

Effectiveness of Video Instructional Techniques (VIT) On Learning Outcomes of Vulnerable Learners in Junior Secondary Schools

L'efficacité des Techniques des Vidéo Pédagogiques (VIT) sur les Résultats d'Apprentissage des Apprenants Vulnérables dans les Ecoles Secondaires du Premier Cycle Collège

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Abstract

This study examined the impact of video instructional techniques on enhancing the learning outcomes of vulnerable learners in secondary schools. *In the context of evolving teaching methods and the imperative to address diverse learning needs, the study explored the effectiveness of instructional videos compared to traditional face-to-face instruction. A quasi-experimental design was employed, involving pre-test and post-test measures for both experimental and control groups. The findings revealed that instructional videos significantly improved the learning outcomes of vulnerable learners. Additionally, the study highlighted the positive influence of instructional videos on learners' retention abilities. This research contributes to the discourse on innovative teaching strategies, particularly their efficacy in catering to diverse student needs and enhancing educational outcomes.*

Keywords: video instructional techniques, vulnerable learners, innovative teaching, learning outcomes

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Résumé

Cette étude a examiné l'impact des techniques pédagogiques par vidéo sur l'amélioration des résultats d'apprentissage des apprenants vulnérables dans les écoles secondaires. Dans le contexte de l'évolution des méthodes d'enseignement et de l'impératif de répondre aux besoins d'apprentissage divers, l'étude a exploré l'efficacité des vidéos pédagogiques par rapport à l'enseignement traditionnel en face-à-face. Un modèle quasi-expérimental a été utilisé, impliquant des mesures de pré-test et de post-test pour les groupes expérimentaux et les groupes de contrôle. Les résultats ont révélé que les vidéos pédagogiques amélioraient de manière significative les résultats d'apprentissage des apprenants vulnérables. De plus, l'étude a mis en évidence l'influence positive des vidéos pédagogiques sur les capacités de rétention des apprenants. Cette recherche contribue au débat sur les stratégies d'enseignement innovantes, en particulier leur efficacité pour répondre aux divers besoins des étudiants et améliorer les résultats éducatifs.

Mots-clés : Techniques pédagogiques par vidéo, apprenants vulnérables, enseignement innovant, résultats d'apprentissage

Introduction

Education serves as the gateway to knowledge and skill acquisition, facilitating structured interactions between educators and learners. In our rapidly evolving world, the shift from traditional teaching methods to a learner-centric approach has become a necessity to meet the contemporary skill demands of the 21st century (Holbrey, 2020; Hafee, 2021). This transition places a profound emphasis on educators' possession of innovative teaching skills that actively engage learners in the educational process. Therefore, the quality of teaching and learning is intrinsically linked to the competence of educators, as measured by their theoretical and practical knowledge, as well as their pedagogical abilities in incorporating novel and emerging information. Traditionally, teaching methods were often lecture-driven, minimally participatory, and primarily teacher-centred, casting educators as the primary authorities while relegating learners to passive roles (De Kok, Divaris & Samuelson, 2017). The conventional 'chalk and talk' pedagogy, which has prevailed for centuries, proves inadequate in

meeting the contemporary requirements of modern-day secondary education (De-Kok & Samuelson, 2017). While this approach may be advantageous for transferring fundamental knowledge to large groups, studies have revealed its limitations in fostering critical thinking and teaching-learning skills essential for today's education.

Modern education demands innovative pedagogical approaches that cater to diverse students' needs. However, despite the welcoming reception of technological innovations, several educational institutions still adhere to a standardized teaching approach (Beas, 2019). This one-size-fits-all methodology poses challenges for learners who struggle with rigid and fast-paced learning environments, often characterized as "vulnerable children" (Rosyidah, 2016). These individuals, frequently labeled as "slow learners," exhibit comparatively delayed cognitive development compared to their peers, prompting the need for educational reform to bridge this gap.

As described by Beas (2019), vulnerable learners are those who acquire academic skills at a rate lower than the average student, necessitating additional time, repetition, and instructional resources for success. Common characteristics of these learners encompass limited cognitive capacity, reduced intelligence quotient (IQ), information processing deficits, short-term memory deficiencies, concentration issues, and challenges in abstract thinking and expressing ideas (Makhomova & Ergashev, 2022). Vulnerable learners often populate regular classrooms, and addressing their unique needs is crucial to prevent potential dropouts. A proficient teacher recognizes classroom behaviors associated with learning difficulties, and the extent of vulnerability can often be indicated by an IQ score ranging from 70 to 90 (Cooter & Robert, 2019).

To address the distinct needs of vulnerable learners effectively, an innovative approach that leverages educational technology is imperative. Educational technology, often referred to as EdTech, involves the integration of technology and digital tools in educational settings to enhance teaching and learning processes (Roblyer, 2016). Its core purpose is to provide innovative solutions that improve pedagogy, facilitate personalized learning, and adapt to the changing

educational landscape (Bower, 2016). Technology-driven educational advancements have transformed the learning process for vulnerable learners, and their diverse behaviours necessitate a range of teaching methodologies. However, these characteristics shouldn't deter them from embracing modern educational technology. By exposing vulnerable learners to new technology and its potential benefits, educators can effectively bridge the learning gap.

In the context of evolving instructional paradigms, a shift from traditional methods to video-based instruction is becoming increasingly prominent. Instructional videos, dynamic and interactive, offer a versatile alternative to traditional teaching materials (Sablic et al., 2020). They have gained significant attention and widespread adoption in various educational settings due to their potential to enhance learning experiences and improve educational outcomes (Allen, Gu, & Michel, 2016). Recorded video instruction allows students to access educational content at their own pace and convenience, catering to diverse learning styles and preferences. It enables learners to revisit and review the material as needed, enhancing comprehension and engagement (Brame, 2016; Mayer, 2014).

Furthermore, the interactivity of recorded video instruction, through features like quizzes, discussion forums, and feedback mechanisms, can be harnessed to engage learners actively, providing instructors with insights into students' progress and comprehension (Jham, 2019). While recorded video instruction is commonly associated with traditional academic settings, it also serves as a valuable resource in professional development and skills training, making it accessible for upskilling and on-the-job learning (Davies, Howell, & Petrides, 2010). The integration of instructional videos into teaching methodologies, such as the flipped classroom approach, holds significant potential to boost learning outcomes (Roe, Rowe, Odegaard, Syllias, & Dahl-Micheisen, 2019). Numerous studies have emphasised the efficacy of instructional videos in enhancing learning skills and outcomes (Elsenousy & Alquda, 2017; Uzunboylu et al., 2017).

The COVID-19 pandemic has given prominence to distance learning, predominantly in employing recorded video instruction in teaching and

learning (Surono et al., 2020; Ekoinrajit & Wabawa, 2020; Kardpah and Wabawa, 2020; Chaeruman et al., 2018). Technology integration in education advocates multimedia content for active learning, including dynamic videos and animations. These instructional tools capitalise on the power of visual and auditory cues for effective learning (Gold & Holodynski, 2017). However, while recorded video instruction offers numerous benefits, it is not without its challenges.

One significant challenge lies in ensuring that all students, regardless of their circumstances, have equitable access to video content. In an era where the digital divide still persists, it's vital to consider the availability of necessary technology and internet access. Educational institutions must adopt strategies to bridge this gap, such as providing students with the required devices or facilitating access to high-speed internet. Additionally, effective use of recorded video instruction requires instructors to possess the knowledge and skills to create engaging and pedagogically sound content. While technology proficiency is increasingly becoming a requisite skill for educators, comprehensive training and support are essential. Professional development programs should empower instructors with the competencies needed to produce high-quality video materials. This includes not only technical skills but also an understanding of best practices for instructional design and effective communication through video.

Moreover, copyright considerations must be taken into account when using third-party materials (Jung, 2018; Vaughan, 2014). The integration of recorded video instruction in education brings forth a myriad of possibilities and challenges.

This study therefore examined the effectiveness of VIT on the learning outcomes of vulnerable learners, Specifically, the study sought to:

- examine the effectiveness of video instruction in teaching vulnerable learners (slow learners).
- Determine the retentive ability of vulnerable learners after the use of instructional videos.

Hypotheses

The following hypotheses were tested at 0.05 level of significance

- 1 There is no significant difference in the learning outcomes of vulnerable learners taught using video instructional technique and the group taught with the conventional teaching method.
- 2 There is no significant difference in the retentive ability of vulnerable learners taught using video instructional technique and those taught using conventional method

Research Methodology

This study employs a quasi-experimental design, specifically utilising a pre-test, non-equivalent, control group design. The choice of this design is driven by the practical constraints and ethical considerations inherent in an educational research context, where random assignment of students to different groups may not always be feasible or ethical.

The population of the study consists of vulnerable learners in the selected classrooms. Vulnerable learners are identified based on the assessment report card and teachers' assessments over the course of one year. This selection process ensures that the study focuses on students with similar levels of vulnerability within each group. To draw the sample, a multi-stage sampling procedure was utilised. The selection of the intact classrooms and experimental groups was carried out through a purposive sampling technique. This method was selected to ensure that the sample is homogenous in terms of relevant student characteristics. The sample comprises two intact classrooms from junior secondary schools, one serving as the experimental group (Group A) and the other as the control group (Group B).

The study utilises the Basic Science Achievement Test as both the pre-test and post-test instrument. This test comprises 50 multiple-choice items, with each correct answer worth two points. The choice of this instrument is made based on its relevance to the research objectives, and its reliability and validity are established to ensure the accuracy of assessment.

The instructors responsible for the experimental group (the class teacher) receive specific training on how to effectively use video-taped instructional strategies. This training spans two days and equips the teachers with the necessary skills to implement video instruction such as audio recording styles, voice control, connections method and projecting. In contrast, the control group teacher follows the traditional teaching method with prepared lesson notes.

Prior to commencing the experiment, a pre-test was administered to both the experimental and control groups to establish a baseline for their knowledge. The intervention, which involves video instruction, is implemented over a span of three weeks. During this instructional period, a specific topic, "States of Matter," was taught. This topic was further divided into three subtopics, covering solids, liquids, and gases. Each subtopic was taught in a week. The pre-test is thoughtfully designed to encompass the content taught during the three-week instructional period, ensuring that it appropriately reflects the knowledge and skills addressed in the experiment. Following the three-week intervention period, the same pre-test is re-administered as the post-test. This post-test is essential for assessing the impact of the intervention on the learners' understanding of the subject matter. Additionally, a retention test is conducted two weeks after the post-test using the Basic Science Achievement Test. This test serves to evaluate the learners' ability to retain and apply the knowledge gained from the intervention over an extended period.

By organising the procedure in this manner, the flow and logical sequence of the experiment are maintained, allowing for a clear understanding of the process. The study adheres to ethical principles, including informed consent from participants and considerations for the confidentiality of their information.

Data collected from the pre-test, post-test, and retention test are subjected to rigorous data analysis.

Result of findings

Table 1. Comparison of the mean scores of the experimental group and control group.

Groups	N	Mean	Standard Deviation	Std Error Mean
All control posttest (Using face-to-face teaching)	10	24.4	9.74	3.10
All experimental posttest (Using instructional video)	10	41.6	12.5	3.9

Table 1. The experimental group taught using video instruction had a higher mean score ($X = 41.6 \pm 12.5$), then the control group taught using traditional method ($X = 24.4 \pm 9.74$), which revealed statistically significant difference, From the pre-test, it is known that the mean post-test value of the experimental class using video was 41.6, classified as good with a standard deviation of 12.5 and a standard error of 3.9. While for the mean posttest value of the control class with traditional face-to-face learning, the value was 24.4, classified as poor with a standard deviation of 9.74 and a standard error of 3.10. The mean value of the experimental class was higher than the control class.

Mean pretest, Mean Post-test, and Mean Gain Scores

The mean gain score of students in the experimental group was higher than in the control group. This result suggests that there was a greater increase in the level of knowledge in Basic science of the students exposed to the instructional video than those exposed to the traditional method. When control and experimental groups were compared, results show that the posttest scores of experimental groups have standard deviation values greater than that of the control group. This indicates that the scores posted by the students in the control group were more homogenous than those of the students in the control group

Table 2. Pretest, posttest, mean gain scores of students in the control and experimental groups

Variable	Control		Experimental	
	Mean	Std.	Mean	Std.
Pretest Score	16.4	7.04	18.2	6.07
Posttest Score	24.4	9.74	41.6	12.5
Mean Gain Score	1.01	0.03	2.91	0.07

Mean Difference between the Mean Pretest and Posttest Scores

Comparing the mean scores of pre-tests and posttest in basic science in both groups, paired samples t-test result revealed a p-value less than 0.05. This indicates that there was a significant difference between the mean pretest and posttest scores in basic science test of students exposed to instructional video technique.

Table 3. Paired samples t-test on the mean pretest and posttest scores of students in the control and experimental groups

GROUP	t-value	D.f	p-value
Control	-2.35	9	0.04331
Experimental	-2.7	9	0.02562

*Significant at $p < 0.05$

The p-value associated with t-value -2.7 and degree of freedom $n-1=9$ is $p\text{-value} = 0.02562$. the result is significant at $p < 0.05$ hence, the hypothesis one is not accepted. This indicates that there was a significant difference between the mean pretest and posttest scores in basic science test of students exposed to instructional video technique There is no significant relationship between the posttest and retention scores in the experimental group.

To determine whether there were significant differences in the retention mean scores of groups with instructional video and those exposed to traditional teaching method, data were analysed using the paired t-test as shown in table 3 and 4

Table 4. The comparison of the posttest and retention test scores in experimental group

Test	N	Mean	Std	D f	t-value	p-value
Posttest	10	41.6	12.5	9	1.79	0.10707
Retention	10	40.2	12.14	9		

Table 5. The comparison of the posttest and retention test scores in control group

Test	N	Mean	Std.	D.f	t-value	p-value
Posttest	10	24.4	9.74	9	2.40	0.03990
Retention	10	18.4	6.98	9		

*Significant at $p < 0.05$

When compared table 5.and 6, there was a significant difference between the scores of posttests on retention tests of both experimental and control group ($p < 0.05$). Retention test scores of the both group is lower than the posttest scores. But the differences are lower in control group. While the decrease between the posttest and retention test scores of experimental groups is 1.40, the decrease between the posttest and retention test scores of the control group is 6.00.

Summary of Findings

A pronounced disparity in performance between the experimental group, exposed to instructional videos, and the control group, who underwent traditional instruction. The results unequivocally indicate that the utilisation of instructional videos yields a substantial and positive impact on the learning outcomes of vulnerable learners when compared to conventional teaching methods. This underscores the significance of incorporating technology-enhanced instruction to enhance the educational experience of this demographic.

Additionally, the study's findings shed light on another critical dimension. They underscore the instructional video's potent effect on the retentive capacity of vulnerable learners. This means that the use of instructional videos not only improves immediate learning outcomes but also enhances the learners' ability to retain and recall the acquired knowledge over time. This finding further bolsters the argument for the

integration of instructional videos in educational settings, particularly for addressing the distinctive needs of vulnerable learners.

In summation, the results of this study offer compelling evidence in favour of instructional videos as an effective and valuable tool in the realm of education, particularly for empowering vulnerable learners and augmenting their learning outcomes and retention capabilities. These findings hold substantial implications for educational practitioners, policymakers, and stakeholders who are dedicated to ensuring inclusive and effective educational practices for all students.

Discussion of the Findings

The first major finding of the study highlights a substantial improvement in the performance of pupils in the experimental group compared to those in the control group subjected to traditional face-to-face teaching methods. This result underscores the effectiveness of instructional videos in enhancing the learning outcomes of vulnerable learners. Educational research has consistently shown that instructional videos offer several advantages over traditional teaching approaches. For instance, in a study by Mayer (2003), it was found that well-designed instructional videos can improve learning outcomes by leveraging multimedia principles, such as the combination of visual and auditory information. Hegeman (2015), also found some evidence that the usage of video-based learning witnessed improvements in teaching techniques and learning outcomes in a survey of peer-reviewed qualitative and quantitative publications ranging from 2003 to 2013 that were sourced from 7 major databases and 21 academic journals. According to Bong (2003), access to digital devices has been identified as a critical factor in enhancing learning etc

Additionally, cognitive load theory, as explained by Sweller et al. (1998), emphasises the importance of minimising extraneous cognitive load to enhance learning. Traditional teaching methods often involve the simultaneous processing of verbal information and complex visual aids on chalkboards or whiteboards, potentially overloading the cognitive capacity of vulnerable learners. Instructional videos, on the other hand, can be carefully designed to reduce cognitive load by

presenting information sequentially and at a manageable pace. This reduction in cognitive load may have contributed to the improved learning outcomes observed in the experimental group. This finding further collaborated with research outcome of Ogundaini, (2023), Ihuoma & Akande (2020) both asserted that students with access to digital instructions performed well.

The second key finding of the study pertains to the significant effect of instructional videos on the retentive ability of vulnerable learners. This finding highlights the lasting impact of using video-based instruction on students' ability to recall and retain information over time. The concept of retention and memory enhancement through multimedia learning aligns with the principles of cognitive psychology. One explanation for this effect is the dual-coding theory mentioned earlier (Paivio, 1971). When instructional videos present information both visually and auditorily, it provides learners with multiple memory pathways for encoding and retrieval. Also, Ohler (2020) claimed that the utilisation of multimedia instructional technology brings clarity and create recognition that allow students to grasp the content of the subject.

Furthermore, research by Mayer and Moreno (2003) emphasises the importance of managing cognitive load to optimise learning and retention. They propose that multimedia presentations, such as instructional videos, should carefully manage the cognitive demands placed on learners. By reducing extraneous cognitive load and focusing learners' attention on essential information, instructional videos can facilitate better encoding and retention of knowledge. Furthermore, Taslibeyaz (2017) asserts that watching videos was beneficial in the context of medical education, which primarily used case studies. The use of instructional videos is effective and leads to more learning in less time and ensures that the students retain what is learned.

Overall, the findings provide compelling evidence for the efficacy of instructional videos in improving the learning outcomes and retention abilities of vulnerable learners. The discussion has drawn upon established educational psychology theories and empirical research to support and contextualise the findings. These outcomes have practical

implications for educators and instructional designers, emphasising the value of incorporating well-designed instructional videos into pedagogical practices, especially when teaching vulnerable learners. By leveraging multimedia principles and managing cognitive load, instructional videos can play a pivotal role in enhancing both the immediate and long-term educational experiences of these learners.

Conclusion

The study underscores a significant advantage in favor of video instruction over conventional teaching methods in terms of students' learning outcomes and engagement. This finding aligns with a growing body of research highlighting the benefits of multimedia-enhanced learning environments. The use of video instruction positively impacted students' learning outcomes. This outcome is consistent with numerous studies that have demonstrated the effectiveness of multimedia in education. The study highlights the potential benefits of incorporating video instruction into pedagogical practices to enhance students' learning experiences. This approach can be particularly valuable when aiming to capture and maintain students' attention, especially in contemporary digital age, where students are accustomed to multimedia-rich content.

Additionally, it suggests that educators should explore opportunities to create more interactive video content that encourages students to actively engage with the material. Incorporating quizzes, discussions, or problem-solving scenarios within instructional videos can promote deeper understanding and critical thinking.

Recommendations

In line with the findings of the study, the following recommendations were made:

Teachers should be encouraged to adopt video instructions as an innovative strategy to improve the academic performance of vulnerable learners. This is a proactive step toward addressing the unique learning needs of their students.

Training of teachers on how to handle vulnerable learners and make learning more accessible to them should be organised. Vulnerable learners may have diverse needs, including those related to special education or socioeconomic challenges. Teaching Service Commissions can play a pivotal role in organising training sessions that focus on inclusive teaching strategies, classroom management techniques, and the use of technology, such as video instructions, to cater to these students' needs.

Additionally, it might be beneficial to consider policy-level changes that support the implementation of these recommendations. Educational authorities can develop policies that promote the use of instructional videos in classrooms, allocate resources for professional development initiatives, and prioritise inclusive education practices

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