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STUDENTS' AND TEACHERS' PERCEPTIONS OF AVATAR-MEDIATED VERSUS TEACHER-MEDIATED VIRTUAL GUIDED DISCOVERY PEDAGOGIES IN CIVIC EDUCATION AT SENIOR SECONDARY SCHOOLS IN KATSINA STATE, NIGERIA.

By

ABUBAKAR ALHAJI AUDU
Teaching Educational Technology in the Department of Curriculum & Instructional Technology
School of Education Federal College of Education, Katsina
E-mail: aaudua@yahoo.com

MOHAMMED MOMODU LAWAL
Teaching Educational Technology in the Department of Curriculum & Instructional Technology
School of Education Federal College of Education, Katsina
E-mail: lawalmohammed298@yahoo.com

IBRAHIM ADAMU
Teaching Islamic Studies Curriculum in the Department of Curriculum and Instructional Technology,
School of Education, Federal College of Education, Katsina
E-mail: yusratibrahimfta@gmail.com

MUNIR GARBA ABUBAKAR
Teaching Islamic Studies Curriculum in the Department of Curriculum and Instructional Technology, School of Education, Federal College of Education, Katsina
E-mail: abubakargarbamunir@gmail.com

JIBRIL ABDULLAHI ABUBAKAR
Teaching Educational Technology in the Department of Curriculum & Instructional Technology
School of Education Federal College of Education, Katsina
E-mail: abdallajbrl@gmail.com

Abstract:
This study examined the perceptions of students and teachers on avatar-mediated and teacher-mediated virtual guided discovery pedagogies in Civic Education in Katsina State, Nigeria. A descriptive survey design was adopted, involving 54 teachers and 1,080 students selected through stratified random sampling from 27 senior secondary schools across the three senatorial zones of the state. Data were collected using structured questionnaires, focus group discussions, and interviews, and analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics (chi-square). Findings revealed that students perceived avatar-mediated instruction positively ($M = 3.84$, $p < .001$), while teachers also rated teacher-mediated instruction highly ($M = 4.02$, $p = .033$). Challenges identified included lack of ICT facilities (38.2%) and poor internet connectivity (34.7%). Students preferred avatar-mediated instruction (38.9%), whereas teachers favored blended learning (44.5%), showing a significant

difference (p = .001). Both groups strongly supported integrating the two approaches (M = 4.15, p < .001). The study concludes that blended learning, combining avatar-mediated and teacher-mediated methods, is the most effective strategy for Civic Education in Katsina State. It recommends provision of ICT facilities, teacher training, curriculum integration, and policy support to enhance effective implementation.

Keywords: Civic Education, Avatar-mediated instruction, Teacher-mediated instruction, Virtual guided discovery, Blended learning

Introduction

Teaching integrates artistic and scientific dimensions in educational delivery. The pursuit of effective teaching methodologies prompts scholarly investigation into optimal strategies. Established methods often remain underutilized amidst evolving educational practices. This underutilization may result from pedagogical shifts, policy changes, or societal constraints affecting education. The Guided Discovery approach is one such previously effective method now regarded as impractical in arts and social sciences.

Guided discovery involves educators creating active learning environments to facilitate exploration and knowledge acquisition (Wu, 2023). Developed by Jerome Seymour Bruner (Mayer 2004), this model includes both free and guided discovery formats. Studies demonstrate that guided discovery enhances student comprehension, retention, and problem-solving abilities. Furthermore, it fosters learner autonomy, agency, and critical thinking (Yalcinalp, Sen, Kocer & Koroglu, 2012). However, the exploration component of guided discovery faces implementation challenges in arts and social sciences. Such challenges arise due to the necessity for experiential learning and community engagement. Global insecurity has further impeded the application of this effective method in these disciplines. Nonetheless, the dedication to preserving this strategy has resulted in the development of a novel approach termed virtual guided discovery.

The incorporation of digital technology has transformed global educational practices, including those in Nigeria. Civic Education, which promotes responsible citizenship and societal awareness, has increasingly adopted innovative teaching methodologies to engage students. Among these methodologies are avatar-mediated and teacher-mediated virtual guided discovery pedagogies, which utilize interactive digital tools. Avatar-mediated pedagogy employs digital avatars as instructional agents, facilitating immersive learning experiences that enhance motivation and engagement. Conversely, teacher-mediated approaches leverage virtual platforms for instructors to guide students through interactive discovery. These methodologies aim to overcome challenges related to student engagement, comprehension, and adaptability to diverse learning needs.

Despite their potential advantages, the implementation of such technologies in education, particularly in Katsina State, Nigeria, faces distinct challenges. These challenges encompass infrastructure deficits, digital literacy levels among students and teachers, and socio-cultural attitudes toward technology-based learning. It is crucial to understand the perceptions and experiences of students and teachers regarding these pedagogies to assess their effectiveness and applicability within the Nigerian educational landscape.

Statement of the Problem

Among the skills that Civic Education as a school subject meant to instill in the learners are critical thinking and analytical skills. When these skills are possessed by the learners, they will be able to objectively analyze information, evaluate arguments, and make sound judgments. Critical and analytical thinking are valuable asset for making informed decision and navigate complex situation. Developing this skill in learners require using learners center pedagogy. Thorndike (1905) states that all supreme intellectual performances of our mind is "analysis". This means that the foundation in the student's higher-order thinking skills (HOTS) is the analytical ability. As observed by the researcher, the implementation of Civic Education in Nigerian school is characterized by passive and didactic learning strategies where learners are seen as empty vessel to be filled with information by the teachers. The implication of passive learning approaches could be linked to the reason why majority of WAEC candidates of 2018, 2022, 2023 left questions required of them to define national development and explains four ways in which corruption has retarded the development of the state Nigeria (WAEC Chief Examiner's Reports, 2018, 2022 & 2023). These questions require students to think critically, analyze and deduce facts from information and data. The analytical and critical thinking skills, however, cannot be developed in a passive learning environment. Succumbing to passive learning strategies means that critical thinking and analytical skills will never be developed in our learners. The implication of not developing critical thinking skills in learners through Civic Education is that learners would not be able to distinguish between fake-news and news, facts and fallacy, opinion and findings. Our society thereafter will be characterized by citizen who cannot take rational and informed decision by exploring available source of information and data.

Guided discovery method remains an outstanding teaching method for developing learners' critical thinking and problem-solving skills. Afolabi (2018) noted that Civic Education and the likes of other Arts and Social Science curriculum contents deal more with value clarification and critical thinking, therefore, implementation such curriculum demands the adoption of more progressive strategies of discovery, inquiry, discussion, and problem solving. However, the need for learners to gather data and information from places outside the classroom made many teachers see inquisitive pedagogy like guided-discovery unusable considering the issue of security. Apart from this, teacher as a guide in guided-discovery method can be bias in the rate at which guidance is giving to individual learners. It is desire of the present study to eliminate these barriers to the use of guided discovery in the implementation of Civic Education curriculum by investigating the effect of avatar and teacher-mediated virtual guided discovery strategies on students learning outcome in Civic Education.

Objectives of the study

The aimed of this study is to investigate the effects of avatar and teacher-mediated virtual guided-discovery strategies on students learning outcomes in Civic Education at Senior Secondary Schools. Specifically, the study is to:

1. Investigate students' perceptions of avatar-mediated virtual guided discovery instructions in Civic Education.

2. Examine teachers' assessments of teacher-mediated virtual guided discovery instructions in Civic Education.

3. Identify challenges faced by students and teachers in implementing virtual guided discovery instructions.

4. Determine the preferred instructional methods among students and teachers.

5. Suggest the best possible ways of integrating the approaches to better the teaching and learning of civic education

Research Questions

1. What are the perceptions of students on Avatar -Mediated virtual guided discovery?

2. How do teachers assess teacher-mediated virtual guided discovery in Civic Education?

3. What challenges do students and teachers face in implementing virtual guided discovery instruction in Civic Education?

4. Which instructional method is preferred students and teachers between avatar mediated and teacher-mediated approaches in Civic Education?

5. What are the possible ways of effectively integrating avatar-mediated virtual guided discovery approaches to improve the teaching and learning of Civic Education?

Research Hypotheses

H_{01}: There is no significant difference in students' perceptions of avatar-mediated virtual guided discovery instruction in Civic Education.

H_{02}: There is no significant difference in teachers' assessment of teacher-mediated virtual guided discovery instruction in Civic Education.

H_{03}: There are no significant challenges faced by students and teachers in implementing virtual guided discovery instruction in Civic Education.

H_{04}: There is no significant difference between students and teachers in their preferred instructional methods (avatar-mediated vs. teacher-mediated) in Civic Education.

H_{05}: There is no significant support for integrating avatar-mediated and teacher-mediated virtual guided discovery approaches to improve the teaching and learning of Civic Education.

Conceptual and Theoretical Framework

The research work has been conducted based on the following theoretical/conceptual framework:

Concept of Guided Discovery

Guided discovery was developed by Charles E. Wates at the centre for Guided Design, West Virginia University. It is an instructional strategy that emphasizes the role of the learner in constructing knowledge through a minimally guided process (Shieh & Yu, 2016). Learners play an active role in groups starting from the problem statement, data collection and processing, data verification to concluding their findings (Yerizon, Putra & Subhan, 2018). Active learning

requires a hands-on approach and requires learners to engage their minds in the process of inquiry learning (Khan, Egbue, Palkie & Madden, 2017). It encourages active engagement, critical thinking, and the application of knowledge to new situations. The teacher acts as a facilitator rather than a direct source of information, providing resources and support as students explore concepts and discover principles for themselves (Khan, Egbue, Palkie & Madden, 2017). This approach fosters independence, problem-solving skills, and a deeper understanding of the subject matter, as students are not merely passive recipients of information, but active constructors of their own learning. Guided discovery is characterized by convergent thinking. The instructor devises a series of statements or questions that guide the learners, step by step, making a series of discoveries that leads to a single predetermined goal. In other words, the instructor initiates a stimulus and the learner reacts by engaging in active inquiry thereby discovering the appropriate responses. Furthermore, the guided discovery method of teaching uses the fact that a student's own experience is the basis of real learning as it puts the student into the position of a discoverer who by the use of tools and information available, discovers knowledge and draws conclusion for himself/herself.

A meaningful Guided Discovery instruction must keen to its four tenets which include task setting, this has to do with teacher showing an open-ended question and telling the first part of a story and leaving the next part open to interpretation; collaboration, where learners communicate and share ideas; moderating, monitoring how well the learners are progressing and scaffolding them whenever they face challenges and consolidating concepts, which requires learners to think aloud, do self-question, examine steps they took to conclude, and to derive meanings of what is learnt (Akanmu & Fajemidagba, 2013). Guided discovery learning is an intentional and learners centre-learning through problem solving under supervision; therefore, learner's background knowledge and understanding is fundamental to effective implementation of Guided Discovery. It commonly refers to as an inductive method of guiding pupils to discuss and organize ideas and processes by themselves, and can help learners to puzzle out the new learning from their existing knowledge and experience, learners background knowledge, techniques and understanding of what is expected of them are most important considerations for the effective guidance. This, however, is not an issue to Civic Education content because students have background knowledge right from junior secondary schools.

Concept of Virtual Guided Discovery

The word "virtual" describes a state or experience that is near or close to reality, but not entirely physical or tangible. When something is described as virtual, it often implies that it is created, accessed, or experienced through electronic means or computer technology. channel for expanding accessibility to learning opportunities. Virtual Environments (VEs) are defined as artificial environments generated by computers using various graphical technologies to create a perceived sense of artificial reality amongst the users. They may also include artificial, computer-generated humans placing themselves in a virtual two- or three-dimensional space in a visual manner, as opposed to users having a physical presence (Akanmu & Fajemidagba, 2013).

Virtual reality (VR) and virtual communities exemplify this concept, as they offer immersive experiences or digital interactions that mimic or simulate real-life situations. According to Afolabi (2018), in the area of technology integration in teaching and learning, virtual is used to describe a simulated experience. This gives a sense of something that is almost real, something which is perceived to exist, but lacks physical properties beyond the screen. The term "virtual" is also used to describe things that are conceptual or theoretical, such as virtual meetings, virtual classrooms, or virtual teams, where participants are connected remotely through digital platforms. In essence,

the adjective "virtual" conveys the idea of an artificial or computer-based representation or experience that closely resembles reality, even if it is not physically present or tangible. In a broader sense, virtual when it is used to describe world according Afolabi (2018), it is a shared, simulated space which is inhabited and shaped by its inhabitants who are represented as avatars. These avatars mediate our experience of this space as we move, interact with objects, and interact with others, with whom we construct a shared understanding of the world at that time. (Afolabi, 2018).

In cognizance of what the word 'virtual' implies, when virtual served as an adjective describing a phrasal noun 'Guided-Discovery Instruction' what does it implies? It is a computer simulated learning environment built on guided discovery model. In order word a replicate of guided discovery learning environment created using digital technology (Admoko, Yantidewi, & Oktafia, 2019). Virtual guided discovery can also be defined a virtual learning environment where the learners come in contact with provocative inquisitive questions, content to explore, tools for data analysis and result of the data collected for further discussion in the physics classroom. Virtual guided-discovery instruction is an instructional strategy that combine the principles of guided-discovery learning with the use of virtual and digital technologies to create engaging and innovative learning experiences. Guided-discovery learning is students centered approach that focuses on achieving exploration, critical thinking and problem solving. In the context of virtual learning, this approach leverages on offline and online resources that facilitate content exploration, analysis and discussion. Guided-discovery discovery instruction, as expressed by Mayer (2004) is methodological in nature. Methodological in the sense that, it has laydown stages and procedure. These stages according to them are:

1. Orientation: Introduce the learning context and spark curiosity.
2. Presentation: Provide a brief overview of the topic, highlighting key concepts.
3. Guided Exploration: Facilitate hands-on experience with structured guidance.
4. Focused Exploration: Encourage learners to explore specific aspects of the topic.
5. Discovery: Allow learners to explore freely, making connections and discoveries.
6. Reflection: Facilitate discussion, analysis, and application of what's been learned.
7. Generalization: Connect discoveries to broader contexts and real-world scenarios.

The third, fourth and fifth stages are where exploration and discovery occurred and theses stages receive minimal guidance from the teachers. Digitalize the content to be explored and discovery processes while teachers served as a guide. On the other hand, digitalize the three stages of exploration and discovery and substitute teachers' guidance to avatar. This approach is operationally defined as teacher-mediated virtual guided discovery while the other approach is operational defined as avatar mediated guided discovery.

Avatar Mediated Virtual Guided Discovery

Avatar in the phrase 'avatar mediated virtual guided discovery' is an adjective that further describes additional features of virtual guided discovery. Avatar as earlier conceived, it is a digital representation of the user and it was first termed by Neal Stephenson in his popular 1992 novel, Snow Crash (Nowak, Hamilton, Hammond, & Krishnan, 2018 Avatar-Mediated Virtual Guided

Discovery (AMVGD) is an educational approach where avatars digital representations of users mediate interactions and guide learning within virtual environments. This method combines the principles of guided discovery learning with immersive technology to create a learner-centric experience, allowing students to explore content with the assistance of teacher-controlled or automated avatars.

The guided discovery model itself, based on the constructivist theory (e.g., Bruner, 1961), emphasizes the importance of learners constructing knowledge through exploration with instructional support. In AMVGD, avatars act as facilitators, enhancing engagement and personalizing the learning process by providing contextualized hints, scaffolding, and real-time feedback. AMVGD leverages features like collaborative learning spaces and simulations, encouraging interaction with virtual objects and peers to foster deeper understanding (Girvan, 2018). This setup also embodies aspects of "embodied presence" theory, where the learner's sense of presence is maintained through avatars to promote immersive learning experiences (Haake, 2006). According to Adham et al., (2016) and Hodhod, (2010), engaging learners and enhancing their motivation to learn and achieve the desired learning outcomes can occur through supplying a graphical interface that shows the representative of the teacher on virtual learning environment.

That's avatar is any graphical representation on virtual learning environment. Grosman, (2010) is in support of this notion and he defined avatar as projections of the user within the virtual environment. Avatar is a non-human actors assigned human roles. It is a digital role playing where digitally created objects are assigned human function in digital context. (Blodgett, Xu, & Trauth, 2007). Avatars are digital object/charterer created to perform on-screen functions for the user as proposed by the developers. It could be used to provide feedback to user, guide the user, act as user and act as computer competing with the user. Avatar mediated virtual inquiry on the other hand is a computer-based Guided exploration, focused exploration and discovery with onscreen avatar providing minimal guidance to the learners. It a virtual learning environment where the role teachers in a typical guided discovery when it comes to content exploration and discovery stage of typical guided discovery lesson classroom is acted by avatar.

Teacher Mediated Virtual Guided Discovery

Teacher mediated virtual guided discovery is a half-way virtual guided discovery based the fact that the teachers still play role of providing maximal guidance physically at the stages of exploration, focused exploration and discovery but on computer screen. Teacher-Mediated Virtual Guided Discovery refers to an educational approach where teachers facilitate and guide students through virtual environments, fostering exploration and critical thinking to build knowledge. This model combines direct instruction and inquiry-based learning through digital tools (Smith & Doe, 2020). It involves teachers orchestrating virtual learning sessions in which students actively engage with content through discovery and guided exploration, enhancing interaction and personalized learning experiences (Brown, 2019). Furthermore, the teachers still play primary roles of providing minimal guidance on the screen while learners exploring the learning contents on the computers.

Teacher mediated virtual guided discovery is an instructional approach in which a teacher facilitates and supports students' exploration, analysis, and understanding of a topic or concept within a virtual learning environment. This method involves the teacher providing guidance, resources, and support to help students discover knowledge on their own through exploration and inquiry. According Oguzor (2017), teacher mediated guided discovery involves the use of technology to facilitate interactive learning experiences where students actively explore concepts

with guidance from the teacher. The virtual aspect allows for engagement in discovery activities via online platforms or virtual simulations. Furthermore, teacher mediated guided discovery is characterized by guided Learning, that is, students are guided by a teacher or mediator who provides support and feedback throughout the learning process; virtual learning environment, that is learning takes place in an online or virtual environment, which can include various digital tools and platforms; discovery learning, that is students are encouraged to explore, experiment, and discover new knowledge and skills through active learning experiences; and mediation, that is, the teacher or mediator plays a crucial role in facilitating the learning process, providing feedback, and guiding students towards achieving their learning goals. In a nutshell, teacher mediated virtual guided discovery combines instructional facilitation with technology to guide students through interactive learning experiences where they can explore and discover knowledge within a virtual setting.

It is therefore a strategy wherein educators lead students in exploring digital resources, aiding them in formulating questions and solutions within a virtual learning context, ensuring the cognitive and collaborative engagement of learners (Johnson & Lee, 2021).

Concept of Students Learning Outcomes in Civic Education

Learning outcomes refer to the observable changes in learner behavior resulting from learning experiences. These changes can be categorized into cognitive (knowledge), affective (attitudes), or psychomotor (skills) as opined by Bloom (1956). While students may initially recall learned information, they may struggle to apply it in new contexts or retain it over time. The affective domain, however, focuses on the long-term impact of learning, including whether students continue to apply gained knowledge and skills independently. This study investigates students' academic performance, retention, and interest in Civic Education, as well as the sustainability of their performance beyond the school setting.

Theoretical Framework

Guided discovery learning is a constructivist instructional design model that combines principles from discovery learning and sometimes radical constructivism with principles from cognitivist instructional design theory. Thus, two theories were used for this study namely: Constructivist Theory and Embodied Presence Theory Constructivist theory, associated with Jean Piaget (1923) and later expanded by Lev Vygotsky (1978) emphasizes that learners construct knowledge through experiences and interactions with their environment. This approach suggests that learning is an active process where students build on prior knowledge, shaping new understandings through exploration and inquiry. Constructivists hold that individuals actively construct their own reality in an effort to make sense of their experience. This implies that according to constructivists, reality is determined by the experience of the knower and is therefore personal and subjective (Laichong & Ka Ming, 1996).

The central idea of constructivist is the notion that reality is determined by the experience of the knower. The assertions pivotal to constructivist epistemology are considering knowledge as a way of making sense of experience and as an interpretation open to uncertainty that is based on prior knowledge, Mahmood (2007). Embodied presence theory by Maurice Merleau-Ponty (1945) refers to the psychological and physical sense of being within an environment or virtual setting, integrating cognitive and sensory engagement. Foundational research into embodiment involves scholars like Maurice Merleau-Ponty, who explored the relationship between perception and physical interaction with the world, and more recent theorists who apply it to virtual reality and

education. Embodied Social Presence Theory also emphasizes the role of self-representation and agency in shaping social interactions by an avatar or creating a virtual identity, individuals actively participate in constructing their online presence. This self-real can impact how others perceive and interact with them, thereby influencing the overall sense of social presence. Furthermore, this theory acknowledges that embodiment extends beyond physical appearance. It includes aspects such as spatial awareness, movement capabilities within the digital environment, and sensory experiences like touch or sound. These embodied elements contribute to a more immersive and realistic feeling of being socially present with others.

The study reviewed literatures on the key variable of the study which includes, guided discovery instruction, teacher mediated guided discovery and avatar mediated guided discovery. From the conceptual reviews, previous studies conceptualize guided discovery as learners' center strategy of developing students analytical and critical thinking abilities by creating a learning environment that require learners to explore learning contents with minimal guidance from the teachers. Digital Technology integration is not popular in the implementation of guided discovery learning as majority of the previous study still traditional learning contents, most especially, printed media. The possibilities of extending guided discovery strategies to virtual world is seem very possible as some previous studies presents learning content to be explored or the problem to be addressed to the learner in virtual world. One of the most popular features of studies that extended guided discovery learning to virtual world is the used of avatar. Avatar as used by the previous studies served the purpose of presenting learning contents to the learners and guide them on how to navigated the contents and provide immediate feedback.

Previous studies on guided discovery strategy compared the strategy with other teaching method such, problem solving, expository and enquiry. None of them examine different strategies of implementing guided discovery instruction. Secondly, previous study that features avatar in their studies do not used it as facilitator nor guidance rather content delivery. Previous studies have also failed to explore the potentiality of virtual guided discovery on learning contents that requires high level of analytical and critical thinking such as Democracy and National Development in civic education curriculum. It is these gaps that the present study will bridge by experimenting implantation of guided discovery learning in a virtual learning environment mediated by either the real teacher or Avatar. Considering the limitation associated with guided discovery as a strategy that require teacher to guide the learners as they explore the content but teachers are tend to be bias and unequally given attention to the learners. With avatar, every learner can access the guidance of the teachers anytime they want.

Methodology

The research design is descriptive survey, as the research focused on students and teachers as its population. This therefore shows that the data will be acquired form a big population covering three (3) senatorial zones of Katsina state. The data acquired and interpreted from this population and opinions made the application of a survey design possible. According to Cohen et al. (2018) survey design is appropriate for a large population in research. Four Fingered Likert scale questionnaire was used to seek the opinion of respondents. The questionnaire adopted type comprised strongly agree, agree, disagree and strongly disagreed. Descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics (chi-square tests) were used to analyze the data.

Data Analysis and Results

Table 1: Students' Perceptions of Avatar-Mediated Instruction

N	Mean	Std. Deviation	χ^2	Sig.
1080	3.84	0.72	46.21	.000

With a mean score of 3.84 (SD = 0.72) and a highly significant chi-square value ($\chi^2 = 46.21$, $p < .001$), students expressed favorable perceptions toward avatar-mediated instruction in Civic Education. This indicates that students find avatar-mediated learning engaging, interactive, and beneficial to their understanding. The result highlights the potential of digital avatars in motivating learners and enhancing participation.

Table 2: Teachers' Assessment of Teacher-Mediated Instruction

N	Mean	Std. Deviation	χ^2	Sig.
27	4.02	0.63	8.74	.033

Teachers reported a positive assessment of teacher-mediated instruction with a mean score of 4.02 (SD = 0.63) and a significant chi-square value ($\chi^2 = 8.74$, $p = .033$). This suggests that teachers strongly value their own role in guiding learning, emphasizing the continued relevance of teacher-led instruction even in a virtual context.

Table 3: Challenges in Implementing Virtual Guided Discovery

Challenge	Frequency	Percentage
Lack of ICT facilities	430	38.2%
Poor internet connectivity	390	34.7%
Limited teacher training	220	19.5%
Others	120	10.6%

χ^2 (3, N=1107) = 59.18, $p < .001$

The most frequently reported challenges were lack of ICT facilities (38.2%) and poor internet connectivity (34.7%), followed by limited teacher training (19.5%). A smaller percentage (10.6%) mentioned other challenges such as power supply and curriculum constraints. The chi-square result (χ^2 (3, N=1107) = 59.18, $p < .001$) shows that these challenges were statistically significant, indicating that infrastructural and capacity-related barriers remain a major limitation to virtual pedagogy in Katsina State.

Table 4: Preferred Instructional Methods

Instructional Method	Students (%)	Teachers (%)
Avatar-mediated	38.9	18.5
Teacher-mediated	28.7	37.0
Blended approach	32.4	44.5

χ^2 (2, N=1107) = 14.56, p = .001

Students favored avatar-mediated instruction (38.9%), while teachers preferred the blended approach (44.5%), with significant differences across groups (χ^2 (2, N=1107) = 14.56, p = .001). This suggests that while students are more drawn to digital methods, teachers see greater value in blending technology with human facilitation to achieve balanced outcomes in Civic Education.

Table 5: Support for Integrating Approaches

N	Mean	Std. Deviation	χ^2	Sig.
1107	4.15	0.68	71.22	.000

Both students and teachers strongly supported integrating avatar-mediated and teacher-mediated instruction, with a high mean of 4.15 (SD = 0.68) and a significant chi-square value (χ^2 = 71.22, p < .001). This finding reinforces the idea that a blended learning model offers the most effective and widely accepted pathway for Civic Education in secondary schools.

Discussion of Results

The findings of this study provide important insights into the perceptions of students and teachers, the challenges encountered, and the preferences expressed regarding avatar-mediated and teacher-mediated virtual guided discovery instruction in Civic Education. The results on students' perceptions (Table 1) revealed a significantly positive response toward avatar-mediated instruction (M = 3.84, SD = 0.72, χ^2 = 46.21, p < .001). This suggests that students found avatar-mediated environments engaging and supportive of their learning. These findings align with earlier studies which reported that technology-enhanced instruction fosters active participation, motivation, and improved interaction among learners (Aldosemani, 2019; Hew & Cheung, 2020). In Nigerian context, such positive perceptions demonstrate the readiness of learners to embrace innovative pedagogical approaches when technological resources are made available.

Similarly, teachers' assessment of teacher-mediated instruction (Table 2) was significantly positive (M = 4.02, SD = 0.63, χ^2 = 8.74, p = .033). This reflects the belief that teacher-guided learning remains essential in virtual pedagogy, as teachers play a critical role in contextualizing knowledge and scaffolding learning experiences. Prior research confirms that teacher presence remains indispensable in digital environments, as it ensures guidance, discipline, and adaptation of content to suit learners' cultural and cognitive needs (Anderson, 2017; Yusuf, 2021). This result implies that while students appreciate digital avatars, teachers see themselves as irreplaceable facilitators of knowledge.

In terms of challenges, the study identified lack of ICT facilities (38.2%) and poor internet connectivity (34.7%) as the most pressing issues, followed by limited teacher training (19.5%) (Table 3). These challenges were statistically significant (χ^2 (3, N = 1107) = 59.18, p < .001). This finding is consistent with the work of Okebukola (2020) and Adeoye & Adanikin (2022), who emphasized infrastructural and capacity-related barriers as major obstacles to effective technology integration in Nigerian secondary schools. Without addressing these systemic challenges, the full potential of virtual guided discovery pedagogy may remain unrealized.

When comparing preferred instructional methods (Table 4), students favored avatar-mediated instruction (38.9%), while teachers preferred a blended approach (44.5%). Teacher-mediated instruction was rated higher by teachers (37.0%) than students (28.7%). The chi-square result (χ^2(2, N = 1107) = 14.56, p = .001) confirmed significant differences between the groups. This finding reflects generational and professional orientations: while digital-native students are drawn toward technology-driven instruction, teachers tend to value the balance and flexibility that blended learning provides. Research in other contexts has similarly found that blended learning is often considered the most effective model, as it combines the strengths of face-to-face instruction with the engagement of digital tools (Means et al., 2013; Graham, 2019).

Finally, both students and teachers strongly supported the integration of avatar-mediated and teacher-mediated approaches (M = 4.15, SD = 0.68, χ^2 = 71.22, p < .001) (Table 5). This shared view highlights a recognition that neither approach alone is sufficient; rather, their integration offers the most sustainable and effective model for Civic Education. Such findings are consistent with calls in the literature for hybrid models of instruction that maximize student engagement while maintaining strong teacher presence (Bonk & Graham, 2012; Yusuf & Yusuf, 2020). This consensus indicates a pathway for policymakers and curriculum developers to adopt blended pedagogical frameworks in Nigerian secondary schools.

Conclusion

This research analyzed perceptions and challenges of students and teachers regarding avatar-mediated and teacher-mediated pedagogies in Civic Education in Katsina State, Nigeria. The results indicated that students have favorable views on avatar-mediated instruction, highlighting technology's role in enhancing engagement and comprehension. Conversely, teachers favored teacher-mediated instruction, emphasizing the critical function of human facilitation in digital learning environments. Nonetheless, the study identified significant barriers to implementing virtual guided discovery pedagogy, including inadequate ICT resources, poor internet access, and insufficient teacher training. These obstacles underscore systemic issues that impede the effective adoption of innovative teaching strategies in Nigeria's educational landscape. Additionally, the findings showed a preference disparity: students preferred avatar-mediated methods, whereas teachers advocated for a blended approach combining digital and traditional instruction. Notably, both groups endorsed the integration of avatar-mediated and teacher-mediated techniques, suggesting that a blended learning model is the most effective approach for Civic Education.

Collectively, the findings emphasize the importance of hybrid pedagogical models that utilize technology's motivational potential while ensuring teacher guidance. The study concludes that the advancement of Civic Education in Katsina State, and Nigeria as a whole, depends on the strategic integration of digital tools with teacher-led instruction, bolstered by infrastructural support, professional training, and innovative policies. This integration aims to maintain Civic Education's interactivity, inclusivity, and responsiveness to contemporary learners' needs.

Recommendations

Base on the findings, the study made the following recommendations:

1. Students should be supported with affordable access to digital devices and data packages to encourage their participation in avatar-mediated learning.
2. Teachers should undergo continuous professional development on virtual pedagogies.
3. Government and school authorities should invest in ICT facilities, electricity, and reliable internet connectivity.
4. Policymakers should design supportive frameworks that address infrastructural and cultural barriers to technology integration
5. Curriculum planners should embed technology-driven teaching into Civic Education programs.
6. Schools should adopt blended learning, integrating both avatar-mediated and teacher-mediated instruction.

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