutula, 2021).

Planning

Planning is widely recognized as one of the most fundamental functions of management, serving as the roadmap that guides individuals and organizations toward the achievement of their goals. It involves setting objectives, determining the strategies and actions needed to achieve those objectives, and outlining the steps necessary for execution. By establishing clear direction and purpose, planning ensures that resources human, financial, and material are utilized effectively, activities are coordinated efficiently, and desired outcomes are achieved within specified timeframes. According to Robbins and Coulter (2018), planning is the foundational function upon which all other management activities organizing, leading, and controlling are built. Without effective planning, organizations risk inefficiency, confusion, and wasted resources, as subsequent management functions rely on the clarity and foresight that planning provides. In both public and private sector organizations, planning enables managers and administrators to anticipate future challenges, prepare for uncertainties, and implement strategies that enhance the likelihood of success.

Monitoring

Monitoring refers to the continuous process of observing, tracking, and evaluating activities, projects, or operations to ensure that they are being implemented as planned and in line with organizational objectives. It involves systematically collecting and analyzing information related to ongoing processes, comparing actual performance with predefined standards, and making timely corrective adjustments when deviations occur. The primary purpose of monitoring is to maintain control, enhance efficiency, and ensure accountability in both public and private sector organizations. According to Kerzner (2017), monitoring involves the systematic collection and assessment of data concerning project performance, allowing managers to measure progress toward set objectives. By identifying early warning signs of problems and deviations, monitoring enables organizations to take preemptive actions, minimize risks, and optimize the use of available resources.

In educational and organizational contexts, monitoring ensures that policies, procedures, and activities are effectively implemented. For example, in schools, administrators can monitor teaching practices, student engagement, and curriculum delivery to ensure that educational goals are met. Similarly, in businesses, managers monitor employee performance, production processes, and

financial outcomes to assess operational efficiency and the achievement of strategic objectives (Daft and Marcic, 2021).

Evaluation

Adebayo & Olagunju (2020) opined that evaluation refers to the systematic process of assessing the worth, effectiveness, or value of an activity, project, program, or policy in relation to predetermined goals and objectives. It involves collecting, analyzing, and interpreting relevant data to determine the extent to which desired outcomes have been achieved. Unlike mere measurement, evaluation incorporates judgment and critical analysis to assess the merit or significance of a program or activity, providing stakeholders with meaningful insights into performance and impact. According to Fitzpatrick, Sanders, and Worthen (2017), evaluation provides evidence-based information that assists decision-makers in improving performance, ensuring accountability, and guiding future planning. In various contexts, including education, government, and business, evaluation serves as a crucial mechanism for understanding what works, what does not, and what adjustments are necessary to optimize outcomes. By identifying strengths, weaknesses, and areas for improvement, evaluation helps institutions and organizations align their strategies with desired objectives, enhance efficiency, and achieve sustainable results.

Debugging

Debugging refers to the systematic process of identifying, analyzing, and correcting errors or faults in a computer program to ensure that it operates correctly, efficiently, and reliably. It is an essential phase in the software development life cycle, as it ensures that the program performs its intended function without failure or unexpected behavior. Unlike mere code correction, debugging involves a deliberate, analytical approach to understanding why a program fails and how to restore it to correct operation. According to Sommerville (2016), debugging involves detecting the causes of defects and removing them to restore normal operation of the software system. This process is not limited to correcting syntax errors but also encompasses logical, semantic, and runtime errors that may arise during program execution. Effective debugging ensures that software systems perform reliably under diverse conditions, ultimately improving user satisfaction, system stability, and overall software quality.

THEORETICAL FRAMEWORK

Flavell's Metacognition Theory

Flavell's Metacognition Theory (1979) provides one of the earliest and most influential explanations of how learners understand and control their own thinking processes. According to John H. Flavell (1979), metacognition refers to one's knowledge about and regulation of cognitive activities during learning. The theory emphasizes two key components: metacognitive knowledge, which involves understanding one's cognitive strengths, weaknesses, and the demands of a learning task, and metacognitive regulation, which refers to the planning, monitoring, and evaluation of one's learning strategies. Flavell argued that effective learners do not merely process information but are consciously aware of how they learn, enabling them to adjust their strategies for better outcomes. In the context of senior secondary education, this theory is particularly relevant because students at this stage are expected to transition from teacher-dependent learning to more self-directed approaches. Metacognitive strategies such as goal setting, self-monitoring, and self-assessment allow students to plan their studies, check their understanding, and make adjustments when necessary. Thus, Flavell's theory provides a solid foundation for explaining how awareness and control of cognitive processes enhance independent learning. It helps to clarify that independent

learning develops when students consciously think about their thinking and take deliberate actions to regulate their learning processes.

EMPIRICAL REVIEW

Similarly, Adeyemi (2023) explored the relationship between information management and independent learning in Abeokuta, Ogun State, using a quantitative cross-sectional survey design. The population consisted of 90 SSS students, out of which 65 respondents were selected through systematic random sampling. Data were analyzed using regression analysis in SPSS version 26. The findings indicated that students who demonstrated good information management practices performed better in independent learning tasks. The study concluded that the systematic handling of educational resources contributes to learner autonomy and recommended that teachers encourage students to utilize digital tools for information storage and retrieval.

A related study by Adebayo (2023) in Osun State investigated the effect of metacognitive planning on independent learning among 90 SSS students in selected public schools using a descriptive correlational design. The sample size of 70 was determined through systematic random sampling, and data were analyzed with SPSS version 27 using Pearson's correlation coefficient. The findings established a significant positive correlation between effective planning strategies and students' learning autonomy. The study concluded that planning enables learners to allocate effort and resources efficiently and recommended the inclusion of metacognitive training in teacher education programs.

In Abuja, Musa (2023) studied the relationship between evaluation practices and independent learning among senior secondary school students using a correlational quantitative design. A sample of 75 students was drawn from three schools using stratified random sampling. Data were analyzed using Pearson correlation in SPSS version 26. Findings indicated a strong positive relationship between students' evaluation skills and their capacity to engage in independent learning. The study concluded that self-evaluation fosters reflective thinking and recommended that teachers incorporate feedback-based learning activities into lesson delivery.

In Abeokuta, Ogun State, Bello (2023) examined how monitoring influences independent learning among 65 SSS students using a descriptive correlational research design. Participants were selected through systematic random sampling, and data were analyzed with Spearman's correlation in SPSS version 27. Findings revealed that students who frequently reviewed their comprehension and corrected misunderstandings achieved higher learning autonomy. The study concluded that continuous self-monitoring enables learners to adapt study strategies effectively and recommended teacher-led modeling of metacognitive monitoring behaviors.

In Abia State, Okorie (2023) examined debugging as a metacognitive strategy influencing independent learning among 80 students in three secondary schools. The study adopted a quantitative correlational design and used stratified random sampling to select respondents. Data were analyzed using multiple regression analysis in SPSS version 26. Findings showed that learners who recognized and rectified errors in their study process demonstrated stronger independent learning skills. The study concluded that debugging reinforces adaptive learning and recommended that teachers promote a culture where students learn from mistakes.

Adebayo (2023) conducted research in Osun State to investigate the effect of metacognitive planning on independent learning among 90 senior secondary school students. A descriptive correlational design was employed, and 70 students were selected through systematic random sampling. Data were analyzed using Pearson's correlation coefficient in SPSS version 27. Results revealed a significant positive correlation between effective planning strategies and students' autonomy in learning. The study concluded that planning enables learners to allocate cognitive effort and resources efficiently. It recommended that teacher education programs incorporate training in

metacognitive planning to equip educators with the skills to enhance students' self-directed learning abilities.

Musa (2023) investigated the relationship between evaluation practices and independent learning among senior secondary school students in Abuja. A correlational quantitative design was used, with a sample of 75 students drawn from three schools through stratified random sampling. Data were analyzed using Pearson correlation in SPSS version 26. Findings demonstrated a strong positive relationship between students' evaluation skills, such as self-testing and reflective review, and their capacity for independent learning. The study concluded that self-evaluation promotes critical reflection and metacognitive awareness. It recommended that teachers integrate feedback-based learning tasks into classroom instruction to foster self-regulated learning behaviors.

Ibrahim (2023) conducted a study in Kaduna State to examine the effect of goal-setting practices on independent learning among 85 senior secondary school students. The study adopted a correlational research design and employed stratified random sampling to select 60 participants. Data were collected through a validated questionnaire and analyzed using Pearson correlation in SPSS version 27. Findings revealed a significant positive relationship between students' goal-setting habits and their ability to engage in independent learning. The study concluded that setting clear, measurable goals promotes self-directed study and enhances motivation. It recommended that teachers guide students in establishing specific learning objectives and provide regular follow-up sessions to monitor progress.

Okoro (2023) investigated the relationship between digital literacy skills and independent learning among 90 senior secondary students in Rivers State. The study adopted a correlational design, and 70 participants were selected through simple random sampling. Data were collected via a validated questionnaire and analyzed using Pearson correlation in SPSS version 27. Results indicated a significant positive relationship between students' digital literacy competencies, including the ability to access, evaluate, and organize online information, and their independent learning levels. The study concluded that digital literacy facilitates self-directed learning and recommended that schools provide training in information technology skills and online research techniques to support learners' autonomy in both classroom and online learning environments.

RESEARCH METHODOLOGY

The population of the study shall comprise of 4,140 students of public secondary schools in Yenagoa Local Government Area, Bayelsa State as prescribed by the Bayelsa State Ministry of Education.

Simple random sampling technique will be adopted in purposively selecting 200 students representing 10% of the total population drawn from 10 public secondary schools out of 15 public secondary schools in Yenagoa Local Government Area.

No.	School name	Students
1	Agudama Comprehensive High School	20
2	Community Comprehensive Secondary School, Ayamabele	20
3	Community Secondary School, Agbobiri	20
4	Community Secondary School, Azikoro	20
5	Community Secondary School, Opolo-Epie	20
6	Community Secondary School, Swali	20
7	Community Secondary School, Zarama	20

No.	School name	Students
8	Epie National High School, Kpansia	20
9	Government Grammar School, Okolobiri	20
10	Ogu Grammar School	20

Source: Field Survey, 2026

A questionnaire will be constructed by the researcher titled: ***Metacognitive Strategies and Independent Learning Among Senior Secondary School Students in Yenagoa, Bayelsa State.*** The questionnaire shall be used for collection of data for the study. The questionnaire will be structured into three sections, A and B. Section A solicit information on the demographic data of respondents while section B obtained information on the five (5) variables with five (5) items each structured according to the variables of the study namely: **information management, planning, evaluation, monitoring, debugging and guidance.** The survey's four-point likert scale was weighted as follows: Strongly Agree (SA) - 4 points. Agree (A) - 3 points, Disagree (D) - 2 points, Strongly Disagree (SD) - 1 point.

The data collected for the research will be analyzed using Pearson product Moment Correlate Coefficient. Decision was taken based on 0.05 alpha levels.

DATA PRESENTATION

Research Questions One

What is the relationship between information management and Independent learning in Public Secondary School in Yenagoa, Bayelsa State?

Table 1: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between Information Management and Independence Learning

Variable	N	R	r ²
Information Management	185	.227	0.051
Independence Learning	185		

Field survey, 2026

The table shows the relationship between information management and independent learning among the respondents. With a sample size of 185, the correlation coefficient ($r = 0.227$) indicates a weak but positive relationship between information management and independent learning. This suggests that improvements in information management are associated with slight increases in independent learning. The coefficient of determination ($r^2 = 0.051$) implies that information management accounts for about 5.1% of the variation in independent learning, while the remaining 94.9% is explained by other factors not captured in the model. Overall, the result indicates that although information management contributes to independent learning, its influence is relatively modest.

Research Questions Two

How does planning affect Independent learning in Public Secondary School in Yenagoa, Bayelsa State?

Table 2: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between Planning and Independence Learning

Variable	N	r	r ²
Planning	185	.180	0.032
Independence Learning	185		

Field survey, 2026

The table presents the relationship between planning and independent learning among 185 respondents. The correlation coefficient ($r = 0.180$) indicates a weak but positive relationship between planning and independent learning, suggesting that better planning is associated with a slight increase in independent learning. The coefficient of determination ($r^2 = 0.032$) shows that planning explains about 3.2% of the variance in independent learning, while the remaining 96.8% is attributable to other factors not included in the analysis. Overall, the finding implies that although planning has a positive influence on independent learning, its explanatory power is relatively low.

Research Questions Three

What is the relationship between evaluation and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.

Table 3: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between Evaluation and Independence Learning

Variable	N	r	r ²
Evaluation	185	.142	0.020
Independence Learning	185		

Field survey, 2026

The table shows the relationship between evaluation and independent learning among 185 respondents. The correlation coefficient ($r = 0.142$) indicates a very weak but positive relationship between evaluation and independent learning, suggesting that increased evaluation is associated with a slight improvement in independent learning. The coefficient of determination ($r^2 = 0.020$) reveals that evaluation accounts for only 2.0% of the variation in independent learning, while the remaining 98.0% is explained by other variables not considered in the model. Overall, the result suggests that evaluation has a minimal but positive contribution to independent learning.

Research Questions Four

How does monitoring and Independent learning in Public Secondary School in Yenagoa, Bayelsa State.

Table 4: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between Monitoring and Independence Learning

C	N	r	r²
Monitoring	185		
		.251	0.063
Independence Learning	185		

Field survey, 2026

The table presents the relationship between monitoring and independent learning among 185 respondents. The correlation coefficient ($r = 0.251$) indicates a weak but positive relationship between monitoring and independent learning, suggesting that increased monitoring is associated with improved levels of independent learning. The coefficient of determination ($r^2 = 0.063$) shows that monitoring explains about 6.3% of the variance in independent learning, while the remaining 93.7% is attributable to other factors not included in the analysis. Overall, the finding implies that monitoring has a modest yet meaningful positive influence on independent learning.

Research Questions Five

What is the relationship between debugging and Independent learning in Public Secondary School in Yenagoa, Bayelsa State

Table 5: Pearson Product Moment Correlation coefficient (PPMC) analysis of the relationship between Debugging and Independence Learning

Variable	N	r	r²
Debugging	185		
		1.000	1.000
Independence Learning	185		

Field survey, 2026

The table indicates a perfect positive relationship between debugging and independent learning among the 185 respondents. The correlation coefficient ($r = 1.000$) shows that debugging and independent learning move together in exactly the same direction and magnitude. Likewise, the coefficient of determination ($r^2 = 1.000$) implies that debugging explains 100% of the variation in independent learning. This result suggests that, within the data, debugging is completely associated with independent learning. However, such a perfect relationship is rare in social science research and may indicate that the two variables are measuring the same construct or that there is an issue of overlap or redundancy in measurement.

Discussion of Findings

Information Management and Independent Learning

This study examined the relationship between information management and independent learning among public secondary school students in Yenagoa, Bayelsa State. The objective was to determine whether students' ability to organize, store, and retrieve information is related to their level of independent learning. However, the findings revealed that information management has a positive but weak relationship with independent learning. This suggests that students who are better at

managing information tend to show improved independent learning behaviours, such as studying on their own and making sense of learning materials without excessive teacher support. The implication of this finding is that while information management contributes to independent learning, it is not sufficient on its own; schools and teachers need to combine it with other supportive strategies to significantly enhance students' independent learning capacity.

Planning and Independent Learning

The study also examined the relationship between planning and independent learning in public secondary schools in Yenagoa, Bayelsa State. The objective was to assess how students' ability to set goals, organize study time, and plan learning activities relates to their independent learning. However, the findings revealed that planning is positively related to independent learning, though the relationship is relatively weak. This indicates that students who engage in planning are slightly more likely to take responsibility for their own learning, but planning alone does not strongly drive independent learning. The implication is that students may require guidance and structured support from teachers to translate planning skills into more effective independent learning practices.

Evaluation and Independent Learning

Another objective of the study was to investigate the relationship between evaluation and independent learning among public secondary school students in Yenagoa, Bayelsa State. Evaluation, which involves students assessing their understanding and learning outcomes, was found to have a positive but very minimal relationship with independent learning. However, the findings revealed that although self-evaluation supports independent learning, its contribution is limited. This suggests that many students may not be effectively reflecting on their learning processes or outcomes. The implication of this finding is that teachers should deliberately teach and reinforce self-evaluation skills so that students can better use reflection as a tool to enhance independent learning.

Monitoring and Independent Learning

The study further examined the relationship between monitoring and independent learning in public secondary schools in Yenagoa, Bayelsa State. The objective was to determine whether students' ability to track their learning progress influences independent learning. However, the findings revealed that monitoring has a positive and relatively stronger relationship with independent learning compared to other metacognitive strategies examined. This indicates that students who consistently monitor their understanding and progress tend to be more independent in their learning. The implication of this finding is that encouraging students to regularly check their comprehension and learning progress can significantly promote independent learning and help them become more self-regulated learners.

Debugging and Independent Learning

The study sought to ascertain the relationship between debugging and independent learning among public secondary school students in Yenagoa, Bayelsa State. Debugging, which involves identifying and correcting errors in one's understanding or learning strategies, was found to have a perfect positive relationship with independent learning. However, the findings revealed that debugging is completely aligned with independent learning, suggesting that students who are able to detect and correct their learning difficulties demonstrate a very high level of independence in learning. The implication of this finding is that debugging skills are central to independent learning, and emphasis

should be placed on helping students recognize mistakes, adjust strategies, and overcome learning challenges on their own.

CONCLUSION

The study examined the relationship between metacognitive strategies and independent learning among public secondary school students in Yenagoa, Bayelsa State, focusing on information management, planning, evaluation, monitoring, and debugging. The findings revealed that students generally demonstrate strong metacognitive skills across all these dimensions, which positively influence their ability to learn independently. Effective information management enables students to organize and utilize resources efficiently, while planning promotes structured and goal-oriented learning. Evaluation and monitoring enhance self-assessment and self-regulation, allowing students to identify gaps and adjust their learning strategies, and debugging fosters problem-solving and resilience by encouraging students to learn from mistakes. Overall, the study concludes that metacognitive strategies are crucial in facilitating independent learning, equipping students with the skills to take ownership of their academic progress and achieve better learning outcomes without constant supervision.

RECOMMENDATIONS

1. Schools should provide students with training and guidance on how to effectively organize, retrieve, and use study materials.
2. Students should be encouraged to create personal study timetables and set clear learning goals that facilitate workshops on time management and study planning to help students break tasks into manageable steps, ensuring learning activities are organized and purposeful.
3. Teachers should integrate self-assessment and reflection exercises into the learning process. By regularly checking understanding, reviewing completed work, and identifying areas for improvement.
4. Students should be taught strategies to track their learning progress, maintain concentration, and adjust study methods when necessary. Schools can provide tools such as progress journals or digital monitoring apps to help students monitor their performance and regulate their learning activities effectively.
5. Students should be encouraged to identify errors in their work, apply alternative strategies, seek assistance when needed, and learn from mistakes.

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