

Addressing Challenges in Computer-Based Examinations: The Role of Student ICT Skills and Institutional Readiness in Zambia

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ABSTRACT

Computer-based examinations (CBEs) have increasingly become an important mode of assessment delivery within higher education institutions and professional examination bodies worldwide. In Zambia, the British Council, in collaboration with selected universities and colleges, has implemented computer-based examinations for professional and academic programmes such as ACCA, CIMA, and CIPS. Despite the benefits associated with CBEs, several operational and student-related challenges continue to affect successful implementation. This study investigated the influence of student ICT skills and institutional readiness on the effectiveness of computer-based examinations in Zambia. Guided by the Technology Acceptance Model (TAM), the study adopted a quantitative descriptive survey design. Data were collected using structured questionnaires distributed to students who had undertaken British Council facilitated examinations at selected institutions in Zambia. Out of 150 distributed questionnaires, 144 valid responses were analysed using SPSS. Descriptive statistics, regression analysis, and ANOVA were used to examine the relationships between variables. The findings revealed that students generally possessed moderate ICT skills, although typing speed, examination anxiety, and unfamiliarity with examination software remained common challenges. Institutional factors such as unstable internet connectivity, delayed examination commencement, intermittent electricity supply, and inadequate technical support significantly affected examination delivery. Regression analysis established a statistically significant relationship between ICT competence and successful completion of computer-based examinations. The study recommends strengthening ICT infrastructure, increasing student exposure to mock examinations, improving digital literacy training, and enhancing institutional operational preparedness.

Keywords: Computer-based examinations, ICT skills, institutional readiness, digital assessment, Technology Acceptance Model, Zambia

INTRODUCTION

Technological advancement has transformed educational systems worldwide, particularly in the areas of teaching, learning, and assessment. Educational institutions and professional examination bodies are increasingly transitioning from traditional paper-based examinations to computer-based examinations (CBEs) as part of broader digital transformation initiatives.

Computer-based examinations refer to assessments in which computers are used for question delivery, answer submission, scoring, result processing, and examination management. Compared to traditional paper-based examinations, CBEs provide several operational advantages such as faster processing of results, enhanced examination security, reduced administrative costs, increased flexibility, and improved efficiency in managing large candidate populations.

The COVID-19 pandemic further accelerated the adoption of digital assessment systems due to the need for flexible and technology-driven approaches to learning and examination administration. As a result, many institutions globally adopted online learning and computer-based testing systems as part of emergency educational continuity strategies.

In Zambia, the British Council has increasingly partnered with institutions such as the University of Lusaka, Zambia Centre for Accountancy Studies (ZCAS), Zambia ICT College, and Zambia Catholic University to facilitate computer-based examinations for programmes such as ACCA, CIMA, and CIPS. This transition represents a significant step toward modernising educational assessment systems within the country.

Despite the advantages associated with computer-based examinations, several operational and student-related challenges continue to affect examination delivery. Students with limited ICT exposure may experience difficulties navigating examination systems despite possessing adequate subject knowledge. Similarly, infrastructural challenges such as unstable internet connectivity, inadequate ICT infrastructure, intermittent electricity supply, and insufficient technical support may negatively affect examination reliability and candidate confidence.

The successful implementation of computer-based examinations therefore depends not only on technological infrastructure, but also on institutional readiness, operational preparedness, and students' ICT competencies. Institutions are increasingly expected to prepare students to effectively interact with digital assessment systems through orientation programmes, mock examinations, and digital literacy training.

Statement of the Problem

The implementation of computer-based examinations in Zambia has been accompanied by several operational and technical disruptions that negatively affect examination delivery. Despite the intended benefits of modernization and efficiency, recurring challenges such as delayed examination start times, unstable internet connectivity, inadequate candidate orientation, intermittent power supply, and examination anxiety continue to affect students' examination experiences. These disruptions raise concerns regarding examination reliability, fairness, institutional preparedness, and the sustainability of digital assessment systems in Zambia.

Research Objectives

- To identify the challenges faced by candidates during computer-based examinations.
- To determine the relationship between student ICT skills and successful completion of computer-based examinations.
- To examine the influence of institutional readiness on computer-based examination delivery.
- To examine students' perceptions toward computer-based examinations.
- To develop recommendations aimed at improving computer-based examination delivery in Zambia.

LITERATURE REVIEW

The Technology Acceptance Model (TAM) developed by Davis (1986) explains how perceived usefulness and perceived ease of use influence technology adoption. In the context of computer-based examinations, students are more likely to accept digital examination systems when they perceive them as manageable, beneficial, and user-friendly.

Durndell and Haag (2002) established that computer self-efficacy significantly influences students' confidence and attitudes toward technology use. Students with stronger ICT competencies generally experience lower levels of computer anxiety and greater confidence when interacting with digital systems.

Research conducted in Nigeria by Sanni and Mohammed (2015) revealed that students generally preferred computer-based examinations due to advantages such as faster processing of results and reduced examination malpractice. However, operational challenges such as unstable electricity supply, inadequate ICT infrastructure, and insufficient candidate training continued to affect implementation.

Malliari et al. (2011) further demonstrated that computer self-efficacy and computer experience positively influence students' confidence and reduce computer anxiety. Similarly, Hurley (2017) observed that familiarity

and repeated exposure to computer-based systems positively influence students' perceptions and acceptance of digital examinations.

Institutional readiness has also been identified as an important determinant of successful computer-based examination implementation. Reliable internet connectivity, stable electricity supply, operational preparedness, technical support personnel, and effective coordination are necessary to ensure smooth examination delivery.

The literature further indicates that students attempting digital examinations for the first time often experience examination anxiety associated with unfamiliarity with examination software, navigation systems, and time management challenges. Consequently, orientation programmes and mock examinations are considered essential for improving examination preparedness and reducing anxiety.

METHODOLOGY

The study adopted a quantitative descriptive survey design. The quantitative approach was considered appropriate because it enabled the collection of measurable data regarding students' experiences, perceptions, and challenges associated with computer-based examinations.

The study population consisted of students who had undertaken British Council facilitated computer-based examinations at selected institutions in Zambia. The participating institutions included the University of Lusaka, Zambia Centre for Accountancy Studies (ZCAS), Zambia ICT College, and Zambia Catholic University.

A total of 150 questionnaires were distributed to eligible participants. Out of these, 144 valid responses were returned and analysed using the Statistical Package for Social Sciences (SPSS).

The questionnaire measured variables relating to ICT competence, institutional readiness, operational challenges, technical support, and perceptions toward computer-based examinations. The questionnaire utilised a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

RESULTS

Reliability testing using Cronbach's alpha produced a coefficient of 0.81, indicating acceptable internal consistency of the research instrument. Descriptive statistics, regression analysis, and Analysis of Variance (ANOVA) were used to analyse relationships between variables. The significance level for statistical testing was set at $p < 0.05$.

Table 1: Demographic Distribution of Respondents

Variable	Frequency	Percentage
Male	68	47.2%
Female	76	52.8%
ACCA Students	54	37.5%
CIMA Students	41	28.5%
CIPS Students	29	20.1%
Other Programmes	20	13.9%

Table 2: ANOVA Results

Model	Sum of Squares	df	F	Sig.
Regression	57.18	5	133.46	.01
Residual	11.82	138		

Total	69.00	143		
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The ANOVA findings indicate that the regression model was statistically significant, $F(5,138) = 133.46$, $p < 0.05$, suggesting that the predictor variables collectively explained variations in students' ICT skill levels during computer-based examinations.

Table 3: Regression Coefficients

Predictor Variable	B	Beta	t	Sig.
Ease of logging into systems	.202	.256	6.637	.01
Typing ability	.214	.333	7.773	.01
Ability to complete exams on time	.148	.251	6.662	.01
Computer experience	.164	.232	5.445	.01
Availability of practice tests	.175	.302	7.570	.01

Table 4: Institutional Challenges Experienced During Examinations

Challenge	Percentage Affected	Interpretation
Delayed examination start times	77%	Major operational concern
Power interruptions	82%	Negatively affected examination continuity
Network disruptions	86%	Affected examination reliability
Inadequate CBT training	47.2%	Reduced candidate preparedness

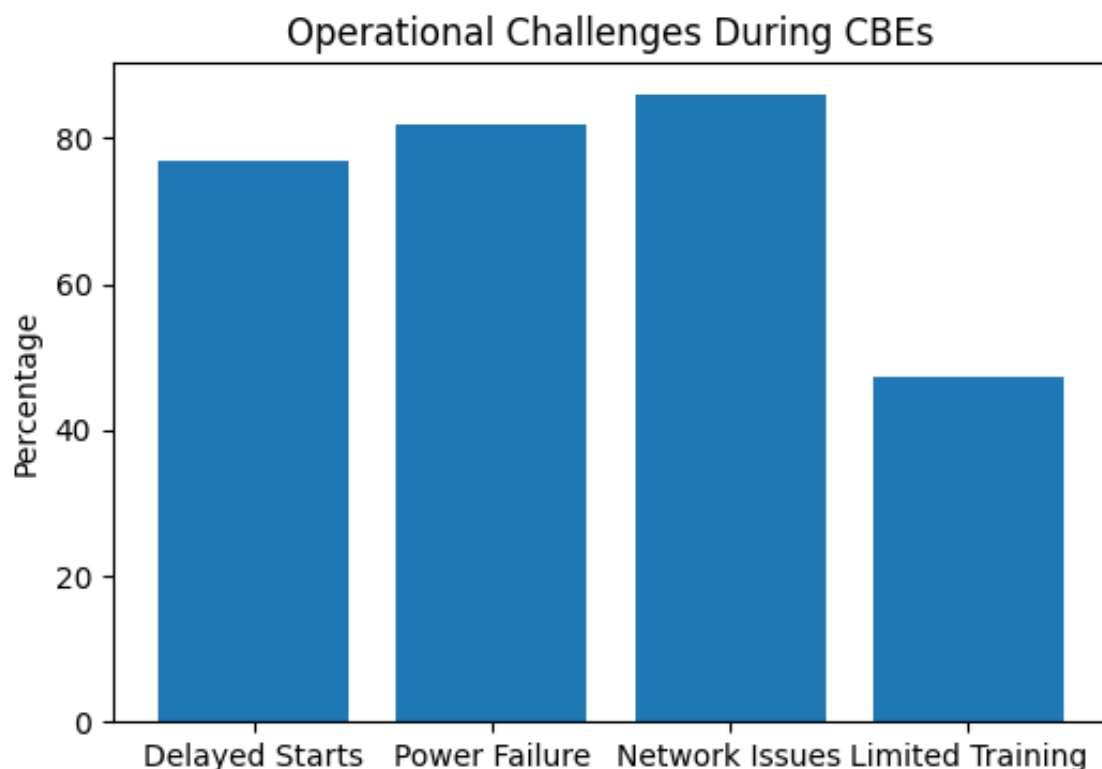


Figure 1: Operational challenges experienced during computer-based examinations.

DISCUSSION

The findings revealed that students generally possessed moderate ICT skills. Most respondents reported familiarity with basic computer operations such as logging into examination systems, typing responses, and navigating examination interfaces.

However, several students reported challenges associated with typing speed, time management, examination anxiety, and unfamiliarity with examination software. Students with limited prior exposure to digital examination systems experienced greater levels of anxiety during examinations.

Regression analysis established a statistically significant relationship between ICT competence and successful completion of computer-based examinations. Students with stronger ICT skills experienced fewer operational difficulties and demonstrated greater confidence during examinations.

Typing ability recorded one of the strongest standardized beta coefficients ($\beta=.333$, $p<0.05$), suggesting that typing proficiency significantly influenced students' examination preparedness and effectiveness.

Institutional readiness emerged as another major factor affecting examination delivery. Respondents identified delayed examination commencement, unstable internet connectivity, power interruptions, and inadequate technical support as major operational challenges.

The findings further established that students who participated in orientation programmes and mock examinations expressed lower levels of computer anxiety and more positive perceptions toward computer-based examinations.

These findings support the Technology Acceptance Model by demonstrating that students who were familiar with computer systems and examination software perceived CBEs as easier to use and more beneficial.

Contribution of the Study

This study contributes to the growing body of literature on digital assessment systems within African higher education contexts by providing empirical evidence from Zambia. The study extends current understanding regarding the combined influence of student ICT competence and institutional readiness on the effectiveness of computer-based examinations. The findings further highlight the importance of digital literacy, operational preparedness, and technological reliability in ensuring sustainable implementation of digital examination systems.

Limitations of the Study

The study was limited to selected institutions administering British Council facilitated computer-based examinations in Zambia and may therefore not fully represent all higher education institutions within the country. The study also relied on self-reported questionnaire responses, which may have introduced response bias. Additionally, the quantitative approach limited opportunities for deeper exploration of students lived experiences during examinations.

RECOMMENDATIONS

- Educational institutions should integrate digital literacy training into regular academic programmes.
- Examination centres should provide orientation programmes and mock examinations before actual examination sessions.
- Institutions should strengthen ICT infrastructure through reliable internet connectivity and backup power systems.
- Technical support personnel should remain available throughout examination sessions.

- Continuous exposure to computer-based learning systems should be encouraged to reduce examination anxiety.

CONCLUSION

Computer-based examinations have become an increasingly important component of modern educational assessment systems. While CBEs provide several advantages such as efficiency, flexibility, improved security, and faster processing of results, several student-related and institutional challenges continue to affect implementation in Zambia. The study established that student ICT competence and institutional readiness significantly influence the effectiveness of computer-based examinations. Improving digital literacy, strengthening ICT infrastructure, increasing candidate exposure to digital examination systems, and improving operational preparedness are essential for strengthening the sustainability and effectiveness of computer-based examinations in Zambia.

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