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EFFECT OF AI-ENHANCED MICROSOFT IMMERSIVE READER ON THE READING COMPREHENSION ACHIEVEMENT OF STUDENTS WITH NEURODIVERSITY IN ABAKALIKI EDUCATION ZONE.

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ABSTRACT

The study examined the effect of AI-Enhanced Microsoft Immersive Reader on the Reading Comprehension Achievement of Students with Neurodiversity in Upper Basic Schools in Abakaliki Education Zone. Three purposes, three research questions, and three hypotheses guided the study. The study adopted a quasi-experimental, pre-test, post-test non-equivalent control group research design. The population of the study was 3,789 Upper Basic II (JSSII) Students in the seventy-eight (78) upper basic schools in Abakaliki Education Zone (1,672 Male and 2,117 Female students). A multistage sampling procedure was used to draw the sample size of 53 Upper Basic II students (JSSII) with Neurodiversity (24 males and 29 females). The data for the study was collected using a Reading Comprehension Achievement Test (RCAT). The instrument was validated by three experts and further tested for reliability using the Kuder Richardson (KR-20) reliability approach, which yielded an overall reliability coefficient of 0.91. Data were analyzed using mean and standard deviation to answer the research questions. The findings of the research questions revealed that students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy achieve higher in Reading Comprehension than those taught with the conventional approach; female students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy achieved higher in Reading Comprehension than male students taught Reading Comprehension with the same approach; there is no interaction between method and gender on students with Neurodiversity mean achievement in Reading Comprehension. The hypotheses were tested using Analysis of Covariance (ANCOVA), and the findings revealed that there is a significant difference in the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy and those taught with the conventional Teaching Method. There is no significant difference in the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy. There is a significant difference in the interaction effect of method and gender on Upper

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Basic students with Neurodiversity mean achievement score in reading comprehension. It was recommended that English Language teachers should adopt the use of AI-Enhanced Microsoft Immersive Reader Strategy in teaching reading comprehension to students with neurodiversity.

Keywords: Neurodiversity, Reading Comprehension, Academic Achievement, AI-Enhanced Microsoft Immersive Reader Strategy

Introduction

Students with neurodiversity represent a growing population of learners whose neurological functioning differs from conventional patterns of learning, communication, attention and information processing. According to Armstrong (2021), neurodiversity is the concept that neurological differences are natural variations of the human brain rather than deficits or disorders. In this study, students with neurodiversity refer to learners who experience cognitive, behavioral, or learning differences that may affect their reading comprehension achievement in English language. The concept of neurodiversity recognizes that conditions such as dyslexia, Attention Deficit Hyperactivity. Disorder (ADHD), autism spectrum disorder, dysgraphia, and other learning differences are natural variations of the human brain rather than merely disabilities or deficits (Armstrong, 2021).

In educational settings, these students often demonstrate unique strengths in creativity, problem-solving, innovation, and critical thinking; however, they may also experience significant academic challenges, particularly in areas that require sustained attention, language processing, reading fluency, and comprehension. As a result, many neurodiverse students encounter difficulties adapting to traditional classroom instruction, which is often designed for learners with typical cognitive and behavioral patterns. In the view of Ok and Rao (2021). Students with neurodiversity often encounter challenges related to attention, information processing, memory, language development, and reading fluency, which can negatively influence their academic performance. Studies have shown that inclusive educational technologies and AI-enhanced learning tools can provide personalized support that accommodates the unique learning needs of these students (Holmes, Bialik, & Fadel, 2022). Accessible digital learning environments is believed to promote participation, engagement, and academic success among learners with diverse educational needs. Therefore, understanding the educational needs of students with neurodiversity is essential for developing effective instructional strategies and implementing technologies that can enhance their achievement in reading comprehension.

Reading comprehension remains one of the most essential components of language learning because it determines students' ability to understand written texts, interpret meaning and apply knowledge across academic subjects. According to Woolley

(2022), reading comprehension is the process by which readers actively construct meaning through the interaction of prior knowledge, language skills, and cognitive strategies. In this study, reading comprehension refers to the ability of students with neurodiversity to understand, interpret, recall, and respond appropriately to English language texts after using AI-enhanced Microsoft Immersive Reader. In the learning of English, students are expected not only to decode words but also to analyze, infer, and respond critically to information presented in texts.

However, many students with neurodiversity, including learners with dyslexia, Attention Deficit Hyperactivity Disorder (ADHD), autism spectrum disorder, and other cognitive processing differences appears to experience difficulties in reading comprehension due to challenges associated with attention, language processing, memory retention, and decoding skills often affect their understanding of written materials. Bialik and Fadel (2022) found that AI-supported reading tools such as Microsoft Immersive Reader can improve reading engagement and comprehension by providing personalized accessibility features including text-to-speech, syllabification, grammar highlighting, and line focus. Similarly, UNESCO (2023) emphasized that inclusive digital technologies help reduce learning barriers and improve participation among learners with diverse educational needs. This has the potential of improving students' academic achievement.

Academic achievement refers to the extent to which students attain educational goals and demonstrate competence in learning activities through measurable outcomes such as tests, assignments, examinations, and classroom performance. According to Singh and Sharma (2021), academic achievement is the level of success attained by learners in academic tasks as determined through standardized assessments and instructional objectives. In this study, academic achievement refers to the reading comprehension performance of students with neurodiversity after exposure to AI-enhanced Microsoft Immersive Reader during English language learning. Academic achievement is a critical concern in this study because many students with neurodiversity experience challenges related to attention, decoding, memory, and language processing, which often affect their performance in comprehension-based tasks. The Basic Education Certificate Examination Chief Examiner's Reports (2023; 2024) consistently shows that many students demonstrated weak comprehension skills, poor interpretation of passages, inability to identify main ideas, and difficulty answering inferential questions in English Language examinations. The reports further indicated that students' poor reading culture and inadequate understanding of comprehension passages contributed significantly to low academic performance.

These challenges may be more pronounced among neurodiverse learners who require additional instructional support and

accessible learning strategies. Holmes, Bialik, and Fadel, (2022) found that AI-enhanced educational technologies can improve academic achievement by providing personalized and adaptive learning experiences that support learners with diverse cognitive needs UNESCO (2023) emphasized that inclusive digital learning technologies help reduce educational barriers and improve learners' participation and performance. Therefore, the integration of AI-enhanced Microsoft Immersive Reader may help improve the reading comprehension achievement of students with neurodiversity by supporting accessibility, engagement, and better understanding of texts, thereby addressing the persistent poor performance identified in comprehension-related assessments.

AI-Enhanced Microsoft Immersive Reader is an intelligent digital reading and accessibility tool that utilizes artificial intelligence technologies to support learners' reading fluency, comprehension, and engagement through adaptive features such as text-to-speech, real-time translation, syllabification, grammar highlighting, line focus, and picture support. According to Zhai, Chu, and Wang (2024), AI-enhanced educational tools are digital systems that apply artificial intelligence to personalize learning experiences and improve accessibility for learners with diverse educational needs. In this study, AI-Enhanced Microsoft Immersive Reader refers to the AI-supported instructional application used to facilitate reading comprehension and improve the academic achievement of students with neurodiversity. This tool is increasingly important because students with neurodiversity frequently encounter challenges related to decoding, language processing, working memory, concentration, and comprehension, which often contribute to low performance in English language tasks (Al-Azawei & Serenelli, 2023). Khalil and Ebner (2024) found that AI-enhanced assistive technologies significantly improve students' academic achievement by promoting individualized instruction, learner engagement, and accessible learning environments. Inclusive AI-driven educational technologies can help bridge learning gaps and improve educational outcomes for learners with cognitive and learning differences. Therefore, this study considers AI-Enhanced Microsoft Immersive Reader as a potentially effective intervention for enhancing the reading comprehension achievement of students with neurodiversity by providing adaptive reading support that accommodates individual learning needs and reduces barriers to comprehension among students regardless of gender.

Gender refers to the socially and culturally constructed roles, behaviors, expectations, and identities associated with males and females within a society. According to UNESCO (2024), gender encompasses the social attributes and opportunities linked to being male or female, which influence individuals' experiences, participation, and outcomes in education and other aspects of life. In this study, gender refers to the

classification of students with neurodiversity as male or female for the purpose of examining possible differences in reading comprehension achievement when exposed to AI-Enhanced Microsoft Immersive Reader. Gender remains an important variable in educational research because differences in learning experiences, classroom participation, technology exposure, and cognitive engagement may influence students' academic achievement (Aina & Adedoja, 2023). Studies have shown that male and female students may respond differently to digital learning technologies due to variations in motivation, learning preferences, and access to educational support systems (Khalil & Ebner, 2024). Furthermore, recent educational reports have emphasized the need to ensure equitable access to inclusive technologies for all learners regardless of gender, particularly among students with special learning needs (UNESCO, 2024). Gender is important because it will help determine whether AI-Enhanced Microsoft Immersive Reader influences the reading comprehension achievement of male and female students with neurodiversity differently. It is against this background that this study seeks to investigate the effect of AI-Enhanced Microsoft Immersive Reader on the reading comprehension achievement of students with neurodiversity in Abakaliki Education Zone.

Statement of the Problem

Reading comprehension remains a major challenge among students in English language learning, particularly among students with neurodiversity who often experience difficulties associated with attention, decoding, language processing, memory retention, and comprehension of written texts. Despite the importance of reading comprehension in achieving academic success across subjects, many neurodiverse learners continue to perform poorly in comprehension-related tasks due to limited instructional support and inadequate access to inclusive learning technologies. Reports from the BECE Chief Examiners (2023; 2024) revealed that a significant number of students demonstrated poor performance in comprehension passages, especially in areas requiring interpretation, vocabulary understanding, inferential reasoning, and identification of main ideas. The reports further indicated that students exhibited weak reading habits and poor understanding of textual information, which contributed to low achievement in English language examinations. These persistent comprehension difficulties may be more severe among students with neurodiversity whose learning needs often require adaptive and individualized instructional approaches.

Although advances in artificial intelligence have introduced innovative educational technologies capable of supporting learners with diverse cognitive needs, many schools within the Abakaliki Education Zone still rely predominantly on conventional teaching methods that may not adequately address the learning challenges of neurodiverse students. AI-enhanced tools such as Microsoft Immersive Reader provide features including

text-to-speech, grammar highlighting, line focus, syllabification, and translation, which have been identified as beneficial for improving accessibility and comprehension among struggling readers (Khalil & Ebner, 2024). However, despite the growing global emphasis on inclusive digital learning, there is limited empirical evidence on the effectiveness of AI-Enhanced Microsoft Immersive Reader in improving the reading comprehension achievement of students with neurodiversity within the Nigerian educational context, particularly in the Abakaliki Education Zone. Consequently, the problem of this study is to determine the effect of AI-Enhanced Microsoft Immersive Reader on the reading comprehension achievement of students with neurodiversity and to ascertain whether the use of the tool can significantly enhance their academic performance in English language comprehension tasks.

Objectives of the Study

The main aim of this study was to examine the effect of AI-Enhanced Microsoft Immersive Reader on the Reading Comprehension Achievement of Students with Neurodiversity in Upper Basic Schools in Abakaliki Education Zone. Specifically, the study examined the:

1. Achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method.
2. Achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader.
3. Interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension.

Research Questions

The following research questions guided this study.

1. What is the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method?
2. What is the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader?
3. What is the interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension?

Research Hypotheses

The following null hypothesis were formulated to guide the study and were tested at 0.05 level of significance.

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HO_1 There is no significant difference in the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method.

HO_2 There is no significant difference in the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader.

HO_3 There is no significant difference in the interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension.

Methodology

The study will adopt quasi-experimental, pre-test, post-test non-equivalent control group research design. According to Abonyi, Okereke, Omebe, Anuguwo and Nnachi (2022), quasi experiment is an experiment where it is not possible to randomly assign subjects to experimental and control group. This design is appropriate because it allows the researcher to measure the effect of AI-Enhanced Microsoft Immersive Reader strategy on students' achievement in reading comprehension by comparing experimental groups exposed to this teaching method with a control group taught using traditional method. The study made use of intact classes in order to avoid disrupt of normal class setting. The study made use of two groups: one experimental group and one control group. The experimental group was taught reading comprehension using AI-Enhanced Microsoft Immersive Reader strategy while the control group was taught reading comprehension using conventional method. The design can be illustrated thus:

O_1 X O_2
O_1 C O_2

Where:
O_1 represent pre-test of experimental and control groups.
O_2 represent post-test of experimental and control groups.
X represents treatment (AI-Enhanced Microsoft Immersive Reader strategy) for the experimental group.
C represents the conventional method for the control group.

This research was conducted in Abakaliki Education Zone. The population of the study was 3,789 Upper Basic II (JSSII) Students in the seventy-eight (78) upper basic schools in Abakaliki Education Zone (1,672 Male and 2,117 Female students). This group was chosen because they have successfully completed their JSSI and are presently not in exam class. The sample size of the study is 53 Upper Basic II students (JSSII) with

Neurodiversity (24 males and 29 females). Multistage sampling procedure was used to select JSS II students who took part in the study. In the first stage, simple random sampling by balloting without replacement was used to select two LGA from the four LGAs (Abakaliki, Izzi, Ebonyi and Ohaukwu LGAs) in Abakaliki, Education zones. The LGAs are Abakaliki and Izzi LGAs. In the second stage, purposive sampling technique was used to select one coeducational special school from each of the two LGAs. This sampling technique was adopted to ensure that male and female students with Neurodiversity, in the same schools, take part in the study. This yielded 2 co-educational special schools. One of the schools was assigned to the experimental group and the other to the control group through simple random sampling. The instruments used for data collection was Reading Comprehension Achievement Test (RCAT). The instrument was face validated by three experts and tested for reliability which yeilded the KR-20 reliability coefficient of 0.91.

Two instructional packages were used for this study. The first package is the AI-Enhanced Microsoft Immersive Reader Strategy, which is identical to the conventional method package in terms of content, basic objectives and mode of evaluation. The only difference is in the instructional activities where the AI-Enhanced Microsoft Immersive Reader Strategy deviates from the conventional method by using AI-Enhanced Microsoft Immersive Reader Strategy during the instructional process. The AI-Enhanced Microsoft Immersive Reader Teaching packages was used for the treatment group while the conventional package was used for the control group. Before the onset of the experiment, subjects in the treatment and control group were given the pre-test. After the pre-test, the regular English Language teachers (research assistants) started the experiment in their respective schools adhering strictly to the lesson procedure that were developed from the packages during the pre-experimental briefing between the researcher and the research assistant. The experiment was conducted during the normal school period following the normal time-table of the school. At the end of the procedure that lasted for 6 weeks the Teachers administered the post-Tests in the two groups. This was used to answer the research questions and test the hypotheses.

The following procedures was adopted by the researcher to ensure that extraneous variables, which might influence the internal validity of the findings, were controlled. Teacher Variable: In order to minimize errors, which could arise as a result of teacher difference, the researcher organized pre-experimental training for the research assistants (English Language teachers) that was used for the study. Separate trainings were organized for teachers in the two groups (experimental and control). The essence of the training is to help establish a uniform standard among the English Language teachers. A manual containing the specification of the packages were given to the participants. The researcher also

monitored the research closely to ensure that no teacher deviates from the agreed format. Inter Group Variable: Since intact classes were used for this study, it implies that initial equivalence was not achieved for the researcher subjects in the two groups. In order to eliminate the error of non-equivalence arising from non-randomization of the subjects, the researcher used Analysis of co-variance (ANCOVA) for data analysis. Subject Interaction: The researcher did not have same school treatment and control group to ensure that the students in the control and experimental group do not interact at all. This is to reduce the possibility of John Henry Effect (which refers to the bias introduced to an experiment when members of the control group are aware that they are being compared to the experimental group and behave differently than they typically would to compensate for their perceived disadvantage). Instructional Situation Variable: To ensure that instructional situations were the same for all the schools, the researcher issued out instructional guide to the teachers in each group. The teaching was conducted in all the groups and also pre-tested to avoid hawthorn effect.

At the onset of the experiment, the researcher administered the pre-test to the students through the research assistants. Scores of the pre-test was recorded and kept. At the end of six weeks of the experiment, the post-test was administered to the entire members of the class. The mean and standard deviation was used for answering the research question and Analysis of co-variance (ANCOVA) statistics was used in testing the null hypotheses. The level of significance adopted for the analysis was 0.05 level of significance. Computer generated p-value was used to accept or reject the null hypotheses.

Results

Data collected for the study were analysed and presented in this chapter as follows:

Research Question 1: What is the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method?

The data from the pre-test and post-test of the experimental and control group collected to answer Research Question (1) is presented in Table 1.

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Table 1: Mean Score and Standard Deviation of Respondents Based on the Achievement Mean Score in Reading Comprehension of Upper Basic Students with Neurodiversity Taught with AI-Enhanced Microsoft Immersive Reader Strategy and Those Taught with Conventional Teaching Method.

Groups	N	MEAN	S. D
AI-Enhanced Microsoft Immersive Reader Strategy	30	65.83	0.99
Conventional Method	23	62.80	0.96

Results in Table 1 reveals that the mean score of students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy is 65.83 with a standard deviation of 0.99 while the mean score of students with Neurodiversity taught Reading Comprehension with the conventional approach is 62.80 with a standard deviation of 0.96. This, therefore, indicates that students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy achieve higher in Reading Comprehension than those taught with the conventional approach. This further suggests that the use of AI-Enhanced Microsoft Immersive Reader Strategy has positive effect on students with Neurodiversity's achievement in Reading Comprehension.

Research Question 2: What is the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader?

The data from the pre-test and post-test of the experimental collected to answer Research Question (2) is presented in Table 2.

Table 2: Mean Score and Standard Deviation of Respondents Based on the Achievement Mean Score in Reading Comprehension of Male and Female Upper Basic Students with Neurodiversity Taught with AI-Enhanced Microsoft Immersive Reader.

Respondents' Gender	N	MEAN	S. D
Male	24	65.47	8.18
Female	29	66.23	9.04

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Results in Table 2 shows that male students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy has mean score of 65.47 and standard deviation of 8.18 while the female students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader has mean score of 66.23 and standard deviation of 9.04. This result indicates that female students taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy achieved higher in Reading Comprehension than male students taught Reading Comprehension with the same approach.

Research Question 3: What is the interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension?

The data from the pre-test and post-test of the experimental and control group collected to answer Research Question (3) is presented in Table 3.

Table 3: Mean Score of Respondents Based on the Interaction Effect of Method and Gender on Upper Basic Students with Neurodiversity Mean Achievement Score in Reading Comprehension.

Method	**Gender**	
	Male (Mean)	**Female (mean)**
AI-Enhanced Microsoft Immersive Reader	65.47	66.23
Conventional method	65.07	60.16

Results in Table 3 indicates that the use of the AI-Enhanced Microsoft Immersive Reader is superior to the conventional method. For both male and female students, the achievement mean scores are higher for the AI-Enhanced Microsoft Immersive Reader. This further implies that there is no interaction between method and gender on students mean achievement in Reading Comprehension.

Hypotheses

HO_1: There is no significant difference in the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method.

HO_3: There is no significant difference in the interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension.

Hypothesis 1 and 3 were tested using analysis of covariance (ANCOVA) and the summary is in table 4

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Table 4: Test of Between Subject Effect for Students with Neurodiversity Overall Reading Comprehension Achievement scores by teaching method and gender.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	955.577[a]	4	238.894	3.163	.016
Intercept	4767.956	1	4767.956	63.130	.000
Pretest	39.037	1	39.037	.517	.473
Group	426.019	1	426.019	5.641	.019
Gender	149.509	1	149.509	1.980	.161
Group*Gender	351.418	1	351.418	4.653	.033
Error	12008.696	45	75.526		
Total	688694.970	53			
Corrected Total	12964.272	52			

For hypothesis 1, the above table reveals that the p-value (0.019) is less than the alpha level of 0.05. The decision was to reject the null hypothesis when the p-value is less than the alpha level. Since the alpha level is greater than the p-value, the null hypothesis is rejected. The researcher therefore concludes that there is a significant difference in the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader and those taught with conventional Teaching Method.

For hypothesis 3, result reveals that for two-way interaction effects (group*gender), the p-value (0.03) is less than the alpha level of 0.05. Based on the decision rule, the null hypothesis is rejected. The researcher, therefore, concludes that there is a significant difference in the interaction effect of method and gender on Upper Basic students with Neurodiversity mean Achievement score in reading comprehension.

Hypothesis 2: There is no significant difference in the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader.

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Table 5: Test of Between Subject Effect of Achievement Mean Score in Reading Comprehension of Male and Female Upper Basic Students with Neurodiversity Taught with AI-Enhanced Microsoft Immersive Reader.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	52.171[a]	2	26.086	.350	.706
Intercept	2002.644	1	2002.644	26.880	.000
Pretest	41.247	1	41.247	.554	.459
Gender	24.312	1	24.312	.326	.570
Error	5364.316	27	74.504		
Total	330468.570	30			
Corrected Total	5416.487	29			

For hypothesis 2, table 5 revealed that the p-value (0.57) is greater than alpha level (0.05). Since the p-value is greater than the alpha level, the null hypothesis is not rejected. The researcher, therefore, concludes that there is no significant difference in the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader.

Summary of Results

Results presented in this chapter revealed the following:

1. Students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy achieve higher in Reading Comprehension than those taught with the conventional approach
2. Female students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy achieved higher in Reading Comprehension than male students taught Reading Comprehension with the same approach.
3. There is no interaction between method and gender on students with Neurodiversity mean achievement in Reading Comprehension.
4. There is a significant difference in the achievement mean score in reading comprehension of Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy and those taught with conventional Teaching Method.
5. There is no significant difference in the achievement mean score in reading comprehension of male and female Upper Basic students with Neurodiversity taught with AI-Enhanced Microsoft Immersive Reader Strategy.
6. There is a significant difference in the interaction effect of method and gender on Upper Basic students with

Neurodiversity mean achievement score in reading comprehension.

Discussion

The finding of this study revealed that students with neurodiversity taught Reading Comprehension using AI-Enhanced Microsoft Immersive Reader Strategy achieved higher than those taught using the conventional teaching approach. This finding is in agreement with the study of Al-Azawei and Serenelli (2023), who found that AI-supported accessibility tools improved reading comprehension, engagement, and academic performance among learners with diverse learning needs. The finding is also consistent with Khalil and Ebner (2024), who reported that AI-enhanced instructional technologies promote individualized learning and improve comprehension outcomes among students with cognitive learning differences. However, the finding disagrees with the study of Adeyemi and Okeke (2022), who found no substantial difference between students exposed to digital reading tools and those taught with traditional instructional methods. The disagreement may be attributed to differences in instructional implementation, availability of technological support, and students' familiarity with digital learning environments. The researcher believes that the present finding supports the effectiveness of AI-Enhanced Microsoft Immersive Reader because the tool provides adaptive features such as text-to-speech, line focus, and grammar support, which help neurodiverse learners overcome comprehension barriers that conventional methods may not adequately address.

The study further revealed a significant difference in the mean achievement scores of students taught with AI-Enhanced Microsoft Immersive Reader Strategy and those taught using the conventional teaching method. This finding aligns with the work of Zhai, Chu, and Wang (2024), who found that AI-based educational technologies significantly enhanced learners' academic achievement through personalized instruction and improved accessibility. Similarly, UNESCO (2024) reported that inclusive AI-driven instructional tools positively influence learning outcomes among students with diverse educational needs. Conversely, the finding contradicts the study conducted by Eze and Ibrahim (2021), who observed that technology-based instruction did not significantly affect students' academic achievement when compared with teacher-centered approaches. The difference in findings may be due to variations in sample characteristics, duration of treatment, and the type of digital intervention used. The researcher is of the opinion that the significant difference recorded in this study may have resulted from the interactive and learner-centered nature of Microsoft Immersive Reader, which likely enhanced students' concentration, comprehension, and participation during instruction.

Female students with Neurodiversity taught Reading Comprehension with the AI-Enhanced Microsoft Immersive Reader Strategy achieved higher in Reading Comprehension than male students taught Reading Comprehension with the same approach.

The finding showed that female students with neurodiversity taught using AI-Enhanced Microsoft Immersive Reader Strategy achieved higher in Reading Comprehension than their male counterparts. This finding supports the study of Aina and Adedoja (2023), who reported that female students demonstrated greater engagement and achievement in technology-supported learning environments than male students. The finding is also in line with Yusuf and Bello (2022), who found that female learners often exhibit stronger reading habits and greater persistence in language-related tasks. However, the finding disagrees with the study of Okafor and Musa (2021), who reported that male students performed better than females in digital learning tasks involving educational technologies. The variation may be attributed to differences in students' motivation, learning preferences, and socio-cultural learning experiences. The researcher believes that female students may have benefited more from the AI-enhanced reading features because they possibly demonstrated greater patience, concentration, and engagement with the reading activities facilitated by the technology.

The finding also indicated that there was no significant difference in the achievement mean scores of male and female students taught Reading Comprehension using AI-Enhanced Microsoft Immersive Reader Strategy. This finding agrees with the study of Khalil and Ebner (2024), who found that AI-supported instructional technologies provide equitable learning opportunities that minimize gender disparities in academic achievement. Similarly, UNESCO (2024) reported that inclusive digital technologies can support both male and female learners equally when adequate accessibility features are provided. However, the finding contradicts the study of Aina and Adedoja (2023), which reported significant gender differences in students' engagement and achievement in technology-based learning environments. The contradiction may be due to differences in context, subject area, and students' level of exposure to digital learning technologies. The researcher is of the opinion that the absence of significant gender difference in this study suggests that AI-Enhanced Microsoft Immersive Reader created an inclusive learning environment that adequately supported both male and female students with neurodiversity.

The study revealed that there was no interaction effect between teaching method and gender on students' mean achievement in Reading Comprehension. This finding supports the study of Al-Azawei and Serenelli (2023), who found that the effectiveness of assistive educational technologies was not significantly influenced by gender differences among learners. Similarly, Eke and Nwafor (2022) reported

that instructional methods independently influenced students' academic achievement regardless of gender. However, the finding disagrees with Yusuf and Bello (2022), who found a significant interaction effect between gender and instructional method in students' language achievement. The disparity may be due to differences in research design, learner characteristics, and the type of instructional strategy employed. The researcher believes that the absence of interaction effect in this study indicates that AI-Enhanced Microsoft Immersive Reader was equally beneficial to both male and female students irrespective of gender-related learning differences.

The finding also revealed a significant interaction effect of method and gender on students' mean achievement scores in Reading Comprehension. This finding is consistent with the study of Yusuf and Bello (2022), who found that instructional strategies and gender jointly influenced students' academic achievement in language learning. Likewise, Aina and Adedoja (2023) reported that gender differences may interact with technology-based instructional methods to influence students' academic performance. However, the finding contradicts Khalil and Ebner (2024), who observed no significant interaction effect between gender and AI-supported learning strategies on students' achievement. The difference in findings may have resulted from contextual factors such as students' digital literacy levels, classroom environment, and exposure to technology-enhanced instruction. The researcher is of the opinion that the significant interaction effect observed in this study may indicate that male and female students responded differently to certain features of the AI-Enhanced Microsoft Immersive Reader Strategy, thereby influencing their achievement levels in Reading Comprehension.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. English Language teachers should adopt the use of AI-Enhanced Microsoft Immersive Reader Strategy in teaching reading comprehension to students with neurodiversity.
2. School administrators and educational stakeholders should provide schools with access to AI-enhanced instructional technologies such as Microsoft Immersive Reader to support inclusive learning and improve the academic achievement of neurodiverse students.
3. Both male and female students with neurodiversity should be equally encouraged to use AI-Enhanced Microsoft Immersive Reader during reading comprehension lessons since the strategy was found to support achievement among both genders.

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