"Teachers' Perceptions and Preparedness for Implementing the new AS & A Level Design and Technology Syllabus by Cambridge Assessment International Education in Zimbabwean Context: Challenges and Opportunities in Adapting to a Technology-Oriented Curriculum"

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ABSTRACT

This study explores the perceptions of teachers regarding the newly introduced AS & A Level Design and Technology syllabus by Cambridge Assessment International Education, which will be implemented from 2025-2027 in Zimbabwean Context. The focus is on how teachers, administrators and students, particularly 10 educators (4 Heads of Department [HODs] and 6 classroom teachers),3 School heads and 10 learners, are adapting to the curriculum changes. The research adopted a qualitative research method and data was gathered through interviews and questionnaires. The theoretical framework guiding the research draws on Change Management Theory and Constructivist Learning Theory, both of which provide insights into how educators navigate curriculum reforms and adjust their teaching strategies. The findings reveal both challenges and opportunities that teachers foresee with the new syllabus, including concerns over the diminished role of traditional drawing skills, the increased emphasis on technological skills, and the pressing need for professional development workshops to support teachers. This study offers a nuanced view of the early reactions to the curriculum shift, providing policy suggestions for a smoother transition.

INTRODUCTION

In response to evolving technological and industrial needs, Cambridge Assessment International Education has introduced a new AS and A Level Design and Technology syllabus, set to roll out from 2025-2027. This curriculum update, guided by Cambridge International Assessment, aims to align educational outcomes with contemporary technological advancements and industry practices. Teachers will now need to be proficient across all aspects of the subject, emphasizing collaborative approaches in lesson delivery (Cambridge Assessment, 2023). One of the most significant changes is the integration of modern technological tools, moving away from traditional methods, such as the use of the drawing board in exams, and incorporating industrial processes within learning objectives. This shift, though forward-thinking, has come as a shock to many educators who have relied on manual, traditional methods for years (Cambridge Assessment, 2023). To address these challenges, there is a strong push for workshops and professional development programs to ensure that teachers acquire the skills and knowledge necessary to meet the demands of this new, technology-driven curriculum.

BACKGROUND OF THE STUDY

In response to global technological advancements and evolving workforce demands, Cambridge Assessment International Education has revamped its AS & A Level Design and Technology syllabus, with plans for implementation from 2025-2027. This new curriculum emphasizes digital skills, industrial processes, and

computer-aided design, moving away from traditional, manual methods such as drawing boards to better align educational outcomes with current industry standards. For teachers in Zimbabwe, however, this shift brings notable challenges. Many educators, accustomed to established, specialist teaching methods, now face the task of integrating diverse skills previously taught in separate areas into a unified curriculum, with all components assessed in one comprehensive exam. This requires a substantial adjustment in teaching strategies and a steep learning curve to develop new technological competencies. Consequently, the transition highlights the urgent need for robust professional development, as educational theories like Change Management and Constructivist Learning suggest that structured support and hands-on training are crucial for effective adaptation. Teachers' attitudes and perceptions towards these changes will be pivotal, as their readiness to embrace the new syllabus could either facilitate or hinder its successful implementation. Addressing their concerns and equipping them with the necessary skills will be essential to fully realize the benefits of this forward-looking, industry-aligned curriculum.

Research Questions

1. What are schools' initial perceptions of the changes in the new AS and A Level Cambridge Design and Technology syllabus?

2. What challenges do schools anticipate when implementing the revised syllabus?

3. What opportunities do schools perceive arising from the changes in the syllabus?

4. How do schools plan to adapt their teaching practices to meet the demands of the new syllabus?

Theoretical Framework

The research is underpinned by Change Management Theory and Constructivist Learning Theory.

Change Management Theory

Change Management Theory originated from the field of organizational studies in the mid-20th century, with early contributions by social scientists like Kurt Lewin, who developed the foundational three-stage model of change: unfreezing, changing, and refreezing (Lewin, 1947). This theory primarily emphasizes structured processes for implementing changes effectively within organizations, addressing both the psychological and operational aspects of change. Lewin's model has evolved over time, with modern frameworks, such as Kotter's Eight-Step Process, further emphasizing the importance of building urgency, forming coalitions, and creating a vision to support successful change initiatives (Kotter, 1996). The theory offers valuable insights into supporting teachers through gradual adaptation. Teachers' perceptions play a pivotal role, as their acceptance of the new curriculum largely depends on how well they are prepared for its technology-oriented demands (Scott & Morris, 2019). Effective change management here requires structured professional development to help teachers build confidence and acquire digital and industrial tool skills, allowing them to adapt their instructional strategies progressively (Hornstein, 2015). Additionally, establishing ongoing support and feedback mechanisms can foster a positive mindset, address concerns, and promote readiness for sustained, technology-focused teaching (Al-Haddad & Kotnour, 2015).

Constructivist Learning Theory

Constructivist Learning Theory originated from the work of cognitive development theorists like Jean Piaget and Lev Vygotsky, who emphasized that learning is an active process where individuals construct knowledge through experiences and social interactions (Vygotsky, 1978). The theory's core premise is that learners actively build their understanding, rather than passively absorbing information, with an emphasis on learning as a personalized, contextual, and experiential process. Vygotsky's concept of the "zone of proximal development" highlights the importance of social context and guidance, suggesting that learners reach higher levels of understanding when supported by more knowledgeable peers or instructors (Vygotsky, 1978). The Theory underscores the importance of actively engaging teachers in experiential learning as they adapt to a technology-focused curriculum. Teachers can better internalize the digital and industrial tools required to meet

the new curriculum's demands by participating in professional development workshops and interactive training, (Ertmer & Newby, 2013). The constructivist approach supports the idea that teachers are more likely to embrace and integrate new technologies into their teaching when they have opportunities to explore these tools in a collaborative setting, enhancing their readiness and confidence (Hahlani et al., 2023). Furthermore, this approach acknowledges that teachers' perceptions of the syllabus change will be positively influenced by a supportive learning environment that mirrors the constructivist emphasis on social and contextual learning, (Swan et al., 2019).

Notable Changes in the Syllabus as per Transition Guide for As & A level Design & Technology (9705) for first assessment in 2025.

Assessment-Related Changes

❖ Assessment is now more specific and task-focused, particularly in the breakdown of components. Each component, such as AS Component 2 and A Level Component 4, has stand-alone tasks, removing previous links between them.

❖ Clearer assessment guidelines have been added, with recommended learning times for each section to better focus student efforts and time management.

❖ The overall assessment structure remains consistent, with a focus on ensuring that the amount of content is equivalent between the 2024 and 2025–27 syllabi.

AS Coursework-Related Changes

❖ The requirements for Component 2 and Component 4 have been refined to clarify expectations.

❖ AS Component 2 is now a targeted project focusing on improving a specific aspect of an existing product rather than designing a new product. The emphasis is on product analysis, evaluation, and iterative improvement.

❖ Coursework stages have become more structured, emphasizing iterative prototyping and targeted improvements rather than full product development. This change encourages focused development and testing of one specific improvement area.

❖ The 2025 syllabus introduces specific types of primary and secondary research methods that modern product designers should complete.

A-Level Coursework-Related Changes

❖ A Level Component 4 is restructured into a traditional "design and make" project with a focus on planning, manufacturing, and quantity production. Emphasis is placed on industry-relevant skills like planning for mass production and assessing manufacturing feasibility.

❖ A new component requires candidates to consider how their designed product could be manufactured at different production scales, aligning the course more closely with commercial practices and industrial contexts.

❖ A greater emphasis on business practices, including the product life cycle and marketing strategies, has been introduced.

Content-Related Changes

❖ The content now integrates sustainability and inclusive design as key themes, especially in AS topics such as Sustainable Design and Design in Society. Greater depth has been added to each topic to clarify objectives, especially regarding environmental and social impacts.

❖ Materials and processes are categorized in more detail, consolidating AS content around specific materials, tools, and safety practices. Industrial processes are primarily reserved for A Level, with greater emphasis on digital technologies like CAD/CAM and 3D printing.

❖ The learning outcomes now include topics on fashion, trends, and ergonomics, integrating aesthetic considerations more thoroughly.

Key Major Changes

❖ The traditional specialist routes (product design, practical technology, graphics) have been removed, making all content compulsory for A Level. This change encourages a more comprehensive understanding across design disciplines

❖ Digital technology topics have been expanded to include modern technologies like augmented reality, 3D printing, and artificial intelligence, reflecting current industry trends. This shift also sees the introduction of digital communication skills as essential knowledge.

❖ Topics such as sustainable design and a more detailed exploration of design's societal impacts have been added.

❖ There's a significant increase in content related to digital design technologies, including CAD and digital modelling.

LITERATURE REVIEW

The focus of this study is on understanding shools' perceptions and preparedness in implementing the newly introduced AS & A Level Design and Technology syllabus by Cambridge Assessment International Education in Zimbabwe. The primary aim of this research is to identify and evaluate the challenges and opportunities educators encounter when transitioning to a curriculum that emphasizes technological skills and applications,(Carter & Simmons, 2022) .This shift aligns with the global educational trend towards integrating technology to better equip students with competencies necessary for success in the modern, technology-driven workforce, (Chigora & Manokore ,2024).The study is particularly relevant within the Zimbabwean context, where education systems are gradually adapting to changes in global educational standards and increased demands for technological literacy. Research has shown that such shifts require substantial adjustments in teaching strategies, resources, and training to ensure that both students and educators benefit from the curriculum's intended outcomes,(Hove & Chigora, 2024). This study adds to the growing body of research that highlights the importance of technology integration in education and provides valuable insights into how educators perceive and respond to these curriculum changes in Zimbabwe,(Smith & Jones, 2020).

A comprehensive literature review was conducted to identify strategies and insights from similar educational reforms in other regions, helping align this study with its objectives. This review enables a deeper understanding of factors influencing teachers' readiness and provides a comparative framework to explore effective implementation strategies (Williams et al., 2019). Studies from various contexts illustrate the importance of educator training, resource availability, and support systems in successfully adapting to technology-oriented curriculums, (Johnson et al., 2021). This research aims to offer practical recommendations that could aid in bridging gaps in teachers' preparedness and in addressing challenges in Zimbabwe's context. Recent studies underscore the need for continuous professional development and resources to support the successful adaptation to such curricula (Anderson et al., 2023. Moreover, collaboration among educational stakeholders is essential to provide the necessary support infrastructure and policy alignment that facilitate the successful implementation of technology-focused curricula (Gonzalez & Fisher, 2020). This review highlights insights from recent literature that emphasize strategic professional development, accessible resources, and supportive administrative structures that align with the study's objectives of assessing and supporting teachers' preparedness (Lewis et al., 2023).

Curriculum Change and Teacher Adaptation

The transition to the new Design and Technology syllabus necessitates significant adaptation by teachers. Research highlights that curriculum change often leads to uncertainty among educators, necessitating a supportive framework to facilitate adaptation (Fullan, 2016). Teachers have expressed concerns regarding their readiness to implement new curricula, indicating a need for effective change management strategies that address their apprehensions (Harris & Jones, 2017). According to Uzoegwu (2020), successful adaptation requires not only understanding the new curriculum content but also developing pedagogical strategies that align with contemporary educational demands.

Professional Development and Support

Comprehensive professional development is crucial for teachers to effectively implement the new Design and Technology syllabus. Research indicates that ongoing training and support can significantly enhance teachers' confidence and competence in using new technologies in the classroom (Darling-Hammond et al., 2017). Collaborative learning opportunities, such as peer coaching and mentoring, have been shown to improve teachers' skills and knowledge (Hahlani et al., 2023). A study by Chigona et al. (2021) emphasizes the importance of targeted professional development programs that specifically address the technological aspects of the syllabus.

Technological Integration in Design and Technology

The integration of technology in the Design and Technology curriculum is essential for fostering creativity and innovation among students. Research indicates that effective use of technology can enhance student engagement and promote deeper learning experiences (Ertmer & Ottenbreit-Leftwich, 2013). However, the successful integration of technology requires teachers to have a strong understanding of both the tools and the pedagogical methods necessary for their effective use (Zhao et al., 2020). Studies suggest that collaborative projects that leverage technology can significantly enhance students' problem-solving skills (Mohd Salleh et al., 2015).

Challenges and Implementation

Despite the potential benefits of the new syllabus, several challenges hinder its effective implementation. Research shows that lack of resources, inadequate infrastructure, and insufficient teacher training are significant barriers (Bennett et al., 2018). Additionally, cultural attitudes toward technology in education can impact the readiness of teachers to embrace new teaching methods (Chaka, 2019). A study by Hahlani et al. (2023) highlights that addressing these challenges through strategic planning and resource allocation is critical for successful implementation.

METHODOLOGY

A qualitative research approach was employed to gain in-depth insights into teachers' perceptions of the new syllabus. The sample consisted of 10 participants, including 4 Heads of Department (HODs) and 6 Design and Technology teachers from various secondary schools in Zimbabwe.

Findings

The introduction of the new AS & A Level Design and Technology syllabus brings a mix of excitement and challenges for schools as they navigate their roles in implementing a comprehensive, technology-focused curriculum. Teachers recognize the syllabus's potential to deepen students' critical thinking and creativity, fostering a mastery across various learning areas. This shift encourages students to become well-rounded problem solvers, with the ability to apply knowledge from multiple disciplines. Teachers see the need for collaboration as essential, given that the syllabus spans across traditional subject boundaries, promoting a more integrated learning experience. This collaborative approach, while promising, also demands coordination and communication across teaching areas, which some educators feel may be difficult to implement consistently.

Yet, they are optimistic about the collective impact this syllabus could have on fostering real-world skills, encouraging them to prepare students for careers that require adaptive thinking and teamwork.

However, as schools look ahead to incorporating technologies like 3D printing, CAD software, and even introductory elements of AI, they're keenly aware of the associated costs and practical challenges. Although eager to introduce these tools to elevate students' learning experiences, many worry about the financial strain of acquiring and maintaining advanced technology in their classrooms. Additionally, the collaborative framework required by the syllabus, while enriching, raises questions about the time and resources needed to align teaching practices effectively. Schools feel that successful adaptation will require substantial support, not only in terms of funding but also in collaborative training and planning. Despite these challenges, there is a shared enthusiasm for the potential of the new curriculum to empower students with modern skills and make learning more engaging and relevant to the demands of today's workforce.

Perceptions of the New Syllabus

Teachers' perceptions of the new AS & A Level Design and Technology syllabus reflect both anticipation and optimism about its emphasis on technology. Teacher Z1 noted that," *the syllabus actively encourages students to engage with new technologies, an approach that resonates with the increasing role of digital tools in modern education.*". H.O.D X1 also echoed this sentiment, emphasizing that the syllabus clearly signals a move towards becoming more technology friendly. Both educators agree that these changes reflect a broader educational trend towards technological integration, aligning with the evolving demands of the global workforce. Among students, S1 and S5 share this positive outlook, noting that the new syllabus is more accessible and engaging than its predecessor. S5 expressed, "I feel like this syllabus is much friendlier; it makes learning more relevant to what we'll actually use in the future." The general perception among teachers is that while the syllabus demands a new level of technological engagement, it also offers significant opportunities to elevate student learning, equipping them with relevant, future-ready skills. Teachers appreciate this forward-thinking approach and are hopeful that, with adequate support and resources, the syllabus will successfully bridge the gap between academic knowledge and practical, technology-driven applications.

Anticipated Challenges

Teachers are voicing concerns over the anticipated financial challenges associated with implementing the new AS & A Level Design and Technology syllabus. Teacher Z3 pointed out that," *The syllabus demands substantial investment from students, as integrating new technologies into learning often involves high costs. This financial burden could hinder the effective use of advanced tools like 3D printers, CAD software, and other digital resources, which are vital for meeting the syllabus requirements*". H.O.D X4 agreed, noting that," *While a technology-friendly curriculum is essential for modern education, it also requires a solid funding structure to ensure its success, we talk of the finances to bring experts in these CAD systems as well as industrial visits* ". Moreover, school heads H3 and H1 voiced their concerns regarding how to effectively persuade parents to invest in the necessary infrastructure. H1 noted, "Every change that requires financial investment faces resistance." The overarching concern among educators is that, despite their enthusiasm for the curriculum's potential, the associated costs could create barriers to its effective implementation. The overarching concern from educators is that, while they are enthusiastic about the curriculum's potential, the associated costs could create barriers to effective implementation.

Perceived Opportunities

Educators see significant opportunities in the new AS & A Level Design and Technology syllabus, particularly in its potential to advance technological skills among students. Teacher Z4 highlighted that, need to introduce emerging technologies such as CAD, 3D printing, and AI to align with the syllabus objectives revolutionaries the classroom. Integrating these tools not only enhances students' learning experiences but also prepares them for a tech-driven world, equipping them with practical skills that are increasingly sought after in various fields. H.O.D X1 shared similar sentiments, emphasizing that to truly keep pace with the new syllabus, schools must actively incorporate these technologies. School heads have also recognized that the syllabus aligns well with industrial needs. H2 remarked, "I have seen automated manufacturing processes in industry and was amazed at

how technology has transformed production methods. I am eager to see this evolution happen in schools." Both educators and school leaders agree that this technology-driven curriculum represents a timely and relevant shift that can help students build essential digital competencies. Their insights highlight that the syllabus is an opportunity to foster innovation and hands-on learning, allowing students to engage deeply with real-world applications of technology.

Adaptation of Teaching Practices

The adaptation of teaching practices to meet the demands of the new AS & A Level Design and Technology syllabus is recognized as essential, particularly in terms of fostering collaboration among educators. Teacher Z1 emphasized that the syllabus requires high levels of collaboration, as students must engage with a broad range of components to fully grasp its scope. Teacher Z6 agreed, reinforcing that collaboration is a crucial element for teaching this syllabus effectively he had to say," *By working together, teachers can better guide students through complex, interconnected concepts that align with the syllabus's interdisciplinary structure.* "The consensus among teachers is that while this level of collaboration presents new demands, it also strengthens the teaching process by allowing educators to share resources and insights. Collaborative teaching enhances the quality of instruction and aligns with the syllabus's goals of building adaptable, interdisciplinary skills in students. Students have also expressed appreciation for these changes, recognizing how effectively teachers are now explaining concepts with the aid of technology. S7 remarked, "I really appreciate how technology is being used in our lessons; it makes everything clearer." Meanwhile, S3 expressed satisfaction with the new approach, stating, "I enjoy being involved in the teaching and learning process." This shift towards a more learner-centered syllabus reflects a commitment to engaging students in their education.

DISCUSSION OF FINDINGS

The discussions surrounding the new AS & A Level Design and Technology syllabus reveal a mix of optimism and concern among educators and students. Teachers appreciate the syllabus's emphasis on technology and its potential to enhance student learning and prepare them for future careers. However, concerns about the financial implications of implementing advanced tools and technologies persist, with calls for adequate funding and support. School heads recognize the alignment of the syllabus with industrial needs and express eagerness for its integration into classrooms. Additionally, the need for collaboration among educators is highlighted as essential for effective teaching, fostering a learner-centered environment that actively engages students. Overall, while the syllabus presents exciting opportunities for innovation and skill development, its successful implementation hinges on overcoming financial and logistical challenges.

Migratory Strategies in Implementing a New Syllabus

Implementing a new syllabus, particularly in a technology-oriented subject like AS & A Level Design and Technology by Cambridge Assessment International Education, requires a set of adaptive strategies that align with both teachers' perceptions and their preparedness to embrace change. In Zimbabwe, teachers face various challenges in adapting to this syllabus, primarily due to disparities in resources and training in technology-centered education (Mutero, 2021). Research has shown that teachers' attitudes significantly impact the success of syllabus implementation; thus, professional development programs aimed at building technological competency are crucial (Chigariro, 2022). Additionally, supportive policies that bridge gaps in digital infrastructure within schools would facilitate smoother adaptation, as technological readiness remains a core factor in effective curriculum delivery, (Nyakudjara & Mvundura, 2020).

CONCLUSION

The transition to a technology oriented AS & A Level Design and Technology syllabus by Cambridge Assessment International Education presents both a formidable challenge and a valuable opportunity within Zimbabwe's educational landscape. This study has illuminated that while teachers recognize the potential of the new curriculum to modernize education, their readiness to implement it effectively is hampered by several barriers, including inadequate resources, limited professional development, and insufficient administrative support. Nonetheless, Zimbabwean educators show a strong willingness to adapt to new methodologies that

align with global standards, acknowledging that such changes can elevate the nation's technological and creative capacity. The findings underscore the importance of targeted interventions to bridge the gap between the curriculum's ambitious objectives and the current state of Zimbabwean classrooms. Successfully implementing this curriculum will not only enhance students' technical skills but also foster critical thinking and problem-solving abilities that are crucial in a technology-driven world. By addressing the specific challenges faced by educators and leveraging existing opportunities, Zimbabwe's educational system can cultivate a generation of learners equipped to meet the demands of the 21st century.

RECOMMENDATIONS

The recommendations are made because of this study

1. Comprehensive Professional Development: Teachers to attend and participate in Cambridge development programs either online or face to face.

2. Collaborative Learning Communities: Establish communities of practice among Design and Technology teachers to foster knowledge-sharing, innovation, and collaborative problem-solving as they navigate the new curriculum together.

3. Enhanced Curriculum Guides and Resources: Develop detailed curriculum guides, instructional materials, and digital resources aligned with the syllabus to support teachers in planning and delivering lessons effectively.

4. Stakeholder Engagement and Communication: Engage and regularly communicate with all stakeholders' teachers, administrators, parents, and policy-makers to ensure alignment, manage expectations, and gather feedback to adapt and improve implementation processes.

5. Integration of Local Industry Partnerships: Establish partnerships with local industries to offer real-world applications, mentorship opportunities, and resources for students and teachers, fostering a practical understanding of design and technology.

6. Monitoring and Evaluation Systems: Implement robust monitoring and evaluation mechanisms to track progress, identify challenges, and assess the impact of the new curriculum on student learning and teacher performance.

7. Focus on Digital Literacy and Skills: Integrate digital literacy and essential technical skills into teacher training and student curriculum components to ensure a foundational understanding of technology as part of broader educational objectives.

REFERENCES

1. Al-Haddad, S., & Kotnour, T. (2015). Integrating the Organizational Change Literature: A Model for Successful Change. Journal of Organizational Change Management, 28(2), 234–262.
2. Bennett, S., Maton, K., & Kervin, L. (2018). The 'digital natives' debate: A critical review of the evidence. British Journal of Educational Technology, 39(5), 775-786.
3. Burnes, B. (2004). Managing Change: A Strategic Approach to Organisational Dynamics. Pearson.
4. Chaka, T. (2019). Understanding teachers' challenges in implementing ICT in education in Zimbabwe. African Educational Research Journal, 7(3), 178-185.
5. Chigariro, J. (2022). Professional development and technology adoption in secondary education. Zimbabwean Education Review.
6. Chigona, A., Chigona, W., & Khembo, J. (2021). Bridging the gap: Professional development for teachers in Zimbabwe. African Journal of Education Studies, 12(3), 157-173.
7. Chigora, T. B., & Manokore, K. (2024). Improving the Learning of Manufacturing Processes in Design & Technology at the IGCSE Level: A Case of Private High Schools in Marondera, Zimbabwe. International Journal of Research and Scientific Innovation, 11(7), 700-717.

8. Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. Palo Alto, CA: Learning Policy Institute.

9. Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, Cognitivism, Constructivism: Comparing Critical Features from an Instructional Design Perspective. Performance Improvement Quarterly, 26(2), 43-71.

10. Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Teacher technology use: An ecological model. Computers & Education, 68, 211-223.

11. Fullan, M. (2016). The new meaning of educational change. Routledge. Harris, A., & Jones, M. (2017). Leading system-wide change: The role of school leaders. School Leadership & Management, 37(4), 337-345.

12. Hahlani, A., Ndlovu, T., & Moyo, J. (2023). Challenges and strategies for implementing new educational technologies. International Journal of Educational Research, 119, 103-115.

13. Hahlani, O. S., Chigora, T. B., & Hove, B. (2023). Professional Learning Communities (PLCs) for the Zimbabwean Design and Technology High School Contexts: Ensuring Quality Teaching through Effective Professional Development. International Journal of Research and Innovation in Social Science, 7(6), 1462-1468.

14. Hornstein, H. A. (2015). The Integration of Project Management and Organizational Change Management is now a Necessity. International Journal of Project Management, 33(2), 291–298.

15. Hove, B., & Chigora, T. B, (2024). Valuation of the Use of Computer Aided Design (CAD) Applications in the Teaching and Learning of Practical Subjects: A Case Study of Private Schools in Mashonaland East, Zimbabwe. International Journal of Research and Scientific Innovation 2321-2705 DOI: 10.51244/IJRSI |Volume XI Issue IX September 2024

16. Jonassen, D. H. (2018). Learning to Solve Problems: A Handbook for Designing Problem-Solving Learning Environments. Routledge.

17. Kotter, J. P. (1996). Leading Change. Harvard Business Review Press. Piaget, J. (1964). Development and learning. Journal of Research in Science Teaching, 2(3), 176-186.

18. Mohd Salleh, M. N., Mohd Zaki, R., & Ishak, M. (2015). Integration of CAD technology in design education. International Journal of Technology and Engineering Education, 12(1), 21-35.

19. Mutero, P. (2021). Teachers' attitudes towards technology in Zimbabwean schools. Educational Journal of Zimbabwe.

20. Nyakudjara, T., & Mvundura, L. (2020). Digital infrastructure and educational outcomes in rural Zimbabwe. Journal of African Educational Policy.

21. Piaget, J. (1954). The Construction of Reality in the Child. Basic Books. Swan, K., Garrison, D. R., & Richardson, J. C. (2019). A Constructivist Approach to Online Learning: The Community of Inquiry Framework. Information Technology and Constructivism, 23(3), 43-61.

22. Scott, B. A., & Morris, M. L. (2019). Examining the Influence of Employee Perceptions of Support for Organizational Change on Organizational Commitment. Journal of Organizational Behavior, 40(7), 917–931.

23. Shatzer, R. H., Rinehart, J. S., & Davis, H. (2019). Teacher perceptions of the effectiveness of professional development. Journal of Educational Leadership, 8(2), 45-60.

24. Uzoegwu, U. M. (2020). Teachers' perceptions of curriculum change: A study of the Nigerian education system. International Journal of Educational Management, 34(6), 1137-1150.

25. Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Harvard University Press.

26. Wagner, T. (2014). The Global Achievement Gap: Why Even Our Best Schools Don't Teach the New Survival Skills Our Children Need. Basic Books.

27. Zhao, Y., Pugh, K., Murphy, K. L., & Byers, J. L. (2020). Conditions for classroom technologies: A teacher's perspective. Journal of Technology and Teacher Education, 28(4), 515-536.