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GREENING ASSESSMENT METHODS FOR SUSTAINABILITY IN INSTITUTIONS OF HIGHER LEARNING: PRACTICES, CHALLENGES, AND THE WAY FORWARD IN THE HIGHER INSTITUTIONS IN GWERU, ZIMBABWE

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Abstract:
The global sustainability agenda has heightened expectations for Institutions of Higher Learning (IHLs) to integrate environmentally responsible practices across teaching, learning, and assessment. While considerable attention has been paid to greening curricula and campus operations, assessment practices remain largely under explored despite their significant environmental footprint. This study examined the extent to which assessment methods were being "greened" in selected higher education institutions in Gweru, Zimbabwe, focusing on existing practices, institutional challenges, and opportunities for sustainable transformation. Guided by Sustainable Assessment Theory and Institutional Theory, the study adopted a mixed-methods approach to gather data from academic staff on assessment practices, perceptions, and institutional support structures. Findings revealed a persistent reliance on paper-based assessments, driven by technological constraints, inadequate training, policy–practice gaps, and entrenched institutional cultures, despite high awareness of sustainability goals and strong support for digital assessment methods. The study identified a critical disconnect between normative commitments to sustainability and the institutional capacity to operationalise green assessment practices. It concluded that effective greening of assessment required coordinated policy reform, targeted capacity building, and strategic investment in technological infrastructure. The study contributes empirical evidence from an urban Zimbabwean context and offers practical recommendations to align assessment practices with sustainable development goals in higher education.

Keywords: green assessment; sustainability; higher learning; sustainable assessment theory; institutional theory; digital assessment practices

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1. Introduction

Globally, concerns over climate change, environmental degradation, and unsustainable resource consumption have intensified calls for systemic transformation across all sectors of society. Education has been widely recognised as a critical driver of sustainable development through its role in shaping knowledge, skills, values, and attitudes necessary for responsible citizenship. Institutions of Higher Learning (IHLs), in particular, occupy a strategic position due to their mandate to generate knowledge, produce skilled graduates, and influence policy and practice beyond the classroom. As a result, universities worldwide are increasingly expected to embed sustainability not only within curricula but also across institutional operations, governance, teaching, learning, and assessment practices.

At the global level, higher education institutions have responded to sustainability imperatives through initiatives such as green campus infrastructure, curriculum reform, and environmental management systems. International frameworks, including the United Nations' Agenda 2030 and Sustainable Development Goals (SDGs), particularly SDG 4 on Quality Education, emphasize the integration of sustainability principles into educational systems. However, despite these commitments, assessment practices remain one of the least examined dimensions of sustainability in higher education. Traditional assessment methods dominated by paper-based examinations, printed assignments, and manual feedback continue to prevail, contributing to high paper consumption, increased energy use, and waste generation. Beyond their environmental impact, such assessment approaches often emphasize rote memorization and high-stakes testing, limiting opportunities for learners to develop critical thinking, problem-solving, and lifelong learning competencies essential for sustainable societies.

In the African context, the pursuit of sustainability in higher education is shaped by complex socio-economic and structural challenges. Many African universities operate under conditions of limited funding, inadequate technological infrastructure, expanding student enrolments, and persistent digital divides. While sustainability rhetoric has gained prominence, often influenced by global policy frameworks, implementation remains uneven and largely aspirational. Assessment systems across African higher education institutions continue to rely heavily on conventional, examination-oriented models that are resource-intensive and pedagogically restrictive. Although digital and alternative assessment methods are increasingly advocated, their adoption is constrained by unreliable internet connectivity, limited access to digital devices, insufficient staff training, and concerns related to quality assurance and academic integrity.

Within Zimbabwe, higher education institutions face compounded challenges arising from economic instability, constrained public funding, and infrastructural limitations. National policy instruments such as the National Development Strategy 1 (NDS1) underscore the importance of sustainable development and recognize education as a key driver of national transformation. However, these policy commitments have not

been fully translated into clear operational frameworks for sustainable teaching, learning, and assessment practices. Empirical observations suggest that Zimbabwean IHLs remain heavily dependent on paper-based assessment methods, particularly invigilated end-of-semester examinations and printed coursework. This reliance is reinforced by limited access to digital technologies, inconsistent internet connectivity, insufficient professional development opportunities for academic staff, and entrenched academic cultures that favor traditional assessment models.

Furthermore, increasing student enrolments without proportional expansion of institutional resources has intensified assessment workloads, making traditional paper-based assessments appear more manageable and less risky from an administrative perspective. This situation creates a contradiction between institutional sustainability aspirations and everyday academic practices. Consequently, assessment remains a largely overlooked contributor to universities' environmental footprints, despite growing awareness of sustainability among academic staff and students.

Against this backdrop, the concept of greening assessment methods, encompassing reduced reliance on paper, adoption of digital and authentic assessments, and alignment of assessment practices with sustainability competencies, has gained increasing relevance in higher education scholarship. However, there is limited empirical research examining how such practices are conceptualized, implemented, and constrained within Zimbabwean higher education institutions, particularly in secondary urban centres such as Gweru. This study therefore sought to address this gap by examining current assessment practices, institutional challenges, and opportunities for greening assessment methods in selected IHLs in Gweru, Zimbabwe.

1.1 Statement of the Problem

Despite the recognized role of higher education institutions as drivers of sustainable development, the integration of environmentally sustainable practices into assessment remains fragmented and inconsistent. Traditional paper-based assessment methods persist due to technological constraints, limited institutional support, policy–practice gaps, and entrenched academic cultures. This creates a disconnect between institutional sustainability commitments and actual assessment practices. In Zimbabwe, there is limited empirical evidence on how IHLs are addressing the environmental implications of assessment or transitioning toward greener alternatives. This lack of context-specific evidence constrains informed policy formulation and institutional planning, necessitating systematic investigation.

1.2 Research Questions

The study was guided by the following research questions:

1) How do institutions of higher learning in Gweru green assessment practices?

2) What institutional policies in Gweru higher learning institutions, support sustainability in assessment?
3) What challenges hinder the implementation of green assessment methods, and why do they persist?
4) What opportunities exist for the successful transition to green assessment methods in Gweru higher learning institutions?

2. Review of Related Literature

2.1 Theoretical Framework

This research employed a robust theoretical framework, integrating Sustainable Assessment Theory and Institutional Theory, to analyse the complex dynamics governing the adoption of green assessment methods.

2.1.1 Sustainable Assessment Theory

Articulated by Boud (2000) and refined by Boud and Soler (2016), Sustainable Assessment Theory (SAT) defines assessment not just as a means of evaluation, but as a mechanism for developing long-term student capacity. SAT argues that assessments must encourage lifelong learning, critical thinking, and responsible citizenship, preparing students for future professional and civic responsibilities. Green assessments, such as e-portfolios, digital submissions, and sustainability-oriented content, not only reduce environmental impact but also fundamentally align with SAT by fostering these transformative educational outcomes.

2.1.2 Institutional Theory

DiMaggio and Powell's (1983) Institutional Theory is utilised to explain the organisational pressures that influence institutional decision-making and practice adoption. The greening of assessment is influenced by three isomorphic pressures:

- **Regulative Pressures:** Explicit rules and mandates from governmental or accreditation bodies.
- **Normative Pressures:** Professional standards and expectations from peer institutions or the academic community.
- **Cultural-Cognitive Pressures:** Deeply ingrained traditions, shared assumptions, and administrative inertia that favour the status quo, such as a preference for high-stakes, invigilated exams.

This theory was instrumental in explaining why challenges persisted and how policy reforms could effectively drive the adoption of green assessment methods. It also helped determine what opportunities existed for leveraging global movements to transform rigid assessment systems.

2.1.3 Global and Local Frameworks

These frameworks provide the essential context for the institutional pressures. The United Nations' Agenda 2030, particularly Sustainable Development Goal 4 (Quality Education) and the broader call for sustainability across all sectors, provides a powerful normative and regulative context. Locally, Zimbabwe's National Development Strategy 1 (NDS1) echoes the need for sustainable practices across educational sectors, although specific frameworks for green assessments are often less explicit.

2.2 Conceptual Framework

2.2.1 Conventional and Emerging Assessment Practices

Higher Education Institutions (HEIs) exhibit a strong path dependence on conventional assessment models. These regimes typically involve paper-heavy assessment practices, such as invigilated sit-down examinations, printed assignments, and hard-copy feedback. Gibbs and Simpson (2004) document this reliance, highlighting the substantial logistical and environmental resource drain associated with these practices.

Globally, however, a dual shift is observed, addressing both ecological footprint and pedagogical efficacy.

1) **Technological Assessment:** The adoption of Learning Management Systems (LMSs) and e-submission tools marks a critical move toward minimizing paper use. Digital submissions and online quizzes directly address the ecological element of "greening assessment".
2) **Authentic and Sustainable Assessment:** Beyond mere digitalisation, the literature points to a pedagogical shift, championed by scholars like Biggs (2003), toward authentic, performance-based tasks. These include projects, e-portfolios, community-engaged assignments, and problem-based assessments. As Boud and Soler (2016) explain, these tasks are inherently more sustainable because they prepare students to apply knowledge in real-world contexts and cultivate lifelong learning capacity, aligning with the core tenets of SAT.

2.2.2 Challenges in Implementing Green Assessments

The path to integrating green assessment methods is significantly obstructed by a set of well-documented barriers that resonate with Institutional Theory's pressures.

2.2.2.1 Technological and Resource Constraints

The most immediate and practical challenge is often the technological barrier. Al-Jadiry (2020) stresses that e-learning and digital assessment tools require robust infrastructure, including reliable internet, adequate computing resources, and technical support. In contexts where resource constraints are severe, the high cost of technology can prohibit the transition from paper-based systems, leading to technological inequity and poor adoption.

2.2.2.2 Cultural, Pedagogical, and Administrative Barriers

The cultural landscape within academia presents significant hurdles. Cultural and attitudinal barriers resist change. Brockbank and McGill (2007) note that staff and students are often locked into traditional practices due to familiarity and a perceived high risk associated with new methods. This administrative and quality assurance-related risk aversion favours standardised, invigilated exams, perceiving them as more reliable for certification and accreditation purposes. This preference contributes to administrative inertia.

Furthermore, pedagogical barriers are widespread. Guskey (2002) highlights that the lack of limited training for lecturers severely restricts the ability of faculty to design and manage complex, authentic green assessments. High staff workloads further discourage the uptake of new, potentially time-consuming assessment formats, leading educators to fall back on familiar, albeit less sustainable, methods.

2.2.2.3 Policy-Practice Gaps

Even where policies promoting sustainability exist, policy-practice gaps are common. Policies may lack the necessary operational guidelines, resource allocation, and monitoring mechanisms to ensure ground-level implementation. This lack of supportive policy infrastructure, or the existence of competing institutional priorities such as accreditation demands, can effectively neutralize the impact of any aspirational greening goals.

These factors, path dependence, resource constraints, and policy-practice gaps, create a perfect storm that locks institutions into unsustainable assessment practices.

3. Methodology

This study adopted a qualitative research approach located within an interpretivist paradigm in order to gain an in-depth understanding of how institutions of higher learning in Gweru enacted and accounted for their practices in greening assessment. The qualitative approach was contextual and generated data within natural, real-life settings, focusing on participants' lived experiences, which is consistent with the views of David (2014). The study sought to understand meanings, actions, and institutional practices as socially constructed phenomena, drawing on the perspectives of David (2014) and Mason (2002). An illustrative case study design was used, enabling the study to explain and describe a specific institutional situation in detail and to provide a comprehensive view of the case. Data were collected through Google Forms with open- and closed-ended questionnaires, and the responses were subjected to interpretive analysis that foregrounded the voices of participants. Convenience and purposive sampling techniques were employed to select 25 information-rich participants with direct involvement in assessment practices. Ethical considerations were observed, including

obtaining informed consent from participants and ensuring anonymity and confidentiality throughout the research process.

4. Findings and Discussion

4.1 Assessment Practices: Reliance on Paper and Environmental Perceptions

The findings reveal a significant and continuing reliance on paper-based assessment, counteracting institutional greening goals.

4.1 Frequency of Paper-Based Assessment

The data shows that paper-based assessments (written exams, paper submissions) are used with alarming frequency. A total of 75% of respondents reported using them either "Very frequently" (25%) or "Frequently" (50%).

4.1.1 Discussion (Application of Institutional Theory)

This overwhelming reliance is a direct manifestation of cultural-cognitive pressures as described by Institutional Theory (DiMaggio & Powell, 1983). The high frequency persists because paper-based exams represent a familiar, low-risk, and easily administered format. This is amplified in environments with high staff workloads, where educators resort to path dependence (Gibbs & Simpson, 2004) on traditional formats, despite the known environmental impact.

4.2 Perceived Environmental Friendliness

In stark contrast to the high usage of paper, a combined 59% of staff "Strongly agree" (21%) or "Agree" (38%) that their current assessment methods are environmentally friendly.

4.2.1 Discussion

This highlights a potential lack of awareness or a low threshold for what constitutes an "environmentally friendly" practice. Staff may be equating minor digital submissions with a fully "green" system, demonstrating a need for increased awareness, normative pressure, and clearer institutional guidelines, as noted in the literature (Brockbank & McGill, 2007; Guskey, 2002).

4.3 Integration of Green Assessment Principles

While paper use remains high, there is moderate success in implementing certain aspects of green assessment.

4.4 Awareness and Content Integration

A high percentage of staff (87%) are aware of institutional efforts to reduce paper consumption. Furthermore, 75% of courses either "Occasionally" (54%) or "Frequently" (21%) require students to address sustainability-related topics or issues.

4.4.1 Discussion (Application of Sustainable Assessment Theory)

The inclusion of sustainability topics, even if only occasionally, aligns with the goals of Sustainable Assessment Theory (Boud & Soler, 2016), which advocates for fostering responsible citizenship and critical thinking through curriculum and assessment content. This suggests that the normative desire for sustainability is present. The awareness of paper reduction initiatives (87%) indicates that the basic "green" practice of using digital submissions is being communicated, addressing the immediate environmental dimension of green assessment.

4.5 Support for Digital Methods

An overwhelming majority of respondents believe that digital assessment methods (e.g., online quizzes, e-portfolios) are an effective way to promote sustainability. They cited reduced paper use, minimized travel, energy savings, and flexibility as key benefits.

4.5.1 Discussion

This strong belief confirms that there is a receptive academic culture (normative pressure) ready for the shift. However, as the subsequent findings show, the institutional reality does not yet match this desire.

4.6 Systemic Challenges and Institutional Gaps

Respondents identified clear, interconnected institutional barriers that explain the continued reliance on paper-based systems.

4.6.1 Primary Barriers to Implementation

The top three primary challenges selected by staff were:

1) Inadequate technological infrastructure (18 respondents).
2) Lack of training or knowledge on green assessments (18 respondents).
3) Lack of institutional policy or support (15 respondents).

These findings strongly corroborate the challenges documented in the literature:

1) The high ranking of infrastructure validates the technological barriers identified by Al-Jadiry (2020) and highlights severe resource constraints (Al-Jadiry, 2020).
2) The lack of training confirms the pedagogical barriers noted by Guskey (2002).
3) The lack of policy confirms the existence of policy-practice gaps (Brockbank & McGill, 2007).

4.6.2 Sufficiency of Institutional Support

A decisive 74% of respondents do not believe there is sufficient institutional support (funding, technical support, policy) to promote sustainable assessment practices.

4.6.2.1 Discussion

This disparity is the most critical finding. It reveals that the regulative and resourcing functions of the institutions are failing to support the normative goals (strong belief in greening). This institutional gap is the primary reason for the continued reliance on paper. Specifically, the main reasons cited for continued reliance on paper were:

- Inadequate technological infrastructure (30%),
- Lack of funding and training (22%),
- Tradition and familiarity (13%).

This analysis confirms that the challenge is structural, related to investment and policy, rather than merely attitudinal.

5. Conclusions

The academic staff surveyed in Gweru's IHLs have reached a clear consensus on the importance of sustainability and the efficacy of digital methods in achieving it. They align with global normative pressures and the principles of Sustainable Assessment Theory.

However, the current institutional practice presents a paradox: high awareness and desire for greening is undermined by a pervasive lack of institutional capacity and support. The continued, high reliance on paper-based assessments is directly attributed to inadequate technological infrastructure, insufficient funding for transition, and a critical policy-practice gap that fails to mandate or guide sustainable assessment practices.

Therefore, the core challenge is structural and administrative: there is a significant gap between the strong desire for sustainable practices and the institutional capacity to implement them effectively and sustainably.

6. Way Forward: A Multi-Faceted Approach

A successful transition to green assessment practices requires coordinated action across three key pillars: Policy, Capacity, and Technology.

6.1 Policy and Administrative Reform (Regulative Pressure)

- **Mandate Clear Policies:** Administrators and Quality Assurance (QA) Units must develop and monitor clear Green Assessment Policies and guidelines, prioritizing paperless examinations and digital submissions. (Recommended by 52% of respondents).

- **Strategic Planning:** Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development should iintegrate green assessment targets into strategic plans and accreditation mandates.

6.2 Training and Capacity Building (Normative Pressure)

6.2.1 Consistent Training

Policy Makers and Staff Development Units must provide ongoing, mandatory training for both staff and students on the use of green technology and the pedagogical design of authentic, sustainable assessment methods (Boud & Soler, 2016). (Recommended by 26% of respondents).

6.3 Strategic Investments in Technology (Resource Support)

6.3.1 Infrastructure Investment

Government, Funders, and ICT Departments must prioritize procuring necessary gadgets, improving ICT provisions, and automating activities to effectively transition away from paper-based systems. (Recommended by 30% of respondents).

6.3.2 Innovation

Ministry of Higher and Tertiary Education, Innovation, Science and Technology Development should adopt innovative digital technologies, such as e-assessments, online submissions, and exploring AI-powered grading tools, to streamline the process.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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