Application of Multimodal Approaches to Remote Teaching and Learning in Rural South African Universities: A Case Study of COVID-19 Pandemic Responses

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Abstract

This study explores effective approaches to implementing multimodal teaching and learning strategies to support students in higher education during the COVID-19 pandemic. Integrating multimodality into academic programs enhances the diversity of instructional methods and offers universities meaningful opportunities to leverage a range of educational technologies within interactive learning environments. Successful online education relies heavily on robust information and communication technology infrastructure. Transitioning to digital platforms not only supports continuity but also fosters students' development of multimodal digital literacy.

The disruption caused by COVID-19 inspired the researcher to examine the role of multimodality in education. Adopting a qualitative research methodology, the study used purposeful sampling to select participants who are academics and students, from a university in KwaZulu-Natal, South Africa. The aim was to explore their experiences and strategies in online teaching and learning. Data collection involved a focus-group interview with academics and six second-year students from various disciplines. A case study framework guided the research, with thematic analysis used to interpret the data. The findings highlight that, despite facing numerous challenges during the pandemic, both students and academics managed to sustain academic activities by utilizing digital tools such as Moodle, WhatsApp and other platforms. These media platforms played a vital role in ensuring the continuity of education, even reaching students in remote locations.

Keywords: COVID-19, Multimodal Approaches, Higher Education Institutions, Remote Teaching and Learning, Rural University

1. Introduction

To ensure teaching and learning are effective, it is essential to employ a variety of instructional methods. This study, therefore, examines the use of multimodal approaches, such as online learning and supplementary materials, as a means to create enriched educational experiences. As Bayar (2014) emphasizes, teaching and learning are fundamental elements of any educational programme. In the pursuit of delivering quality instruction in higher education institutions (HEIs), multimodal strategies appear to offer promising ways to strengthen student engagement and academic success. Kress, as referenced in Öman and Sofkova Hashemi (2015), describes multimodality as an approach that utilizes all available ICT resources to support classroom interaction. This integration of digital tools may significantly enhance students' academic performance and their broader learning experiences. This research explores alternative strategies that may have supported students in HEIs during the COVID-19 pandemic. As the virus spread globally, it disrupted education systems, resulting in the widespread closure of institutions and a shift in how teaching and learning were delivered (Schleicher, 2020). Dagur and Dhakar (2020) note that the severity of the outbreak led the World Health Organization (WHO) to officially declare it a pandemic. In response, HEIs , especially universities, were compelled to move from traditional in-person formats to online learning environments to reduce infection risks.

This study offers an in-depth case analysis of how a selected higher education institution (HEI) in KwaZulu-Natal (KZN), South Africa, strategically employed technology-mediated instruction to support student learning during the COVID-19 pandemic. As the health crisis unfolded, the resulting national lockdowns and stringent social distancing measures fundamentally disrupted the conventional functioning of academic institutions. According to

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Raju (2021), these restrictions significantly impacted both students and academic staff, compelling institutions to rethink and reconfigure the modes through which education was delivered.

The unexpected cessation of traditional face-to-face instruction necessitated a swift and decisive pivot to digital learning platforms, prompting universities across the globe to modify their pedagogical frameworks in alignment with remote delivery modalities (Mncube et al., 2021). This shift was not merely a logistical adjustment but represented a comprehensive transformation in educational practices, requiring new competencies, resources, and infrastructural readiness. Despite the urgency of the situation, many institutions were caught unprepared for the scale and speed of the transition. As noted by the Commonwealth of Learning (COL, 2020), the unexpected onset of the pandemic created a significant learning crisis, exposing vulnerabilities in the preparedness of higher education systems. In response to these challenges, HEIs began to develop and implement multimodal teaching and learning strategies, innovative, flexible approaches grounded in extensive reflection, collaborative dialogue, and strategic consultation. These strategies aimed to ensure that learning could continue despite physical separation, thereby supporting students across diverse contexts and mitigating the risk of educational disruption (COL, 2020).

2. Literature

This study is grounded in the theoretical framework of Manuel Castells' "space of flows" theory. Castells, a prominent Spanish sociologist, is widely recognized as one of the most influential social scientists of our time. His theory argues that the transformative power of recent technologies has significantly reshaped social structures related to time and space, particularly through the integration of human and technological networks. A theoretical framework serves as the foundation of a research study, offering guidance throughout the literature review process. A theory may be understood as a scientific explanation of specific phenomena, or as a set of logically connected ideas, definitions, and propositions aimed at explaining and predicting occurrences. Theories are shaped by the assumptions and conceptual structures that support them (Castells, 1999, 2020; Kumar, as cited in Mngomezulu, 2018).

Castells' space of flows theory, first proposed in 1999 and later revised in 2013, is one of the most comprehensive models for understanding the "Information Age." He asserts that contemporary history is marked by the transformation of geographic space, which plays a key role in broader social and technological shifts. The concept of space of flows captures this spatial transformation. Rather than subscribing to overly simplistic predictions of the demise of spatial relevance, Castells maintains that new ICT developments have redefined spatial dynamics. These technologies enable both centralized and decentralized systems, making it possible for distant areas to be functionally reconnected through advanced communications and efficient transportation systems.

According to this theory, the organization of social practices is increasingly independent of physical proximity. While digital networks are part of this space, the concept extends beyond a mere 'cyberspace.' It is rooted in the physical infrastructure of knowledge systems, telecommunications, and transportation. The location and design of this infrastructure help shape the operation and influence of these networks, as well as their global reach. Nodes and hubs serve as structural models for understanding these flows, which are influenced by the goals and activities of specific networks. Moreover, individuals managing these networks often operate in exclusive spaces either near nodes, within secure consumption zones, or through designated corridors physically separated from surrounding communities. These flows also encompass digital platforms, such as websites and online communication systems, which increasingly facilitate decision-making, knowledge sharing, and global interaction. This theory underscores the fusion of electronic and physical spaces through networked flows. Empirical studies confirm that critical societal activities now predominantly operate within this framework, enabling privileged groups to reinforce their dominance by excluding less-connected regions (Castells, 2020).

Within this digital context, multimedia tools are widely used to deliver content. Importantly, multimedia and multimodality are closely linked. While multimedia refers to diverse forms of content, multimodality encompasses various modes of representation such as text, visuals, and layout—within educational practices. Hassett and Curwood (2009) point out, the move from paper-based to multimodal education requires a rethinking of pedagogy, content design, and use of technology to support learning across diverse social and instructional contexts. Educational institutions employ numerous tools to facilitate online learning. Bloomberg (2021) highlighted how online platforms provide access to a wide range of resources. According to Montebello et al. (2018), educators often promote the use of varied media in student projects, encouraging learners to create knowledge using multimodal resources like images, videos, data visualizations, and diagrams. This diversity enhances cognitive engagement and comprehension.

ICT has become central to modern education, offering tools that support knowledge development and systemic reform. Applications such as Zoom, WebEx, Microsoft Teams, and Skype have allowed students to participate in online classes. Kaur et al. (2020) observed that HEIs have embraced several innovations, incorporating tools like Google Classroom and Google Docs. Even medical institutions adapted by using these platforms to maintain course delivery. As noted by Brenton (2008), most institutions now utilize virtual learning environments web-based systems that allow educators to create and manage course content online without requiring technical expertise. These tools became especially vital during the pandemic, helping universities support continued learning (Subedi et al., 2020). Platforms such as Microsoft Teams, Canvas, Google Classroom, and Blackboard enabled the creation of academic and skill-building programmes (Petrie, 2020). Pokhrel and Chhetri (2021) added that videoconferencing tools and cloud-based learning management systems, such as Moodle, BigBlueButton, Elias, and Skype, have seen a surge in use. Parsons et al. (2015) emphasized that video tools enhance communication and interaction, which are critical to effective online instruction. Koomar and Jull (2020) recommended synchronous lessons via platforms like Zoom, although accessibility remains an issue for some students. These technologies can also serve rhetorical or aesthetic purposes (Montebello et al., 2018). Although face-to-face education remains effective, the pandemic demonstrated how digital platforms could enhance learning convenience (Kaur et al., 2020). Educational content must be curated, aligned with curricula, and delivered through appropriate channels such as mobile, online, television, or radio (EGFSN, 2013). Ali and Al-Dmour (2021) noted how video calls and chat platforms connect students and teachers globally. Juan and Yahaya (2019) further asserted that multimedia learning systems can significantly boost engagement and comprehension.

In a study conducted by Han and Shin (2016), platforms like Moodle have enhanced students' motivation and access to learning in HEIs. The flexibility of such systems has streamlined curriculum delivery. With technology advancing rapidly, distance education has become increasingly viable (McBrien et al., 2009). Cojocariu et al. (2014) observed that terms like online learning and m-learning all share the capacity to deliver education from anywhere, at any time, and through multiple formats. As Cope and Kalantzis (2009) noted, multimodal representation includes language (oral and written), visuals, gestures, and spatial elements. This transition to multimodal learning invites a reevaluation of educational practices. Multimedia tools, such as videos, quizzes, discussion forums, and visual data tracking, are integral to this process (Sharples et al., 2016). Montebello et al. (2018) emphasized that multimedia resources often serve as teaching aids, enriching content delivery. The diversity of formats allows instructors to address various learning styles (Sankey et al., 2010). Emerging technologies have also introduced virtual labs, enabling students to actively experiment and learn by doing (Schleicher, 2020).

Johnson et al. (2020) underscore the importance of implementing a diverse array of teaching strategies to sustain student engagement and ensure effective assessment within virtual learning environments. In the context of rapidly evolving educational demands, the adoption of multiple pedagogical approaches becomes essential to accommodate diverse learner needs and to replicate the interactivity typically found in face-to-face classrooms. However, the success of these strategies is closely tied to addressing the broader issue of digital inequality, which continues to pose significant barriers to equitable learning.

To bridge this divide, UNICEF (2020) advocates for a multimodal educational approach that incorporates a variety of content delivery methods, ranging from online platforms to radio and television broadcasts, alongside targeted public awareness campaigns. These initiatives are critical in helping students, parents, and educators understand and effectively use available learning technologies. Such inclusivity ensures that education remains accessible to all learners, regardless of their socio-economic or geographic backgrounds. Moreover, as Juan and Yahaya (2019) note, the delivery of effective multimedia instruction extends beyond the mere availability of technological tools; it necessitates that educators possess both sound pedagogical acumen and advanced ICT competencies. Teachers must be adept not only in using digital tools but also in integrating them meaningfully into instructional design to foster critical thinking, collaboration, and creativity. Looking ahead, the long-term implications of these digital shifts are profound. Goldstein et al. (2021) argue that the widespread adoption of digital teaching methods during the COVID-19 crisis is likely to reshape the educational landscape permanently. Rather than serving as temporary solutions, these practices are expected to evolve into integral components of mainstream education, compelling institutions to reimagine curriculum delivery and teacher training in a post-pandemic world.

Despite inherent challenges such as digital access inequalities, technical constraints, and varying levels of ICT proficiency among educators and learners, multimedia learning tools remain highly promising in transforming educational experiences. These tools provide dynamic avenues for content delivery, enabling educators to move beyond traditional, text-based instruction to incorporate interactive videos, animations, simulations, and digital storytelling, which cater to a wider range of learning styles. Dai and Fan (2012) highlight that the use of multimedia fosters a rich, multisensory learning environment that actively engages students through a combination of auditory,

visual, and kinesthetic stimuli. This sensory immersion contributes to heightened attention, deeper cognitive processing, and sustained motivation.

Moreover, multimedia integration supports personalized and self-directed learning, where students can control the pace, sequence, and mode of content interaction. De Sousa et al. (2017) emphasize that access to multimedia courseware empowers learners to construct and internalize knowledge on their own terms, facilitating greater autonomy and a more meaningful learning experience. In this way, multimedia tools not only support academic performance but also promote learner agency, creativity, and critical thinking, making them indispensable in modern educational practice.

3. Methodology

This paper is anchored by the central research question: How can multimodal teaching and learning strategies support students in the higher education sector during the COVID-19 pandemic? To explore this inquiry, the study employed a sequential qualitative research methodology, aligning with a constructivist paradigm, which emphasizes the co-construction of knowledge through participants lived experiences. Accordingly, the study was framed within a case study research design, allowing for an in-depth examination of a specific institutional context and its response to the educational disruptions caused by the pandemic.

The primary objective of the research was to investigate and document the various teaching and learning strategies that were implemented during the national lockdown period. These strategies reflect the adaptations made by both academic staff and students in response to an abrupt shift in pedagogical practice. Ahmad et al. (2019) assert, qualitative research constitutes a naturalistic mode of inquiry, aiming to achieve a nuanced understanding of social phenomena within their real-world contexts. It seeks to answer the "why" rather than merely the "what" of human behaviour, privileging the experiential insights of individuals as they navigate and interpret their realities. In this regard, the qualitative approach employed in this study provided a rich interpretative lens through which the impacts, challenges, and innovations of multimodal teaching could be understood during an unprecedented period of global educational disruption.

3.1. Research Model/Design

This study employed a case study research design, focusing on a university located in a rural setting within the KwaZulu-Natal province. The case study approach was selected to facilitate an in-depth exploration of the contextual realities and educational responses to the COVID-19 crisis, particularly within historically disadvantaged and under-resourced higher education institutions (Mdiya, 2020). The primary purpose of adopting this design was to ensure that the data gathered from participants would allow for a comprehensive and credible response to the central research question, grounded in authentic experiences and observable practices (Creswell & Poth, 2018).

Research design functions as the blueprint of an investigation, guiding the planning process and determining the strategies employed for data collection, analysis, and interpretation (Jacobs, & Cornelius, 2022). In this case, the research design directed attention toward the practical implementation of online teaching and learning modalities during a period of institutional closure. The study aimed to identify and evaluate effective digital teaching strategies that were utilised to ensure continuity in academic programmes during the pandemic-induced lockdown. By centering on a rural university, the research also illuminates how geographic and infrastructural disparities shaped the delivery and accessibility of remote education in South Africa's higher education sector (Czerniewicz et al., 2020).

3.2. Data Collecting Tools

To generate rich and contextually grounded data, this study utilised a multi-method qualitative data collection approach, incorporating both semi-structured interviews and focus group discussions involving lecturers and students. These methods were chosen to elicit diverse perspectives and gain nuanced insights into the feasibility and effectiveness of implementing online and virtual teaching for the first time within the institutional context. Semi-structured interviews enabled the researcher to explore individual experiences and viewpoints in depth, while the focus groups facilitated interactive dialogue, allowing participants to reflect collectively on shared challenges and adaptive strategies (Gill et al., 2008). Given the constraints imposed by pandemic-related restrictions, Microsoft Teams was employed as the primary digital platform for conducting and recording all interviews and discussions. This tool offered a secure and accessible environment for remote engagement, particularly crucial for participants located in geographically dispersed and rural settings.

3.3. Sampling or Study Group

This study explored international best practices that were adopted globally to facilitate the continuation of teaching and learning during the COVID-19 pandemic, with particular attention to approaches deemed adaptable and relevant within the South African higher education context. These global practices were assessed for their applicability in supporting both students and academic staff amid the disruptions caused by the pandemic. The research targeted a diverse group of participants, comprising three distinct respondent categories: academic lecturers, undergraduate students, and university administrative officials.

A purposive sampling strategy was employed to identify potential participants based on their accessibility and direct involvement with the transition to remote learning. The selection of a convenience sample ensured that the study captured perspectives grounded in lived experience, which was crucial for generating meaningful and reflective insights into the pedagogical shifts during this period. The final cohort included six academic staff members and twelve undergraduate students, all of whom were first year enrolled in 2020, the year in which the pandemic impact on higher education began to intensify. This participant composition was deliberately chosen to achieve a balanced view of the teaching and learning experience under emergency remote teaching conditions. By incorporating both educator and student perspectives, the study was able to evaluate the efficacy and challenges associated with various digital and multimodal instructional strategies. Furthermore, this approach facilitated a deeper understanding of the academic and institutional adjustments made during lockdown, thereby directly informing the central research question concerning the role of multimodal strategies in supporting higher education during a global crisis.

3.4. Data Analysis

The present study adopted a predominantly qualitative approach, with data analysis conducted through thematic analysis. As Braun and Clarke (2006) note, thematic analysis is a foundational method widely utilised in qualitative research, particularly advantageous for researchers who are new to the field. The data collected were systematically organised into distinct categories, allowing the identification of recurring patterns and insights as the analysis progressed. In line with Mouton's (2005) assertion, data analysis involves deconstructing the information into manageable units to uncover key themes, discernible trends, and meaningful relationships.

All interview recordings were transcribed verbatim to ensure accuracy and reliability in the analytical process. Thematic similarities within the data were then grouped together into categories, each of which served as the basis for coding the transcripts. Through this method, a series of themes and sub-themes emerged, reflecting the core experiences and perspectives of the participants. The final phase of the analysis involved synthesizing these findings and presenting them in a structured and coherent manner, aligned with the study's objectives and research questions.

3.5. Appropriateness and Trustworthiness

To determine the suitability of research instruments, it's crucial that the findings are reliable. Researchers must prioritize evaluating the credibility and trustworthiness of their studies. In this study, the findings accurately reflect the data collected from participants, capturing the essence of their experiences during the COVID-19 pandemic, including the sudden shift to online learning and the network challenges that ensued (as discussed by participants). According to Leung (2015), validity in qualitative research refers to the appropriateness of the methods, processes, and data used to ensure that the research accurately represents the phenomenon being studied. To achieve this, the study employed focus group interviews and semi-structured interviews, designed to gauge the effectiveness of strategies used to support students during the pandemic and identify potential solutions to the challenges that impacted the education system. The responses from academics and students directly addressed the main research question, providing accurate and recorded information. Validity was ensured by seeking to understand the participants' perspectives within their contexts, and interpretations were verified through member checks, thereby confirming that the information obtained was genuinely representative of the participants' views.

3.6. Research Procedures

Prior to data collection takes place, a consent form was provided to the participating institution, outlining the research procedure and details of the study. The institution's agreement to participate was confirmed through a signed consent form. Similarly, individual participants were approached for their consent, with clear explanations of the study's purpose and measures to ensure confidentiality of the findings.

4. Findings and Discussions

4.1 Learning Management Systems(LMS)

This study's results show that incorporating multimedia resources into teaching systems has profoundly impacted education. By leveraging multimedia and internet technologies, traditional teaching methods can be revolutionized, both during and after the pandemic. Our findings suggest that, as we move further into the digital age, integrating multimedia into teaching and learning is no longer optional. Lecturers made a concerted effort to employ diverse teaching approaches, utilizing various methods to engage students. Notably, however, only a few lecturers used voice recordings over slides, which proved to be a popular method among students. The effectiveness of remote teaching and learning also depends on the proficient use of learning management systems (Songca et al., 2021). As Gamede et al. (2018) note, platforms like Moodle offer educators a valuable tool for designing, managing, and presenting online learning materials, thereby enhancing student access to resources. The lecturers' experiences and insights are further illuminated by their statement**s:**

Nolwazy: What I did was that during the lockdown, umm, I continued to upload PowerPoint notes on Moodle.

Nana: I would send my slides through Moodle.

It appears that the Moodle platform is widely adopted across educational institutions; however, some of these digital tools can create challenges, particularly when it comes to assessment.

4.2 Social Media Platforms (WhatsApp)

This study's findings revealed that WhatsApp was the most popular application among students due to its ease of access and relatively affordable data bundles compared to other platforms. The creation of virtual classes through WhatsApp groups, as noted by (Enyama et al., 2021), facilitated communication among students at various study levels, and the institution even provided data bundles to support this. WhatsApp's features, such as text messaging and voice notes, enabled students to engage with each other and with academics. According to Hodges et al. (2020), the innovative use of WhatsApp groups fostered ongoing communication through shared audio and video sessions. Gorgen and McAleavy (2020) also advocated for developing interactive activities on WhatsApp to enhance student engagement. However, despite its popularity, WhatsApp-based distance learning faced challenges related to poor network access, as highlighted by (Latif et al., 2019).

Schleicher (2020) pointed out, digital technology offers new possibilities for rethinking the what, how, where, and when of learning. The lecturers' experiences with WhatsApp were described as follows:

Nana: Do a lot of voice notes for the students on WhatsApp, because WhatsApp was found to be accessible to many of them. So, they preferred that we used the WhatsApp route.

Nolawzy: And also interacting with my students on WhatsApp.

Trump: I put everything on WhatsApp, my lectures and my PowerPoint presentations.

During the COVID-19 pandemic, academics discovered that WhatsApp group discussions were an effective teaching approach, fostering collaborative teamwork among students who were enthusiastic about working together. Although WhatsApp wasn't the sole method used, its affordability and accessibility made it an ideal platform for reaching students, particularly those without computers (potentially referencing a study here). However, despite its convenience, WhatsApp proved to be a distraction when texts interrupted group discussions, a challenge noted in similar contexts by researchers (Bouhnik, & Deshen, 2014)).

4.3 Media Modality (Videos/Audios)

This document's discussions and perspectives are grounded in how Higher Education Institutions (HEIs) adapted to the COVID-19 crisis's disruptive impact, which accelerated their adoption of digital technologies. Participants noted that various software applications, including Zoom, Microsoft Teams, voice recordings over slides, and Big Blue Button, were utilized to facilitate online classes for students. According to Mayer (2014), incorporating media into video lectures enables learners to process information through both visual and auditory channels, potentially leading to enhanced schema construction and a deeper understanding of the content. Notably, even medical colleges have adopted innovative strategies to mitigate the COVID-19 crisis, leveraging platforms like Google Classroom, Zoom, and Microsoft Teams for online courses (Kaur et al., 2020). While online learning modalities and software applications provided a solution during the pandemic, students reported limitations in conducting practical or experiential learning.

Montebello et al. (2018), multimedia involves the integrated use of various media forms, such as text, graphics, animations, video, and audio, to deliver structured and diverse meaning. The experiences and insights of students and lecturers are reflected in their statements:

Mihla: *I liked videos the most. Actually, I prefer them because after the lesson you have an opportunity to replay and listen to them over and over.*

Tukzin: *I support the idea of learning through videos, because you can save them and watch them at your own time, can replay it seven times until knowledge is gained and videos are more interesting.*

Nana: *But after that, do a lot of voice notes for the students, because WhatsApp was found to be accessible to many of them.*

Sihle: *What I did was to download slides with data I had saved. Unlike a class to attend it need one to have lot of data, bust with slides you will keep on revisiting the slides with audio.*

Zolile: *The voice recording over the slides seemed to be useful because I will replay it at any time until I understand what was taught .... however, not all lectures used that. Also, the unfortunate part was that not all lectures used videos, in fact very few modules that uploaded videos.*

It appears that many lecturers made an effort to experiment with various teaching and learning approaches, although it was clear that not all lecturers adopted this approach, as noted by Zolile. Students expressed their preferences for certain teaching methods during the lockdown, which aligns with (Mardiana's, 2020) observation that technological advancements have led to the integration of new teaching methodologies, such as online teaching, in the learning process, as evidenced by a 2015 Scottish Government study.

5. Conclusion and Suggestions

These findings are context-specific and cannot be generalized due to the varying resources available to institutions, which are often tied to funding disparities. Rural institutions, in particular, face significant resource challenges. Through a case study approach, this research successfully explored the use of multimodal approaches in Higher Education Institutions (HEIs) in KwaZulu-Natal during the COVID-19 pandemic. The study demonstrated that by leveraging diverse teaching and learning modes, lecturers were able to effectively engage with students, ensuring continuity of learning. This underscores the importance of adaptability and creativity in education, particularly in times of crisis.

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