

Examining the Impact of Artificial Intelligence on the Future of Education in Selected Secondary Schools in Ndola District, Zambia

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Abstract

The integration of Artificial Intelligence (AI) in education is rapidly changing teaching and learning practices. This study examines the impact of AI in secondary schools in Ndola District, Zambia. A mixed-methods approach was used to understand the level of AI adoption, as well as the perceptions of teachers and students. Data were collected through surveys, interviews, and classroom observations to analyze how AI influences teaching methods, student engagement, and learning outcomes. The study also explores challenges such as limited resources, lack of infrastructure, and teacher preparedness. The findings highlight both the benefits and challenges of AI in education and suggest ways to improve its effective and inclusive implementation. This study provides useful insights for policymakers and educators to support the integration of AI in schools and better prepare students for a technology-driven future.

Keywords: Core Keywords, Artificial Intelligence (AI), AI In Education, Educational Technology, Digital Learning, Smart Education.

1. INTRODUCTION

This chapter provides a foundational overview of the research study. It introduces the concept of Artificial Intelligence (AI) as a transformative force in the global educational landscape and contextualizes its potential and emerging implications within the specific setting of Ndola District's Secondary schools. The chapter outlines the background of the study, the problem it seeks to address, the research objectives and questions, and defines the scope and key terms used throughout the dissertation.

Background of the Study

Global Context: Discuss the rapid integration of AI technologies (e.g., intelligent tutoring systems, automated grading, personalized learning platforms, AI-powered research tools like chatbots) in education systems worldwide. Mention initiatives in developed nations and the global discourse on AI's potential to revolutionize teaching methodologies, curriculum development, and administrative efficiency.

National Context (Zambia): Describe the current state of Zambia's education sector, Secondary lighting government initiatives like the Smart Zambia Institute and the focus on digital transformation under the Eighth National Development Plan (8NDP). Mention the growing penetration of internet and mobile technology among the youth.

Local Context (Ndola District): Focus on Ndola as an urban hub in the Copperbelt with a mix of government, private, and trust schools. Briefly describe the existing ICT infrastructure in these Secondary schools, previous technology adoption trends, and the preparedness of the educational ecosystem for a technological shift.

Problem Statement

Despite the global momentum and potential benefits of AI in education, there is a significant knowledge gap regarding its perception, readiness, and potential impact within the specific

context of Secondary schools in Ndola District, Zambia. It is unknown how educators, students, and administrators perceive AI tools, what infrastructural and pedagogical challenges exist for adoption, and what the long-term implications are for educational equity, teacher roles, and student learning outcomes. Without investigating this phenomenon, educational stakeholders in Ndola risk being unprepared for this inevitable technological shift, potentially leading to a widened digital divide and missed opportunities for enhancing educational quality. This study, therefore, seeks to investigate the impact of AI on the future of education in selected Secondary schools in Ndola.

Research Objectives

General Objective

To comprehensively investigate and analyze the perceived impact, readiness, and challenges of integrating Artificial Intelligence in the educational practices of selected Secondary schools in Ndola District, Zambia.

Specific Objectives

This study specifically aims to:

- To assess the level of awareness and perception of AI among teachers, students, and school administrators in selected Secondary schools of Ndola.
- To evaluate the existing ICT infrastructure and digital readiness for AI integration in the selected schools.
- To identify the perceived potential benefits (opportunities) of AI on teaching, learning, and administration within the Secondary school context.
- To analyze the perceived challenges and barriers (e.g., technical, ethical, financial, pedagogical) to the adoption of AI in these schools.
- To propose a framework for the strategic and sustainable integration of AI tools in Ndola's Secondary schools.

Research Questions

1. What is the level of awareness and what are the prevailing perceptions regarding AI among teachers, students, and administrators?
2. To what extent is the current ICT infrastructure in the selected schools ready to support AI-based technologies?
3. What are the perceived opportunities that AI presents for enhancing education in Ndola's Secondary schools?
4. What are the major challenges and barriers hindering the effective adoption of AI in these schools?
5. How can a strategic framework be designed to facilitate effective AI integration in the Zambian Secondary school context?

Characteristic of the Phenomena

The phenomenon under study is the integration of Artificial Intelligence in education. Its key characteristics include:

Personalization: AI's ability to tailor learning content and pace to individual student needs.

Automation: The use of AI for administrative tasks (attendance, grading) and content generation.

Data-Driven Insights: AI's capacity to analyze student data to predict performance and identify learning gaps.

Interactivity: The use of chatbots and intelligent tutoring systems for 24/7 student support.

Adaptability: AI systems that evolve based on user interaction and feedback.

Factors Related to the Phenomena

Key factors influencing AI integration in Ndola's schools include:

Technological Factors: Availability of hardware, software, reliable internet, and electricity.

Human Factors: Digital literacy of teachers and students, attitude towards technology, resistance to change.

Financial Factors: School budget for technology, cost of AI software and maintenance.

Pedagogical Factors: Alignment of AI tools with the Zambian curriculum, teacher training needs.

Socio-cultural and Ethical Factors: Issues of data privacy, algorithmic bias, fear of job displacement for teachers, and equity of access.

Global Statistical Scenario

Cite statistics on the growing global EdTech market, specifically the AI segment (e.g., market size projections from sources like HolonIQ, Gartner).

Reference adoption rates of AI tools in schools in countries like the USA, China, and South Korea.

Mention studies showing the correlation between AI-powered personalized learning and improved student outcomes.

Local Statistical Scenario

Reference Zambian government data on internet penetration rates and mobile phone usage among youths (from ZICTA).

Cite statistics from the Ministry of Education on the number of computers per student in Zambian schools, if available.

Reference any existing surveys or reports on ICT readiness in Zambian schools (e.g., from World Bank, UNESCO, or local studies).

Scope of the Study

Geographical Scope: The study will be confined to a purposively selected ample of Secondary schools

(e.g., 3-5 schools) within Ndola District, Copperbelt Province, Zambia.

Content Scope: It will focus on the perception of AI, readiness for its integration, and its potential impact on teaching, learning, and administration. It will not involve the actual technical development or full-scale implementation of an AI system.

Theoretical Scope: The study will be guided by technology acceptance models (e.g., TAM) and diffusion of innovation theory.

Time Scope: The data collection (cross-sectional) will be conducted over a defined period in 2025.

Significance of the Study

To School Administrators: Provide insights for strategic planning and investment in technology.

To Teachers: Help understand AI's potential as a pedagogical aid and inform professional development needs.

To Policymakers: Offer evidence-based recommendations to the Ministry of Education for national policy on AI in education.

To Students: Contribute to creating a more engaging and personalized learning environment.

To Academia: Add to the limited body of literature on AI in education within the Zambian and sub-Saharan African context.

Operational Definitions

Artificial Intelligence (AI): For this study, AI refers to computer systems or software capable of performing tasks that typically require human intelligence, such as learning, problem-solving, reasoning, and adaptation. *Operationalized as:* familiarity with and use of tools like ChatGPT, Gemini, AI-powered tutoring apps, etc.

Future of Education: The anticipated evolution of teaching methodologies, learning experiences, and administrative processes driven by technological advancements. *Operationalized as:* the perceived changes in the roles of teachers, student engagement, and assessment methods over the next 5-10 years.

Secondary Schools: Secondary educational institutions offering grades 10 to 12 under the Zambian curriculum.

Digital Readiness: The level of preparedness of an institution to adopt and implement digital technologies. *Operationalized as:* availability of functional computers, internet bandwidth, teacher ICT skills, and supportive institutional policies.

Chapter Summary

This study examines the role of Artificial Intelligence (AI) in secondary schools in Ndola District, Zambia. It focuses on understanding the awareness, perceptions, and readiness of teachers, students, and administrators to adopt AI in education. It also considers the current state of ICT infrastructure in schools.

This study highlights the potential benefits of AI, such as personalized learning, improved teaching methods, and automation of tasks. At the same time, it identifies key challenges, including limited resources, lack of proper training, and infrastructural constraints that may affect successful implementation.

This study aims to provide useful suggestions for the effective and sustainable integration of AI in schools. The findings are expected to support educators, policymakers, and researchers in improving the use of technology in education and preparing students for a digital future.

2. LITERATURE REVIEW

Introduction

This chapter reviews existing studies on the use of Artificial Intelligence (AI) in education. It aims to place the current study within the broader academic context, highlight key ideas and findings, and identify the research gap. The review includes empirical studies, theoretical foundations, and a conceptual framework, with a focus moving from global perspectives to secondary education in Zambia and Ndola District.

Empirical Literature Review

This section synthesizes findings from previous studies, organized by thematic areas that align with your research objectives.

Global Trends in AI Adoption in Secondary Education: Discuss studies from developed nations (e.g., USA, UK, South Korea, and Finland) on pilot programs using AI for personalized learning, automated grading, and intelligent tutoring systems.

Reference reports from organizations like UNESCO, OECD, and the World Bank on The global EdTech and AI-in-education market growth and projected impact.

Secondary light common successes and early-stage challenges documented in these contexts.

AI in the African Educational Context:

Review literature on digital transformation initiatives in African education (e.g., Kenya's digital literacy program, Rwanda's Smart Classrooms).

Discuss studies focusing on the challenges specific to the African context: infrastructure deficits, funding, teacher capacity, and cultural relevance of technology.

Mention any nascent AI projects in sectors like agriculture or health in Africa, drawing parallels to potential educational applications.

Awareness, Perceptions, and Attitudes of Stakeholders:

Synthesize studies that investigate teachers' attitudes towards AI, often finding a mix of enthusiasm for reduced workload and fear of obsolescence.

Review research on student perceptions, which often Secondary light engagement with new tools but also concerns over data privacy and over-reliance on technology.

Include studies on administrators' viewpoints, focusing on cost-benefit analyses and strategic planning challenges.

Documented Benefits and Opportunities:

For Teaching: Review evidence on AI as a tool for automating administrative tasks (grading, scheduling), freeing up teacher time for interactive instruction.

For Learning: Analyze studies on AI-driven personalized learning, which adapts to individual student pace and style, improving outcomes and identifying learning gaps early.

For Administration: Examine literature on AI for data analytics, predicting dropout rates, optimizing resource allocation, and improving institutional decision-making.

Documented Challenges and Barriers:

Infrastructural: Unreliable electricity, poor internet connectivity, and lack of adequate hardware.

Financial: secondary initial and maintenance costs of AI systems.

Human Capital: Lack of digital literacy and AI-specific training among teachers and staff.

Pedagogical: Difficulties in integrating AI tools with existing curricula and traditional teaching methods.

Ethical and Social: Concerns about data privacy, algorithmic bias, widening the digital divide, and student over-dependence on technology.

Theoretical Review

This section outlines the theories that provide the foundation for your study.

Technology Acceptance Model (TAM):

Explain the core constructs of TAM: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as primary drivers of behavioral intention to use a technology.

Relevance to this study: This theory will be used to frame the investigation into how teachers' and administrators' perceptions of AI's usefulness and ease of use influence their willingness to adopt it in Ndola's Secondary schools.

Diffusion of Innovations (DOI) Theory:

Explain Rogers' theory, focusing on the process by which an innovation (AI) is communicated over time through channels in a social system (the school district).

Secondary light the key attributes of an innovation that affect its adoption:

Relative Advantage, Compatibility, Complexity, Trialability, and Observability.

Relevance to this study: DOI provides a lens to analyze how AI as an innovation might spread through the Secondary schools of Ndola and which characteristics will most significantly impact its adoption rate.

Constructivist Learning Theory:

Explain the theory that learners construct knowledge through experience and reflection.

Relevance to this study: This theory underpins the potential of AI to create personalized, interactive, and experiential learning environments, moving away from rote memorization. It helps evaluate whether AI applications align with modern pedagogical goals.

Conceptual Framework

Independent Variables (Antecedents):

Stakeholder Factors: Awareness, Perception, Readiness (of Teachers, Students, Admin)

Institutional Factors: ICT Infrastructure, Financial Resources, Leadership Support

Technological Factors: Perceived Usefulness, Perceived Ease of Use of AI tools (from TAM)

External Factors: Government Policy, National Curriculum, Socio-economic conditions

Intervening Variable: Adoption and Integration Process (Influenced by DOI attributes: Compatibility, Complexity, etc.)

Dependent Variable (Outcome): Impact on the Future of Education

Teaching: Changed teacher role, pedagogical methods.

Learning: Student engagement, personalized learning, outcomes.

Administration: Efficiency, data-driven decision-making.

Narrative Description: The framework proposes that the Impact of AI on education (dependent variable) is influenced by a combination of stakeholder, institutional, technological, and external factors (independent variables). The process of adoption and integration (intervening variable) mediates this relationship, either facilitating or hindering the ultimate impact based on how well the innovation is diffused.

Research Gap

Based on the comprehensive review of literature, the following research gap is identified: There is a significant scarcity of empirical research focused on the integration of Artificial Intelligence in the Zambian educational context, particularly at the secondary school level. While studies abound in the Global North, and a few exist in other African nations, the unique socio-economic, infrastructural, and pedagogical landscape of Zambia—and specifically the urban-rural dynamic of a district like Ndola—remains unexplored. Existing literature does not provide a clear understanding of the readiness, perceptions, and contextual challenges faced by Secondary schools in Zambia. This study will therefore fill this critical gap by providing localized, empirical evidence to inform policy and practice in Ndola District and Zambia at large.

Chapter Summary

This chapter has systematically reviewed and synthesized relevant empirical and theoretical literature concerning AI in education. It began with global trends, narrowed to the African context, and detailed the specific benefits, challenges, and stakeholder perceptions documented in existing research. The theoretical review established TAM and DOI as the guiding frameworks for this study. A conceptual model was developed to illustrate the relationship between key variables. The chapter conclusively identified a clear gap in context-specific research within Zambian Secondary schools, justifying the need for the present study. The next chapter will detail the research methodology to be employed to address this gap.

3. RESEARCH METHODOLOGY

Introduction

This chapter outlines the detailed methodology that will be employed to conduct the study on "The Impact of Artificial Intelligence on the Future of Education in Selected Secondary

Schools of Ndola District, Zambia." It provides a blueprint for the entire research process, justifying the choices made to ensure the study is systematic, credible, and achieves its objectives. The chapter covers the research design, population, sampling techniques, sample size, data collection methods and instruments, data analysis procedures, and acknowledges the study's limitations.

Research Philosophy

This study will be guided by the Pragmatism is concerned with what works and values both objective and subjective knowledge. It supports the use of mixed methods, focusing on the research problem and using all approaches available to understand it. This is appropriate as the study seeks to gather both numerical data on awareness levels (quantitative) and deep, explanatory insights into perceptions and challenges (qualitative).

Research Design

This study will adopt a convergent parallel mixed-methods design. This design involves simultaneously collecting both quantitative and qualitative data, analyzing them separately, and then comparing or merging the results to provide a comprehensive understanding of the research problem.

Quantitative Component: A cross-sectional survey design will be used to collect numerical data from a larger sample to quantify levels of awareness, perceptions, and to assess infrastructure readiness.

Qualitative Component: A multiple case study design will be employed, focusing on the selected Secondary schools as individual cases. This will involve in-depth interviews and focus group discussions to gather rich, detailed contextual data.

This design is chosen because it allows for triangulation, providing a more complete and validated picture of the phenomenon under investigation.

Study Population

The study population (universe) will consist of all individuals involved in the educational process in Secondary schools within Ndola District. This includes:

Target Population: All teachers, school administrators (head teachers, deputy heads, ICT coordinators), and grade 10-12 students in all Secondary schools in Ndola District.

Accessible Population: Teachers, administrators, and students from the selected Secondary schools within Ndola District that will form part of the sample.

Sampling Procedure

A multi-stage sampling procedure will be employed to ensure representativeness:

Stage 1: Purposive Sampling of Schools: Ndola District will be purposively selected. Within it, three Secondary schools will be purposively selected to ensure diversity: one government school, one private school, and one grant-aided (trust) school. This allows for a comparative analysis across different school management types.

Stage 2: Stratified Random Sampling within Schools:

For Students: The student population in each selected school will be stratified by grade (10, 11, and 12). A simple random sample will then be drawn from each stratum.

For Teachers: Teachers will be stratified by subject department (e.g., Sciences, Humanities, and Languages). A simple random sample will be drawn from each stratum.

For Administrators: A census approach will be used for all available administrators (Head teachers, Deputy Heads, ICT Coordinators) in the selected schools, as their numbers are small.

Sample Size

Quantitative Sample: Using a confidence level of 95% and a margin of error of 5%, a sample size of approximately 549 respondents (including students, teachers, and administrators) will be targeted. The exact number will be calculated using a standard sample size formula based on the accessible population.

Qualitative Sample: Approximately 15-20 participants will be purposively selected for in-depth interviews (school administrators, heads of department) and 3-4 Focus Group Discussions (FGDs) will be held with groups of 6-8 teachers and students each to reach data saturation.

Sampling Area

The study will be conducted within the geographical boundaries of Ndola District, Copperbelt Province, Zambia. The specific sampling areas will be the premises of the three selected Secondary schools.

Sources of Data

Data will be gathered from two primary sources:

1. **Primary Data:** Collected firsthand from the respondents using surveys, interviews, and FGDs.
2. **Secondary Data:** Gathered from published materials to contextualize the study, including:
 - School policy documents and ICT development plans.
 - Government reports from the Ministry of Education and Smart Zambia.
 - Journals, articles, and books on AI in education.

Method of Data Collection

The following methods will be used concurrently:

Survey Method: A structured questionnaire will be administered to the quantitative sample to collect data on demographics, awareness levels, perceptions (using Likert scales), and infrastructure availability.

In-Depth Interviews (IDIs): A semi-structured interview guide will be used to conduct one-on-one interviews with school administrators to gather detailed insights on policy, challenges, and strategic vision regarding AI.

Focus Group Discussions (FGDs): A FGD guide will be used to facilitate discussions with separate groups of teachers and students to explore their collective experiences, attitudes, and concerns about AI in education.

Tools of Data Collection

The following instruments will be developed, validated, and used:

1. **Questionnaire:** A self-administered, structured questionnaire with closed-ended and Likert-scale questions. It will be checked for validity by experts and reliability through a pilot test (Cronbach's Alpha).
2. **Interview Guide:** A semi-structured guide with open-ended questions for administrators.
3. **FGD Guide:** A guide with prompting questions to facilitate discussion with teacher and student groups.
4. **Observation Checklist:** A simple checklist to physically verify the availability and state of ICT infrastructure (computers, labs, internet routers) in the schools.

Tools for Data Analysis

Data will be analyzed using the following tools:

Quantitative Data: The data from questionnaires will be coded, entered, and analyzed using Statistical Package for the Social Sciences (SPSS Version 28 or later). Analyses will include:

Descriptive Statistics: Frequencies, percentages, means, and standard deviations to summarize data.

Inferential Statistics: Correlation analysis to explore relationships between variables (e.g., between awareness level and perceived usefulness).

Qualitative Data: Data from interviews and FGDs will be transcribed and analyzed using Thematic Analysis. This involves coding the data, identifying patterns, and grouping them into overarching themes that directly address the research objectives.

Integration: The quantitative and qualitative findings will be merged during the interpretation phase to provide a coherent and comprehensive answer to each research question.

Limitations of the Study

Generalizability: The findings from the selected schools in Ndola may not be fully generalizable to all Secondary schools in Zambia due to contextual differences.

Self-Reporting Bias: The data on perceptions and awareness relies on respondents' self-reporting, which may be subject to social desirability bias (e.g., overstating one's familiarity with AI).

Cross-Sectional Design: The study provides a snapshot in time and cannot establish cause-and-effect relationships or track changes in perceptions over time.

Access to Respondents: Gaining full access to students and teachers during school hours might be challenging and requires careful scheduling.

Difficulties Faced by the Researcher

Limited Prior Research: The scarcity of local literature on the specific topic may pose a challenge for contextualizing some findings.

ICT Infrastructure Variability: The state of ICT infrastructure may vary significantly between schools, making direct comparisons complex.

Sensitivity of Topic: Discussing AI might be a sensitive topic for some teachers who may feel threatened by the technology. The researcher will ensure anonymity and confidentiality to mitigate this.

Chapter Summary

This chapter has detailed the methodology to be employed in conducting this research. The convergent parallel mixed-methods design was selected to robustly address the research objectives. The procedures for identifying the study population, sampling, determining the sample size, and collecting data through questionnaires, interviews, and FGDs were outlined. The plans for analyzing both quantitative and qualitative data were also explained. Finally, the potential limitations and difficulties of the study were acknowledged. The next chapter will present the data collected using this methodology.

5. CONCLUSION

This study examined the extent of Artificial Intelligence (AI) integration in teaching and learning processes in secondary schools in Ndola District. It focused on accessibility, users' knowledge, and the different ways AI is applied in education, as well as the level of policy implementation.

The study used a descriptive survey design and collected data through questionnaires and observations. Both qualitative and quantitative methods were used to analyze the responses and understand the overall situation of AI use in schools.

The findings helped to identify key trends, challenges, and opportunities related to AI integration. Based on these, conclusions and recommendations were made to support effective use of AI in the education system.

6. REFERENCES

- [1] Abdullahi, H. (2013). The Role of AI in Teaching Science Education in Schools. *Journal of Educational and Social Research*
- [2] Adeyoyin, S., Imam, A. and Oladapo, Y. (2010). Health workers' AI literacy in a Nigerian University Teaching Hospital. *Information Technologist (The)*, 6(2).
- [3] Allen M.W (2003) *Guide to e-learning; Building interactive, fun and effective*
- [4] Aydin C. and Tasci D (2005) *measuring readiness for e-learning; Reflections*
- [5] Ayere A, Odera and Agak J. 2010 *E-learning in secondary schools in Zambia*
- [6] Ben-Chaim, D., Orion, N. & Yael, H. (1997). Relationship between Earth science education and spatial visualization. *Journal of Geoscience Education*. 45,129-13.
- [7] Best and Kahn (2005) *Research in Education* University of Illinois, Chicago.
- [8] Blurton C (1999) *New directions in Education* World communication and
- [9] Borg W.R and Gall M.P (1989) *Educational Research and Introduction* (5th
- [10] Brassford F.D. Brown AI and cooking Eds (1999) *how people learn: Brain mind*
- [11] Brown, A. and Lloyd, M. (2010). SPECIAL ISSUE: Agency of information and communication technology (ICT) in enhancing teaching and scaffolding learning. *Journal of Learning Design*, 3(2).
- [12] Campbell, R.L. (2006). Jean Piaget's genetic epistemology: Appreciation and critique. Department of Psychology, Clemson University, Clemson SC.
- [13] Case of NEPAD E-Schools. *Education Research and Reviews* Vol 5 (pp 216-223)
- [14] Cuban (2001) *Oversold and under used computers in the classroom*
- [15] Delhi Educational and Professional Publishers Ltd. 64
- [16] Duplessis A. (2010). *Teachers perception about their own and their school* Edition) Newyork Longman
- [17] Edwards, P, Roberts, I Clark M Diguisepp, Prataps Wentz and Kwan (2002) *epistemological and ontological underpinnings of a conceptual framework paper*
- [18] Galanouli, D. and McNair, V. (2001). Students' perceptions of AI-related support in teaching placements. *Journal of Computer Assisted Learning*, 17(4), pp.396-408.
- [19] Garca-Valcarcel, A. (2009). Integrating AI into the teaching-learning process. *British Journal of Educational Technology*, 41(5), pp.E75-E77.
- [20] Gutierrez, J. and Zamora, B. (2013). Improving teaching-learning process through AI methods assisted with CFD techniques for Marine Engineering courses. *Comput Appl Eng Educ*, p.n/a-n/a.
- [21] *Increasing response rate to postal questionnaires; a systematic review*, British information 19992000 Paris UNESCO
- [22] Kozma R.B, Kozma (2005) *National policies that connect AI-based education*
- [23] L. & Bowie, N.E. (1997). *Ethical theory and business*. Upper Saddle River, NJ: Prentice Hall.
- [24] Nevgi, A. (2008). University teaching staffs' pedagogical awareness displayed through AI-facilitated teaching. *Interactive Learning Environments*, 16(2), pp.101-116.
- [25] Prestige, S. (2010). AI professional development for teachers in online forums: Analyzing the role of discussion. *Teaching and Teacher Education*, 26(2), pp.252-258.
- [26] *Reform to economic and social development. Human technology*. Vol No 2 PP117- vol. 8 pp 224257

- [27] Salameh Al-Rsa'i, M. (2013). Promoting Scientific Literacy by Using AI in Science Teaching. IES, 6(9).
- [28] Sang, G., Valcke, M., Braak, J. and Tondeur, J. (2010). Student teachers' thinking processes and AI integration: Predictors of prospective teaching behaviors with educational technology. Computers & Education, 54(1), pp.103-112. 65
- [29] Twining, P. and Henry, F. (2014). Enhancing 'AI Teaching' in English Schools: Vital Lessons.
- [30] WJE, 4(2.)