

Pedagogy and the Interactive Whiteboard: Challenges for the 21st Century Teacher

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Abstract

The speed technology is moving and place man stressful-free and improving every sphere of human life globally cannot be overemphasized. The teacher who in the past will leave the class after lesson delivery covered with chalk-dust is free from it in most schools as a result of advancement and innovation in technology. One of these innovative technologies is the Interactive Whiteboard (IWB). Interactive whiteboard commonly known as smart board or interactive board is an advanced display tool that can connect to the internet and instantly digitalise task and operations interactively such that more senses are involve in learning process. This rapid change and advancement in technology affects the teacher whose knowledge is more on the traditional use of chalk-and-talk. The study emphasises the importance of IWB as a change agent in teaching and learning and should be encouraged even though the teachers have capability and competence challenges in the use of IWB. The paper suggests that teachers should be trained to acquire knowledge and skills necessary to use IWB in line with the global trends. It concludes that because of the potentials of IWB, the management of institutions and government should make IWB available in classes for teachers use to promote digital education.

Keywords: Challenges, Interactive, Pedagogy, Teacher, Whiteboard

Introduction

Globally, technology has taken space in human life and revolutionized all aspect of human endeavour. Worthy of note is the rapid progress and innovative advancement in digital knowledge which has brought major changes in education that the role of the teacher requires expertise to adapt and implement to the benefit of the system.

This change requires a new orientation for teachers to be able to keep up with the times and play the role of the true change bearer. This is obvious because the advancement and progress in technology is not proportional to the knowledge and skills of teachers. The

teachers who are supposed to be at the centre of technology use are still struggling with the old traditional method of teaching.

The era of technology has brought a shift in classroom delivery and being a teacher in the 21st century is different. The 21st century teacher needs to be literate in the use of digital technology like the Interactive Whiteboard (IWB) that has taken centre stage in most classes in developed countries. Technology such as interactive whiteboard is now unavoidable and vital part of today's classroom.

An Interactive Whiteboard (IWB) is a large, touch-sensitive display surface connected to a computer and a digital projector, which allows users to interact with digital content using a finger, stylus, or other input device. Unlike traditional chalkboards or dry-erase boards, IWBs integrate multimedia, text, images, sound, video, and internet resources in a single platform, thereby transforming the classroom into a more dynamic and engaging learning environment (Higgins, Beauchamp & Miller, 2007).

The IWB functions by projecting the computer screen onto the whiteboard surface. Teachers and students can manipulate the content directly on the board—writing, drawing, moving objects, highlighting text, or accessing applications—thus making the lesson interactive (Kennewell & Beauchamp, 2007). It combines the features of a presentation tool and a collaborative workspace, allowing multiple users to engage simultaneously.

From a pedagogical perspective, IWBs embody the shift from teacher-centered instruction toward learner-centered pedagogy, as they encourage participation, dialogue, and co-construction of knowledge (Smith, Hardman & Higgins, 2006). Their integration aligns with 21st-century educational goals of promoting active learning, digital literacy, and differentiated instruction. In essence, the concept of the IWB is not only technological but also pedagogical: it represents a mediating artefact that bridges traditional classroom practices with digital affordances, enabling teachers to design rich, multimodal, and interactive learning experiences (Mercer, 2000; Jewitt, 2008).

Interactive whiteboard or smartboard is a large interactive display in the form of a whiteboard. Mata, Lazar and Lazar (2016) see interactive whiteboard as a large touch-sensitive and interactive display that connects to a computer and projector. It is an electronic device that enables interactive work with computer directly from the board itself through clicking on the projected picture, interactive pen (stylus) or a human finger.

Al-Faki and Khamis (2014) defined an interactive whiteboard as “a large touch-sensitive display unit, connected to digital projector and computer” (p.137). The interactive whiteboard has the capacity to manipulate data, project images and videos, include sound and allows for the data to be stored and retrieved and be manipulated once again. Kennwell and Higgins (2007) also defined IWB as the combination of blackboard, computer, overhead projector, CD player, video player or flip chart and therefore allow the usage of all kinds of media in one device.

Over the years Interactive Whiteboards (IWBs) have entered the class to improve the teaching of the entire class by enhancing the visual impact and interactivity of the lesson

(Gregorcic *et.al.*, 2018). IWB when properly used will foster students learning as while motivates and engages students (Shi *et. al.*, 2021).

Interactive whiteboard is an educational technology which is being used in the classroom to enhance teaching and learning activities. IWB is a teaching tool and learning resource a teacher can use to bring the outside world inside the classroom through the internet. However, many teachers who are incompetent in computer knowledge face some challenges as a result, school with IWB are still using chalk-and-talk because of their incompetence.

A successful teaching and learning rest on the teacher who is knowledgeable in the use of the tool before him to facilitate teaching and learning. Using interactive whiteboard can only be effective on the strength of the teacher.

Importance of Interactive Whiteboard in Teaching and Learning

Pedagogy refers to the methods and practices of teaching, particularly as an academic discipline or theoretical concept. With the integration of IWBs, pedagogy extends beyond transmission of knowledge to interactive, learner-centered engagement. IWBs afford opportunities for:

- a. **Multimodal teaching**, combining text, audio, video, and animation.
- b. **Interactive participation**, enabling students to engage directly with content.
- c. **Collaborative learning**, fostering group problem-solving and discussions (Glover & Miller, 2001).

However, pedagogy with IWBs demands teachers to **rethink lesson planning**. IWBs can either reinforce traditional teacher-centered instruction or serve as a tool for transformative, student-centered learning, depending on how they are used:

- i. It provides a multi-molality environment where images, texts, can be used by teachers and students (De vita *et. al.*, 2018).
- ii. You can save work done, print, or distribute your notes at the touch of a button.
- iii. In the traditional method of teaching where the teacher is at the centre of teaching, with IWB the learner is no longer imagining but taking part using his five sensory organs in perception.
- iv. The teaching is fast, effective and practical.
- v. Interactive whiteboard has the ability to stimulate, enrich, strengthen skills and motivates students for efficient and productive learning (Dave and Tearle, 2010).
- vi. Students gain 21st century skills and improve their competency.
- vii. Flexibility in terms of time and location.
- viii. Provides the students the opportunity to present their work before the teacher and therefore, taking a more active part in the learning process.

Multimodal Learning

Multimodal learning theory emphasizes that learners interpret and construct meaning through multiple channels — visual, auditory, textual, and kinesthetic. According to Kress and van Leeuwen (2001), communication in the classroom is inherently multimodal, and teaching tools should reflect this reality. IWBs enable such learning by combining text, images, animations, audio, and interactive manipulation in one platform. Kennewell and Beauchamp (2007) highlight that IWBs allow teachers to design learning experiences that address diverse learning styles, supporting learners who might otherwise be disadvantaged in traditional text-dominant classrooms. For example, a science lesson on plant growth can integrate video demonstrations, diagrams, and interactive drag-and-drop activities. Jewitt (2008) further argues that IWBs enhance students' ability to shift between different representational modes, which deepens conceptual understanding.

Affordances: Multiple representations of knowledge, inclusive teaching strategies, integration of text-image-sound, and the ability for learners to re-represent ideas across modes.

Active Learning and Engagement

Active learning emphasizes that students learn more effectively when they are actively involved in constructing meaning rather than passively receiving information. Bonwell and Eison (1991) describe active learning as engaging students in activities such as discussion, problem-solving, and analysis. IWBs support this by transforming lessons from static presentations to dynamic, participatory experiences. Research by Smith, Hardman, and Higgins (2006) shows that IWBs can increase students' motivation and participation because of their interactive features. Students are often eager to come to the board, manipulate objects, or contribute ideas that are immediately visible to the whole class. This visibility fosters accountability and shared responsibility for learning. Levy (2002) argues that IWBs create "learning episodes" where students engage cognitively and emotionally, sustaining attention and deepening understanding.

Affordances: Hands-on interaction, enhanced student participation, immediate feedback, and increased motivation through visual and kinesthetic involvement.

The Integration of Interactive Whiteboard in Teaching and Learning in the 21st Century

The 21st-century classroom demands innovative teaching approaches that foster critical thinking, collaboration, creativity, and digital literacy. The **Interactive Whiteboard (IWB)** provides a versatile technological tool that teachers can integrate to meet these pedagogical goals. Effective integration, however, requires intentional planning, alignment with instructional objectives, and active learner involvement (Mishra & Koehler, 2006).

- 1) **Enhancing Lesson Presentation:** Teachers can use IWBs to present lessons in a dynamic, multimodal way. Instead of static chalk-and-talk methods, they can display animations, simulations, and diagrams that make abstract concepts more concrete. For example, in mathematics, geometric shapes can be manipulated to demonstrate transformations, while in science, teachers can simulate chemical reactions safely (Higgins, Beauchamp & Miller, 2007).
- 2) **Promoting Collaborative Learning:** IWBs can be used as shared spaces for **group projects and discussions**. Teachers can encourage learners to come to the board, annotate text, or rearrange visual materials. This supports **social constructivist learning** (Vygotsky, 1978), where knowledge is co-constructed through interaction. Peer collaboration can be fostered through brainstorming sessions, mind mapping, or problem-solving activities on the board.
- 3) **Supporting Differentiated Instruction:** In the 21st-century classroom, learners have diverse needs and learning styles. IWBs allow teachers to integrate **multiple means of representation**, catering to visual, auditory, and kinesthetic learners. According to Universal Design for Learning (Rose & Meyer, 2002), teachers can present the same concept in varied formats—videos, images, audio, and interactive tasks—ensuring inclusivity and equity in learning.
- 4) **Encouraging Active Learning and Engagement:** Teachers can integrate IWB tools to shift learners from passive recipients of information to **active participants**. Features such as drag-and-drop activities, quizzes, polling, and interactive games encourage engagement and sustain attention (Smith, Hardman & Higgins, 2006). By involving students in manipulating digital content, teachers enhance motivation and deepen conceptual understanding.
- 5) **Linking Classroom Learning with Real-World Contexts:** Teachers can connect lessons with **real-time digital resources** through internet-enabled IWBs. For instance, a geography teacher may use live satellite images to teach about climate change, while a literature teacher can access author interviews or dramatic performances to contextualize texts (Jewitt, 2008). This fosters critical 21st-century skills such as information literacy and global awareness.
- 6) **Assessment and Feedback:** IWBs can support formative assessment through interactive quizzes, polls, and instant feedback. Teachers can record students' contributions, save annotated lessons, and revisit them for review. Such practices promote reflective learning and continuous assessment (Levy, 2002).
- 7) **Professional Collaboration and Lesson Design:** Beyond classroom teaching, teachers can collaborate using IWBs to design digital lesson resources. Through the Technological Pedagogical Content Knowledge (TPACK) Framework (Mishra & Koehler, 2006), teachers can integrate pedagogy, content, and IWB features to create effective lesson designs. Sharing interactive materials across schools also fosters professional learning communities.

Challenges for the 21st Century Teacher in the use of Interactive Whiteboards (IWBs)

- 1) **Technical Competence:** Many teachers lack adequate training to effectively use IWBs. According to Higgins, Beauchamp, and Miller (2007), insufficient digital competence often results in teachers using IWBs merely as projection screens, underutilizing their interactive potential.
- 2) **Pedagogical Shifts:** Moving from traditional teaching to interactive pedagogy requires reorientation. Teachers must learn to design **student-centered lessons** that exploit the interactive capabilities of IWBs (Glover *et al.*, 2005). Resistance to pedagogical change remains a challenge.
- 3) **Time Constraints:** Effective use of IWBs demands significant time for lesson preparation. Teachers often struggle to balance the need for interactive lesson design with existing workload (Smith *et al.*, 2005).
- 4) **Infrastructure and Technical Support:** In many developing contexts, challenges such as unreliable electricity, poor internet connectivity, and lack of technical support hinder effective IWB integration (Adeyemi, 2010).
- 5) **Equity and Access:** Not all schools have access to IWBs, creating disparities in technology-enhanced pedagogy. Even within schools, some teachers may receive more exposure or training than others (BECTA, 2004).
- 6) **Student Distraction:** While IWBs can motivate learners, they can also serve as distractions if not effectively managed. Over-reliance on animations and multimedia can divert attention from the core lesson objectives (Mercer, Hennessy & Warwick, 2010).

Conclusion

Interactive whiteboard is fundamental and important landmark in the innovation of the teaching process at all level of education. The 21st century teacher teaching with IWB and modern tool will improve teaching and making the teacher stress-less in carrying out his teaching task. It is up to the teacher to key into this new trend of imparting knowledge using the IWB because of its potentials. While these tools offer immense affordances such as interactivity, multimodality, collaboration, and the capacity to engage diverse learners, their effective utilization remains dependent on teachers' pedagogical competence, training, and adaptability. The challenges faced—ranging from inadequate technical skills, resistance to change, infrastructure deficits, and lack of ongoing professional development—highlight the need for a holistic approach to IWB adoption.

Teachers must therefore be repositioned as facilitators of knowledge who harness IWBs not just for presentation, but for co-construction of meaning, problem-solving, and inquiry-driven learning. School systems and policymakers must also support this shift by providing consistent training, access to resources, and institutional backing to foster innovative classroom practices. Ultimately, the successful integration of IWBs in pedagogy lies not in the technology itself but in how educators critically and creatively apply it to

enrich learner experiences. Embracing these challenges with resilience and innovation will ensure that IWBs contribute meaningfully to the vision of 21st century education.

Recommendations

Based on the challenges and prospects of using Interactive Whiteboards (IWBs) in pedagogy, the following recommendations are proposed to strengthen teachers' capacity and enhance effective integration in 21st century classrooms:

1. Teachers should be provided with regular, hands-on training and workshops on the pedagogical and technical use of IWBs. This will build competence, confidence, and creativity in lesson delivery.
2. Educational institutions and policymakers should establish clear policies and provide infrastructural support to ensure sustainable IWB use, including adequate power supply, internet connectivity, and maintenance services.
3. Schools should encourage communities of practice where teachers share experiences, teaching strategies, and innovative approaches to maximize the affordances of IWBs.
4. The use of IWBs should be embedded into the curriculum in ways that promote inquiry, critical thinking, and learner-centered approaches rather than mere content delivery.
5. Governments and stakeholders should work towards equitable distribution of IWBs across urban and rural schools to reduce the digital divide and promote inclusive education.
6. Many teachers (educators) need more skills to effectively implement technology into their teaching practices. This call for robust, comprehensive teacher training that will empower the teacher to navigate the technology confidently.

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