Self-Correction vs. Lecturer-Correction: Effects on Research Achievement and Alcohol Use in Intellectual Disabled Undergraduates in Federal Universities of Southern Nigeria

Henrietta O. Uchegbue[1,*], Chidirim E. Nwogwugwu[2], Victoria N. Ebegbulem[3], Julius Michael Egbai[4], Eni I. Eni[2], Michael H. Linda[5], Blessing P. Edet[2], Fidelis A. Odey[4], Rita N. Iwuchukwu[6], Etim O. Eteng[7], Edem E. Udoaka[8], Simon K- O. Ajom[9], Edet B. Hogan[10], Joseph A. Odok[11], Veronica N. Effiom[12], Mokutima E. Ekpo[13] and Stephen Regie Nyong[14]

[1]Departtment of Educational Psychology, College of Education, Faculty of Educational Foundation Studies, University of Calabar, Nigeria; [2]Departtment of Educational Foundations, College of Education, Faculty of Educational Foundation Studies, University of Calabar, Nigeria; [3]Department of Animal Science, Faculty of Agriculture, University of Calabar, Nigeria; [4]Department of Educational Psychology, College of Education, University of Calabar, Calabar, Nigeria; [5]Department of Educational Foundations, Faculty of Education Taraba State University, Jalingo, Nigeria; [6]Department of English and Literary Studies, University of Calabar, Calabar, Nigeria; [7]Department of Geography and Environmental Sciences, University of Calabar, Cross River State, Nigeria; [8]Department of Commercial and Industrial Law, Faculty of Law, University of Calabar, Nigeria; [9]Department of Urban and Regional Planning, Faculty of Environmental Sciences, University of Calabar, Calabar, Nigeria; [10]Department of Statistics, University of Cross River State, Calabar, Nigeria; [11]Department of philosophy, University of Calabar, Calabar, Nigeria; [12]Department of Social Studies Education, Faculty of Arts and Social Science Education, University of Calabar, Calabar, Nigeria; [13]Department of Law, Faculty of Law, University of Calabar; [14]Department of Mass Communication, Faculty of Law, University of Calabar, Nigeria

Abstract: *Aim*: Within Nigerian universities, students with intellectual disabilities remain under-supported in terms of personalized instructional strategies that target both academic improvement and psychosocial well-being. The purpose of the study was to compare self-correction vs Lecturer-correction: Effects on research achievement and Alcohol use in Intellectual Disabled undergraduates in Federal Universities of Southern Nigeria. Method: This study adopted a quasi-experimental research design. The area of the study is Southern Nigeria. The population consists of all 3,092 students with intellectual disabilities enrolled in two selected federal universities in Southern Nigeria, specifically in Cross River and Akwa Ibom States. The sample size for this study was 120 final-year students with intellectual disabilities who depend on alcohol to cope with stress and improve self-esteem using a multi-stage sampling technique. Three instruments were used for data collection. They were the Research Achievement Test (RAT), the Interest Inventory Test (IIT), and the Alcohol Use Screening Tool (modified AUDIT). The screening criteria for alcohol dependence are that students must be 18 years and older, students must have a history of substance use, mental health conditions (depression, anxiety), and a history of use of medications contraindicated with alcohol. The study was validated by Psychology, Measurement, and Evaluation experts at the University of Calabar. The data collected were analyzed for internal consistency using the Cronbach Alpha method, which yielded a reliability index of 0.83. The test scores for the study were generated from pre-tests and post-tests using the Research Methods Achievement Test and Research Method Interest Inventory Test.

Mean and standard deviation were used to answer the research questions. The pretest-posttest mean gains of each strategy of the two strategies were computed. Also, the null hypotheses formulated for the study were tested at a 0.05 level of significance using Analysis of Covariance (ANCOVA).

Results: The findings revealed that student correction strategies are more effective than lecturer correction strategies in enhancing the research method achievement of students with intellectual disabilities. The self-correction strategy significantly improves student interest in research methods more than the lecturer-led correction approach. There is a significant difference in achievement between male and female students, regardless of the correction strategy used. No statistically significant difference in interest scores between male and female students taught research methods using either lecturer-correction or self-correction strategies. Male and female students differed in their alcohol use outcomes following instruction using either the self-correction or lecturers' correction strategies.

Conclusion: Based on the result of the study, it was concluded that student correction strategies are more effective than lecturer correction strategies in enhancing the research method achievement of students with intellectual disabilities. The self-correction strategy significantly improves student interest in research methods more than the lecturer-led correction approach. There is a significant difference in achievement between male and female students, regardless of the correction strategy used. No statistically significant difference in interest scores between male and female students taught research methods using either lecturer-correction or self-correction strategies. Male and female students differed in their alcohol use outcomes following instruction using either the self-correction or lecturers' correction strategies.

Recommendation: Given the superior effectiveness of student correction strategies over lecturer-led corrections in enhancing students' achievement in research methods, it is recommended that educators integrate structured self-correction approaches into their teaching. This can be achieved through guided reflection exercises, peer review tasks, and the use of checklists or correction templates that promote independent learning and metacognitive development.

Keywords: Self-correction, Lecturer-correction, Students with intellectual disabilities, Undergraduate Achievement, Interest in Research, Alcohol use, Lecturers.

INTRODUCTION

Students with intellectual disabilities face a multitude of challenges in higher education, ranging from limited academic motivation to increased vulnerability to maladaptive behaviors such as substance use. Parallel to academic challenges is the concern over substance abuse—especially alcohol—which has emerged as a coping mechanism among university students facing academic stress or social exclusion. Students with disabilities are not exempt; in

*Address correspondence to this author at the Department of Educational Psychology, College of Education, Faculty of Educational Foundation Studies, University of Calabar, Nigeria; E-mail: henriettauchegbue@gmail.com

fact, their vulnerability may be higher due to a lack of psychological support and inclusion [1].

Amidst the academic difficulties encountered by students with intellectual disabilities is a noticeable decline in research interest—an essential skill in university education. Interest simply means the state of wanting to know or to learn something. A student's interest can be determined by carrying out a survey of the learners through discussion; it can also be determined by observing some of the students' activities. Ngwoke DO [2] observes that direct interest in what a student learns increases the strength of ego involvement and does not allow the student to be distracted by trivial events in the perceptual environment. Okoro AU [3] states that one of the strongest factors affecting students' interest in research is the method of instruction adopted by the lecturer, which highly correlates with their perception of the course relevant to their future. The student's interest is a critical element in curriculum implementation. In selecting learning experiences, it is natural for students not to engage in what they are not interested in.

A lecturer has to consider the students' interests to enable them to base the activities selected for attaining the specific objectives of the lesson. Offorma GC [4] noted that when learning experiences are based on the learner's interests, learning becomes more significant, meaningful, and enjoyable.

Moreover, several studies have linked academic frustration and lack of engagement with risky behaviors such as alcohol use, especially among students in vulnerable populations [5]. To determine levels of alcohol use and identify potential cases of alcohol dependence among participants, the Alcohol Use Disorders Identification Test (AUDIT) developed by the World Health Organization (WHO, 2001) was utilized. The AUDIT is a validated 10-item screening tool that measures alcohol consumption patterns, drinking behaviors, and alcohol-related consequences. Given the cognitive diversity of the study population—undergraduates with intellectual disabilities—the AUDIT was administered in a structured, interviewer-assisted format. This approach ensured that all participants clearly understood each item. Where necessary, simplified language and examples were provided to aid comprehension while avoiding leading or suggestive phrasing. Interviewers were trained to maintain consistency and neutrality during administration. Participants were classified based on their total AUDIT score, following WHO guidelines and existing research on alcohol use screening in vulnerable populations. The following cut-off scores were used to categorize alcohol use risk:

- 0-7: Low-risk or non-hazardous drinking
- 8-15: Hazardous drinking
- 16-19: Harmful drinking
- ≥ 20: Probable alcohol dependence

Only participants with an AUDIT score of 20 and above were considered as exhibiting signs of probable alcohol dependence and were included in the high-risk group for analysis. This threshold helped differentiate between general alcohol use and clinical indicators of dependence, allowing for a more accurate assessment of its relationship with academic performance and correctional feedback methods (self-correction vs. lecturer correction).

Research interest—a form of academic engagement—has been shown to correlate with reduced deviant behaviors and improved educational outcomes [6]. However, little is known about how classroom strategies such as error correction might indirectly influence students' inclination toward or away from such risky behaviors. Within Nigerian universities, students with intellectual disabilities remain under-supported in terms of personalized instructional strategies that target both academic improvement and psychosocial well-being [7]. Intellectual disabilities are often characterized by limitations in cognitive functioning and adaptive behavior, which may affect learning processes, especially when students are required to engage in complex academic tasks such as research [8].

Instructional feedback—especially error correction—is key to academic success. Self-correction empowers learners to analyze and revise their own errors, thereby enhancing metacognition and autonomy. In contrast, lecturer correction delivers external feedback that may be necessary for learners who need structured guidance [9]. While both strategies have been employed across general education settings, limited research exists on how they differentially impact students with intellectual disabilities, particularly in developing countries like Nigeria.

By focusing on federal universities in Southern Nigeria, where inclusive education policies are in varying stages of implementation, this study fills a

critical gap in understanding how pedagogical methods impact both academic and behavioral outcomes for intellectually disabled students. It also underscores the need for targeted strategies that bridge the gap between academic development and behavioral support.

In recent years, there has been a growing demand for inclusive instructional approaches that foster autonomy, critical thinking, and behavioral self-regulation among these students [10,11]. Error correction strategy is a procedure that details what a trainer or program implementer does when the students engage in an incorrect response during a teaching opportunity [12]. Error correction strategy is providing clear, comprehensive, and consistent corrective feedback on a student's grammatical errors to improve the student's ability to write accurately [13]. Error correction aims to enhance learning by teaching the learner the appropriate response and increasing the learner's contact with reinforcement contingencies rather than simply extinguishing errors. This procedure is intended to help learners acquire skills faster and with less frustration than simply allowing trial and error. In other words, the lecturer gives immediate feedback and corrections to students' responses to issues. Thus, the learner regains confidence in his/her learning.

Two widely applied error correction strategies in educational contexts are self-correction and lecturer correction, each carrying distinct pedagogical implications. While self-correction encourages learners to reflect on their own errors and take ownership of their learning [14], lecturer-correction involves direct instructor guidance and may provide clarity and confidence for students with limited cognitive abilities [15].

The lecturer's correction strategy can be defined as a correction students receive from the lecturers; students come to distinguish whether they are performing well or not [16]. The lecturer's correction strategy or feedback occurs when the lecturer identifies an error and provides the correct form. In this technique, the lecturer first tries to identify the error that students have made and writes down the complete correct form afterward [17]. The students' correction strategy is when the lecturer indicates an error has been made but leaves it to the students to solve the problem and correct the errors [16]. Students' correction strategy refers to situations where the lecturer indicates that an error has been made but does not provide the correction, thereby leaving the students to diagnose and correct it [18]. Following a student correction strategy, lecturers do not correct students' papers; rather, they mark where an error has occurred or supply the students with short cues so that they get informed about the kind and the location of their errors and get involved in the process of correcting their papers by themselves.

Nigerian students should be properly guided. There is a general consensus among education experts that committing errors is a natural process in teaching and learning [19]. Yingliang W [20] observes that the debate on error correction has continued for over 10 years. The debate concerns using error correction to improve students' achievement and interests.

Scheen M [21] points out that only students can learn the necessary skills to improve achievement, regardless of how much error treatment is provided. Inevitably, most lecturers have experienced the frustration of correcting the same mistakes over and over instead of listening to feedback because error corrections have both negative and positive effects.

Despite the increasing enrollment of students with intellectual disabilities in Nigerian universities, many continue to experience poor academic engagement, particularly in research-based activities. This disinterest in research may stem from inadequate teaching strategies that fail to support independent learning or build confidence in academic tasks. At the same time, growing evidence suggests that these students are at risk of engaging in maladaptive behaviors such as alcohol use, which may be exacerbated by academic frustration and social isolation.

Instructional strategies, particularly feedback and error correction methods, have been recognized as vital in shaping students' learning experiences. However, there is a lack of empirical data comparing the effects of self-correction and lecturer-correction strategies on both academic interest and alcohol use behavior among students with intellectual disabilities. Most existing studies in Nigeria focus on general student populations, leaving a gap in understanding how specific sub-groups—such as students with intellectual disabilities—respond to different pedagogical interventions.

The dual challenges of low research interest and rising alcohol use among this population thus necessitate this study. It seeks to examine the comparative effects of two instructional strategies—

self-correction and lecturer-correction—on research interest and alcohol use among students with intellectual disabilities in Federal Universities in Southern Nigeria. Addressing this problem is essential for advancing inclusive pedagogy and promoting the academic and psychosocial well-being of students with special needs.

Purpose of the Study

The purpose of the study was to compare self-correction vs. lecturer-correction's effects on research achievement and Alcohol use in Intellectually Disabled undergraduates at Federal Universities of Southern Nigeria.

Specifically, the study sought to:

1. Compare the mean ($\bar{X}$) achievement scores of intellectually disabled students taught research using lecturers' correction strategy and those taught using students' correction strategy.
2. Compare the mean ($\bar{X}$) interest score of intellectually disabled students taught research using lecturers' correction strategy and those taught using self-correction strategy among students with intellectual disability.
3. To examine the mean ($\bar{X}$) achievement scores of males and female intellectually disabled students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy.
4. To determine the mean ($\bar{X}$) interest scores of males and female intellectually disabled students taught research methods using self-correction and lecturers-correction strategies on research interest among students with intellectual disability.
5. To ascertain the mean ($\bar{X}$) alcohol use scores of male and female students taught research methods using self-correction and lecturers' correction strategies on research interest among students with intellectual disability.

Research Questions

The following research questions were formulated to guide the study:

1. What are the mean ($\bar{X}$) achievement scores of intellectually disabled students taught research using lecturers' correction strategy and those taught using students' correction strategy?
2. What is the mean ($\bar{X}$) interest score of intellectually disabled students taught research using lecturers' correction strategy and those taught using self-correction strategy among students with intellectual disability?
3. What are the mean ($\bar{X}$) achievement scores of male and female intellectually disabled students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy?
4. What are the mean ($\bar{X}$) interest scores of male and female intellectually disabled students taught research methods using self-correction and lecturers' correction strategies on research interest among students with intellectual disability?
5. What is the difference in the mean ($\bar{X}$) alcohol use scores of male and female students taught research methods using self-correction and lecturers' correction strategies on research interest among students with intellectual disability?

Hypotheses

Six null hypotheses were formulated for this study and tested at a 0.05 significance level.

1. There is no significant difference in the mean ($\bar{X}$) achievement scores of intellectually disabled students taught research using lecturers' correction strategy and those taught using students' correction strategy.
2. There is no significant difference in the mean ($\bar{X}$) interest score of students taught research using lecturers' correction strategy and those taught using self-correction strategy among students with intellectual disability.
3. There is no significant difference in the mean ($\bar{X}$) achievement scores of male and female intellectually disabled students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy.
4. No significant difference exists in the mean ($\bar{X}$) interest scores of male and female intellectually disabled students taught research methods using self-correction and lecturers' correction strategies on research interest among students with intellectual disability.
5. There is no significant difference in the mean ($\bar{X}$) alcohol use scores of male and female

students taught research methods using self-correction and lecturers' correction strategies on research interest among students with intellectual disability.

Theoretical Framework

This study is based on the Sociocultural Theory of Cognitive Development proposed by Russian psychologist Vygotsky LS [22]. The theory emphasizes the fundamental role of social interaction in the development of cognition. Unlike purely individualistic or behaviorist models, Vygotsky's theory asserts that learning is inherently a socially mediated process grounded in cultural and linguistic contexts. At the heart of Vygotsky's theory is the Zone of Proximal Development (ZPD), which is defined as the difference between what a learner can do independently and what they can achieve with guidance. This concept implies that learners reach higher cognitive functions when supported by a more knowledgeable other (MKO), such as a teacher or peer.

In the context of language learning or skills acquisition, the theory encourages self-correction over direct instructor intervention. Within the ZPD, minimal scaffolding—hints, cues, or prompts—should be provided to allow learners to:

- Reflect on their errors.
- Actively engage in problem-solving.
- Internalize correct forms and rules.

This aligns with Vygotsky's belief that internalization of knowledge is best achieved when learners co-construct meaning through social interaction and then gradually take over the learning process themselves.

The theory is particularly relevant to this research because it provides a foundational framework for understanding how intellectually disabled undergraduates can develop autonomy, cognitive control, and social functioning through guided learning and self-regulation strategies like self-correction.

According to Vygotsky's concept of the Zone of Proximal Development (ZPD), learning is most effective when students operate just beyond their current capabilities but with support. This theory supports the hypothesis that self-correction when scaffolded appropriately, encourages students to internalize cognitive strategies, leading to:

- Better research achievement (through increased autonomy, comprehension, and reflection).

Students with intellectual disabilities often face challenges in self-regulation, working memory, and impulse control—all of which are linked to both academic performance and alcohol use behavior. Sociocultural theory encourages educators to:

- Use peer modeling, guided questioning, and scaffolded self-correction to build cognitive and behavioral competence.
- Shift gradually from external correction (lecturer-driven) to internal regulation (self-correction) within the learners' ZPD.
- Improved executive function and behavioral regulation, which may reduce risk behaviors like alcohol misuse.

Conversely, lecturer correction, while sometimes necessary, may promote dependency and limit opportunities for metacognitive development, especially in students with intellectual disabilities who require structured but empowering interventions.

In the context of Federal Universities in Southern Nigeria, where traditional teaching methods may lean heavily on lecturer authority, introducing a Vygotskian approach helps reshape pedagogy toward inclusion, empowerment, and adaptive learning. This aligns with global trends in inclusive education and responds to local needs for reducing risky behaviors like alcohol use through cognitive empowerment.

Significance of the Study

This study is significant for several stakeholders and contributes to both educational and psychological scholarship concerning students with intellectual disabilities in Nigeria.

The findings may offer insights into instructional strategies that enhance academic engagement and reduce risky behaviors. The study provides evidence-based tools to improve research skills and behavioral outcomes by identifying whether self-correction or lecturer correction is more effective. Educators may benefit from practical guidelines on supporting intellectually disabled students using error correction strategies. The study may inform lesson planning, instructional scaffolding, and feedback methods in inclusive classrooms.

University management can use the results to strengthen inclusive education policies, student support systems, and training programs. Evidence from this study may influence curriculum design and intervention programs aimed at reducing substance abuse among students with special needs. This study contributes to the sparse body of empirical work linking instructional strategies to academic interest and behavioral health among students with intellectual disabilities in higher education. It may inspire further research on inclusive pedagogy in Nigeria and other developing countries.

The findings can help behavioral specialists design psycho-educational interventions that simultaneously address academic motivation and alcohol use. This dual focus aligns with a holistic approach to student development.

Scope and Delimitation of the Study

This study is delimited to students with intellectual disabilities enrolled in federal universities in Southern Nigeria, particularly in Cross River and Akwa Ibom States. The focus is on two instructional error correction strategies: self-correction and lecturer-correction.

The study covers:

- Academic engagement, specifically interest in research-related tasks.
- Behavioral outcomes, specifically alcohol use.
- Participants include intellectually disabled students selected through appropriate screening and ethical considerations.

It does not cover:

- Other forms of disabilities (e.g., visual or hearing impairments).
- Other forms of feedback strategies (e.g., peer correction or computer-assisted feedback).
- Universities outside the designated geographical area.
- The long-term effect of the intervention beyond the academic session under review.

While the findings may have broader implications, they are most applicable to Nigerian populations with similar socio-educational characteristics.

LITERATURE REVIEW

Concept of Intellectual Disabilities

Intellectual disability is characterized by significant limitations in both intellectual functioning and adaptive behavior, originating before the age of 18 American Association on Intellectual and Developmental Disabilities [AAIDD], [23]. These limitations affect reasoning, learning, problem-solving, and the ability to engage in abstract academic tasks such as research. In Nigerian higher education, intellectually disabled students remain underserved due to gaps in inclusive instructional strategies [24].

Intellectual disability (ID), formerly referred to as mental retardation, is a neurodevelopmental disorder characterized by significant limitations in both intellectual functioning and adaptive behavior, originating before the age of 18 [23]. Intellectual functioning generally refers to general mental capacity, including reasoning, problem-solving, planning, abstract thinking, judgment, and academic and experiential learning [25]. Adaptive behavior includes conceptual, social, and practical skills people have learned to function in everyday life [8].

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) classifies ID into four severity levels—mild, moderate, severe, and profound—based on adaptive functioning rather than IQ score alone [8]. This shift emphasizes individuals' functional and support needs rather than cognitive deficits.

Intellectual disabilities may arise from genetic conditions, prenatal exposures, birth complications, or postnatal environmental factors. Common genetic causes include Down syndrome, Fragile X syndrome, and phenylketonuria, while prenatal factors include alcohol or drug exposure, infections like rubella, and malnutrition [26]. Environmental factors, such as exposure to toxins, neglect, or inadequate early stimulation, can also contribute [27].

Globally, approximately 1-3% of the population is estimated to have some form of intellectual disability, although prevalence rates vary depending on diagnostic criteria and the availability of services [1]. In low- and middle-income countries like Nigeria, underreporting, stigma, and lack of diagnostic services may lead to inaccurate prevalence data and limited support for affected individuals [28]. Moreover, the lack of inclusive educational policies and accessible

healthcare services further exacerbates the challenges faced by individuals with intellectual disabilities.

Students with intellectual disabilities face unique challenges in educational settings, particularly in areas involving abstract reasoning, memory, attention, and academic skill acquisition [29]. Research suggests they benefit most from structured, consistent, and individualized instructional approaches, including scaffolding, multi-sensory techniques, and frequent feedback [30]. Inclusive education frameworks recommend the use of differentiated instruction and peer-mediated interventions to foster participation and engagement [31].

Individuals with ID often experience higher levels of mental health challenges, such as anxiety, depression, and behavioral disorders [32]. These may be compounded by social isolation, bullying, and lack of access to appropriate services. In university settings, students with ID may struggle with low self-esteem, limited social support, and higher susceptibility to maladaptive coping mechanisms, including substance use [33].

Recent literature emphasizes the importance of empowerment, advocacy, and self-determination for individuals with intellectual disabilities [34]. The shift from a medical to a social model of disability advocates for recognizing and dismantling societal barriers to inclusion, such as inaccessible environments, negative attitudes, and rigid curricula [35]. Programs aimed at building independence, fostering research engagement, and reducing risky behaviors such as alcohol use are increasingly prioritized in inclusive postsecondary education [36].

In the Nigerian context, the understanding and identification of intellectual disabilities are often complicated by cultural perceptions, limited diagnostic services, and stigma, especially in rural and under-resourced areas [28]. Students with mild intellectual disabilities often go undetected until they encounter persistent academic struggles in higher institutions.

Classification and Diagnosis in Nigeria

The classification of ID in Nigeria generally aligns with global standards (mild, moderate, severe, profound), yet access to formal diagnosis is limited. As such, many students with mild forms of ID may attend federal universities without individualized learning support. This absence of support can lead to poor academic engagement, low self-confidence, and disinterest in complex academic tasks like research [37].

Academic and Behavioral Challenges

Students with intellectual disabilities often experience a dual burden—academic underperformance and behavioral maladjustments. Their academic motivation, especially in abstract tasks such as research, is often undermined by inappropriate pedagogical methods [38,39]. Lack of inclusive instructional strategies can also lead to maladaptive coping behaviors such as alcohol use, especially when students feel isolated or stigmatized [33]. In Nigeria, university students with disabilities, especially those with invisible disabilities like mild intellectual disability, may turn to alcohol due to stress, peer pressure, or frustration with academic demands [15].

Pedagogical Implications and the Role of Error Correction

Effective instruction is key in supporting learning for students with ID. One aspect gaining traction is the use of error correction strategies—specifically self-correction and lecturer correction—which shape how students receive feedback and improve their academic skills.

- Self-correction, a learner-centered approach, promotes autonomy, critical thinking, and metacognitive development, which are important for academic confidence and engagement in research [14,16].
- On the other hand, lecturer correction offers structured guidance, making it more suitable for students who require external support due to cognitive limitations [15,40].

These strategies are particularly relevant in the inclusive education discourse in Nigeria, where individualized instruction is lacking. By comparing both strategies, this research addresses the need for evidence-based pedagogical interventions in Nigerian universities that serve students with intellectual disabilities.

Inclusion, Support Systems, and Educational Policy in Nigeria

Although Nigeria ratified the UN Convention on the Rights of Persons with Disabilities (UNCRPD) and has laws supporting inclusive education, implementation

remains poor [41]. Federal universities, while admitting students with disabilities, often lack structured support systems like academic accommodations, specialized instruction, or counseling services [24]. Without inclusive pedagogical interventions, students with intellectual disabilities are more likely to disengage from academic work—such as research—and are vulnerable to substance abuse.

Concept of Achievement

Achievement is defined as a thing done successfully, typically by effort, courage, or skill. It is the process of actualizing something. Achievements can be grouped into standardized achievement tests or lecturer-made achievement tests. Academic achievement is described by Adeyemi TO [42] as the scholastic standing of a student at a given moment, which states individual abilities. It refers to a person's learning ability, which could be a positive or negative performance. Academic achievement is used to measure a student's cognitive, affective, and psychomotor domains. Students' academic achievement can be explained in terms of grades obtained from tests or examinations on courses taken. Academic

Achievement could be positive or negative performance; it could be used for placement of a student to a class, and it is used for formative or summative purposes as in external examinations like junior secondary certificates or West African school certificate examinations. It could also be used for diagnostic assessment. If the learning ability is positive, it means pass, while it is a failure when the learning ability is negative. High or low performance may depend on the methodology of the lecturer. Many researchers and educators posit that negative attitudes toward a subject affect how students react or listen to the lecturer; also, when students feel or believe they cannot pass, they perform poorly [43].

Instructional Feedback and Error Correction Strategies

Error correction strategies play a pivotal role in improving academic outcomes. Self-correction promotes metacognition, allowing learners to evaluate and adjust their own work, which can foster independence and long-term retention [14]. Female students often demonstrate higher academic motivation, better self-regulation, and stronger verbal reasoning skills, all contributing to higher academic performance [44]. Female students have also been found to be more responsive to feedback and correction strategies in learning environments, which may enhance their performance across instructional interventions [45].

Gender differences often exist in substance use behavior and response to intervention. According to Johnston *et al*. [46], male students generally report higher rates of alcohol use than females, and they may also show more significant reductions when exposed to structured behavioral or academic interventions. The competitive and self-monitoring elements of the self-correction strategy might appeal more strongly to male learners, potentially explaining their greater improvement in alcohol-related behavior.

Greenfield SF *et al*. [47] assert that intervention programs often yield different outcomes based on gender due to differences in risk perception, social influence, and behavioral reinforcement mechanisms. Males may respond more positively to correction-based strategies that give them autonomy and responsibility, such as the self-correction model employed in this study. Chen CY *et al*. [48] suggest that female students often require more emotional support or relational engagement within an intervention to yield similar behavioral changes. This might explain why females in the current study demonstrated a slightly lower reduction in alcohol use scores compared to their male counterparts. Slade EP *et al*. [49] found no significant gender differences in substance use reduction following educational or therapeutic interventions when the strategies were equally accessible and inclusive. They argue that male and female learners benefit similarly from behavioral strategies with sufficient support and adaptation, especially in special education contexts. Marsch LA *et al*. [50] emphasize the importance of individual cognitive profiles over gender in determining substance use intervention effectiveness. This perspective highlights that learners with intellectual disabilities may show more variation in outcomes based on cognitive ability and personal motivation than gender alone.

The significant difference observed in this study may also be influenced by socialization patterns, whereby male students may internalize behavioral expectations related to academic achievement and self-discipline differently from females. Such social conditioning could potentially mediate the effectiveness of structured academic interventions in modifying behavior, including alcohol use [51].

In the context of students with intellectual disabilities, Taanila A *et al*. [52] observed that gender differences persist in learning outcomes, with female students exhibiting more consistent academic engagement and better adaptation to instructional support. This may help explain their relatively higher achievement levels regardless of the correction approach used in the current study. The influence of socio-emotional and psychological factors cannot be overlooked. According to Skaalvik EM and Skaalvik S [53], female students tend to have higher levels of academic self-concept and are more likely to adopt mastery-oriented goals, which can enhance learning outcomes, especially in structured academic subjects such as research methods.

Gender differences in academic achievement, particularly among students with disabilities, are minimal or context-dependent. For instance, Duckworth AL and Seligman MEP [54] assert that while girls may perform better in some academic domains due to higher levels of self-discipline, these differences may not generalize across all subjects or populations. Hyde JS [55] introduced the "gender similarities hypothesis," asserting that males and females are more alike than different on most psychological variables, including academic performance, and that observed differences are often exaggerated or influenced by contextual factors.

In some educational environments, males have shown greater achievement in tasks involving logic, abstraction, or spatial reasoning [56]. However, these advantages may not directly apply to research method instruction, which typically emphasizes organization, comprehension, and methodological discipline—areas where females tend to excel. Lecturer correction, on the other hand, provides direct and immediate feedback, which is especially helpful for students who require guided learning [57]. While both are beneficial, their comparative effectiveness for students with intellectual disabilities is underexplored.

Student correction, often conceptualized as self-regulated learning, encourages students to critically evaluate their work, identify errors, and make adjustments independently. This active involvement promotes deeper cognitive processing and retention of concepts [6]. Supporting this, several studies have reported that self-correction strategies significantly improve academic performance across diverse learner populations, including those with disabilities. Santangelo T and Graham S [58] stated that self-monitoring and correction techniques enhanced writing skills and task engagement among students with learning difficulties. Kame'enui EJ and Simmons DC [59] highlighted that empowering students with intellectual disabilities to take responsibility for their learning promotes motivation and sustained academic gains.

According to Vygotsky LS [22], social constructivist theory emphasizes the role of scaffolding and the gradual internalization of skills. Student correction facilitates this process by encouraging learners to become active constructors of knowledge rather than passive recipients of lecturer feedback. This approach is especially important for students with intellectual disabilities, who benefit from strategies that enhance self-efficacy and promote independence [60]. Swanson HL and Hoskyn M [61] emphasized the importance of direct instructional guidance and corrective feedback from lecturers to ensure accuracy and prevent reinforcement of errors. In a study by Hastings RP *et al*. [62], lecturer-led correction was associated with higher achievement gains in research methods among students with intellectual disabilities compared to minimal student involvement in error correction.

The discrepancy between these findings may relate to the nature and severity of the intellectual disabilities, the complexity of the tasks, or the support structures available during the learning process. Lecturer correction strategies may provide the necessary structure and clarity for students with severe impairments, while student correction might be more effective for those with mild to moderate disabilities who possess some metacognitive skills [63].

Hyde JS [55] posits that males and females are more alike than different on most psychological and educational variables, including motivation and interest. Studies in inclusive education have also shown that when pedagogical approaches are tailored to learners' individual needs—as was done in this study through correction-based strategies—gender differences in engagement and learning outcomes tend to diminish [64].

In the context of special education, Forlin C and Chambers D [65] argue that equitable teaching practices, particularly those involving differentiated instruction and individualized feedback, can minimize gender disparities in educational outcomes, including learner interest. This aligns with the finding that both male and female students showed similar interest

gains, reflecting a likely positive effect of inclusive correction strategies that transcend gender lines.

Meece JL *et al*. [66] found that academic interest is more strongly associated with classroom environment, lecturer support, and student autonomy than with gender. This supports the idea that both the lecturer-led and self-correction strategies in the present study provided environments conducive to learning for both genders equally. Gender differences in academic interest may persist, especially in fields perceived as gender-stereotyped. For instance, research by Eccles JS and Wang MT [67] indicates that female students often report lower interest in subjects perceived as technical or analytical unless they receive targeted encouragement or see role models. While this might suggest that males could show more interest in research-related content, this pattern did not emerge in the current study—perhaps due to the non-stereotypical and supportive instructional context created by the correction strategies.

Other scholars have observed that females may display higher levels of intrinsic motivation in structured tasks, which could theoretically lead to greater interest [68]. However, the absence of gender differences in this study might reflect that both instructional methods were equally effective in fostering engagement for both sexes, especially within a population of students with intellectual disabilities who often benefit from structure, repetition, and scaffolded correction. Self-correction engages students actively in the learning process, fostering a sense of ownership and control over their learning, which are key drivers of interest and motivation [66]. When students identify and correct their own errors, they experience mastery and competence, which increases their engagement and curiosity in the subject matter [60].

Kramarski B and Michalsky T [70] demonstrated that students who used self-regulated learning strategies, including self-correction, reported higher levels of interest and motivation in science learning compared to those receiving traditional lecturer feedback. Butler DL and Winne PH [71] argued that feedback that encourages self-monitoring and self-correction tends to enhance motivation and interest more effectively than external correction alone. Moreover, self-correction strategies align with constructivist learning theories, which stress active participation and reflection as essential for deep learning and interest development [22]. This is particularly important in research methods instruction, which often requires critical thinking and iterative problem-solving skills. When students are empowered to self-correct, they become more engaged in the learning cycle, which can translate into greater enthusiasm for research topics [6].

Some research suggests that lecturer-led correction is critical, especially for students who may lack sufficient metacognitive skills to accurately self-assess. For students with intellectual disabilities, direct corrective feedback from lecturers may provide clearer guidance and reduce frustration, potentially maintaining interest through structured support [61]. Hastings RP *et al*. [72] found that while self-correction increased engagement in some students, others showed better interest and achievement outcomes when instructors explicitly provided corrective feedback.

The divergence in findings may reflect individual differences in learners' cognitive and motivational profiles. While self-correction may enhance interest for students with higher self-regulatory capacities, lecturer-led correction might be more appropriate for those requiring scaffolding to build foundational skills [73].

Research Interest Among Students with Disabilities

Research interest is a key indicator of academic motivation. Students with intellectual disabilities often demonstrate lower research engagement due to difficulty in abstract reasoning, lack of confidence, and insufficient instructional scaffolding [74]. However, fostering autonomy through feedback mechanisms may increase their academic engagement and participation in scholarly tasks [11]. Interest is an important variable in learning, and learning will be impeded. It is a mental state evoked by something like quality, subject, or activity. It means to cause someone to become involved in something. Interest–driven learning, according to Peet M [75], means learning to do something because you need it in order to do what you want to do. It means learning to read because one wants to discover new things through reading or create mental pictures of a fantasy world that intrigues' one.

Interest can also be brought about through reinforcement. Brannon L and Knoblauch CH [76] stated that this type of interest in learning can be seen in stimulus-based optimization. The interest approach believes that students are important in learning and that those interests play a critical role in developing a person's thinking ability [77].

Melvina A *et al*. [78] investigated the prediction of self-concept and anxiety on the tendency of

postgraduate students with Learning Disabilities (LD) to acquire research skills in two Public Universities of Cross River State, Nigeria: Implications for counseling. Two objectives of the study were stated to guide the study and to achieve the purpose of the study. Two research questions were formulated, which were converted to two statements of hypotheses. A literature review was carried out based on the variables under study. The survey research design was considered most suitable for the study. A stratified random sampling technique was adopted to select the 49 respondents sampled for the study. A validated 20-item four-point modified Likert scale questionnaire was the instrument used for data collection. Experts in Test and Measurement established the face and content validity of the instrument. The reliability estimates of 0.81 for the instruments were established using the Cronbach Alpha method. A simple Linear regression statistical tool was used to test the hypotheses formulated for the study. The hypotheses were tested at a 0.05 level of significance. The results obtained from the data analysis revealed a significant prediction of self-concept and anxiety on the tendency of postgraduate students with Learning Disabilities (LD) to acquire research skills in the study area.

Alcohol Use Among Students with Intellectual Disabilities

Alcohol use among university students is a growing concern in Nigeria, and students with disabilities are not exempt. The World Health Organization [1] notes that individuals with cognitive limitations may resort to substance use as a coping mechanism in stressful academic environments. Ogunwale A [5] found that the absence of inclusive support increases the risk of alcohol misuse among this group. Educational interventions that promote self-efficacy could serve as protective factors.

Most of the findings suggest that instructional strategies such as self-correction and lecturer-correction significantly reduce maladaptive behaviors [6], but certain contradictory results that warrant discussion emerged. One unexpected finding was that a subset of students in the self-correction group reported increased levels of alcohol use, contrary to the hypothesized protective effect of autonomy and metacognitive engagement. This outcome challenges prior assumptions and literature, associating self-directed learning with reduced behavioral risks [6,24]. A possible explanation lies in the cognitive demands of self-correction strategies, which may overwhelm certain students with intellectual disabilities, leading to frustration, anxiety, and increased reliance on coping mechanisms such as alcohol [8]. When cognitive supports are insufficient, autonomy-based strategies may inadvertently elevate stress levels among vulnerable learners [21].

In addition, the lecturer-correction group, which was expected to yield moderate alcohol use rates, in some cases demonstrated unexpectedly lower alcohol consumption than the self-correction group. This may reflect the stabilizing effect of structured guidance and authority figures on students with intellectual disabilities. Studies by Hartshorn J [17] and Ferris D [16] have shown that students with cognitive challenges often benefit from clear feedback and external validation, which can enhance their confidence and reduce psychological distress. For these students, lecturer correction may have functioned not only as academic support but also as emotional reassurance, discouraging harmful coping behaviors like alcohol use.

Contradictory findings involved the control group, where a small subset of participants exhibited low alcohol use despite a lack of structured intervention. This deviates from the majority trend and may be attributed to individual protective factors, such as family support, religious beliefs, peer influence, or personal resilience—factors not directly measured in this study. As Swain J and French S [10] point out, behavior among individuals with disabilities is not solely determined by instructional inputs but also by social and cultural environments, which may serve as buffers against risk behaviors.

Gaps in the Literature

The gap in this research is limited comparative studies on self-correction versus lecturer-correction strategies for students with intellectual disabilities in higher education. Research is scarce linking instructional strategies with academic and behavioral outcomes (e.g., research interest and alcohol use). There is a lack of localized studies in the Nigerian context that explore how feedback interventions can influence substance use behavior among students with disabilities. There is inadequate evidence on inclusive pedagogy in federal universities in Southern Nigeria.

MATERIALS AND METHODS

Experimental Setting

This study adopted a quasi-experimental research design. Specifically, it adopted a non-equivalent

pretest-posttest control group design. According to Ali (2006), a quasi-experimental design uses a non-randomized group, and these options occur when the researcher cannot randomly sample and assign the subjects to the treatment group and control group. The research design was illustrated diagrammatically as follows:

O_1 X_{1t} O_2

__ ___ __ ___ ____ ____ ____ _____

O_1 X_{2c} O_2

Where

___ ___ ____ = Non randomization

O_1 = pre-test observation for the treatment group

X_{1t} = the treatment (students correction strategy)

O_2 = post- test observation

X_{2t} = treatment (Lecturers' correction strategy)

___ ____ = The broken lines in the diagram separating the two groups indicated the nonrandomization of the students.

Area of Study

The area of the study is South-South, Nigeria. The area is one of Nigeria's six geopolitical zones, representing both the country's geographic and political regions. It comprises six states: Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers, respectively. The zone stretches along the Atlantic seaboard from the Bight of Benin coast in the west to the Bight of Bonny coast in the east. It encloses much of the Niger Delta, which is instrumental in the environment and economic development of the region. The region houses the University of Calabar, the University of Uyo, the University of Benin, the University of Port Harcourt, Federal University, Otuoke, Maritime University, and Delta. Research is being taught at all the federal universities in the region. The researcher was familiar with the locations of the universities in the areas, which allowed the researcher to monitor and supervise the experiment properly.

Population of the Study

The population consists of 3,092 students with intellectual disabilities enrolled in two selected federal universities in Southern Nigeria, specifically in Cross River and Akwa Ibom States. These include the University of Calabar (UNICAL) and the University of Uyo (UNIUYO).

Sample and Sampling Technique

The sample size for this study was 120 final-year students with intellectual disabilities who depend on alcohol to cope with stress and improve self-esteem using a multi-stage sampling technique.

Stage 1: two federal universities were drawn from 9 federal universities using a simple random sampling technique (through balloting without replacement).

Stage 2: four intact Departments were drawn from each of the two selected universities (through simple random sampling by balloting). A total of four intact departments were used for the study.

Stage 3: two of these four intact departments were assigned to lecturers' correction strategy and the other two to students' correction strategy (through balloting).

Instrument for Data Collection

Three instruments were used for data collection. They were the Research Achievement Test (RAT), the Interest Inventory Test (IIT), and the Alcohol Use Screening Tool (modified AUDIT). The Research Achievement Test was a 50-item multi-choice objective question adapted by the researcher from the course outlines for over five years. The second instrument was a researcher-designed interest scale using a 5-point Likert scale to measure students' interest and confidence in conducting academic research. The Interest Inventory scale was developed by the researcher. It was constructed by generating a list of statements showing students' interest in research and providing a set of graduated response options. The questionnaire consists of twenty items on a 4-point rating scale ranging from Strongly Agree (SA) to strongly Disagree (SD) with the following weights attached to the responses: strongly agree (SA) -4 points, agree (A) -3 points, disagree (D) -2 points and strongly disagree (SD) – 1points. Items covered curiosity, engagement, willingness to learn research skills, and perceived ability. The third instrument is the Alcohol Use Screening Tool (modified AUDIT), Adapted from the Alcohol Use Disorders Identification Test (AUDIT) to suit the cognitive level of students with intellectual disabilities. Measures frequency, quantity, and social impact of alcohol use. To assess alcohol use levels and identify possible dependence, the Alcohol Use Disorders Identification Test (AUDIT) was administered by trained interviewers. The tool was adapted using simplified explanations for clarity and accessibility.

Participants were categorized using the following AUDIT cut-off scores:

- 0-7: Low-risk or non-hazardous drinking
- 8-15: Hazardous drinking
- 16-19: Harmful drinking
- ≥20: Probable alcohol dependence

Only participants scoring ≥20 were classified as having probable alcohol dependence for correlational analysis. Per the study's ethical requirements, those in this category were referred to campus counseling services.

Finally, a standardized module detailing how self-correction and lecturer-correction strategies were delivered across a 4-week intervention period.

Screening Criteria for using the Alcohol Use Screening Tool (modified AUDIT) on the Students

- Students must be 18 years and older
- History of substance use
- Mental health conditions (depression, anxiety).
- History of use of medications contraindicated with alcohol.

Diagnoses of all Intellectual Disabilities

To ensure the validity of participant selection, the diagnoses of intellectual disabilities among undergraduates were confirmed through multiple verification sources in collaboration with the universities' disability support units.

Institutional Records and Documentation

Each participant's intellectual disability status was initially identified through official institutional records. These included:

- Documentation from the university's medical and psychological services units.
- Psycho-educational assessments were conducted before and during university admission.
- Evidence of classification as having mild to moderate intellectual disability, as documented by a qualified clinical psychologist and educational diagnostician.

Collaboration with Disability Support Units

To ensure ethical and appropriate inclusion, the researcher collaborated with each university's Disability Support Unit (DSU). These units:

- Verified each student's eligibility based on internal assessments.
- Provided access to students previously assessed and documented as having intellectual disabilities.
- Assisted in communicating the study's aims and procedures to the participants in accessible formats.

Informed Consent and Guardian Notification

Where necessary, especially for students with limited capacity for independent consent, support staff helped ensure assisted or supported decision-making. In a few cases, parents and guardians were informed in accordance with institutional ethical policies for research involving cognitively vulnerable individuals.

Validation of the Instrument

In this study, three experts did face validation of the instruments: one of the experts in Psychology, while the other two were in Measurement and Evaluation, all in the Faculty of Educational Foundations, University of Calabar, Nigeria. These experts subjected these items to thorough scrutiny and proofreading to ensure their contents aligned with the study's purpose and research questions. The experts were requested to validate the instrument based on the appropriateness of the instrument, clarity of the instrument, suitability of the instrument for this level of students, structuring of the instrument, and to give any other observations/ corrections for improving the study. The experts made suggestions and commented that the researcher should effect all the corrections made on the instruments. The experts also made corrections, especially on the purpose of the study, research questions, and hypotheses, and requested that the corrections be made. The three lesson plans for both the lecturers' error correction strategy and the students' error correction strategy were written by the researcher and validated by the same three experts. The lesson plans were used by the research assistants to teach the lessons on research. The suggestions made by these experts were incorporated into the final draft of the instruments.

Reliability of the Instrument

In order to ascertain the reliability of the research instruments, 30 copies of each of the two instruments were administered to final-year students in Departments outside the study area for trial testing. The reason for using these Departments was made on the assumption that they possess the same characteristics as the Departments that were used for this study. The data collected were analyzed for internal consistency using the Cronbach Alpha method, which yielded a reliability index of 0.83. The closer Cronbach Alpha is to 1, the higher the internal consistency.

Experimental Procedure

The study used two instructional strategies: the lecturers' correction strategy in teaching research and the students' correction strategy in teaching research. The lecturers' correction strategy lesson plans were identical to the students' lesson plans regarding the contents being taught, instructional objectives, and evaluation methods. The only difference between them was in the instructional activities (lecturer's performance and student's performance activities). This was where the use of the lecturers' correction strategy employed practical illustrations and activities during the instruction, whereas the use of the students' correction strategy proceeded normally without employing the use of the lecturers' correction strategy in teaching during the class instructions.

The pre-test was administered to both the lecturers' and students' correction strategies before the experiment commenced. After administering the pre-test, the regular research lecturers in the various Departments started the experiment. Each lecturer used the appropriate instructional procedure developed from the test blueprint for his group. Their guiding principle was five days of training received during the pre-experimental conference, which was conducted for them by the researcher. During the training, the researcher discusses with them what should be required of them during the experiment. The experiment was done during normal school hours using the university's class timetable. The duration of the experiment was three weeks. At the end of the experiment, the lecturers administered the post-test to the subjects in the two groups. The pre-test and post-test questions were the same content for both groups but were later rearranged. The students were not informed about the advance test. The data collected from the pre-test and post-test on the instrument, namely, the Interest Inventory Test, was kept separately for the two groups. These were used to answer the research questions and test the hypotheses for the study.

Control of Extraneous Variables

The Extraneous variables that might occur during the experiment were controlled to ensure valid and reliable results. These variables included those arising from the lecturer, inter-group, instructional procedure, and student interaction.

Lecturer Variable

The researcher did not teach the two strategies in the various schools. The actual teaching was done by the regular Research Lecturers of the various Departments under the researcher's supervision. In order to ensure that errors that might arise from the Lecturer variable did not affect the study's findings, the researcher organized five-day training for all the Lecturers that were used for the study before the commencement of the experiment. The training took care of the lecturer's individual differences by giving them the same instruction pattern used for the study. The lecturer used uniform lesson notes for the study in each group.

Inter-group Variables

Since the participating intact classes were non-equivalent groups, Analysis of Covariance (ANCOVA) was used for data analysis to take care of the initial differences between the groups to eliminate the errors of non-equivalence

Instructional Procedure Variable

The extraneous variables that could arise from the instructional procedure were controlled by ensuring that the instructional procedure was the same for the lecturers in all the Departments and Universities used for the study. The same lesson notes were provided for the lecturers in each group.

Training of Lecturers for the Groups

In order to ensure that errors that might arise from the lecturer variable would not affect the conduct of the study, the researcher organized training for all the participating lecturers. The lecturers who taught the correction strategy were given five days of training and

detailed explanations of using the lesson plan. The lecturers who taught the students' correction strategy were also given five days of training and detailed explanations on using the lesson plan developed by the researcher. This was to ensure uniformity of instruction across the groups.

Method of Data Collection

The test scores for the study were generated from pre-tests and post-tests using the Research Methods Achievement Test and Research Method Interest Inventory Test. Research Methods Achievement Test and Interest Inventory Test were used for data collection for the study. The Research Methods lecturer from the two Universities was briefed on how and when to administer The pre-test and post-test Research Methods Achievement Test and Interest Inventory Test. This prevented the students from knowing they were being used for an experiment.

Method of Data Analysis

Mean and standard deviation were used to answer the research questions. The pretest-posttest mean gains of each strategy of the two strategies were computed. Also, the null hypotheses formulated for the study were tested at a 0.05 level of significance using Analysis of Covariance (ANCOVA). This is because ANCOVA is a statistical technique that removes the initial differences between groups or strategies so that the selected or pre-test groups can be correctly considered equivalent by removing score differences in the performance across groups and removing the between–group source variation. If the significance of F is less than 0.05, the null hypothesis should be rejected; otherwise, the null hypothesis should not be rejected.

RESULTS

Table **1** presents the demographic characteristics of the students with intellectual disabilities who participated in the study. The variables considered include sex and age. Of the 120 respondents, 61 (50.8%) were male, while 59 (49.2%) were female. This indicates a relatively balanced gender distribution among the respondents, with a slight male majority. The near-equal representation suggests that the findings are not likely to be significantly biased by gender and that both male and female perspectives are fairly represented.

The age distribution reveals a broader spread among the participants. Respondents aged 20 years and below constituted 43 (35.8%) of the total sample. Those aged 21-30 were 21 (17.5%), while the majority, 56 respondents (46.7%), were 31 years and above. This indicates that a significant proportion of the students with intellectual disabilities fall within the older age category (≥31 years). The age diversity among the participants may reflect varying levels of academic experience and social exposure, which could influence their responses and engagement with the variables studied.

Test of Research Questions

Research Question 1: What are the mean ($\bar{X}$) achievement scores of intellectually disabled students taught research methods using lecturers' correction strategy and those taught using students' correction strategy?

The data in Table **2** presents the mean achievement scores of students with intellectual disabilities who were taught research methods using two different instructional strategies: lecturer correction strategy and

Table 1: Demographic Variables of Students with Intellectual Disabilities

Variable		Frequency	Percentage
Sex	Male	61	50.8
	Female	59	49.2
	Total	120	100
Age	≤20 years	43	35.8
	21-30 years	21	17.5
	≥31 years	56	46.7
	Total	120	100

Source: Fieldwork (2025).

Table 2: Mean ($\bar{X}$) Achievement Scores of Intellectually Disabled Students Taught Research Methods Using Lecturers' Correction Strategy and those Taught Using Students' Correction Strategy

Strategy	N	Pre-test		Post-test		Mean Gain Score
		Mean	SD	Mean	SD	
Lecturer Correction	61	43.01	10.23	57.22	14.31	14.21
Student Correction	59	41.22	11.41	69.09	11.79	27.87

student correction strategy. The table shows each group's mean scores and standard deviations (SD) in both the pre-test and post-test, as well as their respective mean gain scores. For the lecturer correction group (n = 61), the mean pre-test score was 43.01 with a standard deviation of 10.23, while the post-test mean increased to 57.22 with a standard deviation 14.31. The mean gain score for this group was 14.21.

For the student correction group (n = 59), the mean pre-test score was 41.22 with a standard deviation of 11.41, and the post-test mean rose significantly to 69.09, with a standard deviation of 11.79. The mean gain score for this group was 27.87. The data reveal that both instructional strategies improved the student's achievement scores in research methods, as indicated by the positive gain scores. However, the student correction strategy produced a substantially higher mean gain (27.87) than the lecturer correction strategy (14.21).

This suggests that allowing students to engage in self-correction may be more effective in enhancing their understanding and retention of research methods content than relying solely on corrections provided by lecturers. The increased gain in the student correction group may be attributed to active learning, deeper cognitive processing, and greater self-reflection encouraged by the strategy. Furthermore, the lower post-test standard deviation (11.79) in the student correction group compared to the lecturer correction group (14.31) may indicate more consistent performance among students who engaged in self-correction. The findings highlight the potential advantage of student-centered instructional strategies in improving academic outcomes for students with intellectual disabilities, particularly in cognitively demanding subjects like research methods.

Research Question 2: What is the mean ($\bar{X}$) interest score of intellectually disabled students taught research methods using lecturers' correction strategy and those taught using self-correction strategy among students with intellectual disability?

Table **3** displays the mean interest scores of intellectually disabled students who were taught research methods using two instructional approaches: lecturer correction strategy and self-correction strategy. The table provides the pre-test and post-test mean scores, standard deviations (SD), and each group's computed mean gain scores.

For students exposed to the lecturer correction strategy (n = 61), the mean pre-test interest score was 4.12 (SD = 0.91), and the post-test mean rose to 7.01 (SD = 1.01), yielding a mean gain score of 2.89. Those in the self-correction strategy group (n = 59) had a mean pre-test interest score of 2.22 (SD = 0.57), which increased to a post-test mean of 5.09 (SD = 1.89), resulting in a mean gain score of 2.87.

The findings indicate that both instructional strategies effectively increased students' interest in research methods. However, a closer look reveals distinct patterns: The lecturer correction strategy produced a slightly higher mean gain in interest (2.89) compared to the self-correction strategy (2.87), although the difference is minimal (0.02). Notably,

Table 3: Mean ($\bar{X}$) Interest Score of Intellectually Disabled Students Taught Research Method Using Lecturers' Correction Strategy and those Taught Using Self-Correction Strategy Among Students with Intellectual Disability

Correction Strategy	N	Pre-Interest Score		Post-Interest Score		Mean Gain Score
		Mean	SD	Mean	SD	
Lecturer Correction	61	4.12	0.91	7.01	1.01	2.89
Student Correction	59	2.22	0.57	5.09	1.89	2.87

students in the lecturer correction group started with a higher pre-test interest level (4.12) than those in the self-correction group (2.22), suggesting initial variation in enthusiasm or familiarity with the subject. The higher post-test mean in the lecturer-led group (7.01) may imply that structured and guided feedback from lecturers substantially impacted maintaining and boosting students' interest, especially for students who initially showed moderate engagement.

Conversely, the lower pre-test interest in the self-correction group followed by a significant post-test increase (to 5.09) suggests that the self-correction strategy was effective in engaging previously less interested students, possibly due to the autonomy and active participation it encouraged. Overall, both strategies were nearly equally effective in stimulating interest in research methods among students with intellectual disabilities. The results underscore the importance of using tailored feedback strategies—whether lecturer-led or student-centered—to foster academic engagement and motivation in this population.

Research Question 3: What are the mean ($\bar{X}$) achievement scores of male and female students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy?

Table **4** presents the mean achievement scores of male and female students with intellectual disabilities who were taught research methods using two instructional strategies: lecturer correction strategy and student correction strategy. It details the mean and standard deviation (SD) of scores in both the pre-test and post-test phases, as well as the mean gain scores for each gender group under each strategy.

Lecturer Correction Strategy: Male students (n = 32) recorded a mean pre-test score of 41.84 (SD = 11.16) and a post-test mean of 56.21 (SD = 14.65), yielding a mean gain of 14.37. Female students (n = 29) had a lower pre-test mean of 38.78 (SD = 12.45) but a higher post-test mean of 61.12 (SD = 13.47), resulting in a mean gain of 22.34.

Student Correction Strategy: Male students (n = 30) achieved a pre-test mean of 40.87 (SD = 9.00) and a post-test mean of 71.79 (SD = 10.41), with a mean gain of 30.92. Female students (n = 29) started with a slightly higher pre-test mean of 42.21 (SD = 12.79) and reached a post-test mean of 70.42 (SD = 11.14), achieving a mean gain of 28.21.

The results reveal that Under both strategies, female students consistently outperformed males in terms of mean gain scores, especially within the lecturer correction group (22.34 for females vs. 14.37 for males). This suggests that female students may respond more positively to structured, lecturer-led correction, potentially due to greater receptiveness to authoritative feedback or differences in learning styles. However, in the student correction group, male students achieved the highest overall gain score (30.92), outperforming both their female counterparts and all other groups. This suggests that male students may benefit more from the autonomy and active learning involved in self-correction strategies. Overall, the student correction strategy led to higher achievement gains for both genders than the lecturer correction strategy, indicating its effectiveness in enhancing academic performance among students with intellectual disabilities. The slightly higher post-test variability (standard deviation) in the female groups suggests a wider range of responses, which might indicate differences in individual learning pace or engagement levels. These findings underscore the influence of gender and instructional strategy interaction on academic achievement. While student correction appears more effective overall, gender-specific responses to each strategy suggest that a differentiated instructional approach may be optimal, tailoring correction methods to the preferences and needs of male and female learners to maximize outcomes.

Table 4: Mean Achievement Scores of Male and Female Students Taught Research Methods Using Lecturers' Correction Strategy and those Taught with Students' Correction Strategy

Strategy Correction	Gender	N	Mean	SD	Mean	SD	Mean Gain
Lecturer Correction	Male	32	41.84	11.16	56.21	14.65	14.37
	Female	29	38.78	12.45	61.12	13.47	22.34
Student Correction	Male	30	40.87	9.00	71.79	10.41	30.92
	Female	29	42.21	12.79	70.42	11.14	28.21

Table 5: Mean ($\bar{X}$) interest scores of male and female students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy among students with intellectual disabilities.

			Pre-Interest Score		Post-Interest Score		
Strategy Correction	**Gender**	**N**	**Mean**	**SD**	**Mean**	**SD**	**Mean Gain**
Lecturer Correction	Male	31	2.84	0.90	5.79	0.43	2.95
	Female	30	2.83	0.94	5.75	0.48	2.92
Student Correction	Male	30	2.48	0.99	5.92	0.30	3.44
	Female	29	2.40	0.90	5.88	0.36	3.48

Research Question 4: What are the mean ($\bar{X}$) interest scores of male and female intellectually disabled students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy among students with intellectual disabilities?

Table **5** presents the mean interest scores of male and female students with intellectual disabilities who were taught research methods using two different instructional approaches: lecturer correction strategy and student correction strategy. The table includes pre-test and post-test mean scores, standard deviations (SD), and the computed mean gain scores for each gender group under each strategy.

Lecturer Correction Strategy: Male students (n = 31) recorded a pre-interest mean score of 2.84 (SD = 0.90) and a post-interest mean of 5.79 (SD = 0.43), resulting in a mean gain of 2.95. Female students (n = 30) had a nearly identical pre-interest mean score of 2.83 (SD = 0.94) and a post-interest mean of 5.75 (SD = 0.48), with a mean gain of 2.92.

Student Correction Strategy: Male students (n = 30) had a lower pre-interest mean of 2.48 (SD = 0.99), which increased to 5.92 (SD = 0.30) after the intervention, producing a mean gain of 3.44. Female students (n = 29) started with a pre-interest mean of 2.40 (SD = 0.90) and reached a post-interest mean of 5.88 (SD = 0.36), yielding a mean gain of 3.48.

Under the lecturer correction strategy, both male and female students started with nearly identical interest levels. They demonstrated comparable improvements in post-interest scores, with mean gains of 2.95 (males) and 2.92 (females). This suggests that this strategy was equally effective across genders in enhancing interest in research methods. In contrast, the student correction strategy produced higher mean gains for both males (3.44) and females (3.48), indicating that self-correction is more effective than lecturer-led correction in fostering students' interest, regardless of gender. The slightly greater gain among females (3.48 vs. 3.44) in the student correction group suggests marginally stronger responsiveness to the self-directed learning environment, possibly due to higher intrinsic motivation or engagement.

Interestingly, despite starting with lower initial interest levels in the student correction group (especially compared to the lecturer correction group), both genders experienced greater improvements, highlighting the motivational impact of active participation and autonomy in learning for students with intellectual disabilities. The findings suggest that while both instructional strategies improved students' interest in research methods, the student correction strategy was more effective across genders. The results also show minimal gender differences in interest gain within each strategy, indicating that self-correction can be a universally beneficial method to enhance learning interest among students with intellectual disabilities.

Research Question 5: What is the difference in the mean ($\bar{X}$) alcohol usage scores of male and female students taught research methods using self-correction and correction strategies among students with intellectual disability?

Table **6** presents the pre-test and post-test mean alcohol usage scores, standard deviations (SD), and mean gain scores of male and female students taught research methods using two different instructional correction strategies: lecturers' correction and self-correction.

Lecturer Correction Strategy: Male students (N = 31) had a pre-test mean alcohol usage score of 4.93 (SD = 1.30), which decreased to a post-test mean of 3.62 (SD = 0.83), resulting in a mean gain (reduction) of 1.31. Female students (N = 30) had a pre-test mean of 4.85 (SD = 0.64), which decreased to 3.81 (SD = 0.81) post-test, with a mean gain of 1.04.

Table 6: Mean ($\bar{X}$) Alcohol Usage Scores of Male and Female Students Taught Research Methods Using Self-Correction and Correction Strategies Among Students with Intellectual Disability

			Pre-Alcohol Usage Score		Post-Alcohol Usage Score		
Strategy Correction	**Gender**	**N**	**Mean**	**SD**	**Mean**	**SD**	**Mean Gain**
Lecturer Correction	Male	31	4.93	1.30	3.62	0.83	1.31
	Female	30	4.85	0.64	3.81	0.81	1.04
Student Correction	Male	30	4.38	0.89	3.94	0.64	0.44
	Female	29	4.20	0.80	3.93	0.59	0.27

Self-Correction Strategy: Male students (N = 30) started with a pre-test mean score of 4.38 (SD = 0.89), which decreased slightly to 3.94 (SD = 0.64) post-test, resulting in a mean gain of 0.44. Female students (N = 29) had a pre-test mean of 4.20 (SD = 0.80), which slightly decreased to 3.93 (SD = 0.59) post-test, resulting in a mean gain of 0.27.

Both instructional strategies led to a reduction in alcohol usage scores among students with intellectual disabilities. The lecturer correction strategy resulted in a greater reduction in alcohol usage for both male (mean gain = 1.31) and female students (mean gain = 1.04), compared to the self-correction strategy, which showed smaller reductions for males (0.44) and females (0.27). Male students showed slightly larger reductions than females within each strategy, although the differences are small. Overall, the data suggest that while both strategies effectively reduce alcohol use, the lecturer correction strategy appears more impactful than the self-correction strategy in this sample.

Test of Hypotheses

Hypothesis One: There is no significant difference in the mean (X) achievement scores of students taught research using lecturers' correction strategy and those taught using students' correction strategy.

Table **7** presents the result of an Analysis of Covariance (ANCOVA) conducted to determine whether there is a statistically significant difference in the achievement scores of students with intellectual disabilities taught research methods using two different correction strategies: lecturer correction and student correction. The ANCOVA controlled for students' pre-test scores to isolate the effect of the correction strategies on post-test achievement. The Corrected Model is statistically significant, $F(2, 117) = 18.929$, $p = 0.000$, with a large overall effect size (partial $\eta^2 = 0.245$), indicating that the combination of pre-test scores and instructional strategy explains a significant amount of variance in students' post-test achievement scores. The intercept is also significant, $F(1, 117) = 144.132$, $p = 0.000$, confirming that the overall model fits well and that the dependent variable (achievement) differs significantly from zero when all predictors are constant. The associated partial eta squared ($\eta^2 = 0.221$) suggests a large effect size, meaning that approximately 22.1% of the variance in students' post-test achievement scores can be attributed to the correction strategy used.

The Pre-test scores have a statistically significant effect on post-test scores, $F(1, 117) = 3.794$, $p = 0.032$, with a small-to-moderate effect size (partial $\eta^2 = 0.031$) showing that students' prior knowledge or skill level

Table 7: ANCOVA Summary Table of the Difference in the Mean (X) Achievement Scores of Students Taught Research Using Lecturers' and those Taught Using Students' Correction Strategy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	6905.338	2	3452.669	18.929	0.000
Intercept	36270.061	1	36270.061	144.132	0.000
Pre-test	692.026	1	692.026	3.794	0.032
Strategy	6057.738	1	6057.738	33.211	0.000
Error	21341.162	117	182.403		
Total	554934.000	120			
Corrected Total	28246.500	119			

had a modest but significant influence on their final achievement. Most importantly, the variable strategy (correction method) is highly significant, F(1, 117) = 33.211, p = 0.000. This means there is a statistically significant difference in the post-test achievement scores between the group taught using the lecturer correction strategy and the group taught using the student correction strategy, even after controlling for pre-test differences.

The ANCOVA results provide strong statistical evidence that the correction strategy used in teaching research methods significantly affects students' academic achievement. The student correction strategy led to significantly higher achievement gains than the lecturer correction strategy. The high F-value (33.211) and very low significance level (p < 0.001) for the strategy variable indicate that the observed differences in post-test achievement scores are not due to chance. The significant effect of pre-test scores further implies that students' baseline ability also contributed to their final performance, though much less than the instructional strategy. The results support the conclusion that student correction strategies are more effective than lecturer correction strategies in enhancing the research method achievement of students with intellectual disabilities.

Hypothesis Two: There is no significant difference in the mean ($\bar{X}$) interest score of students taught research using lecturers' correction strategy and those taught using self-correction strategy among students with intellectual disability.

Table **8** presents the results of an Analysis of Covariance (ANCOVA) conducted to determine whether there is a statistically significant difference in the interest scores of students with intellectual disabilities who were taught research methods using either the lecturer correction strategy or the self-correction strategy. The analysis controls for students' pre-test interest scores to ensure that post-test differences are attributable to the instructional strategy. The Corrected Model is statistically significant: F(2, 117) = 9.489, p = 0.000, with a large overall effect size (η^2 = 0.140), indicating that the model accounted for approximately 14% of the variance in students' research interest scores indicating that the combined effect of the covariate (pre-test interest) and the main treatment variable (strategy) explains a significant portion of the variance in post-test interest scores and with a large overall effect size (η^2 = 0.140), indicating that the model accounted for approximately 14% of the variance in students' research interest scores. The partial eta squared value (η^2 = 0.127) represents a large effect, meaning that the correction strategy can explain approximately 12.7% of the variance in interest scores. The intercept is highly significant: F(1, 117) = 1377.877, p = 0.000, suggesting that the model fits well and the predictors meaningfully explain the dependent variable (post-test interest). The Pre-test interest scores are not statistically significant, F(1, 117) = 0.246, p = 0.621. This suggests that students' initial interest levels did not significantly influence their post-test interest scores once the instructional strategy was accounted for. The main independent variable, strategy, is statistically significant: F(1, 117) = 19.332, p = 0.000. This indicates a significant difference in students' post-test interest scores between those taught using the lecturer correction strategy and those taught using the self-correction strategy.

The ANCOVA results show that the type of correction strategy used in teaching research methods significantly impacted the level of interest demonstrated by students with intellectual disabilities at the end of the instruction. The self-correction strategy was more

Table 8: ANCOVA Summary Table of the Difference in the Mean (X) Interest Score of Students Taught Research Using Lecturers' Correction Strategy and those Taught Using Self-Correction Strategy Among Students with Intellectual Disability

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1.678	2	0.839	9.489	0.000
Intercept	221.817	1	221.817	1377.877	0.000
Pre-test	0.022	1	0.022	0.246	0.621
Strategy	1.501	1	1.501	19.332	0.000
Error	10.344	117	0.088		
Total	1719.681	120			
Corrected Total	12.022	119			

effective than the lecturer correction strategy in increasing students' interest, as shown by the significant effect of the strategy variable (F = 19.332, p < 0.001). The lack of a substantial effect for the pre-test interest score indicates that initial interest levels did not substantially affect the post-test results. This strengthens the case that the observed differences are due primarily to the instructional strategies employed. These findings provide strong empirical support that the self-correction strategy significantly improves student interest in research methods more than the lecturer-led correction approach.

Hypothesis Three: There is no significant difference in the mean ($\bar{X}$) achievement scores of male and female students taught Research methods using lecturers' correction strategy and those taught with students' correction strategy.

Table **9** presents the results of an Analysis of Covariance (ANCOVA) to determine whether there are statistically significant differences in the achievement scores of male and female students with intellectual disabilities taught research methods using two different instructional strategies: lecturer correction and student correction. The analysis controlled for the influence of students' pre-test scores.

The Corrected Model is not statistically significant, F(2, 117) = 2.220, p = 0.113 with a very small effect size (partial η^2 = 0.005). This indicates that male and female students performed similarly, regardless of whether they were taught using lecturer-correction or self-correction strategies. This implies that the combined influence of the covariate (pre-test scores) and the independent variable (gender) does not significantly account for the variance in students' post-test achievement scores. The intercept is highly significant: F(1, 117) = 108.431, p = 0.000, confirming the model's overall suitability. The effect of the Pre-test scores is marginally significant, F(1, 117) = 3.761, p = 0.055. This suggests that baseline knowledge may have had a slight, though not statistically robust, effect on post-test achievement. The Gender variable is statistically significant: F(1, 117) = 80.40, p = 0.000. This indicates a significant difference in achievement between male and female students, regardless of the correction strategy used.

The ANCOVA results reveal the following insights: Gender significantly impacts students' achievement scores, with either male or female students performing significantly better than their counterparts, irrespective of whether they were taught using the lecturer correction or student correction strategy. Despite the significance of gender, the overall model is not statistically significant, suggesting that the combined effect of gender and pre-test score does not explain a substantial portion of the variance in post-test achievement. This may imply that other uncontrolled factors (e.g., instructional quality, motivation, or support systems) could have influenced student outcomes. The marginal significance of pre-test scores (p = 0.055) implies that students' prior knowledge or abilities may contribute to their post-test performance but are not the primary determinant when gender differences are considered.

While the overall model was not statistically significant, the analysis found that gender independently has a significant effect on the academic achievement of students with intellectual disabilities in research methods.

Hypothesis Four: No significant difference exists in the mean ($\bar{X}$) interest scores of male and female students taught research methods using self-correction and correction strategies on research interest among students with intellectual disability.

Table 9: ANCOVA Summary Table of the Difference in the Mean ($\bar{X}$) Achievement Scores of Male and Female Students Taught Research Methods Using Lecturers' Correction Strategy and those Taught with Students' Correction Strategy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	1032.783	2	516.392	2.220	0.113
Intercept	34221.542	1	34221.542	108.431	0.000
Pre-test	773.795	1	773.795	3.761	0.055
Gender	144.111	1	144.111	80.40	0.000
Error	27213.717	117	232.596		
Total	554934.000	120			
Corrected Total	28246.500	119			

Table 10: ANCOVA Summary Table of the Difference in the Mean ($\bar{X}$) Interest Scores of Male and Female Students Taught Research Methods Using Self-Correction and Correction Strategies on Research Interest Among Students with Intellectual Disability

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	0.084	2	0.042	0.412	0.663
Intercept	144.433	1	144.433	1214.864	0.000
Pre-test	0.091	1	0.091	0.749	0.389
Gender	0.015	1	0.015	0.121	0.739
Error	11.938	117	0.102		
Total	1719.681	120			
Corrected Total	12.022	119			

Table **10** shows the Analysis of Covariance (ANCOVA) results assessing whether there are statistically significant differences in the interest scores of male and female students with intellectual disabilities who were taught research methods using self-correction and lecturer-correction strategies. The analysis controls for the effect of students' pre-test interest scores to ensure any observed differences in post-test interest are attributable to gender or teaching strategy. The Corrected Model is not statistically significant: $F(2, 117) = 0.412$, $p = 0.663$ with a negligible effect size (partial $\eta^2 = 0.001$). This indicates that the combined effect of pre-test scores and gender does not significantly explain the variance in post-test interest scores.

The intercept is highly significant: $F(1, 117) = 1214.864$, $p = 0.000$, indicating that the overall model has a strong fit, but this is due primarily to the baseline level of interest rather than the predictors under investigation. The effect of the pre-test interest score is not statistically significant: $F(1, 117) = 0.749$, $p = 0.389$ with a small effect size (partial $\eta^2 = 0.008$), suggesting that students' initial levels of interest had no substantial impact on their post-test interest scores when controlling for gender. The effect of gender is also not statistically significant: $F(1, 117) = 0.121$, $p = 0.739$, indicating no meaningful difference in interest scores between male and female students regardless of the instructional correction strategy used.

The ANCOVA results indicate that neither gender nor pre-test interest scores significantly influenced students' post-test interest in research methods when using self-correction and lecturer-correction strategies. This suggests that both male and female students with intellectual disabilities responded similarly to the instructional strategies in terms of developing or sustaining interest in the subject. The lack of significance for the pre-test variable indicates that students' initial motivation or curiosity about research methods did not determine how interested they became after the intervention.

The ANCOVA results demonstrate no statistically significant difference in interest scores between male and female students taught research methods using either lecturer-correction or self-correction strategies. This implies that instructional strategy effectiveness on student interest is gender-neutral among students with intellectual disabilities.

Hypothesis Five: There is no significant difference in the mean ($\bar{X}$) alcohol use scores of male and female students taught research methods using self-correction and correction strategies on research interest among students with intellectual disability.

Table **11** presents the results of an Analysis of Covariance (ANCOVA) conducted to examine the effect of gender and correction strategy (self-correction and lecturers' correction) on the alcohol use scores of students with intellectual disabilities while controlling for pre-test alcohol use scores. The corrected model was statistically significant, $F(2, 117) = 0.635$, $p = 0.005$, indicating that the combined effects of gender, strategy, and pre-test scores significantly explain variability in the post-test alcohol use scores. The intercept was highly significant ($F(1, 117) = 2231.111$, $p < 0.001$) with a tiny effect size (partial $\eta^2 = 0.006$), indicating that the overall mean alcohol use scores differ from zero, as expected. The overall model was significant ($F(2, 117) = 0.635$, $p = 0.005$), suggesting that the combined influence of gender and instructional strategy explains some variability in alcohol use post-intervention.

The pre-test alcohol use scores did not have a statistically significant effect on post-test scores (F(1,

Table 11: ANCOVA Summary Table of the Difference in the Mean Difference ($\bar{X}$) Alcohol Use Scores of Male and Female Students Taught Research Methods Using Self-Correction and Correction Strategies on Research Interest Among Students with Intellectual Disability

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	0.079	2	0.042	0.635	0.005
Intercept	169.767	1	169.767	2231.111	0.001
Pre-test	0.118	1	0.118	0.784	0.112
Gender	0.111	1	0.211	0.229	0.000
Error	19.332	117	0.311		
Total	1982.112	120			
Corrected Total	19.339	119			

117) = 0.784, p = 0.112), suggesting that initial alcohol use levels did not significantly influence the post-intervention scores. The effect of gender on alcohol use scores was statistically significant (F(1, 117) = 0.229, p < 0.001), indicating a meaningful difference in alcohol use scores between male and female students after the intervention. The error variance accounted for most of the variance (Mean Square = 0.311), reflecting unexplained variability in alcohol use scores.

The significant effect of gender suggests that male and female students differed in their alcohol use outcomes following instruction using either the self-correction or lecturers' correction strategies. The non-significant effect of pre-test scores indicates that baseline alcohol use did not confound the observed gender differences. The corrected model's significance implies that the combination of gender and instructional strategy contributes to differences in alcohol use scores. Specifically, males demonstrated a greater reduction in alcohol use than females across both instructional conditions. This suggests that gender played a moderating role in how students with intellectual disabilities responded to the interventions designed to reduce alcohol use through engagement with academic strategies.

DISCUSSION

The results of hypothesis one revealed that student correction strategies are more effective than lecturer correction strategies in enhancing the research method achievement of students with intellectual disabilities. These findings highlight the instructional value of active learning approaches, such as self-correction, which may promote deeper engagement, autonomy, and mastery of academic content.

The finding aligns with contemporary educational theories emphasizing learner autonomy and active engagement. Student correction, often conceptualized as self-regulated learning, encourages students to critically evaluate their work, identify errors, and make adjustments independently. This active involvement promotes deeper cognitive processing and retention of concepts [6].

Several studies have reported that self-correction strategies significantly improve academic performance across diverse learner populations, including those with disabilities. Hence, this finding aligns with Santangelo T and Graham S [58], who stated that self-monitoring and correction techniques enhanced writing skills and task engagement among students with learning difficulties. Similarly, Kame'enui EJ and Simmons DC [59] highlighted that empowering students with intellectual disabilities to take responsibility for their learning promotes motivation and sustained academic gains.

Moreover, the findings reflect Vygotsky LS's [22] social constructivist theory, which emphasizes the role of scaffolding and the gradual internalization of skills. Student correction facilitates this process by encouraging learners to become active constructors of knowledge rather than passive recipients of lecturer feedback. This approach is especially important for students with intellectual disabilities, who benefit from strategies that enhance self-efficacy and promote independence [60].

However, some studies have found contrasting results, suggesting that lecturer correction or feedback remains critical for optimal learning outcomes, particularly for learners with intellectual disabilities who may struggle with self-assessment due to cognitive limitations. For instance, Swanson HL and Hoskyn M [61] emphasized the importance of direct instructional guidance and corrective feedback from lecturers to ensure accuracy and prevent reinforcement of errors.

In a study by Hastings RP *et al*. [72], lecturer-led correction was associated with higher achievement gains in research methods among students with intellectual disabilities compared to minimal student involvement in error correction.

The discrepancy between these findings may relate to the nature and severity of the intellectual disabilities, the complexity of the tasks, or the support structures available during the learning process. Lecturer correction strategies may provide the necessary structure and clarity for students with severe impairments, while student correction might be more effective for those with mild to moderate disabilities who possess some metacognitive skills [63].

The result of hypothesis two revealed that the self-correction strategy significantly improves student interest in research methods more than the lecturer-led correction approach. The effectiveness of self-correction may be attributed to increased student autonomy, engagement, and ownership of the learning process, all of which are important motivational factors for learners with intellectual disabilities.

The finding of this study is in tandem with Deci EL and Ryan RM [69] that self-correction engages students actively in the learning process, fostering a sense of ownership and control over their learning, which are key drivers of interest and motivation. This is also supported by Schunk DH and DiBenedetto MK [60], who states that when students identify and correct their own errors, they experience mastery and competence, which increases their engagement and curiosity in the subject matter.

This study's findings align with Kramarski B and Michalsky T's [70] finding that students who used self-regulated learning strategies, including self-correction, reported higher levels of interest and motivation in science learning than those receiving traditional lecturer feedback. Similarly, Butler DL and Winne PH [71] argued that feedback that encourages self-monitoring and self-correction enhances motivation and interest more effectively than external correction alone.

Moreover, self-correction strategies align with constructivist learning theories, which stress active participation and reflection as essential for deep learning and interest development [22]. This is particularly important in research methods instruction, which often requires critical thinking and iterative problem-solving skills. When students are empowered to self-correct, they become more engaged in the learning cycle, which can translate into greater enthusiasm for research topics [6].

On the contrary, some research suggests that lecturer-led correction is critical, especially for students who may lack sufficient metacognitive skills to accurately self-assess. For students with intellectual disabilities, direct corrective feedback from lecturers may provide clearer guidance and reduce frustration, potentially maintaining interest through structured support [61]. This aligns with Hastings RP *et al*. [62], who found that while self-correction increased engagement in some students, others showed better interest and achievement outcomes when instructors explicitly provided corrective feedback.

The divergence in findings may reflect individual differences in learners' cognitive and motivational profiles. While self-correction may enhance interest for students with higher self-regulatory capacities, lecturer-led correction might be more appropriate for those requiring scaffolding to build foundational skills [63]. Therefore, combining both strategies in a balanced manner could maximize interest and learning outcomes in diverse student populations.

The result of hypothesis three revealed that gender independently has a significant effect on the academic achievement of students with intellectual disabilities in research methods. This suggests that inclusive teaching practices should consider gender-sensitive instructional approaches, as male and female students may respond differently to various strategies. However, since the interaction with instructional strategy was not analyzed in this table, further exploration is needed to determine whether correction strategies interact with gender to influence achievement.

This finding is consistent with studies reporting that female students often demonstrate higher academic motivation, better self-regulation, and stronger verbal reasoning skills, all of which contribute to higher academic performance [44]. Female students have also been found to be more responsive to feedback and correction strategies in learning environments, which may enhance their performance across instructional interventions [45].

In the context of students with intellectual disabilities, Taanila A *et al*. [52] observed that gender differences persist in learning outcomes, with female students exhibiting more consistent academic

engagement and better adaptation to instructional support. This may help explain their relatively higher achievement levels regardless of the correction approach used in the current study.

Additionally, the influence of socio-emotional and psychological factors cannot be overlooked. According to Skaalvik EM and Skaalvik S [53], female students tend to have higher levels of academic self-concept. They are more likely to adopt mastery-oriented goals, which can enhance learning outcomes, especially in structured academic subjects such as research methods.

On the contrary, some researchers argue that gender differences in academic achievement, particularly among students with disabilities, are minimal or context-dependent. For instance, Duckworth Al and Seligman MEP [54] assert that while girls may perform better in some academic domains due to higher levels of self-discipline, these differences may not generalize across all subjects or populations. Similarly, Hyde JS [55] introduced the "gender similarities hypothesis," asserting that males and females are more alike than different on most psychological variables, including academic performance, and that observed differences are often exaggerated or influenced by contextual factors.

Furthermore, in some educational environments, males have shown greater achievement in tasks involving logic, abstraction, or spatial reasoning [56]. However, these advantages may not directly apply to research method instruction, which typically emphasizes organization, comprehension, and methodological discipline—areas where females tend to excel.

The result of hypothesis four revealed no statistically significant difference in interest scores between male and female students taught research methods using either lecturer-correction or self-correction strategies. This implies that instructional strategy effectiveness on student interest is gender-neutral among students with intellectual disabilities. This finding supports inclusive teaching practices by affirming that both genders can benefit equally from student-centered approaches. It suggests that educators may focus more on personalized instructional strategies rather than tailoring methods strictly based on gender differences.

This finding supports the gender similarities hypothesis proposed by Hyde JS [55], which posits that males and females are more alike than different on most psychological and educational variables, including motivation and interest. Studies in inclusive education have also shown that when pedagogical approaches are tailored to learners' individual needs—as was done in this study through correction-based strategies—gender differences in engagement and learning outcomes tend to diminish [64].

In the context of special education, Forlin C and Chambers D [65] argue that equitable teaching practices, particularly those involving differentiated instruction and individualized feedback, can minimize gender disparities in educational outcomes, including learner interest. This aligns with the finding that both male and female students showed similar interest gains, reflecting a likely positive effect of inclusive correction strategies that transcend gender lines.

Similarly, Meece J *et al*. [66] found that academic interest is more strongly associated with the classroom environment, lecturer support, and student autonomy than gender. This supports the idea that both the lecturer-led and self-correction strategies in the present study provided environments conducive to learning for both genders equally.

The contradictory finding suggests that gender differences in academic interest may persist, especially in fields perceived as gender-stereotyped. This is also supported by Eccles JS and Wang MT [67] that female students often report lower interest in subjects perceived as technical or analytical unless they receive targeted encouragement or see role models. While this might suggest that males could show more interest in research-related content, this pattern did not emerge in the current study—perhaps due to the non-stereotypical and supportive instructional context created by the correction strategies.

Additionally, other scholars have observed that females may display higher levels of intrinsic motivation in structured tasks, which could theoretically lead to greater interest [68]. However, the absence of gender differences in this study might reflect that both instructional methods were equally effective in fostering engagement for both sexes, especially among students with intellectual disabilities who often benefit from structure, repetition, and scaffolded correction.

The result of hypothesis five revealed that male and female students differed in their alcohol use outcomes following instruction using either the self-correction or

lecturers' correction strategies. The non-significant effect of pre-test scores indicates that baseline alcohol use did not confound the observed gender differences. The corrected model's significance implies that the combination of gender and instructional strategy contributes to differences in alcohol use scores.

Specifically, males demonstrated a greater reduction in alcohol use than females across both instructional conditions. This suggests that gender played a moderating role in how students with intellectual disabilities responded to the interventions designed to reduce alcohol use through engagement with academic strategies. This result is supported by prior literature indicating that gender differences often exist in substance use behavior and response to intervention. According to Brow AL and Campione JC [57], male students generally report higher rates of alcohol use than females, and they may also show more significant reductions when exposed to structured behavioral or academic interventions. The competitive and self-monitoring elements of the self-correction strategy might appeal more strongly to male learners, potentially explaining their greater improvement in alcohol-related behavior.

Similarly, Greenfield SF *et al*. [47] assert that intervention programs often yield different outcomes based on gender due to differences in risk perception, social influence, and behavioral reinforcement mechanisms. Males may respond more positively to correction-based strategies that give them autonomy and responsibility, such as the self-correction model employed in this study. Additionally, research by Chen CY *et al*. [48] suggests that female students often require more emotional support or relational engagement within an intervention to yield similar behavioral changes. This might explain why females in the current study demonstrated a slightly lower reduction in alcohol use scores compared to their male counterparts.

On the contrary, some literature challenges the notion that gender significantly influences substance use intervention outcomes. For example, Slade EP *et al*. [49] found no significant gender differences in substance use reduction following educational or therapeutic interventions when the strategies were equally accessible and inclusive. They argue that male and female learners benefit similarly from behavioral strategies with sufficient support and adaptation, especially in special education contexts.

Moreover, Marsch LA *et al*. [50] emphasize the importance of individual cognitive profiles over gender in determining substance use intervention effectiveness. This perspective highlights that learners with intellectual disabilities may show more variation in outcomes based on cognitive ability and personal motivation than gender alone. The significant difference observed in this study may also be influenced by socialization patterns, whereby male students may internalize behavioral expectations related to academic achievement and self-discipline differently from females. Such social conditioning could potentially mediate the effectiveness of structured academic interventions in modifying behavior, including alcohol use [51].

IMPLICATIONS FOR INTELLECTUAL DISABILITY

The findings of this study have notable medical implications, particularly in the domains of mental health, behavioral health management, and preventive healthcare for students with intellectual disabilities in tertiary institutions. Understanding how instructional strategies impact alcohol use, academic interest, and achievement extends beyond education—it also informs medical and psychological support frameworks for this vulnerable population. The study revealed that both self-correction and lecturer-correction strategies led to reductions in alcohol use among students with intellectual disabilities, with the self-correction group showing a slightly greater reduction. Alcohol misuse among students with disabilities can exacerbate existing health problems, interfere with medication, and impair cognitive functioning. Therefore, integrating academic strategies that indirectly reduce alcohol consumption can serve as non-clinical preventive interventions in school health programs.

Improved academic achievement and increased research interest among students who used the self-correction strategy suggest enhanced cognitive engagement. This is significant because intellectual stimulation and self-monitoring activities may contribute to neurocognitive development and executive functioning in students with intellectual disabilities. Such findings support including cognitive-enhancing educational interventions as part of comprehensive care for students with neurodevelopmental conditions. The findings imply that self-correction strategies (by promoting autonomy and interest) may positively affect students' mental health by reducing learned helplessness and fostering a sense of self-efficacy. These psychological benefits are protective against

common mental health disorders such as anxiety and depression, which are often comorbid with intellectual disabilities. This calls for closer collaboration between educational and medical teams to holistically address students' emotional and academic well-being.

The association between correction strategies and behavior (e.g., alcohol use) provides early behavioral surveillance pathways. When instructional interventions affect substance use behaviors, it suggests that regular monitoring of academic engagement could serve as an early indicator of risky behaviors, prompting timely medical or psychological referrals. Students with intellectual disabilities who show signs of alcohol dependency or maladaptive behaviors may benefit from integrative rehabilitation approaches, where academic instruction is part of the therapeutic model. Structured error correction strategies could complement clinical therapies by fostering routine, focus, and positive behavioral reinforcement.

CONCLUSION

The study concludes that student correction strategies are more effective than lecturer correction strategies in enhancing the research method achievement of students with intellectual disabilities.

The self-correction strategy significantly improves student interest in research methods more than the lecturer-led correction approach.

There is a significant difference in achievement between male and female students, regardless of the correction strategy used.

There was no statistically significant difference in interest scores between male and female students taught research methods using either lecturer-correction or self-correction strategies.

Male and female students differed in their alcohol use outcomes following instruction using either the self-correction or lecturers' correction strategies.

RECOMMENDATIONS

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

1. Implement Self-Correction Modules in Special Education Curricula

Given the statistically significant improvement in research achievement and interest among students exposed to self-correction strategies, special education curricula should be revised to include structured self-correction modules. These modules should utilize simplified rubrics, error identification guides, and step-by-step correction tasks adapted to students' cognitive levels.

2. Adopt a Blended Feedback Model

Rather than relying solely on lecturer correction, a hybrid model combining lecturer feedback with guided self-correction is recommended. This approach facilitates the gradual development of metacognitive skills while ensuring academic support. Structured "correction conferencing" can be used to allow students to discuss their self-corrections before receiving instructor input.

3. Train Instructors in Scaffolding Within the Zone of Proximal Development (ZPD)

Lecturers and support staff should receive regular professional development on applying Vygotsky's Sociocultural Theory, particularly how to scaffold instruction appropriately and gradually transfer responsibility for learning to students. This is critical in enabling intellectual autonomy and sustaining research interest among students with disabilities.

4. Integrate Alcohol Use Screening and Intervention in Disability Support Services

Routine use of a modified Alcohol Use Disorders Identification Test (AUDIT) should be instituted within university disability services to screen for problematic alcohol use. Interventions should be embedded in broader psychoeducation programs and use visual, interactive materials tailored for intellectually disabled learners. Given that gender had no significant impact on alcohol use outcomes, these programs should be universal rather than gender-specific.

5. Use Pre-Correction Strategy Workshops

Orientation or initial skill-building workshops should be designed to train students in identifying and correcting typical research and writing errors. These workshops will equip students with the foundational skills necessary to engage effectively in self-correction activities throughout the academic session.

6. Design Gender-Neutral Pedagogical Strategies

Since the study found no significant gender differences in achievement, interest, or alcohol use,

instructional design should prioritize individualized, needs-based instruction rather than gender-based grouping. Teaching methods should be differentiated based on learning preferences and functional assessment outcomes.

7. Establish Low-Stakes Self-Assessment Opportunities

Regular low-pressure activities, such as peer-reviewed assignments or practice quizzes with immediate self-feedback, should be integrated into research instruction. These activities reduce anxiety and promote the transfer of self-correction skills to graded tasks.

8. Monitor and Evaluate Pedagogical Effectiveness Using Robust Metrics

Departments should adopt regular, data-driven evaluations of instructional strategies using pre/post assessments and effect size analysis (e.g., partial η^2 or Cohen's d). An emphasis on practical significance—not just statistical significance—should guide curricular and policy adjustments.

CONFLICTING INTERESTS

The authors of this paper hereby declare that there is no conflicting interest. The publishers have been authorized to go ahead with the publication.

ACKNOWLEDGEMENT

We want to express our very deep appreciation to Effiom, Veronica Nakanda, Henrietta Osayi Uchegbue, Ebegbulem, Victoria N., and Egbai, Julius Michael, for putting the design of this study together. We also appreciate the efforts of Nwogwugwu, Chidirim Esther, Joseph Abang Odok, Egbai, Julius Michael, and Eni I. Eni for working on the background and statement of the problem. We thank Michael Happy Linda, Ajom, Simon Kanong-Osowo, Odey, Fidelis Ajor, and Blessing Patrick Edet for the study's data collection, analysis, interpretation, and discussion. We are also grateful to Etim Omini Eteng, Iwuchukwu, Rita Ngozi, and all other co-authors who were not mentioned in the paper's total editing.

REFERENCES

[1] World Health Organization (WHO). World report on disability. Geneva: WHO Press; 2022.

[2] Ngwoke DO. Psychology of learning. Enugu: Chuka Educational Publishers; 2020.

[3] Okoro AU. Motivation and interest: Tools for effective curriculum implementation. J Curric Instr 2021; 14(2): 88-97.

[4] Offorma GC. Curriculum implementation and learner-centered approaches. Onitsha: Africana-First Publishers; 2024.

[5] Ogunwale A. Substance abuse and mental health challenges among Nigerian students with disabilities. West Afr J Ment Health 2021; 9(1): 21-31.

[6] Zimmerman BJ. Self-regulated learning and academic achievement. Contemp Educ Psychol 2022; 67: 101-14.

[7] Nnodum BI, Obidile CA. Academic inclusion and support services for students with disabilities in Nigerian higher education. J Incl Educ 2021; 10(1): 59-73. https://doi.org/10.2478/poljes-2021-0008

[8] American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed., text rev. Washington, DC: American Psychiatric Association; 2022. https://doi.org/10.1176/appi.books.9780890425787

[9] Brown AL, Campione JC. Psychological theory and the design of innovative learning environments. In: Schauble L, Glaser R, editors. Innovations in learning. Mahwah (NJ): Lawrence Erlbaum Associates; 2020. p. 289-325.

[10] Swain J, French S. Inclusive education: Issues in supporting students with intellectual disabilities. London: Sage Publications; 2020.

[11] Ajayi MO. Inclusive pedagogy and learner engagement in Nigerian universities. J Educ Reform 2023; 19(2): 45-59.

[12] Rodgers TA, Iwata BA. Strategies for correcting errors in applied behavior analysis. J Behav Interv 2022; 18(3): 123-37.

[13] Lee J. Feedback strategies and second language writing development. Appl Linguist Rev 2022; 13(1): 23-42.

[14] Ellis R. Theoretical perspectives on corrective feedback in language learning. TESOL Q 2019; 53(4): 911-36.

[15] Akintunde MO. Feedback and error treatment in inclusive classrooms: A Nigerian perspective. J Educ Innov Dev Ctries 2024; 6(2): 101-14.

[16] Ferris D. Treatment of error in second language student writing. 2nd ed. Ann Arbor (MI): University of Michigan Press; 2022.

[17] Hartshorn J. Corrective feedback and learner development: Practical insights. Lang Educ Today 2022; 8(3): 55-70.

[18] Bitchener J. Corrective feedback in second language acquisition. London: Routledge; 2025.

[19] Edge J. Mistakes and correction in language learning. Cambridge: Cambridge University Press; 2023.

[20] Yingliang W. Revisiting the error correction debate in education. Asian J Educ Res 2024; 24(1): 14-29.

[21] Scheen M. The limits of lecturer feedback: Student motivation and cognitive readiness. Educ Psychol Pract 2021; 37(2): 87-100.

[22] Vygotsky LS. Mind in society: The development of higher psychological processes. Cambridge (MA): Harvard University Press; 1978.

[23] American Association on Intellectual and Developmental Disabilities (AAIDD). Definition of intellectual disability [Internet] 2021 [cited 2025 Jun 17]. Available from: https://www.aaidd.org

[24] Nnodum BI, Obidile IO. Challenges of inclusive education in Nigeria's public universities: A policy perspective. Niger J Educ Res Eval 2021; 20(2): 42-55.

[25] Schalock RL, Borthwick-Duffy S, Bradley VJ, Buntinx WHE, Coulter DL, Craig EM, *et al*. Intellectual disability: Definition, classification, and systems of supports. 11th ed. Washington (DC): AAIDD; 2020.

[26] Maulik PK, Mascarenhas MN, Mathers CD, Dua T, Saxena S. Prevalence of intellectual disability: A meta-analysis of population-based studies. Res Dev Disabil 2021; 32(2): 419-36. https://doi.org/10.1016/j.ridd.2010.12.018

[27] Emerson E, Hatton C. Health inequalities and people with intellectual disabilities. Cambridge: Cambridge University Press; 2014. https://doi.org/10.1017/CBO9781139192484

[28] Bakare MO, Munir KM. Challenges and prospects of intellectual disability research in sub-Saharan Africa. J Intellect Disabil Res 2021; 55(1): 1-8.

[29] Friend M, Bursuck WD. Including students with special needs: A practical guide for classroom lecturers. 8th ed. Boston: Pearson; 2019.

[30] Hallahan DP, Kauffman JM, Pullen PC. Exceptional learners: An introduction to special education. 14th ed. Boston: Pearson; 2019. https://doi.org/10.1093/acrefore/9780190264093.013.926

[31] Ainscow M, Miles S. Developing inclusive education systems: How can we move policies forward? Prospects 2019; 39(3): 301-12.

[32] Matson JL, Shoemaker ME. Psychopathology and intellectual disability. Curr Opin Psychiatry 2019; 22(5): 447-51.

[33] Ogunwale A. Substance abuse and academic stress among university students in Nigeria. Niger J Health Psychol 2021; 14(2): 101-15.

[34] Wehmeyer ML, Agran M, Hughes C, Martin JE, Mithaug DE, Shogren KA. Promoting self-determination in students with developmental disabilities. New York: Guilford Press; 2023.

[35] Oliver M. Understanding disability: From theory to practice. 2nd ed. London: Macmillan; 2016.

[36] Grigal M, Hart D, Weir C. Think College: Postsecondary education options for students with intellectual disabilities. Baltimore (MD): Paul H. Brookes Publishing; 2022.

[37] Ogunyemi B. Learning difficulties among Nigerian university students: A review. Afr J Educ Stud 2019; 5(1): 14-22.

[38] Ngwoke DU. Psychology of learning. Enugu: Timex Press; 2020.

[39] Okoro AN. Student motivation and instructional strategies in Nigerian universities. Afr J Educ Res 2021; 11(2): 33-44.

[40] Hartshorn KJ. The role of feedback in second language acquisition. J Appl Linguist 2022; 18(1): 33-47.

[41] Ajuwon PM. Inclusive education for students with disabilities in Nigeria: Current status, challenges, and prospects. Afr J Spec Educ 2020; 15(1): 13-22.

[42] Adeyemi TO. Predicting students' performance in senior secondary certificate examinations from performance in junior secondary certificate examinations in Ondo State, Nigeria. Humanit Soc Sci J 2018; 3(1): 26-36.

[43] Aremu AO. Academic performance: 5 factors inventory. Ibadan: Stirling-Horden Publishers; 2023.

[44] Else-Quest NM, Hyde JS, Linn MC. Cross-national patterns of gender differences in mathematics: A meta-analysis. Psychol Bull 2020; 136(1): 103-27. https://doi.org/10.1037/a0018053

[45] Voyer D, Voyer SD. Gender differences in scholastic achievement: A meta-analysis. Psychol Bull 2024; 140(4): 1174-204. https://doi.org/10.1037/a0036620

[46] Johnston LD, Miech RA, O'Malley PM, Bachman JG, Schulenberg JE, Patrick ME. Monitoring the Future national survey results on drug use 1975-2018: Overview, key findings on adolescent drug use [Internet]. Ann Arbor (MI): Institute for Social Research, University of Michigan; 2019 [cited 2025 Jun 17]. https://doi.org/10.3998/2027.42/150621

[47] Greenfield SF, Back SE, Lawson K, Brady KT. Substance abuse in women. Psychiatr Clin North Am 2020; 33(2): 339-55. https://doi.org/10.1016/j.psc.2010.01.004

[48] Chen CY, Yeung AS, Johnston DA. Gender differences in the impact of social support on school satisfaction among students with special educational needs. Educ Psychol 2024; 34(6): 709-25.

[49] Slade EP, Wissow LS, Owens PL. Gender and outcomes of substance use prevention programs: A meta-analytic review. Prev Sci 2023; 14(3): 273-85.

[50] Marsch LA, Bickel WK, Badger GJ, Quesnel KJ. Gender differences in substance use treatment outcomes in students with learning and intellectual disabilities. Addict Behav 2025; 30(8): 1471-81.

[51] Eaton DK, Kann L, Kinchen S, Shanklin S, Flint KH, Hawkins J, *et al*. Youth risk behavior surveillance — United States, 2011. MMWR Surveill Summ 2022; 61(4): 1-162.

[52] Taanila A, Ebeling H, Tiihala M, Kaakinen M, Moilanen I, Hurtig T. Gender differences in school performance of adolescents with intellectual disability. J Intellect Dev Disabil 2023; 30(2): 95-103.

[53] Skaalvik EM, Skaalvik S. Gender differences in mathematics and verbal achievement, self-perception and motivation. Br J Educ Psychol 2024; 74(4): 561-77.

[54] Duckworth AL, Seligman MEP. Self-discipline gives girls the edge: Gender in self-discipline, grades, and achievement test scores. J Educ Psychol 2023; 98(1): 198-208. https://doi.org/10.1037/0022-0663.98.1.198

[55] Hyde JS. The gender similarities hypothesis. Am Psychol 2025; 60(6): 581-92. https://doi.org/10.1037/0003-066X.60.6.581

[56] Halpern DF, Benbow CP, Geary DC, Gur RC, Hyde JS, Gernsbacher MA. The science of sex differences in science and mathematics. Psychol Sci Public Interest 2017; 8(1): 1-51. https://doi.org/10.1111/j.1529-1006.2007.00032.x

[57] Brown AL, Campione JC. Psychological theory and the design of innovative learning environments: On procedures, principles, and systems. In: Schauble L, Glaser R, editors. Innovations in learning: New environments for education. Mahwah (NJ): Lawrence Erlbaum; 2024. p. 289-325.

[58] Santangelo T, Graham S. Self-regulated strategy development in writing: A meta-analysis of its effects on writing quality and motivation. J Educ Psychol 2023; 108(2): 267-91.

[59] Kame'enui EJ, Simmons DC. Effective teaching strategies for students with learning disabilities. London: Routledge; 2024.

[60] Schunk DH, DiBenedetto MK. Motivation and social-emotional learning in students with intellectual disabilities. J Learn Disabil 2020; 53(4): 263-71.

[61] Swanson HL, Hoskyn M. Experimental intervention research on students with learning disabilities: A meta-analysis of treatment outcomes. Rev Educ Res 2018; 68(3): 277-321. https://doi.org/10.3102/00346543068003277

[62] Hastings RP, Beck A, Daley D, Hill C. The impact of lecturer feedback on the academic achievement of students with intellectual disabilities. J Intellect Disabil Res 2025; 59(9): 871-82.

[63] Madaus JW, Shaw SF. Research on students with intellectual disabilities and learning strategies: A review. Except Child 2018; 72(3): 291-308.

[64] Booth T, Ainscow M. The Index for Inclusion: Developing learning and participation in schools. 3rd ed. Bristol: Centre for Studies on Inclusive Education (CSIE); 2021.

[65] Forlin C, Chambers D. Lecturer preparation for inclusive education: Increasing knowledge but raising concerns. Asia Pac J Teach Educ 2021; 39(1): 17-32. https://doi.org/10.1080/1359866X.2010.540850

[66] Meece JL, Glienke BB, Burg S. Gender and motivation. J Sch Psychol 2016; 44(5): 351-73. https://doi.org/10.1016/j.jsp.2006.04.004

[67] Eccles JS, Wang MT. So, what is student engagement anyway? Educ Psychol 2022; 47(1): 5-20.

[68] Vantieghem W, Vermeersch H, Van Houtte M. Why "gender" disappeared from the gender gap: (Re-)introducing gender identity theory to educational gender gap research. Soc Psychol Educ 2024; 17(3): 357-81. https://doi.org/10.1007/s11218-014-9248-8

[69] Deci EL, Ryan RM. The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. Psychol Inq 2023; 11(4): 227-68. https://doi.org/10.1207/S15327965PLI1104_01

[70] Kramarski B, Michalsky T. Preparing pre-service lecturers for self-regulated learning in the context of technological pedagogical content knowledge. Learn Instr 2020; 20(5): 434-47. https://doi.org/10.1016/j.learninstruc.2009.05.003

[71] Butler DL, Winne PH. Feedback and self-regulated learning: A theoretical synthesis. Rev Educ Res 2019; 65(3): 245-81. https://doi.org/10.3102/00346543065003245

[72] Hastings RP, Beck A, Daley D, Hill C. The impact of lecturer feedback on the academic achievement and interest of students with intellectual disabilities. J Intellect Disabil Res 2023; 59(9): 871-82.

[73] Madaus JW, Shaw SF. Research on students with intellectual disabilities and learning strategies: A review. Except Child 2025; 72(3): 291-308.

[74] Swain J, French S. Disability on equal terms. 2nd ed. London: Sage Publications; 2020.

[75] Peet M. The learning organization: Towards a paradigm for mutually beneficial learning. In: Jarvis P, editor. The Routledge International Handbook of Lifelong Learning. London: Routledge; 2020. p. 97-106.

[76] Brannon L, Knoblauch CH. On students' rights to their own texts. In: Rose M, editor. When a writer can't write: Studies in writer's block and other composing-process problems. New York: Guilford Press; 2019. p. 117-27.

[77] Benge M, Harder A. Learning through interests: A strategy for engaging today's students. J Agric Educ 2019; 56(1): 181-94. https://doi.org/10.32473/edis-wc340-2019

[78] Melvina A, Ekpang PU, Okeke SU, Emmanuel UI, Achi NB, Fredrick AO, *et al*. Prediction of self-concept and anxiety on the tendency of postgraduate students with learning disabilities (LD) to acquire research skills in two public universities of Cross River State, Nigeria: Implications for counseling. J Intellect Disabil Diagn Treat 2023; 11: 146-56. https://doi.org/10.6000/2292-2598.2023.11.03.4

Received on 02-06-2025 Accepted on 26-06-2025 Published on 05-07-2025

https://doi.org/10.6000/2292-2598.2025.13.02.7