Effect of Heuristic Method on Students' Performance in Shorthand in Polytechnics of North Eastern States

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Abstract: *This research explores the influence of heuristic teaching methods on the academic performance of students in shorthand courses within polytechnic institutions located in the North Eastern States. Shorthand, as a vital skill in various professional fields, requires effective instructional strategies to enhance students' learning experiences and outcomes. The study employs a survey research design aimed at identifying the Effect of Heuristic Method on Students' Performance in Shorthand in Polytechnics of North Eastern States. The instrument for data collection is a questionnaire, a closed ended questionnaire was used and answers were provided by choosing from the given option. Preliminary findings suggest that the integration of heuristic methods positively influences students' shorthand performance, fostering a deeper understanding of the subject matter and enhancing skill development. The research contributes to the ongoing discourse on innovative teaching methodologies and their impact on technical education, specifically in the context of shorthand instruction. The outcomes of this study provide valuable insights for educators, policymakers, and curriculum developers aiming to improve teaching practices and enhance students' learning outcomes in shorthand courses. Furthermore, the research contributes to the broader discussion on the applicability of heuristic approaches in technical education within the unique context of polytechnics in the North Eastern States. The researcher wants to appreciate TETFUND for funding the research project.*

Keywords: *Heuristic Method Students' Performance Shorthand Polytechnics.*

1.0 Introduction

Academic performance measures student achievement in various subjects, including grades, test scores, and attendance. It provides satisfaction and encourages students to practice further. To achieve good performance, a better method is needed to help students achieve high grades and cope with learning experiences provided by teachers (Rosenthal, 2008).

Shorthand is a writing system using symbols, abbreviations, or a specialized script to represent words, phrases, or information more efficiently than traditional longhand writing (Smith, 2015). According Favour (2022). It is a core course in Office Technology and Management, providing students with mental and physical skills for teaching and learning office occupations.

This subject teaches business education students about English language consonants, vowels, and phrases, breaking them down into shorthand outlines. This helps them understand pronunciation and improves their speech and writing skills, enhancing their understanding of the language.

Heuristic is a teaching method based on trial and error theory, emphasizing problem-solving, discovery-based learning, and experience-based learning to facilitate student learning and promote self-learning.(Sanchita, 2023). **The heuristic teaching approach involves the teacher acting as a facilitator, encouraging students to explore concepts, ideas, and problems through open-ended questions and guided results.**

Heuristics is a teaching method that promotes self-discovery and problem-solving through exploration and experimentation, often linked to the constructivist theory of learning in education. According to Jonassen and Tessmer (1996), Heuristics are problem-solving strategies that use practical approaches to find solutions. They involve students presenting open-ended questions, challenges, or scenarios, requiring critical thinking and experimentation. This method promotes inquiry-based learning and develops problem-solving abilities. It is an economic and fast strategy, requiring students to be independent discoverers without teacher guidance. The researcher aims to explore its impact on short-term student academic performance.

Heuristic methods, characterized by their emphasis on self-discovery and active problem-solving, have shown promise in enhancing students' learning experiences in various subjects (Jonassen & Tessmer, 1996). However, their application and impact on shorthand instruction in the specific context of North Eastern Nigerian polytechnics have not been extensively studied.

2.0 Literature Review

This literature review tends to examines the existing body of knowledge related to the effect of heuristic teaching methods on students' performance in shorthand, with a specific focus on polytechnics located in the North Eastern States of Nigeria. The review aims to provide a comprehensive understanding of the topic, identify gaps in the literature, and set the stage for the research study.

2.1   Conceptual Review
2.1.1   Students Performance

According to Khan,Begum, & Imad,(2019), academic performance is defined as the measure of what a person has accomplished after exposure to an educational program. It is an important parameter for ascertaining the level of mastery attained by the student in a particular course of study. Assessing students' academic performance through standardized tests is crucial for the school system and society. Grade levels have learning goals or instructional standards, and improving student performance requires quality instruction and accurate teaching methods. According to Sinha, Ghate, Chatur and Sinha (2017), educational institutions' success is measured by academic performance or how well students meet the standards set out by the institutions. Students' satisfaction from high performance levels motivates them to practice further learning activities. A better method is needed to help students achieve high grades and cope with business education teacher-provided learning experiences.

2.1.2   Shorthand

Pitman, (1837). Shorthand is the art of representing spoken sounds by written signs. This course is a fundamental program in Office Technology and Management, equipping students with necessary skills and competencies for effective teaching, office work, and self-reliance. Njoku (2022) opined that shorthand provides good skills that help students to be marketable in the world of work, especially in a country that is under the pressure of high and rising rate of unemployment. Shorthand involves drilling and transcribing outlines and representing spoken sounds with written signs, using abbreviated symbolic signs for phonemes, words, and phrases, enhancing speed and brevity in writing. Shorthand is one of the vital subjects required in OTM curriculum as prepared by the National Board for Technical Education (NBTE 2006). This subject teaches business education students about English language consonants, vowels, and phrases, breaking them down into shorthand outlines. This helps them understand pronunciation and improves their speech and writing skills, enhancing their understanding of the language.

Generally, shorthand, also called stenography is a system of rapid writing that uses symbols or abbreviations for letters, words or phrases (Encyclopaedia Brittanica, 2010). Shorthand is a rapid handwriting system that uses simplified letters and abbreviations to represent phonemes, words, and phrases, allowing trained individuals to write as quickly as people speak.

2.1.3   Heuristic

Heuristic teaching, based on trial and error theory, emphasizes problem-solving, discovery-based learning, and experience-based learning to facilitate student learning. Heuristic basically means any method or process that helps in problem-solving, self-learning, and discovery (Sanchita, 2023). **The heuristic teaching approach involves the teacher acting as a facilitator, encouraging students to explore concepts, ideas, and problems through open-ended questions and guided results.**

2.1.4   Polytechnics

Polytechnics, as defined by Akinsete and Aninkan (2012), are institutions of higher education and vocational training that offer a wide range of diploma and certificate programs in fields such as engineering, agriculture, business, and technology. These institutions are designed to provide practical skills and competencies to prepare students for careers in various industries. Polytechnics are institutions of higher education that primarily focus on providing technical and vocational education and training in various fields, with an emphasis on practical skills development for the workforce (Reid, 2002). According to Smith (2021), "Polytechnics are institutions that offer technical and vocational education and training."

2.2   Empirical Review

2.2.1   Heuristic Teaching Method on Students Performance

The heuristic teaching method is grounded in constructivist learning theories (Jonassen & Tessmer, 1996). It emphasizes active engagement, problem-solving, and experiential learning. Prior research has illustrated the efficacy of heuristic methods in enhancing students' critical thinking, problem-solving abilities, and knowledge retention (Nasrin & Tamim, 2016). Katarzyna and Jaszczolt, (2022). A heuristic method is particularly used to rapidly come to a solution that is hoped to be close to the best possible answer, or 'optimal solution'. The Heuristic method involves a teacher setting a problem for students to solve, then providing explanations if needed,

thereby aiding in the study of shorthand. According to Armstrong, as cited in Maheshwari (2016) a heuristic method of teaching is a method which involves students finding out instead of being merely told about things". The heuristic method is a strategy that uses rules of thumb, educated guesses, and intuitive judgments to control problem-solving in humans and machines. It involves thorough inquiry and thorough study to gain a heuristic idea about the subject taught.

Moreover, heuristic teaching encourages inquiry-based learning, where students are encouraged to explore topics of interest deeply. Smith (2001) argues that this method allows students to discover knowledge for themselves, making learning a more meaningful and self-directed process.

The heuristic teaching method, as described by Smith (2001) and Savery (2006), is characterized by active learning, problem-solving, and inquiry-based exploration. It empowers students to take ownership of their learning, develop critical thinking skills, and engage in independent inquiry, aligning with modern educational goals and pedagogical approaches.

Key Characteristics of Heuristic Teaching:
1. **Active Learning:** Heuristic teaching promotes active engagement rather than passive reception of information. Students are encouraged to participate actively in the learning process, often through hands-on activities and discussions.
2. **Problem-Solving:** Central to heuristic teaching is the development of problem-solving skills. Students are presented with open-ended questions or challenges that require them to analyze, synthesize, and find solutions independently.
3. **Critical Thinking:** Heuristic teaching fosters critical thinking by encouraging students to question, evaluate, and analyze information critically. They learn to assess evidence, make judgments, and develop reasoned arguments.

Benefits of Heuristic Teaching:
1. **Enhanced Learning:** Heuristic teaching engages students actively, leading to better retention and understanding of concepts. It promotes a deeper level of learning.
2. **Problem-Solving Skills:** Students develop strong problem-solving and critical thinking skills, which are valuable in various academic and real-world contexts.
3. **Independence:** This method fosters self-reliance and independence in learning. Students become more capable of self-directed learning, a skill essential in lifelong education.
4. **Motivation:** Active participation and the sense of discovery often motivate students, making learning more enjoyable and rewarding.

The heuristic teaching method promotes active learning, critical thinking, problem-solving, and inquiry-based exploration, empowering students to become independent, motivated learners and fostering deep understanding.

2.2.2 Shorthand Education

Shorthand education has long been recognized as a critical component of vocational training, equipping students with essential skills for careers in secretarial, administrative, and transcription roles (Omeje & Chukwu, 2018). This specialized form of writing enables individuals to record spoken language quickly and efficiently using a system of symbols and abbreviations, making it an indispensable skill in professions where accurate and rapid note-taking is essential.

Historically, shorthand education has been a foundational aspect of secretarial and administrative training programs (Wills, 2016). Shorthand proficiency has been considered a

hallmark of a skilled secretary, enabling efficient transcription of spoken words and facilitating effective communication in the workplace.

In vocational education, shorthand instruction has been recognized for its practical relevance and direct applicability to the workplace. Omeje and Chukwu (2018) highlight the importance of addressing skill deficiencies in shorthand writing among students in polytechnics, emphasizing the need for effective shorthand education to bridge the gap between classroom learning and workplace demands.

Shorthand, as a critical skill in secretarial and administrative roles, has been a subject of study in vocational education literature. Researchers emphasize the importance of shorthand proficiency in preparing students for the demands of contemporary workplaces (Omeje & Chukwu, 2018). Shorthand education is considered a vital component of vocational training, equipping graduates with efficient transcription and note-taking skills (Wills, 2016).

2.2.3 Application of Heuristic Methods in Vocational Education

As educators seek innovative approaches to prepare students for dynamic work environments, the application of heuristic methods in vocational education has gained prominence. While much of the existing research has concentrated on conventional academic subjects, emerging studies explore the use of heuristic methods in vocational and technical education (El Said, 2017).

Heuristic methods in vocational education promote active learning, critical thinking, problem-solving, and practical skill development, preparing students for specific careers and equipping them with the necessary skills for success.

1. **Active Learning and Engagement:** Heuristic methods encourage active learning by involving students in hands-on activities and practical experiences, promoting deeper understanding and knowledge retention. (Bonwell & Eison, 1991).
2. **Problem-Solving Skills:** Heuristic methods promote real-world problem-solving, a crucial skill in vocational contexts, by allowing students to apply their knowledge to practical situations. (Kavanoz et al., 2015).
3. **Critical Thinking:** Heuristic methods encourage critical thinking, information analysis, and informed decision-making, enhancing higher-order thinking skills crucial in vocational fields requiring complex problem-solving. (Jonassen, 2004).
4. **Skill Development:** Vocational education equips students with necessary skills for their careers, with heuristic methods facilitating skill development through practical practice in real or simulated vocational settings. (Creswell & Creswell, 2017).
5. **Authentic Learning:** Heuristic methods often incorporate authentic learning experiences, resembling real-world vocational scenarios, to improve students' readiness for the workforce and their performance. (Lombardi, 2007).
6. **Adaptability**: Heuristic methods are versatile and can be customized by educators to suit the specific skills and knowledge needed in various vocational fields, including healthcare and technical trades. (Hakkarainen et al., 2000).
7. **Motivation:** Heuristic methods, which involve active engagement and problem-solving activities, can enhance students' motivation to learn, making the learning process more enjoyable and meaningful. (Nasrin & Tamim, 2016).

Heuristic methods in vocational education enhance learning experiences by promoting active engagement, problem-solving, critical thinking, and skill development, preparing students for successful careers in various fields.

2.2.4 Gender in Heuristic Teaching Method on Students Performance

According to a study by Johnson and Smith (2008), the Heuristic Teaching Method has shown a positive impact on student performance, with a notable consideration for gender differences. Female students, for instance, demonstrated a higher proficiency in critical thinking skills when exposed to heuristic approaches (Johnson & Smith, 2008).

In contrast, Brown et al. (2006) found that male students exhibited increased engagement and problem-solving abilities in a heuristic learning environment. These findings underscore the importance of considering gender dynamics when implementing heuristic teaching strategies.

Gender influences learning styles and preferences, with females preferring collaborative environments and males preferring competitive ones. Heuristic teaching methods involve active learning, critical thinking, problem-solving, and discovery-based learning, allowing students to explore concepts independently. However, individuals can have diverse learning styles that don't align with traditional gender stereotypes.

2.2.5   Vocational Education in North Eastern Nigeria

The North Eastern region of Nigeria confronts unique challenges in education due to factors such as security concerns, restricted access to educational resources, and socio-economic disparities (Aminu, 2019). These challenges influence the delivery and effectiveness of vocational education programs, making it essential to adapt teaching methodologies to the specific context.

The socio-economic, cultural, and security context of North Eastern Nigeria significantly impacts the delivery and effectiveness of vocational education programs.

Aminu (2019) highlights the challenges of technical and vocational education in the North-Eastern States of Nigeria. The region has experienced security concerns, including insurgency, which has disrupted educational activities and access to vocational training resources. This security situation has made it imperative to adapt vocational education programs to the unique challenges of the region.

Despite these challenges, vocational education in North Eastern Nigeria holds promise for addressing local employment needs and contributing to regional development. The vocational skills acquired by students in the region can enhance their employability and provide opportunities for income generation and economic growth (Aminu, 2019).

Vocational education in North Eastern Nigeria, as discussed by Aminu (2019), is influenced by the region's specific challenges, including security concerns, limited access to resources, and socio-economic disparities. While these challenges are significant, vocational education can still play a vital role in addressing local employment needs and contributing to the region's development.

2.2.5   Research Gap

Despite the growing interest in heuristic teaching methods and the significance of shorthand proficiency in vocational education, a noticeable gap exists in the literature regarding the application of heuristic methods in shorthand instruction within North Eastern Nigerian Polytechnics. Most research on heuristic teaching has been conducted in Western contexts,

necessitating an exploration of how this method can be adapted to address the distinct needs and challenges of vocational education in the North Eastern region.

2.3 Theoretical Review

2.3.1 Theory of Heuristic Teaching Method

The heuristic teaching method is grounded in the concept of "heuristics," defined as problem-solving approaches or strategies that facilitate self-discovery and critical thinking in learners (Novak & Gowin, 1984). According to this theory, education is most effective when students actively engage with the learning process, rather than passively receiving information (Kirschner, Sweller, & Clark, 2006). The heuristic teaching method promotes active, inquiry-based, problem-solving, critical thinking, and lifelong learning skills, requiring further research and literature exploration.

2.3.2 Theory of Students Performance

Student performance is influenced by a multitude of factors that encompass various aspects of an individual's life and learning environment. These factors can be categorized into several key domains.

1. Individual Factors:

Cognitive Abilities: A crucial individual factor is cognitive abilities, including intelligence, memory, and problem-solving skills (Neisser et al., 1996). These abilities play a significant role in a student's capacity to learn and perform academically.

Motivation: Motivation is a key determinant of student performance (Pintrich & Schunk, 2002). Motivated students tend to engage more actively in learning activities and persist in the face of challenges.

2. Socioeconomic Factors:

Socioeconomic Status (SES): SES can have a substantial impact on student performance (Sirin, 2005). Students from higher SES backgrounds often have greater access to educational resources and support, which can positively affect their performance.

Family Support: The support and involvement of families in a student's education can significantly influence academic outcomes (Henderson & Mapp, 2002). Family engagement and a conducive home environment can contribute to better performance.

3. Educational Factors:

Quality of Instruction: The quality of teaching and instructional methods employed by educators is a critical factor (Hattie, 2009). Effective teaching practices can enhance student learning and performance.

Curriculum and Resources: The curriculum, textbooks, and educational resources available to students can impact their performance (Schmidt et al., 2001). Access to up-to-date materials is crucial.

4. Psychosocial Factors:

Peer Influence: Peer interactions and relationships can affect student performance (Wentzel, 2005). Positive peer support can enhance motivation and engagement.

Emotional Well-being: Emotional well-being, including stress management and mental health, plays a role in student performance (Eisenberg et al., 2006). Emotional challenges can hinder academic success.

5. Environmental Factors:

School Environment: The physical and social environment of the school, including safety, discipline, and school culture, can impact student performance (Cohen et al., 2003). A positive and supportive school climate is conducive to learning.

Student performance is influenced by various individual, socioeconomic, educational, psychosocial, environmental, and cultural factors, and holistically addressing these factors is crucial for improved understanding and performance.

2.3.3 Theory of Gender

Gender studies roles, behaviors, and societal norms, encompassing disciplines like sociology, psychology, anthropology, and feminist studies, to understand how these expectations influence individuals and societies. Here, are overviews of some key theories related to gender:

1. **Social Constructionist Theory:** Social constructionist theories assert that gender is not an inherent or biologically determined characteristic but is socially constructed through cultural and societal norms (Connell, 2002). According to this perspective, individuals learn and internalize gender roles through socialization processes.

2. **Feminist Theory:** Feminist theories focus on understanding and challenging gender-based inequalities, discrimination, and power imbalances. There are various branches of feminist theory, including liberal feminism, radical feminism, and intersectional feminism, each addressing different aspects of gender issues (hooks, 1984).

3. **Gender Schema Theory:** Gender schema theory, proposed by Sandra Bem, suggests that individuals organize and interpret information in their environment based on gender-related schemas or mental frameworks. These schemas influence perceptions, attitudes, and behaviors related to gender roles (Bem, 1981).

4. **Social Role Theory:** Social role theory posits that observed gender differences in behavior and roles arise from societal expectations and division of labor. According to this theory, the roles and responsibilities assigned to men and women are influenced by historical and cultural factors (Eagly & Wood, 1999).

Scholars use various theories to understand the intricate nature of gender, incorporating multiple perspectives to analyze gender dynamics in diverse contexts.

3.0 Methodology

This area describes the procedure used in carrying out the study. These include the research design, area of the study, population, sample and sampling techniques, instrument for data collection, validation of the instrument, procedure for data collection and method of data analysis. This study is a survey research design aimed at identifying the Effect of Heuristic Method on Students' Performance in Shorthand in Polytechnics of North Eastern States.

The population of the study includes all National Diploma (ND) students of Office Technology and Management who are currently enrolled in Polytechnic institutions located in the North Eastern States of Nigeria and who are studying shorthand as part of their curriculum. This population encompasses both male and female students across various age groups, ethnic backgrounds, and academic levels within the polytechnic institutions in the North Eastern States.

Given the scope of the study and considering practical constraints, a working sample size of 188 students were randomly selected using stratified random sampling technique. The stratified random sampling technique allows the researchers to ensure representation from

different geographic locations and polytechnic sizes within the North Eastern States. It enables the study to capture diversity and variations that may exist across polytechnics while maintaining statistical rigor. This approach strikes a balance between the need for representation and practical feasibility in conducting the study and also this technique ensures that the sample is drawn from different strata or subgroups within the population, allowing for a more representative sample. The instrument for data collection in the study was a closed ended questionnaire titled "Questionnaire on Effect of the Heuristic Teaching Method on Students' Performance in Shorthand in the Polytechnics of the North Eastern States of Nigeria." The questionnaire contained thirty-six (36) items to be responded to on a five points scale where SA = Strongly Agreed (5), A = Agreed (4), UD =Undecided (3), DA = Disagree (2), and SD = Strongly Disagree (1), in relation to the research questions. The scale for measuring the weighted responses was 3.00. This means that a mean score below 3.00 indicated a negative response while a mean score above 3.00 indicated a positive response. The face and content validation of the instrument was done by two lecturers in OTM Department and one in BAM Department, whose comments were used for correction. A reliability coefficient of .86 was obtained, which indicated that the instrument was reliable for data collection. The data were analyzed using the mean for answering the research questions.

4.0   Results
4.2   Data Analysis

A total of 188 questionnaires were administered and 186 questionnaires were returned. Therefore, the analysis was based on the number of questionnaires completely filled and returned.

Table 4.1: Analysis of Questionnaires

Number of Questionnaires	Number of Questionnaires Returned	Number of Questionnaires Not Returned	Percentage of Questionnaires Returned	Percentage of Questionnaires Not Returned
188	186	2	98.9	1.1

Data collected was analyzed using mean, patterned after 5-point rating scale method of data

Table 4.2: Gender of the Respondents

S/N	Gender	Frequency	Percentage
1.	Male	108	58.1%
2.	Female	78	41.9%
	Total	**186**	**100%**

Table 4.2 analyzed the gender of the respondents, where male has 58.1% and female has 41.9%. Data analysis of the above table shows that 108 (58.1%) of the respondents are males while 78 (41.9%) are females.

Table 4.3: Respondents Level

S/N	Respondents Level	Frequency	Percentage
1.	ND I	111	59.7%
2.	ND II	75	40.3%
	Total	**186**	**100%**

Table 4.3 analyzed level of respondents, where ND I students represent 59.7% of the respondents and ND II students represent 40.3% of the respondents.

Table 4.4: Respondents Age

S/N	Respondents Level	Frequency	Percentage
1.	Under 18	8	4.3%
2.	18 – 24	75	40.3%
3.	25 – 34	73	39.2%
4.	35 – 44	28	15.1%
5.	45 and Above	2	1.1%
	Total	**186**	**100%**

Table 4.4 analyzed the age group of the respondents, where under 18 students represent 4.3.7% of the respondents, 18 – 24 students represent 40.3% of the respondents, 25 – 34 students represent 39.2% of the respondents, 35 – 44 students represent 15.1% of the respondents and 45 and above students represent 1.1% of the respondents.

Research question one: What is the effect of heuristic method on students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria?

Table 4.5: Assessment of the Effect of Heuristic Method on Students' Performance in Shorthand

S/N	VARIABLES	∑X	Mean Score	Decision
1.	The heuristic method is an effective teaching approach for shorthand.	610	3.28	Accepted
2.	The heuristic method enhances your understanding of shorthand concepts	685	3.68	Accepted
3.	Have you find the heuristic method engaging and interactive in learning shorthand	748	4.02	Accepted
4.	The use of the heuristic method has improved your shorthand writing speed.	758	4.08	Accepted
5.	The heuristic method has positively influenced your shorthand accuracy.	685	3.68	Accepted
6.	Do you feel more confident in your shorthand skills due to the heuristic method.	574	3.10	Accepted
7.	How satisfied are you with the use of the heuristic method in learning shorthand	561	3.02	Accepted
8.	Do you think the teaching method has improved your understanding of shorthand concepts	591	3.20	Accepted
9.	Were the teaching materials and resources provided for the heuristic method helpful	602	3.24	Accepted

Source: Field Survey, 2023

From table 4.5 above on the research question 1, What is the effect of heuristic method on students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria, mean score of 4.02 of the respondents which find the heuristic method is engaging and interactive in learning shorthand, mean score of 4.08 of the respondent also agreed that the use of heuristic method has improved their shorthand writing speed, Therefore, this shows that all the variables support the fact that these variables are highly needed for students' performance.

Question 2: To what extend does gender in heuristic teaching method affects students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria?
Table 4.6: Assessment of Gender-based Differences in Heuristic Teaching Method and Shorthand Performance

S/N	VARIABLES	∑X	Mean Score	Decision
10.	Do you believe that gender plays a role in the effectiveness of heuristic teaching methods	561	3.02	Accepted
11.	The heuristic teaching method is equally effective for both male and female students in learning shorthand.	784	4.21	Accepted
12.	Do you believe that your gender has positively or negatively influenced your shorthand	624	3.35	Accepted
13.	How do you perceive the influence of gender on your ability to learn shorthand	721	3.87	Accepted
14.	Do you think heuristic teaching methods can be tailored to better accommodate different genders in shorthand education	754	4.05	Accepted
15.	Do you think that gender has influences the way individuals learn shorthand	842	4.53	Accepted
16.	Do you feel comfortable and supported in your shorthand learning environment regardless of your gender	742	3.98	Accepted
17.	The heuristic teaching method promotes equal participation and engagement among male and female students	694	3.73	Accepted
18.	Do you believe that gender influences the speed of shorthand writing using the heuristic method.	621	3.34	Accepted
19.	Do believe that gender influences the accuracy of shorthand writing using the heuristic method.	611	3.28	Accepted
20.	Do you think there are gender-based differences in confidence levels regarding shorthand skills with the heuristic method	560	3.01	Accepted
21.	To what extent do you believe gender influences the effectiveness of the heuristic teaching method in improving shorthand performance	811	4.36	Accepted

Source: Field Survey, 2023

From table 4.6 above on the research question 2. To what extend does gender in heuristic teaching method affects students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria? the mean score 3.34 of the respondents believe that gender influences the speed of their shorthand writing using the heuristic method, the means score of 3.28 of the respondents believe that gender influences the accuracy of their shorthand writing using the heuristic method. Therefore, this shows that all the variable supports the fact that the gender

influences the effectiveness of the heuristic teaching method in improving shorthand performance

Question 3: What is the effect of Polytechnic location in heuristic teaching method on students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria?
Table 4.7: Assessment of Polytechnic Location and Heuristic Teaching Method on Shorthand Performance

S/N	VARIABLES	∑X	Mean Score	Decision
22.	Do you think the combination of heuristic teaching methods and the location of your Polytechnic has positively influenced your performance in shorthand	599	3.22	Accepted
23.	Do you believe the location of your Polytechnic has an impact on your academic performance in shorthand	645	3.47	Accepted
24.	How would you describe the accessibility of your Polytechnic	754	4.05	Accepted
25.	How would you describe the learning environment at your Polytechnic in relation to shorthand classes	719	3.86	Accepted
26.	Do you think the location of your Polytechnic affects your ability to focus on your shorthand studies	699	3.76	Accepted
27.	The effectiveness of the heuristic teaching method in shorthand varies based on Polytechnic location.	711	3.82	Accepted
28.	The availability of resources and facilities in your Polytechnic enhances the application of the heuristic teaching method in shorthand.	685	3.68	Accepted
29.	Do you believe that the geographical location of your Polytechnic affects the implementation of the heuristic teaching method in shorthand.	705	3.79	Accepted
30.	Do you think students from Polytechnics in certain locations demonstrate better shorthand skills with the heuristic method.	702	3.77	Accepted
31.	The geographical location of your Polytechnic has a significant impact on your shorthand writing speed using the heuristic method.	721	3.87	Accepted
32.	Do believe that the location of your Polytechnic influences the overall effectiveness of the heuristic teaching method in improving shorthand performance.	658	3.54	Accepted
33.	To what extent do you believe Polytechnic location influences the effectiveness of the heuristic teaching method in improving shorthand performance?	711	3.82	Accepted

Source: Field Survey, 2023

From table 4.8 above on the research question, what is the effect of Polytechnic location in heuristic teaching method on students' performance in shorthand within the Polytechnics of the North Eastern States of Nigeria, the mean score of 3.54 of the respondents believed that the location of their Polytechnics influences the overall effectiveness of the heuristic teaching method in improving shorthand performance and also the means of 3.82 of the respondents believed Polytechnic location influences the effectiveness of the heuristic teaching method in improving their shorthand performance. Therefore, this shows that all the variable supports the

fact that Polytechnic location influences the effectiveness of the heuristic teaching method in improving shorthand performance.

5.0 Discussion of Findings

Based on the data collected and analyzed, the following are the major findings of the study:

The analysis indicates that the heuristic method positively impacts students' performance in shorthand at Polytechnics of the North Eastern States of Nigeria, enhancing comprehension, engagement, practical skills, and confidence.

The analysis indicates that gender significantly influences the effectiveness of the heuristic teaching method in improving shorthand performance, guiding educators to tailor their approaches accordingly.

The study reveals that Polytechnic location significantly influences the effectiveness of heuristic teaching methods for improving shorthand performance, highlighting the need for regional considerations in educational institutions.

5.1 Conclusions

In conclusion, the has provided valuable insights into the dynamics of teaching and learning in this specific context. The findings underscore the significance of the heuristic teaching method in shaping students' performance across various dimensions.

The heuristic method, a teaching approach for shorthand, was found to be highly effective in improving understanding, engagement, and interactive learning, thereby enhancing practical skills development.

The heuristic teaching method, despite acknowledging gender-related factors, is perceived as equally effective for both male and female students, indicating its potential for inclusivity and adaptability.

The research explores the impact of Polytechnic location on the heuristic teaching method's effectiveness in shorthand performance in Nigeria. It highlights the importance of accessibility, learning environment, and resource availability in enhancing shorthand education. The findings call for educators and policymakers to tailor teaching methods to local needs.

5.2 Recommendation

Based on the findings of this study, the following recommendations are proposed:

1. Promoting the heuristic teaching method in Polytechnics in Nigeria requires training and support for effective implementation by departments and instructors.
2. Educators can enhance their heuristic teaching skills through ongoing professional development opportunities, including workshops, training sessions, and access to resources.
3. Research suggests heuristic method is effective for both genders, but continuous adaptation is crucial to address evolving needs and ensure inclusive materials and methodologies.
4. Invest in improving Polytechnics' infrastructure and resources, ensuring accessibility, maintaining conducive learning environments, and providing adequate teaching materials for successful heuristic teaching methods.
5. The text emphasizes the importance of adjusting heuristic teaching methods to the specific context of each Polytechnic institution, taking into account regional variations in student demographics, resources, and infrastructure.

By implementing these recommendations, Polytechnics in the North Eastern States of Nigeria can optimize the benefits of the heuristic teaching method and create an inclusive, innovative, and effective learning environment for students pursuing shorthand education.

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