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Editorial Team

Table of Contents

EDITORIAL:
The IJAHE's Decade Long Successful Journey

Introduction

This Volume 10, Issue Number 3 marks the conclusion of a decade long journey of the *International Journal of African Higher Education* (IJAHE). Published by the International Network for Higher Education in Africa (INHEA) based at the University of KwaZulu-Natal (UKZN) in South Africa, it was launched in 2014 with the support of multiple regional and international players interested in advancing higher education in Africa.

The IJAHE was launched to advance knowledge and promote research, as well as provide a forum for policy discussion and analysis on diverse higher education issues on the African continent. At its launch, the journal aspired to contribute to shaping discourses in the sector and reporting new frontiers as well as creating a nexus for communication and networking among a wide array of researchers, students, academicians, policy makers and policy analysts interested in and concerned with higher education in Africa.

As a multidisciplinary journal, the IJAHE has published research and review articles on a multitude of higher education topics in regular and special issues that are comparative and theme-based in nature. It has published issues on the theory and practice of African higher education not only by scholars but also practitioners on the continent and beyond and has served as a platform for senior and emerging scholars alike.

Recognition

In 2018, four years into its existence, the journal received recognition from the South African Department of Higher Education and Training (DHET) which accredits periodicals both nationally and internationally. Another four years later in 2022, it was indexed by African Journals Online (AJOL).

In March 2023, it received recognition from Scopus – one of the most authoritative scholarly databases in the world. This achievement is testimony to its vigorous pursuit of excellence and is a noteworthy

accomplishment for a typical African journal, which often faces challenges that threaten its existence. Later on, it entered into an agreement with EBSCO, another major player in the business of published works.

The IJAHE's journey started with publishing just one issue per year as an English language journal with abstracts in French. It grew into producing two issues per year for several years; and at present, stands at three issues per year.

For its inaugural issue, the journal published commissioned articles on several key and contemporary issues in higher education in Africa and beyond, authored by leading authorities from around the world by invitation only. Likewise, it recruited leading and well-established authorities in higher education as it formed its International Advisory Board. The IJAHE made a strategic decision to recruit a "who's who" in African higher education from universities, research centres, government ministries, funding organisations and non-governmental organisations (NGOs) from across Africa and globally. In further consolidating this approach, the publisher partnered with the Center for International Higher Education at Boston College, one of the leading such centres in the world, where the journal continues to be hosted.

These approaches have contributed to elevating the stature of the IJAHE and have been instrumental in garnering recognition from potential contributors and other stakeholders. As a result, it has attracted contributors from Asia, Australia, Europe, Latin America, and North America, with the majority hailing from Africa.

Profile

The IJAHE maintains and encourages diverse methodological, philosophical/ideological, and theoretical approaches. It welcomes discourses from multiple schools of thought to advance a rich and robust body of knowledge in the higher education sector. However, the journal has received a disproportionate number of certain approaches. For instance, the manuscripts it receives and the papers it ultimately publishes tend to be more qualitative than quantitative.

Table 1: Profile of IJAHE (as at 8 June 2024)

Articles published (including this issue)	130
Regular Issue articles	83
Special Issue articles	41
Co-authored articles	63
Manuscript submission	901
Abstract views	117,639
PDF downloads (full article views)	91,238

Regular Issues

In the past ten years, the journal received more than 900 manuscripts from contributors in over 30 countries across Africa, Asia, Australia, Europe, Latin America, and North America. The majority came from South Africa, followed distantly by submissions from the US, Uganda, Ghana, and Ethiopia. However, only about 10 percent of the manuscripts it received were published in its 12 regular issues.

The profile of the publication over the decade reveals a rich variety of issues that can be organised under two dozen thematic areas. Figure one shows that internationalisation and collaboration were the most prevalent theme, followed by general higher education issues (in Africa and developing countries), gender, diversity, and inclusion, quality assurance and management, migration and diaspora engagement, financing, and research.

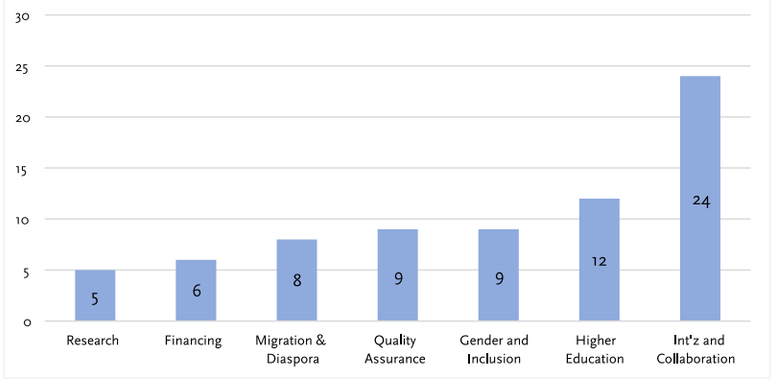

Figure 1: Distribution of thematic areas published by the IJAHE over a decade.

Special Issues

In the past decade, the journal published five special issues based on thematic and comparative studies by leading academics and researchers on the subject from around the world. Most of the papers for the special issues emanated from conferences organised in Africa on topical and thematic higher education issues. These brought together some of the leading authorities in higher education from around the world, especially Africa, Asia, Europe, Latin America and the United States.

The first special issue in 2016 undertook a deep analysis and critique of a seminal book *Higher Education in Developing Countries: Peril and Promise*, published in 2000 under the auspices of the World Bank and UNESCO. The study was steered by 14 Task Force members; two study directors; 10 funders; and nearly 100 prominent individuals from around the world who "made substantive contributions". We were of the view that, for a ground-breaking document such as "*Peril and Promise* to be impactful – and garner the requisite attention it deserves against the entrenched policy deficit of the time", it needed to be anchored in the convening powers of two of the world's leading multilateral institutions – the World Bank and UNESCO – buttressed by leading experts from a host of academic, geographical, economic, political, and developmental divides in the world. In featuring a special issue of IJAHE on this ostensibly seminal document with divergent perspectives from multiple corners, we endeavoured to gauge its significance and contribution to the development of higher education in the world in general and Africa in particular. While we continue to participate enthusiastically in the positive higher education policy discourse since *Peril and Promise* (and subsequent documents), we affirmed that, "we should be more proactive in subjecting existing and emerging ones to a systematic and rigorous intellectual dialogue" (Teferra, 2016).

The second special issue was dedicated to the Commemoration of the Establishment of the Higher Education Forum for Africa, Asia and Latin America (HEFAALA) at UKZN organised under the banner "Continental Realities, International Imperatives" in 2016. The First International Symposium of HEFAALA took place in Durban, South Africa on 20 and 21 August 2016 organised by the INHEA, the publisher of this journal, with funding support from the Carnegie Corporation of New York. The symposium attracted senior and early career academics,

experts, policy advisors, policy makers and development partners from the three continents and beyond. In recognition of the enormous common challenges as well as potential and growing opportunities in these regions, HEFAALA was established to promote mutually constructive and proactive engagements in higher education to foster dialogue, advance research and promote favourable policies in higher education. This special issue featured many countries in Africa and in Asia and Latin America, including Brazil, China, Malaysia, and Mexico, and a number of cross cutting issues. In virtually all cases, similar issues and developments were evident across the three continents, further emphasising the need for closer engagement and cooperation among these regions (Teferra, 2018).

In the third special issue, the IJAHE published the outcome of the Second HEFAALA Symposium which took place in July 2019, in Addis Ababa, Ethiopia, organised by the INHEA in cooperation with Saint Mary's University and a number other national and international organisations. Under the theme "Internationalisation of Higher Education in the New Era of World (Dis)Order" it was organised in appreciation of the world "grappling with, excited about and concerned with disruptive technologies; Artificial Intelligence; the Fourth Industrial Revolution; social media; genetic engineering; superbugs; food insecurity; climate change; global warming; unilateralism; nationalism and so on – key issues of, and for, higher education. The gravity as well as the complexity of critical global issues prompted the choice of the word "Dis(order)" in its title." The symposium generated nine articles contributed by experts in Africa, Asia, Latin America and the US, including "The Irrelevance of the Re-Configured Definition of Internationalisation to the Global South: Intention Versus Coercion". This article challenged the latest definition of internationalisation and became the subject of a series of pieces in *University World News*. The debate involved the definition's architects, who embedded 'intentionality' in the definition, and a critic who argued vigorously against it, stating that the essence of a definition "need not be about therapeutic advocacy, nor should it be a restorative discourse, however benevolent or unanimous" (Teferra 2020).

The fourth special issue was an outcome of a major conference, "Continental Forum on the Role of the Diaspora in Higher Education, Research, and Innovation in Africa" organised in November 2019 by

the Institute of African Studies, Carleton University, Canada, with the Citizens and Diaspora Directorate (CIDO) of the African Union (AU) through funding from the Carnegie Corporation of New York at the Union's headquarters in Addis Ababa. The forum attracted participants from a range of relevant stakeholders including the AU Commission, AU member states' focal agencies for the diaspora and education, government ministries and officials, African diaspora programme administrators, and educational leaders, including professional associations and think tanks such as the Association of African Universities (AAU), the Council for the Development of Social Science Research in Africa (CODESRIA), and the Pan-African Doctoral Academy (PADA). It drew more than 80 participants from numerous countries including Algeria, Botswana, Cameroon, Central African Republic, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Liberia, Malawi, Morocco, Mozambique, Nigeria, Rwanda, Senegal, South Africa, Uganda and Zambia, as well as Australia, Canada, China, Germany, India, the United Kingdom and the US. The forum explored the perspectives of government ministers and vice-chancellors on the role and potential of the academic diaspora to contribute to teaching and research in higher education institutions. University leaders discussed what can and cannot be achieved through engagements with diaspora academics and what they see as the drivers of, and constraints to, success. The special issue produced six articles that included a comparative perspective from India (Teferra, 2021).

The fifth special issue emerged from the Third HEFAALA Symposium that took place on 27 and 28 April 2022 in Addis Ababa under the theme "Academic Collaboration in Africa, Asia and Latin America in the Post-COVID World". The symposium had four panels under the following sub-themes: Academic Collaboration: Imperatives and Modalities; Impact and Relevance of Academic/Research Collaboration; Mobility and Intellectual Diaspora; and Challenges and Opportunities of Academic Collaboration. They featured some of the leading authorities in the fields drawn largely from Africa, Asia and Latin America, as well as Australia, Canada, Europe and the US. The symposium was integrated with the 20th International Conference on Private Higher Education in Africa under the theme "Embracing New Realities and Paradigms: Africa's Higher Education Response" and masterclass workshops under the theme "Building Leadership of Young Academics:

The Power of Academic Collaboration" which were mainly sponsored by the Mastercard Foundation. This issue contained eight, mostly jointly authored, articles by experts from multiple continents. There was near unanimity – and a renewed call – for South-South collaboration which is often sustained through the intervention of sources and forces in the North.

It was noted that, although much has been said about the need to change the paradigm in terms of collaboration, commensurate follow up action has been lacking. Accordingly, the need for more progressive discourses on academic collaboration in the three regions was emphasised. It was further noted that the 'polygamous' nature of collaborations, particularly in the context of Africa, may require deeper and more extensive analysis of the dominant mode of research and academic collaboration in the interests of the global community, particularly those in the Global South (Teferra, 2022a; 2022b).

It is in recognition of this dominant discourse – and part of the effort to counter it – that the Africa Charter for Transformative Research Collaborations has been recently developed and widely endorsed by multiple stakeholders in both the Global South and the North. The Charter, which is one of the key outcomes of the Conference of Rectors, Vice-Chancellors and Presidents of African Universities (COREVIP) in July 2023 in Windhoek, Namibia, under the theme "Advancing Excellence in African Higher Education", discussed a range of critical challenges facing the sector with a proposal for collaborations that would "serve a more just and richer, pluriversal global scientific effort across the natural and social sciences, arts and humanities, in which Africa takes its rightful place" (Edwin, 2023).

Support, Recognition and Acquisition

The IJAHE provides immediate open access (OA) to its content on the principle that making research freely available to the public supports greater global exchange of knowledge. This is particularly significant to the audience in the South, especially Africa where considerable challenges and barriers in accessing knowledge are widespread. Furthermore, readers do not have to create an account in order to access issues of the journal. The IJAHE charges neither article processing

charges (APCs) nor submission charges; nor does it impose embargo periods.

The journal has received financial, technical, and administrative support from multiple sources including UKZN. The support from the Carnegie Corporation of New York has been particularly instrumental in financially sustaining it for nearly a decade and also raising its credibility internationally. Since the culmination of the corporation's support, the Editor-in-Chief has been financially supporting the journal through the resources he generates from financial awards for his research productivity, a distinct South African model (and UKZN's approach) to advance research.

These interventions and contributions – by an external funder, other institutions, and an individual – have enabled the journal to remain fully open-access and subscription-free, achieving what is known in the industry as Gold Standard. However, without additional external support, it may be difficult to sustain as a fully open periodical with Gold status in the long run, a nagging reality that diminishes access for the large majority of African consumers who already grapple with accessibility issues.

Following the IJAHE's recognition by SCOPUS, it has been approached by a number of acquisition agents, including both private and multinational publishers. A few proposed sustaining the editorial arrangements with a different financial model, which would translate to subscription-based access, dismantling the open-access platform, and imposing fees.

These acquisition interests and a change in the modality of access that will impose fees have been disregarded, for now. This situation highlights the need for a mechanism to provide sustained support for such journals as vital and "equitable" conduits in advancing not only dissemination of knowledge, but also its generation.

It is reassuring to learn of a recent study that assessed the challenges and needs of the publishing community of Diamond Open Access journals, periodicals like the IJAHE that do not charge any fees for either authors or readers. On the basis of this review, Electronic Information for Libraries (EIFL), AJOL (African Journals Online) and WACREN (the West and Central African Research and Education Network) invited African organisations – legal entities that own OA journals and where

editorial teams are based – to submit a proposal for funding made possible by Wellcome Trust.

Such interventions that support OA journals will be key to countering the scourge of the 'Volume 1 Number 1' syndrome that typically afflicts the African knowledge landscape and hinders journals' sustainability. These efforts should be actively pursued by all those interested in and concerned with advancing the African knowledge domain.

Conclusion

It is fairly easy to launch a journal these days, but sustaining it is a different matter altogether. The literature on scholarly publishing in Africa is replete with examples of the numerous challenges that undermine the emergence and sustainability of successful journals.

One of the most intractable challenges remains the review process, as is the case with most bona fide journals in the scholarly publishing landscape today. This task is typically performed on a pro bono basis, with no obligation. While the IJAHE now enjoys a healthy influx of manuscripts and sound recognition, the challenge in the reviewer's corner persists.

At its launch, the journal underscored its commitment to serve as an independent and unbiased forum that accommodates a wide variety of perspectives and analyses, which are solid in their formulation and organisation, in the service of the community interested in advancing higher education on the continent. It has been a vigorously independent platform, entertaining a rich array of methodological, philosophical, and epistemological discourses, paradigms, and perspectives.

As we celebrate the end of an arduous but successful decade, we look forward to continuing our service to a host of emerging and existing communities of practice bound by common interest, concern, role, mandate, and profession with renewed vigour and dedication. We are determined to maintain this commitment well into the future.

Professor Damtew Teferra
Editor-in-Chief
June 2024

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The Nexus Between Higher Education Expansion and Economic Growth in Ethiopia: An Empirical Examination

Paulos C. Tsegaw

Abstract

Over the past three decades, Ethiopia's higher education system has undergone substantial expansion, marked by an increase in the number of universities from two to more than 100 and a surge in student enrollment from 48 000 to more than 400 000. Despite this growth, there is a paucity of research on the relationship between higher education expansion and economic growth, with the few quantitative studies that have been undertaken yielding inconsistent outcomes. This research study embraced endogenous economic growth theory, employed the Autoregressive Distributive Lag (ARDL) bound testing model, and used World Bank data from 1991 to 2021 to explore the relationship between economic growth (measured by GDP per capita) and the expansion of higher education (proxied by gross tertiary enrollment). Contrary to prevailing assumptions, the study uncovered an insignificant association between higher education expansion and economic growth. Unlike other studies, it used qualitative analysis to unearth the potential contributing factors and identified subpar educational quality, limited university autonomy, and constrained academic freedom as critical issues. It is recommended that policymakers in countries undergoing similar higher education expansion should not only focus on increasing the number of students, but also prioritise improving the quality of education, granting greater autonomy to universities, and ensuring academic freedom. These factors are crucial for higher education to effectively contribute to economic growth.

Key words: Higher education expansion, economic growth, ARDL bound testing model, Ethiopia

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Résumé:
Au cours des trois dernières décennies, le système d'enseignement supérieur éthiopien a connu une expansion substantielle, marquée par une augmentation du nombre d'universités, qui est passé de deux à plus de 100, et par une hausse du nombre d'étudiants, qui est passé de 48 000 à plus de 400 000. Malgré cette croissance, il existe peu de recherches sur la relation entre l'expansion de l'enseignement supérieur et la croissance économique, et les quelques études quantitatives qui ont été entreprises ont donné des résultats incohérents. Cette étude s'appuie sur la théorie de la croissance économique endogène, utilise le modèle ARDL (Autoregressive Distributive Lag) et utilise les données de la Banque mondiale de 1991 à 2021 pour explorer la relation entre la croissance économique (mesurée par le PIB par habitant) et l'expansion de l'enseignement supérieur (représentée par le nombre brut d'inscriptions dans l'enseignement supérieur). Contrairement aux hypothèses dominantes, l'étude a révélé une association non significative entre le développement de l'enseignement supérieur et la croissance économique. Contrairement à d'autres études, elle s'est appuyée sur une analyse qualitative pour mettre au jour les facteurs contributifs potentiels et a identifié une qualité d'enseignement médiocre, une autonomie limitée des universités et une liberté académique restreinte comme étant des problèmes cruciaux. Il est recommandé aux décideurs politiques des pays qui connaissent une expansion similaire de l'enseignement supérieur de ne pas se concentrer uniquement sur l'augmentation du nombre d'étudiants, mais de donner la priorité à l'amélioration de la qualité de l'enseignement, à l'octroi d'une plus grande autonomie aux universités et à la garantie de la liberté académique. Ces facteurs sont essentiels pour que l'enseignement supérieur contribue efficacement à la croissance économique.

Mots clés : Modèle autorégressif à retardement distribué (ARDL), expansion de l'enseignement supérieur, croissance économique, Éthiopie.

Introduction

Higher education is a significant investment in human capital, offering lifelong benefits to individuals and playing a crucial role in cultivating a skilled workforce capable of driving sustainable economic growth (Benhabib and Spiegel, 2005; Bloom et al., 2006; Chankseliani et al., 2021). However, the literature on African higher education presents contradictory perspectives on its impact on economic growth (Glewwe et al., 2004; Oketch and Schendel, 2014). Similarly, the few studies on Ethiopia's higher education system report inconsistent findings (Borojo and Yushi, 2015; Mengesha and Singh, 2022).

Ethiopia embarked on its modern or secular higher education journey by establishing the University College of Addis Ababa in December 1950. It initially enrolled fewer than 80 students and was staffed by a small group of non-Ethiopian teachers (Habte et al., 1963). In the early 1960s, the university received its Charter as a four-year degree-granting institution. Students enrollment increased to more than 450, with 60 staff members, including 20 Ethiopians (Ibid). By 1970, the university's student body had expanded to 6 000, with 437 faculty members, including 228 expatriates (Amare, 1988). During the Dergue regime (1974-1991), the higher education system experienced modest expansion, with the establishment of postgraduate schools and colleges across various regions. In the 1982/83 academic year, enrollment reached 16 117 (Ibid). However, Ethiopian higher education's true massification began in the late 1990s under the Ethiopian People's Revolutionary Democratic Front (EPRDF) (1991-2018) and the current regime. Enrollment skyrocketed from 48 000 in 1990 to more than 400 000 in 2022, with a significant increase in the number of public and private higher education institutions from two in 1990 to more than 100 in 2022.

The EPRDF's policy documents stated that the primary objective of the expansion of higher education was to contribute to the country's economic development within the framework of the Agricultural Development Led Industrialization (ADLI) development strategy. The government aimed to raise the higher education gross enrolment ratio to 22% to elevate Ethiopia's status to that of a middle-income country by 2025 (FDRE, 2012; MOE, 2010).

Qualitative studies on the Ethiopian higher education system have yielded inconsistent findings. While some of these note that its expansion has led to the introduction of new academic programmes at both graduate and undergraduate levels, increased enrollment of female students, expanded access to citizens residing outside the capital city, the establishment of supportive institutions, and enhanced employment opportunities for academic staff (Yallew, 2020; Areaya, 2010; Tessema, 2009), others highlight various interconnected challenges. These include quality issues, a shortage of qualified academic staff, sub-standard teaching and learning, poor research output, insufficient financial and material resources, a lack of autonomy, and limited academic freedom (Semela and Ayalew, 2008; Leqa, 2009; Tessema, 2009; Semela 2011; Bishaw and Melesse, 2017; Areaya, 2010; Woldegiyorgis, 2023). Furthermore, Tamrat and Teferra (2019) note that private higher institutions face financial constraints, regulatory restrictions, and related external challenges.

Few quantitative or econometric analyses have empirically examined the impact of higher education on Ethiopia's economic growth and those that exist produced mixed results. For instance, a World Bank study in 1996 showed that higher education made a significant economic contribution, with its private and social rates of return standing at approximately 25% and 14%, respectively (Saint, 2004). Mengesha and Singh (2022) argued that the secondary and higher education sub-sectors positively impacted economic growth. In contrast, Borojo and Yushi (2015) concluded that higher education enrollment has an insignificant effect on economic growth in both the long and the short run.

This brief review highlights the need for further research to inform policy decisions regarding the future of higher education in Ethiopia. Moreover, quantitative and qualitative approaches should be combined to offer a comprehensive empirical analysis of this issue.

Against this background, the study on which this article is based employed quantitative and qualitative approaches. On the quantitative front, the ARDL bounds test model was employed to examine the level of co-integration between higher education (proxied by the gross tertiary education enrollment ratio) and economic growth (proxied by Gross Domestic Product (GDP) per capita) in Ethiopia. The qualitative approach involved a systematic review and synthesis of existing literature.

This article is organised as follows: Following the introduction, it presents a review of the overall and empirical literature. This is followed by a discussion on the quantitative methodology and the findings of the econometric analysis. The final part employs a qualitative approach to investigate the factors contributing to the insignificant relationship between higher education and economic growth in Ethiopia.

Literature Review

General Literature

Higher education has a rich history in many developed economies and is widely recognised for its significant contribution to economic growth (Schultz, 1961; Barro and Lee, 1993; Hanushek and WoBmann, 2010). Numerous studies have demonstrated that it produces a highly educated workforce equipped with advanced knowledge and skills and capable of driving innovation and applying newly developed technologies. Such employees are regarded as agents of change who respond to competition and technological advancements and address growing consumer demand for new products (Sianesi and Van Reenen, 2003; Santiago, 2008; Pillay, 2011).

Since the late 1950s, economists have explored the relationship between higher education and economic development using different theoretical models. The two prominent models in this regard are the augmented neoclassical growth theory (Romer, 1990; Mankiw et al., 1992) and the endogenous growth theory (Lucas, 1988). They posit that education has a positive effect on economic growth and attest to its role in long-term growth by increasing an economy's innovative capacity and facilitating the transmission and diffusion of knowledge required to implement new technologies (Benhabib and Spiegel, 2005).

Academics, researchers, national governments, and donors in developed countries have debated the relationship between education and economic growth. Key issues include which level of education (primary, secondary, or tertiary) should be targeted for development; effective budget allocations between these levels; designing education policies; and examining the association among educational expenditure, enrollment, and GDP. The literature on higher education in developing

economies also proposes several theories that suggest a symbiotic relationship between higher education and economic growth/development in these countries. Bloom et al. (2005) and Oketch and Schendel (2014) identify the following four significant theories:

A) The human capital theory suggests that higher education generates both private and social returns through higher earnings for individuals and contributes to national economic growth due to increased productivity. This theory justified the expansion of higher education in developing economies during the early post-colonial period, particularly from the 1960s to the early 1980s.
B) The endogenous growth theory suggests that in the context of a knowledge economy, highly-skilled workers are crucial for economic growth as they play a fundamental role in adapting and transferring technology. It argues that higher education produces positive externalities such as improved health, increased longevity, enhanced cognitive development in children, and reduced family size, contributing to workforce productivity and economic growth.
C) The capability approach to development highlights the power of higher education in enhancing capabilities within a population. It posits that higher education allows students to pursue diverse objectives, including employment, strengthening citizenship, and ethical commitment to society. This approach assumes that expanding higher education leads to broader social impacts, such as strengthening democracy, promoting social cohesion, and fostering good governance, which in turn contribute to economic growth.
D) Institutional theory considers higher education's impact on a wide range of institutions or collectives, including formal organisations and the social norms governing behaviour. It suggests that higher education can play a crucial role in producing skilled individuals who are able to build improved institutions, contributing to various social, political, and economic development outcomes.

These four theories collectively justify the significance and value of higher education in developing economies. They highlight that it fosters human capacity-building, endogenous economic development, broader economic and non-economic development outcomes, and improvements in public and private institutions by producing competent graduates. However, it should be noted that the validity of these theories relies on several fundamental assumptions. As set out by Bloom et al. (2005), the World Bank (2009), and Oketch and Schendel (2014), they include:

- Quality education in higher education institutions;
- Sufficient access to primary and secondary education and quality education at both levels;
- Adequately-prepared secondary school graduates to enter higher education institutions;
- Equal access to higher education, regardless of income, gender, religion, ethnicity, place of residence (urban/rural) and other societal identities;
- Qualified faculty and staff with adequate academic resources to produce knowledgeable graduates;
- High-quality research to generate new knowledge and faculty members' ability to disseminate such knowledge to students; and
- Relatively higher budget allocations for higher education.

This article focuses on how the absence of these conditions affects the long- and short-term relationship between higher education and economic growth in Ethiopia.

Empirical Literature

Numerous empirical studies have examined the relationship between education and economic growth using different variables to measure education or human capital, including enrollment rates; average years of schooling; education quality and systems; cognitive skills such as mathematics and science; and government spending on education as a percentage of GDP.

Unlike the consensus regarding the general theoretical approaches to the association between higher education and economic growth, empirical studies in developing and developed economies have produced inconsistent and controversial results. Benosa and Zotou (2013) point to

different and sometimes conflicting empirical findings in cross-country and country-specific analyses of the education-growth nexus. Similarly, Temple (2001) asserts that despite robust theoretical predictions, the empirical evidence on the long-term relationship between education and economic growth has been inconclusive. Hanushek and Woessmann (2009) also point to debate on the most appropriate indicators to measure education or human capital and suggest the use of cognitive skills rather than years of schooling. The authors (Ibid: 17) note that "cognitive skills generated in the school system lead to higher long run growth of economies".

Studies on the relationship between higher education and economic development in sub-Saharan Africa have also produced inconsistent findings. While some establish no direct and significant relationship, others found a positive and significant association. For example, Barro's (1996) cross-country study that included some sub-Saharan African countries found that male educational attainment, particularly at secondary and tertiary levels, significantly positively affected growth. He estimated that an additional year of male upper-level schooling raises the growth rate by a substantial 1.2 percentage points per annum. Psacharopoulos (1996) concluded that the private and social rates of return on investment in primary education were higher than those for secondary and higher education, suggesting that higher education is less relevant to economic growth than primary education. The findings of this study influenced national governments and donors to invest less in higher education until they were challenged by Teal (2011) and others scholars.

Oketch and Schendel's (2014) review of 25 studies on the relationship between higher education and economic growth in sub-Saharan Africa, South Asia, and Southeast Asia also produced inconsistent findings. Some of the studies included in the review suggested that primary and secondary education yield greater economic benefits than higher education in lower-income countries and pointed to the lack of a significant relationship between the number of university graduates and economic growth. In contrast, others concluded that expanding higher education in African countries increases the growth rate of per capita income and contributes to economic growth. Yet other studies found that aid for higher education in middle-income countries stimulates

economic growth.

Similar studies on higher education in specific African countries have produced conflicting findings. For example, Omodero and Nwangwa (2020) found no causality effect between the higher education gross enrollment ratio and economic growth, and vice versa in Nigeria. Bloom et al. (2005) suggested that higher education in sub-Saharan Africa may accelerate technological diffusion, narrow knowledge gaps, ameliorate poverty, and maximise the region's potential for economic growth. Similarly, Valero and Van Reenen (2019) found that an increase in the number of universities is associated with higher GDP per capita in a region. Other studies identified reverse causality, where economic growth leads to increased enrollment in higher education (Teal, 2011). Kyaw and Macdonald (2009) highlighted the difficulty of establishing a relationship between higher education and economic growth due to low enrollment rates in tertiary education in many sub-Saharan African countries. As discussed earlier, quantitative studies on Ethiopia also produced mixed results.

This review of the empirical research highlights the need for more country-based and cross-country studies to draw conclusive results and inform higher education policies, especially in developing countries. Our study focused on Ethiopia, a developing African economy that is heavily investing in its higher education system.

Methodology

The study was guided by endogenous growth theory that focuses on the factors and mechanisms that drive long-term economic growth within a country. One of its central assumptions is that economic growth is primarily facilitated by internal processes inherent to the system itself. This theory was relevant as it emphasises education as a vehicle for human capital accumulation and treats it as a factor of production besides labour and capital (Lucas, 1988). Lucas argued that the labour force's improved educational attainments enhance productivity and in turn, national economic performance (Ibid.).

The study employed time series econometric models that combine different variables to assess the relationship between higher education and economic growth. The analysis considered the World Bank dataset

from 1991 to 2021, focusing on Ethiopia's GDP per capita, Gross Fixed Capital Formation, Labour Force Participation, and Gross Tertiary Education Enrollment. Multiple imputation techniques were employed to estimate the missing values where data was missing for specific years. The selection of 1991 as the starting point was informed by the fact that it marked the beginning of the EPRDF regime after overthrowing the Dergue regime and the launch of massification of the country higher education system. As noted earlier, human capital can be measured using enrollment rates; average years of schooling; education quality and systems; cognitive skills or international test scores such as in mathematics and science; and government spending on education as a percentage of GDP. This study used enrollment rates in higher education as this data is relatively readily available in Ethiopia.

Many studies on economic development measure capital using Gross Fixed Capital Formation that measures the net increase in physical assets over a certain period, Capital Stock (the accumulated value of physical assets used in production), and Investment Expenditure (spending on new physical capital). This study employed Gross Fixed Capital Formation that is a common measure in many studies.

The specified econometric model incorporates a dependent variable, GDP Per Capita (GDP) along with three independent variables: Gross Fixed Capital Formation (FC), Labour force Participation (LR), and Gross Tertiary Education Enrollment Ratio (TE). Based on the theoretical premise and connecting GDP, FC, LR, and TE, the formulated model is as follows:

$$GDP = \beta_0 + \beta_1 FC_t + \beta_2 LR_t + \beta_3 TE_t + \mu_t$$

Where:

GDP = Gross Domestic Product Per Capita

FC = Gross Fixed Capital Formation

LR = Labour Force Participation rate

TE = Higher Education Enrollment Ratio

μ_t = Error term

All the variables in the model have the subscript "t" representing different periods (t = 1, 2, …, t). The parameter β_0 represents the intercept term, while β_1, β_2, and β_3 denote the slope coefficients, all expected

to have positive signs. The model suggests that a country's economic growth, as measured by GDP per capita, is positively influenced by increases in capital investment, labour force participation, and tertiary education enrollment.

- Capital (Gross Fixed Capital Formation): This variable represents the total value of all new fixed investment made in a country's physical assets such as infrastructure, machinery, and buildings. A positive relationship implies that as the level of capital investment increases, the model predicts that the country's GDP will also increase. This aligns with the economic theory that suggests that adequate capital accumulation contributes to economic growth.
- Labour (Labour Force Participation): This variable represents the percentage of the working-age population that is either employed or actively seeking employment. A positive relationship suggests that an increase in labour force participation is associated with an increase in GDP. This is in line with the idea that a larger and more engaged workforce can contribute to economic output.
- Human Capital (Tertiary Education Enrollment): Tertiary education enrollment is often used as a proxy for the level of human capital in a country. Human capital refers to the workforce's skills, knowledge, and expertise. A positive relationship indicates that as more individuals enroll in tertiary education (such as universities and colleges), the model predicts a positive impact on GDP. This aligns with the notion that a well-educated and skilled population is a crucial driver of economic development.

As pointed out in the theoretical discussion, the above model reflects a holistic view of economic development that considers both physical and human capital as essential contributors to a nation's prosperity. However, it is important to note that while the model indicates associations, causation is a complex issue in economics, and other factors not included in the model may also influence variations in GDP.

Empirical Model

The study employed the Autoregressive Distributive Lag (ARDL)-Bounds Testing model for co-integration (Pesaran et al., 2001) to

empirically investigate the relationship among the variables in the model specified above. It was selected due to its applicability to small sample sizes and its ability to handle endogenous regressors that are integrated of order one [I(1)] or order zero [I(0)] (Ibid). It suited the dataset used, which comprised a relatively small number of variables, 30 years of data, and one country, with endogenous variables and integrated of order one (I(1)).

The ARDL bounds test is employed to examine the presence of a long-run equilibrium relationship among variables and estimate the associated short-run dynamics (Pesaran et al., 2001). The following standard procedures are followed: First, a unit root test is conducted to assess the stationarity of the variables and ensure that none are integrated at a level of two or more. Second, the lag-length criteria are determined. Third, the co-integration test based on the bounds test is applied to examine long- and short-run relationships between the variables. Lastly, residual and stability diagnostic tests are performed to assess the reliability of the econometric model. EViews 12 statistical software was used to analyse the data and administer the required tests.

Unit Root Test: Testing for stationarity is crucial as many time series variables exhibit unit roots or follow a random walk pattern (i.e., non-stationary) over time, primarily driven by stochastic trends. Such trended time series can potentially lead to spurious regression results and undermine the policy implications (Engle and Granger, 1987). In this study, the unit root properties of the variables were tested using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. Variables that exhibit unit roots at the level are considered integrated of order zero (I(0)), while those that become stationary after first differencing are regarded as integrated of order one (I(1))

Table 1: Result of the unit root tests

	Augmented Dickey-Fuller (ADF)	Phillips-Perron (PP)
GDP (I(0))	-0.239406(0.9227)	0.261494(0.9722)
GDP (I(1))	-3.570648(0.0498)	-3.690668 (0.0387)
FC (I(0))	-1.710656 (0.4162)	-1.695620(0.4235)
FC (I(1))	-5.985072 (0.0000)	-5.985272 (0.0000)
LB (I(0))	-1.844583 (0.6584)	-2.074532 (0.5391)
LB (I(I))	-4.810182 (0.0029)	-4.712224 (0.0037)
TE I(0)	-1.801414 (0.6797)	-0.235690 (0.962)
TE I(1)	-3.133240 (0.0347)	-3.096022(0.0376)

Table 1 displays the unit root test results, presenting the T-statistics and corresponding P-values (in parentheses) calculated using EViews 12 software. The result of the unit root tests indicates that none of the variables are stationary at their levels, but after taking the first difference, all variables become stationary. Consequently, all variables are integrated of order one (I(1)).

Lag-Length Criteria: Based on the unit root test results, which establish that all variables are integrated of order one, it is possible to apply the ARDL model. However, prior to this, it is essential to determine the optimal lag length. Five selection criteria are commonly employed to identify the suitable lag order for the model. In this study, EViews 12 automatically selected the appropriate lag length for the model.

Table 2: Lag-length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	5.762024	NA	1.05e-05	-0.117468	0.069358	-0.057701
1	218.9401	355.2967	2.07e-11	-13.26267	-12.32854*	-12.96383
2	243.3695	34.20126*	1.26e-11*	-13.82464*	-12.14320	-13.28673*

Table 2 indicates the lag order selected by the five criteria (LR: sequential modified LR test statistic; FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion). Accordingly, the four criteria selected a

lag length of two years. This lag length was used to run all the required ARDL measures and diagnostic tests.

Co-integration Test: The assessment of co-integration is a crucial step to determine if a meaningful long-run relationship exists among the variables (Pesaran et al., 2001). This study applied the selected lag length and conducted the co-integration test within the framework of the ARDL bounds test. Three analytical tests were considered: The F-Bounds, long-run co-integration, and short-run dynamics tests.

The F-Bounds Test: The Bounds test provides F-statistics and upper and lower bounds based on critical values of 1%, 2.5%, 5%, and 10%. Under this test, the null hypothesis is that "no long-run relationship exists" between the variables. The criteria for accepting or rejecting this null hypothesis are as follows: a) if the F-value exceeds the upper bound, it indicates the presence of a long-run relationship; b) if the F-value falls below the lower bound, it suggests the absence of a long-run relationship; c) if the F-value falls within the range of the upper and lower bounds, the results are inconclusive (Pesaran et al., 2001).

Table 3: Result of ARDL Long Run Form and Bounds Test (F- Bounds Test)
Dependent Variable D(GDP)
Null Hypothesis: No Levels relationship

Test statistic	Value	Signif.	I(0) (lower bound critical value)	I(1) (upper bound critical value)
F-Statistics	8.642337	10%	2.72	3.77
K	3	5%	3.23	4.38
		2.5%	3.69	4.89
		1%	4.29	5.61

Table 3 presents the results of the F-Bound test, indicating that the F-statistics exceeded the upper bounds at the four significant levels. This means that long-run co-integration exists between the dependent and independent variables, providing evidence of a stable relationship.

Long-run Co-integration: The ARDL model was employed to assess the presence of a long-run relationship or co-integration between the dependent variable and each independent variable. Table 4 presents the results.

Table 4: Result of ARDL Long Run Form and Bounds Test (Long Run Model)

Dependent variable = GDP				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FC	0.557186	0.261279	2.132535	0.0478
LB	0.690240	1.109802	0.621948	0.5422
TE	-0.119485	0.428597	-0.278781	0.7838

Table 4 displays the results of the long-run regression analysis. The coefficients of the two variables are consistent with the predictions, except for Tertiary Education Enrollment (TE). Gross Fixed Capital Formation (FC) positively and statistically significantly affects economic growth. The findings suggest that a 10% increase in Gross Fixed Capital Formation leads to a GDP increase of approximately 5.57% in the long run. Labour Force Participation positively impacts economic growth, although it is statistically insignificant. However, higher education proxied by Tertiary Education enrollment shows a negative and statistically insignificant association with economic growth. This finding aligns with a previous study that highlighted the insignificant relationship between higher education and economic growth in Ethiopia (Borojo and Yushi, 2015).

Short-run Co-integration Model: The ARDL model's short-run dynamics enable an examination of how the variables adjust in response to changes in the short run. The coefficient of the one-period lagged error-correction term (CointEQ(-1)) measures the speed of adjustment to the co-integration relationship. The expected value for this coefficient is negative and statistically significant, and its absolute value should be smaller than one. These characteristics indicate a gradual convergence of the system towards long-run equilibrium values (Engle and Granger, 1987).

Table 5: Result of ARDL Error Correction Regression (Short-Run Model)
Dependent Variable: D(GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.223252	0.362955	-3.370256	0.0036
D(GDP(-1)	0.443903	0.105284	4.216254	0.0006
D(FC)	0.579469	0.190654	3.039370	0.0384
D(LB)	-1.879373	4.80880	-0.390820	0.7008
D(LB (-1)	6.6848802	5.530222	1.208777	0.2433
D(TE)	-0.167856	0.129174	-1.299464	0.2111
D(TE(-1))	-0.041820	0.150019	-0.278762	0.7838
CointEQ (-1)*	-0.349999	0.054882	-6.377289	0.0000
R-Squared	0.83			
Adjusted R- Squared	0.76			
F-Statistics	12.28578			
Prob (F-Statistics)	0.000003			
Durbin-Watson Stat	2.084856			

Table 5 demonstrates that the short-run model is valid, as indicated by the negative and significant coefficient value. The Error Correction Coefficient of -0.34 suggests that the model adjusts approximately 35% of the disequilibria within one year. However, the rate of adjustment is relatively slow.

Furthermore, Table 5 reveals that in the short run, GDP per capita for the previous period (GDP - 1) is a significant determinant of the current period's GDP per capita (GDP). A 10% increase in GDP from the previous period corresponds to an average improvement of 4.43% in GDP per capita. This finding aligns with the endogenous growth approach.

The coefficients for fixed capital formation show signs consistent with predictions. The results indicate that a 10% increase in gross capital formation in the short run leads to a GDP increase of approximately 5.79%. However, this is not the case for labour and higher education. Similar to the long-run co-integration results, only capital proxied by fixed capital formation exhibits a positive and significant impact on

economic growth in the short run. The finding also suggests that in the short-run, higher education expansion is not significantly related to economic growth.

Residual and stability Diagnostic tests: Diagnostic tests are commonly performed in econometric modeling and analysis to ensure the reliability and validity of the model. Residual diagnostic tests assist in evaluating whether the model assumptions are met and if the model accurately captures the underlying relationships within the data. Three diagnostic tests were conducted: normality of residuals, autocorrelation, and heteroscedasticity. A stability test was also performed. The results of these tests, presented in Table 6 and Figure 1, confirm the soundness and dependability of the model.

Table 6: Results of the Residual and stability diagnostic tests

Measure	Null hypothesis	Value (p-values)
Jarque-Bera Normality test	Ho: Disturbances are normally distributed	2.481858 (0.289116)
Breusch-Godfrey Serial Correlation LM te.st	Ho: No serial correlation up to 2 lags	F-statistic: 0.975996 (0.3995) Chi-square: 3.339296 (0.1883)
Heteroskedasticity Test Breusch-Pagan-Godfrey	Ho: Homoskedasticity	F-statistics: 0.439151(0.9160) Chi-square: 6.417082 (0.8441)

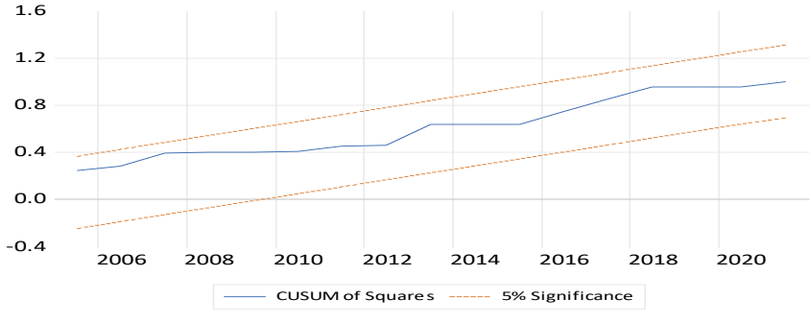

Figure 1: Stability test

The above four tests confirm the suitability of our model to analyse the relationship between economic growth and three independent variables: Gross Fixed Capital Formation, Labour, and Higher Education Enrollment. The results obtained from these tests support the validity of the model as follows:

- The Jarque-Bera normality of residuals test validates the assumption of normality by demonstrating that the residuals follow a normal distribution.
- The Breusch-Godfrey Serial Correlation LM test indicates the absence of significant autocorrelation in the residuals, suggesting independence.
- The Breusch-Pagan-Godfrey heteroscedasticity test reveals no evidence of heteroscedasticity, indicating that the assumption of constant variance is satisfied.
- The CUSUM stability test shows that the coefficients of the model remain relatively constant over time, indicating stability.

The results from these residual and stability diagnostic tests collectively confirm the reliability and validity of the model, instilling confidence in the conclusions drawn from the analysis.

Based on the empirical analysis, it is evident that the econometric model employed in this study is reliable for drawing statistical inferences regarding the relationship between higher education and economic growth in Ethiopia. The findings suggest no significant long- or short-term effect or relationship between Ethiopian higher education and economic growth. The following section discusses the factors that could contribute to the lack of a significant and robust relationship between higher education and economic growth in Ethiopia.

Possible Factors Contributing to the Weak Association Between Higher Education Expansion and Economic Growth

The literature review noted widespread recognition of higher education's pivotal role in fostering social and economic progress. The expansion of higher education in Ethiopia aims to produce highly-qualified graduates to drive social and economic development in the country. However, the econometric analysis conducted in this study revealed no significant

long- or short-term relationship between higher education and economic growth in Ethiopia. This finding contradicts theoretical and empirical findings in many developed and developing economies. This section examines this enigma and identifies factors that could account for the insignificant and negative relationship between Ethiopia's higher education system and economic growth. Following the assumptions expounded in the theoretical discussion, two key challenges, namely, quality education, and academic freedom and autonomy are discussed. Given the influence of path dependency, it is important to briefly address the challenges confronted in earlier periods before exploring the difficulties encountered in the past three decades.

Challenges Confronting Higher Education Before the EPRDF (1950-1991)

As noted previously, modern higher education in Ethiopia spans only seven decades and has faced different challenges. Although the degree of these challenges may have differed, many persisted throughout the three regimes that governed the country. Studies reveal that during the imperial regime (1930-1974), they included: a) lack of coordination among higher education institutions, resulting in programme duplication and inefficient utilisation of human and financial resources; b) disparities between the country's human resources needs and the educational programmes offered by higher education institutions; c) the imbalanced composition of the student population in terms of regional, gender, and ethnic representation; and d) the absence of a well-defined national ideology to guide the connection between higher education and government development plans (Amare, 1988). The last challenge has been an issue throughout the history of Ethiopian higher education.

During the Dergue regime (1974-1991), critical challenges included: a) heavy government involvement in administrative and academic matters; b) revocation of universities' Charters, which guaranteed a degree of freedom and autonomy; c) mandatory indoctrination of Marxism-Leninism in all educational institutions alongside the use of dialectical materialism for analysis and interpretation of subjects; d) limited research engagement by scholars due to resource constraints and fears of reprisal for producing research critical of government policies; and e) inadequately qualified teaching staff (Amare, 1988). Bishaw and

Melesse (2017) also note that the Dergue regime exerted control over higher education institutions through increased security surveillance, repression of dissent, mandated courses on Marxism-Leninism, prohibition of student organisations, the appointment of senior university officers, and control of academic promotions.

Challenges Confronting Higher Education Since the EPDRF (1991 to Present)

Significant changes were made to Ethiopia's higher education system during the EPRDF regime. The transformation became evident in the remarkable surge in the number of universities and student enrollment, leading to the massification of higher education. The system expanded across all regions, and the student body became more diverse. The establishment of a new legal framework governing the functioning of universities was another milestone.

However, despite these advancements, the higher education system has encountered challenges that have impeded its potential to make a substantial contribution to economic growth. Drawing on the literature, these challenges fall under two major themes: a) quality and b) academic freedom and autonomy.

A) The Quality of Education in Ethiopian Higher Education Institutions

During the EPRDF regime, the primary focus was on improving access to education across all regional states and increasing enrollment. Quality education was not a priority. Numerous studies conducted during this period have highlighted that the expansion of universities and the surge in student numbers harmed the quality of education. They revealed that universities were established and their academic programmes were launched without ensuring that teaching staff were appropriately qualified and that essential resources such as textbooks, reference material, libraries, computers, laboratories, lecture rooms, power generators, and accommodation were available (Saint, 2004; Semela, 2011; Akalu, 2014). Tamrat (2023) is also of the view that the quality of the higher education system during the EPRDF regime was undermined by excessive politicisation, corruption, ethnic strife, poor infrastructure and ill-prepared students, as well as ill-qualified, poorly paid, discontented faculty. While there are several determinants of

quality education in higher institutions, this article focus on three key aspects: the quality of faculty, the academic preparedness of secondary school graduates entering universities, and the teaching and learning process.

As briefly indicated in the literature review, in a higher education system, the adequacy and quality of faculty are critical factors in producing qualified graduates and research output. Unfortunately, the quality and composition of faculty in almost all universities were inadequate in terms of numbers and specialisations. Areaya (2010) noted that the standard set by the Ethiopian Higher Education Relevance and Quality Agency (HERQA) on the qualification composition of teaching staff in 2008 was 20:50:30 (Bachelor's, Master's, Doctorate). However, in 2009/10, the academic staff composition across all higher education institutions was 42.8% Bachelor's, 41.12% Master's, and 8.53% Doctorate holders. He added that 41.9% of academic staff did not qualify to teach at university level.

A decade later, Tadesse et al. (2020) indicated that while the Ministry anticipated a ratio of 0:70:30 (Bachelor's, Master's, Doctorate), the qualification composition in 2017/2018 was 27% Bachelor's, 58% Master's, and 15% Doctorate holder. This was a slight improvement, but still below the standard set by the Ministry. The challenge is, however, critical in newly-opened universities where there is hasty employment of poorly-qualified faculty with no training in teaching methodologies and inadequate disciplinary education (Areaya, 2010). Moreover, teachers generally have little voice in the policy/decision-making process in the higher education system (Leqa, 2009).

The academic preparedness of incoming secondary school completers significantly impacts the quality of higher education. A mark of 50% in the National School Leaving Certificate Examination is required for acceptance to higher-level institutions. Nonetheless, a noticeable number of ill-prepared students are entering the higher education system. Cases in point are presented in Table 7.

Table 7: Secondary school completers admitted without scoring the required marks

	2008/9	2009/10
Number of students who sat for National School Leaving Certificate Examination	86 238	85 610
Total number of students who scored above 50%	31 934 (37.03%)	38 901 (45.4%)
Number of students assigned to public universities	73 111 (84.8%)	78 822 (92.0%)
Number of students admitted to public universities without scoring minimum pass mark (50%)	41 117 (56.3%)	39 921 (50.6%)

Source: Ministry of Education (2010)

Table 7 shows that more than half the students admitted to universities during this period did not qualify for enrollment in higher institutions. Similarly, Teferra (2023) notes that during the 2013/14 academic year, the average score for all subjects in the national examination in Grade 12 was only 45.52%, signifying that more than half the students did not meet the requirements for university admission. The situation becomes even more alarming when considering subject-specific scores, with only 13.9% of students achieving 50% and above in physics, 37.6% in mathematics, and 36.3% in English (Ibid). The data highlights a significant gap in the academic preparedness of secondary school completers, contributing to the influx of ill-prepared students into higher education.

A concerning issue is the prevalence of students allegedly passing the National School Leaving Certificate examinations through corrupt and unethical practices. These include allowing students to cheat during exams and teachers providing answers to students during the examination. Tamrat (2023) highlights that this has become widespread, with schools, teachers, principals, regional authorities, and politicians implicated in encouraging such behaviour. Consequently, passing national examinations has become more of a political contestation among regional states' political leaders than a genuine manifestation of students' competence (Ibid.).

The results of the 2021/22 national secondary school-leaving examinations, conducted under the strict supervision of the Ethiopian

Ministry of Education, revealed the corrupt practices and the extent of deterioration in the Ethiopian education system over the past three decades. Only 29 909 (3.3%) of the nearly one million secondary school completers who sat the examination scored 50% or more to qualify for university admission. The Education Minister noted that the 2022/23 results point to the multiple challenges the education sector has been grappling with for an extended period. In a presentation to Parliament on 17 May 2023, the Minister revealed that, following an extensive evaluation of 47 000 schools throughout the country, a staggering 85.9% of elementary and middle schools, and 70.9% of high schools, were found to be sub-standard (*Addis Standard*, News, 24 May 2023).

A similar indicator of the declining quality of higher education in Ethiopia is the outcome of the recently introduced Nationwide Graduate Exit Exams – a national exam that every potential graduate must take after completing their university education but before being awarded their BA/BSc degree. According to a tweet by the Deputy Minister of Education on 15 July 2023, 150 184 prospective graduates sat for the examination in July 2023, with only 60 054 (40.65%) scoring above 50% (https://twitter.com/fdremoe). These results demonstrate the magnitude of the challenge confronting the Ethiopian higher education system in ensuring that graduates are adequately equipped with the necessary knowledge and skills.

The quality of teaching and learning plays a crucial role in producing graduates capable of contributing to economic growth. However, many Ethiopian universities continue to employ traditional teaching and assessment methods and are characterised by inflexible timetables, rote learning, a rigid lesson structure and a lack of instructional material and administrative support (Alemu and Schulze, 2012). While efforts have been made to improve the quality of teaching and learning, they have not always yielded the desired results (Tadesse et al., 2020). The adoption of student-centred teaching and continuous assessment faced challenges, as students and teachers raised issues (Alemu and Schulze, 2012) such as the fact that increased enrollment was not accompanied by increased capacity and resources, misalignment between different components of the curriculum, assessments that are unrelated to the learning objectives of the course, and quality-assessment efforts that focused on assurance rather than improvement (Semela 2011; Tadesse, 2014).

The above challenges apply to both graduate and undergraduate programmes. Typical issues in graduate programmes include the lack of adequate guidance and support for graduate students when working on their research papers, which results in plagiarism and poor-quality essays and theses.

B) Academic freedom and Autonomy in Ethiopian Higher Education Institutions

The 2003 Education Proclamation grants Ethiopian higher education institutions autonomy to manage their administrative and academic affairs and also contains provisions on academic freedom. However, various studies note that interventions by the ruling party undermine the autonomy and academic freedom of faculty, staff, and students. This section discusses two interrelated issues: the erosion of faculty, staff, and students' academic freedom and the denial of universities' autonomy. As asserted by Saint (2004), minimal interference from the state is necessary for universities to fulfill their mandate of contributing to national development.

Erosion of faculty, staff, and students' academic freedom: The academic freedom of faculty, staff, and students has been restricted in Ethiopian universities for the past 30 years. Assefa (2007) highlights disturbing incidents since January 1993, including campus raids by the police, beatings, extrajudicial killings, mass arrests of students, dismissal of staff and students without due process or valid reasons, prolonged campus occupation by the security forces, and disruption of classes. He adds that the three major universities – Addis Ababa, Haramaya, and Jimma – are marked by a pervasive sense of insecurity among students, faculty, and staff. Zeleza (2013) documented arbitrary dismissal of faculty, including 40 professors in 1993 and the lack of tenure. Faculty involved in human rights activism faced arrest, and government cadres assumed control of all leadership positions within Ethiopian higher education institutions, raising serious questions about institutional independence and academic freedom (Ibid). The lack of academic freedom and autonomy negatively impact research output, lead to brain drain, and hamper academic and administrative leadership's day-to-day operations.

Asgedom and Hagos (2016) highlight that the lack of academic freedom has excluded faculty from decision-making, resulting in a lack of commitment to university objectives and research collaboration. Various factors contribute to this situation, including the fear of harsh retribution for criticising government policies, inadequate research facilities, heavy teaching workloads, limited access to research funds, and bureaucratic financial management systems (Assefa, 2007). This has resulted in low levels of research within universities, limiting the production of local knowledge, hindering critical thinking among faculty and students, and undermining the symbiotic relationship between research and teaching, research and policy, and research and development.

Another alarming manifestation of the lack of academic freedom is the prohibition on faculty and staff forming associations and negotiating their conditions of service, including salaries, benefits, privileges, and workloads. This has exacerbated the shortage of qualified teachers and researchers as it has contributed to significant brain drain. It also impacts job satisfaction and overall commitment to their roles within the university and discourages talented educators and researchers from remaining in the academic sector, losing valuable expertise and skills (Assefa, 2007; Akalu, 2014; Asgedom and Hagos, 2016). While precise data on this phenomenon is not available, it is evident that a considerable number of faculty members that travelled abroad for seminars and advanced education decided not to return, primarily because of the lack of academic freedom.

The Loss of Higher Education Institutional Autonomy: Ethiopian higher education institutions' lack of autonomy in managing their academic and administrative affairs has limited their ability to make independent decisions based on their unique needs and capacity. Assefa (2007) notes that, while the Higher Education Proclamation (351/2003) makes provision for charters, universities do not have such. He adds that the government's heavy involvement is evident in its interference in admission to graduate and undergraduate programmes, curriculum development, the establishment of new academic programmes, human resources management, financial management, and university leadership appointments. Public universities have limited power in decisions regarding student admission and placement. The governing

party recruits incoming students and determines the number of admissions to specific colleges or fields of study (Kahsay, 2012). For instance, prior to the 2019/20 academic year, universities were required to place 70% of their students in engineering and natural sciences and 30% in humanities and social sciences. This recently changed to 60% and 40%, respectively. Moreover, decisions regarding curriculum revision, establishing and closing academic programmes, and the launch of new graduate programmes are made by political leaders without due consideration of the resources and capacity available at individual universities (Saint, 2004; Melu, 2016).

The lack of autonomy is also reflected in the appointment of university leadership. Studies (Melu, 2016; Akalu, 2014) point to the lack of clear guidelines or procedures for such appointments. It would seem that, in many cases, political affiliations and connections to local and regional state political leaders play a significant role in university leadership appointments rather than merit. Party control has also been a feature of university governance, with the ruling party infiltrating universities by recruiting faculty as members and deploying its top officials to universities' governance structures. This has resulted in a lack of visionary leadership within higher education institutions, hindering their ability to promote quality enhancement (Saint, 2004). Centralised control and political influence have led to challenges in pursuing academic excellence and producing graduates that can contribute to national development.

Ethiopia's universities depend entirely on state funding for their recurrent and capital investment. No charter or other government policies empower them to implement programmes to self-finance their operations. Studies also indicate that universities do not have the autonomy to set salaries or link remuneration to performance (Saint, 2004). This has limited their ability to attract and retain top talent, as they cannot offer competitive salaries based on individual merit and performance. It has also undermined their capacity to implement incentive programmes that would motivate faculty and staff to excel and contribute to the institution's advancement (Kahsay, 2012, Akalu, 2014, Melu, 2016). Moreover, it has prevented institutions from acquiring necessary teaching and learning infrastructure.

Ethiopia's private higher education institutions are not immune to government regulations. As highlighted by Tamrat and Teferra (2019), they face numerous challenges, including a number of regulatory restrictions that limit the courses and programmes they offer. They also encounter financial and operational hurdles due to frequent and unstable regulations imposed by the ruling party. The shortage of qualified faculty and an increasing focus on the profit motive hinder the production of graduates capable of supporting the country's economic development (Ibid). These and related challenges have impeded the growth and development of private higher education institutions in Ethiopia, hindering their ability to offer diverse and high-quality programmes and produce skilled graduates.

The study's quantitative analysis and the above discussion reveal two interrelated factors that contribute to the lack of a significant long- and short-range relationship between higher education and economic growth in Ethiopia. The first is that the quality of education is undermined by various factors, including staff shortages and faculty's lack of appropriate qualifications, the ill-preparedness of secondary school graduates entering universities, and the failure to embrace modern teaching and learning approaches. The second is the restrictions imposed on students and staff's academic freedom and universities' autonomy.

Conclusion

Based on an empirical investigation, the study points to the lack of a long- and short-term significant relationship between Ethiopia's higher education expansion and economic growth. This is due to two main factors, namely, the declining quality of higher education in the country, and the denial of university autonomy and academic freedom.

The study's results are preliminary and they could be complemented and triangulated by conducting similar studies using indicators like international test scores and government expenditure on tertiary education, and surveys that measure the challenges identified. Based on the findings, the following implications can be identified:

This study reinforces the existing literature that highlights the essential factors required to establish a robust relationship between higher education and economic growth. It confirms that merely

expanding higher education is insufficient to make a meaningful contribution to economic growth. Instead, equal attention should be devoted to enhancing the quality of faculty, incoming students, and the teaching and learning process. Autonomy and academic freedom are also essential.

These findings have significant implications, particularly for economically disadvantaged countries in Africa. They offer valuable lessons to those that focus solely on increasing enrollment without adequately considering the factors discussed in this article. The results underline the importance of a comprehensive approach to higher education, which involves not only increasing the number of universities and enrollment, but also enhancing educational quality, institutional autonomy and academic freedom.

Lastly, the study suggests that Ethiopian policymakers should address the identified challenges to revitalise the higher education sector and unlock its potential to make a significant contribution to the nation's economic growth.

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A Solution or a Problem? The Bologna Process in West Africa: Views from Local Scholars

Solomon Gebreyohans Gebru, Jef C. Verhoeven and Kurt De Wit

Abstract

In the wake of the Bologna Process, West Africa implemented the 'Licence, Maîtrise, Doctorat' (LMD) system. What views of LMD are held by West African scholars who studied the stakeholders of this process? This article analyses the relevant literature available on Google Scholar and Web of Science from a perspective of policy borrowing or appropriation. The analysis shows that all the authors report the transition to the formal LMD structure, but that not all expectations of this process (e.g., improvements in teaching or management) have been realised. Further research is suggested, including a longitudinal study involving different countries and universities to obtain a clearer picture of the level of adaptation/adoption and outcomes of LMD in West Africa.

Key words: Bologna process, LMD, West Africa, policy borrowing, higher education policy, education innovation

Résumé:

Dans le sillage du processus de Bologne, l'Afrique de l'Ouest a mis en place le système " Licence, Maîtrise, Doctorat " (LMD). Quels sont les points de vue sur le LMD des chercheurs ouest-africains qui ont étudié les acteurs de ce processus ? Cet article analyse la littérature pertinente disponible sur Google Scholar et Web of Science dans une perspective d'emprunt ou d'appropriation de politiques. L'analyse montre que tous les auteurs font état de la transition vers la structure LMD formelle, mais que toutes les attentes de ce processus (par exemple, les améliorations de l'enseignement ou de la gestion) n'ont pas été réalisées. Des recherches supplémentaires sont suggérées, notamment une étude longitudinale impliquant différents pays et universités afin d'obtenir une image plus

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claire du niveau d'adaptation/adoption et des résultats du LMD en Afrique de l'Ouest.

Mots clés: Processus de Bologne, LMD, Afrique de l'Ouest, emprunt de politique, politique de l'enseignement supérieur, innovation en matière d'éducation.

Introduction

Long before the Bologna Process (BP)[1] was launched in Europe, African universities embarked on a process to harmonise higher education (HE) and recognise qualifications obtained in different countries. The Arusha Convention on the Recognition of Qualifications in Africa of 5 December 1981 engaged 19 of the 53 African countries and was accepted by 20 countries in 2007 (Obasi and Olutayo, 2009). However, this policy was not successful and student and staff exchange among African universities remained weak. The launch of the BP in Europe in 1999 inspired many African countries to renew their efforts to establish a more harmonised HE structure based on bachelor's, master's, and PhD degrees as proposed by the BP, with a view to becoming part of the worldwide system of learning.

This article focuses on the countries of West Africa[2]. However, the challenge of implementing an adapted structure inspired by the BP was not the same in all these countries. On the one hand, the HE structure of those that had been part of the British colonial system (the Gambia, Ghana, Nigeria, Sierra Leone) was similar to the British one which, in turn, resembled that of the BP. On the other hand, the majority of West African countries were part of the French colonial system and consequently developed a HE system similar to that of the French (Ndoye, 2009). While the colonial system no longer exists, these

1 The Bologna Process is a series of intergovernmental agreements aimed at creating a harmonised European Higher Education Area (EHEA). It was initiated in 1999 in Bologna, Italy, and has since involved 49 European countries. The main goals of the process include promoting mobility among higher education institutions, increasing transparency and the comparability of qualifications (among other things, by adopting the three-tier structure of bachelor, master, and PhD), and enhancing the quality and competitiveness of European higher education institutions (Bologna Follow-Up Group, 2020).

2 West Africa is understood here to include Benin, Burkina Faso, Cabo Verde, the Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo (ECOWAS (n.d.): https://www. ecowas.int/member-states/).

countries are still influenced by developments in France (Chouli, 2009). Accordingly, France's choice to adopt the BP raised the question of whether Francophone African universities should follow suit (Quashie, 2009). Like France, they adopted the Licence, Maîtrise, Doctorat (LMD) system as opposed to the English Bachelor, Master, PhD system.

Policymakers expected that the LMD system would address the challenges encountered by West African universities (see, for instance, Sécrétariat ROCARE, 2014). These include governance-related issues (low levels of autonomy, accountability, and transparency) (Edu-Buandoh, 2014), funding constraints (African Capacity Building Foundation, 2006), a lack of effective quality assurance mechanisms (Olaniyan and Okemakinde, 2008), curriculum rigidity (Teferra and Altbach, 2004), teacher-centred and didactic pedagogical approaches (Edu-Buandoh, 2014), and "diminishing productivity" (Sécrétariat ROCARE, 2014). Further issues include rapid growth in student enrollment, inadequate capacity to teach and house students, staff shortages, and a high student failure rate.

Many universities established a *comité de passage au LMD* (LMD implementation committee) (Quashie, 2009) to implement the new system, In the Francophone countries, the LMD was promoted by the Agence Universitaire de la Francophonie (AUF), regional or Pan-African educational organisations such as the Conseil Africain et Malgache pour l'Enseignement Supérieur (CAMES) and Réseau pour l'Excellence de l'Enseignement Supérieur en Afrique de l'Ouest (REESAO), and international economic organisations such as l'Union Economique et Monétaire de l'Afrique de l'Ouest (UEMOA[3]) and Communauté Monétaire de l'Afrique Centrale (CMAC) (GTES, 2008; Ndoye, 2009).

Many scholars assert that LMD was initially externally imposed (see André, 2009; Mignanwande and Hounmenou, 2016; Chitou, 2011; Diallo, 2016; Diop, 2016; N'Doly, 2018; Goudiaby, 2009; Diarra, 2009; Ramdé et al., 2018) by foreign international organisations. These organisations argued that an international process like the BP or LMD would enable African states to align their HE systems with international standards and the continent's universities to foster integration with the

3 In 2007, UEMOA proposed the establishment of an African Area of Higher Education, while in 2011, CAMES endorsed the implementation of LMD in all West African universities (Eyébiyi, 2011).

global academic community. For their part, many West African scholars regarded LMD as an instrument to address poverty and unemployment (Nyamusenge, 2009; N'Doly, 2018; Kouadio, 2010; Goin Bi et al., 2018; Chouli, 2009; Chitou, 2011; Yacouba et al., 2007; Shabani, 2012; Pongo et al., 2015; Mereku et al., 2016).

The literature notes that, in general, African HE systems adopted the BP/LMD in order to modernise institutions, enhance international recognition, improve quality assurance, facilitate student mobility, address employability challenges, and enhance regional integration (African Capacity Building Foundation, 2006; Sall and Diouf, 2014; Söderqvist, 2014; Teferra and Altbach, 2004. Mvé-Ondo (2009) observes that it was regarded as strategy to mitigate the crises (in relation to their mission, thrust, funding, level of excellence, etc.) confronting these institutions. Thus, LMD was promoted as a framework to secure a place for African HE in a globalised system and as an instrument to address educational and social problems on the continent. It is against this background that the Association of African Universities (AAU) developed guidelines for its implementation (GTES, 2008).

However, implementing LMD was not without its challenges. Indeed, even in Europe, where the BP took place in a more stable political and economic milieu, it met with resistance (Ramdé et al., 2018; Broucker et al., 2019). The implementation of LMD in Francophone Africa was hindered by political problems (Makosso, 2006; Nyamba, 2007; Nyamusenge, 2009; N'Doly, 2018; Ramdé et al., 2018), protests by students and faculty (N'Doly, 2018; Diop, 2016; Dekor et al., 2011; Batchana et al., 2012; Chouli, 2009; Yacouba et al., 2007), and by the economic situation as many students struggle to pay tuition fees (Kakai et al., 2008).

In other words, LMD's implementation was counteracted by the very context which it hoped to address. Many researchers pointed to poor libraries facilities, poor and slow Information and Communication Technologies (ICT) networks, and a shortage of equipment in African higher education institutions (HEIs) (Kakai et al., 2008; Batchana et al., 2012; Modou Aïssami et al., 2014; Khan, 2015; Goin Bi et al., 2018; Diarra et al., 2011; Chitou, 2011; Diaouné et al., 2008; Dekor et al., 2011; Camara and Barry, 2008; Shabani, 2012; Mingawande and Hounmenou, 2016; Ettien, 2018). Universities also suffer from staff shortages, and low salaries compel many lecturers to secure a second job in another (private) university (Mingawande and Hounmenou, 2016; Assogbadjo et al., 2016; Nyamusenge, 2009; Nyamba, 2007; Diarra et al., 2011; Chitou, 2011; Yacoba et al., 2007; Modou Aisami et al., 2014; Goudiaby, 2009; Goin Bi et al., 2018; Éyébiyi, 2011; Chouli, 2009; Chitou, 2011, Awokou, 2012; Atitsogbe et al., 2019). Scholars (e.g., Shawa, 2008; Efionayi and Piguet, 2014; Bolu-Steve et al., 2014; Khelfaoui, 2009; Kouadio, 2010; Diop, 2016; Materu, 2007) also feared that the LMD system would stimulate brain drain from Africa to other continents, while at the same time hoping that it might stop or diminish it.

In short, implementing LMD in West Africa was a sensitive issue in a context very different from the European one in which the BP originated. While numerous studies have been conducted on the BP in Europe, there is limited research on LMD in West Africa. We aimed to contribute to filling this gap by conducting a literature review to paint a picture of its implementation process in this region. We do so from the West African perspective, that is, local scholars' views on the implementation of LMD.

This article addresses the following questions:

1. What is the focus of West African scholars' research on LMD (the whole process or a facet of it)?
2. How do they study it (theoretical background and methods)?
3. How do they assess the implementation of LMD in West Africa?
4. What steps do these scholars propose going forward?

Before addressing these questions, it should be noted that the BP/LMD framework encompasses various facets aimed at harmonising and enhancing HE across participating countries. Table 1 below lists these facets.

Table 1: Major facets of the BP/LMD framework

Facets	Description
Degree Structure	Adopts a three-tier degree structure, comprising bachelor's, master's, and doctoral degrees.
Credit System	Allows for the accumulation and transfer of credits between institutions.
Quality Assurance	Introduces quality assurance mechanisms to ensure the quality and standards of HE programmes. These include accreditation processes, external evaluations, and the establishment of quality assurance agencies.
Mobility Programmes	Promote student and staff mobility.
Curriculum Development	Places emphasis on competency-based education and the development of learner-centred curricula.
Recognition of Qualifications	Establishes standardised frameworks for the recognition of qualifications.
Social Dimension	Emphasises the social dimension of HE to promote equity, diversity, and inclusion.
Internationalisation	Promotes the integration of global perspectives into curricula, the establishment of international partnerships, and participation in collaborative research projects.
Research and Innovation	Encourage research and innovation through funding schemes, doctoral training, and support for research collaboration.

Sources: Scott, 2010; Kehm and Teichler, 2007

Theoretical Background

As noted in the introduction, HE policymakers and university managers in West Africa were aware of changes in global HE policy, and growing internationalisation and globalisation of HE and research. They realised that, if they wanted to create more opportunities for students, professors, and researchers, they had to offer a university structure comparable to that on other continents. The decision to adopt this HE innovation can thus be seen as a form of policy transfer or policy borrowing.

Dolowitz and Marsh (1996, p. 344) define policy transfer as: "... a process in which knowledge about policies, administrative arrangements, institutions, etc., in one time and/or place is used in the development of policies, administrative arrangements, and institutions in another time and/or place". It is also known as 'policy borrowing' (see e.g., Phillips and Ochs, 2003; Steiner-Khamsi, 2002).

Dolowitz and Marsh (1996) map five factors that should be included in an analysis of policy transfer. The first are the important actors who transfer the policy, for instance, elected officials, political parties, bureaucrats/civil servants, pressure groups, policy entrepreneurs/experts, and supra-national institutions. Second, the questions of why (voluntary or coercive) and what aspects of the policy (policy instruments, institutions, ideology, administrative techniques, etc.) are transferred should be addressed. The third issue is the degree to which the policy is transferred; do policymakers copy the policy, emulate it, synthesise it with their policy, etc.? Fourth, who is delivering the lessons to be learned? This can come from the history of the organisation, but also from the history and current experience of other actors. Fifth, what constraints impact the transfer? This considers the complexity of the policy, and institutional and/or structural constraints experienced by the actors who transfer or accept the new policy. It should be stressed that this model is not explicitly mentioned in the papers discussed below, although all the observations made by the authors of these papers can be placed somewhere in its five factors.

The reviewed papers also make mention of the concept of 'appropriation'. It is used more in Francophone than in Anglophone papers, and as Baillete and Kimble (2008) conclude, it has a slightly different meaning in these languages. In the Francophone literature appropriation means to take "something into oneself, without the overtones of depriving others by the act of doing so" (Baillete and Kimble, 2008, p. 14), whereas in the Anglophone literature it means "something being taken from another" (Baillete and Kimble, 2008, p. 14) so that one person becomes more powerful.

This concept has been used in theories relevant to how changes in HE can be appropriated by the actors involved. To explain this educational change, Deniger (2012) highlights three key concepts: understanding, adherence, and commitment. Ramdé et al. (2018) use these concepts to construct a theory of the process of appropriation of an educational (or other social) change in which three variables play an important role, namely the interpretations, attitudes, and behaviour of the actors involved. First, social changes go hand in hand with an interpretation of a phenomenon by the actors. This means that actors receive meaning from and/or give meaning to objects or actions. To

understand an appropriation, researchers should examine the involved actors' interpretations of a change. Second, the actors' attitudes towards the change should be studied. Attitudes can be defined as "evaluative stances held toward social objects" (Buhagiar and Sammut, 2020). Faced with change, actors interpret its meaning and develop a certain attitude towards it. Third, for an actor to appropriate a change, his/her behaviour must adapt in accordance with the change. This will not always be the case: the actor could develop resistance towards the change, meaning that perfect appropriation will not be attained.

Methods

For our analysis, we searched for publicly available research sources using Google Scholar, Web of Science (WoS), and the DOAJ (Directory of Open Access Journals). Since West African scholars publish in French as well as in English, we conducted two searches: one used 'LMD' or 'Processus de Bologne' in combination with 'Afrique', 'Afrique occidentale' or 'ouest', and the names of all the West African countries, while the second used 'LMD' or 'Bologna Process' (BP) in combination with 'Africa', 'West(ern) Africa', and the names of all West African countries. Because the BP started in 1999 and the LMD process in West Africa commenced a bit later, we checked the data between 2000 and 2020. Only publications written by local scholars[4] (including those written in collaboration with non-local scholars) were considered relevant to offer an overview of research on the implementation of LMD/BP framework in West Africa from West Africans' perspective. The search against these criteria yielded 46 outputs (articles, chapters in a book, conference papers, and reports) (see Table 2).

Table 2: LMD research sources based on language and type of publication (2000-2020)

Language	Journal articles	Chapters	Conference papers	Reports	Total
French	16	6	2	10	34
English	9	0	2	1	12
Total	25	6	4	11	46

4 By local scholars we mean West Africans who wrote (including in collaboration with non-West Africans) about the implementation of the LMD/BP framework in their country or other West African states.

We further refined the search to focus on research outputs that employed observation of or interviews with HE stakeholders in West Africa. We included articles in journals, readers, or conference reports, but excluded reports by research units (unless published in journals or books) and articles mainly based on desk research. This search yielded 14 papers in French and six in English (20 in total). While 10 of the 14 French papers were published by single authors, five of the six English papers were published by a team. Fourteen of the 20 papers were published in a journal, five were chapters in a book, and one was part of a conference report. The oldest was published in 2007, and the latest in 2020. Overall, the quality and credibility of the texts and alignment with our research objectives were the major criteria considered in selecting the 20 papers and excluding others.

We undertook a close reading of these 20 texts in three steps. First, all texts were read as a first exploration of the content, and at the same time, an overview of the most relevant sections (i.e., problem statements, theories applied, methodology, and results) was made, followed by a short synthesis.

Second, all texts were read again in order to answer our research questions: 1) Do the researchers/interviewees see LMD as comprehensive university reform or are only particular facets addressed? 2) What research paradigms were used for the evaluation of the progress of LMD? 3) What are Western African scholars and stakeholders' perceptions of the LMD/BP framework? 4) What do the researchers/stakeholders think is needed to successfully implement LMD/BP?

Third, all articles were imported into NVivo. This programme for qualitative data analysis enables a systematic check of the content through searches in the text and supports coding.

It should be noted that the final selection of 20 papers did not cover all West African countries[5]. The selection covers Senegal (five papers), Ivory Coast and Togo (three papers each), Benin and Burkina Faso (two papers each), and Ghana, Guinea, Mali, Niger, and Nigeria (one paper each). We did not consider this problematic because our intention was not to provide a complete account of LMD in each country, but rather to paint a picture of research on LMD using literature from West African scholars.

5 No papers were found for Cabo Verde, the Gambia, Guinea-Bissau, Liberia, and Sierra Leone.

Lastly, to assess policy transfer, we examined the texts for the important actors involved in the transfer, the characteristics of the transfer, the reasons for transfer, and the degree to which it was achieved. This was the basis for a coding scheme that roughly (although not exclusively, as more codes were used than these general categories) focused on the following themes: country, year of publication, research questions and hypotheses, LMD, ICT, theories, research methods, results of transfer assessed by interviewees and researchers, policy suggestions.

Results

What is studied?

While some scholars focus on implementing LMD as a framework, others hone in on some of its facets (e.g., adopting competency-based education and learner-centred curricula and introducing quality assurance mechanisms). Yet others focus on the consequences of LMD. French-speaking authors define LMD in accordance with the Bologna Declaration (1999). This means that LMD (the French terminology for the BP) includes easily readable and comparable degrees between countries, two main cycles (undergraduate and graduate), a system of credits (such as the ECTS system used in Europe), and promotion of mobility, as well as other components added in later stages of the process in Europe (e.g., the third cycle of studies, lifelong learning, quality assurance) (Verhoeven and Zhang, 2013).

Although all authors of the selected papers are interested in LMD in one way or another, this does not mean that it is the main focus of all their research. Quite a large group is interested in a broad study of the realisation of LMD in one or more HEIs (Nyamba, 2007; Ndoye, 2009; Eyébiyi, 2011; Modu Aïssami et al., 2014; Diop, 2016; Mignanwande and Hounmenou, 2016; Goin Bi et al., 2018; N'Doly, 2018; Ramdé et al., 2018; Teclessou et al., 2020). Most of these studies were conducted in 2016 or later, which could be expected since LMD did not start in all countries simultaneously, and the official start followed pilot initiatives in some faculties of HEIs in some countries.

Other scholars focus on some facets of LMD, for example, competence education (an educational approach that focuses on mastery of specific competencies or skills rather than simply accumulating credit hours or completing courses) (Diaouné et al., 2011), the benefits of the Internet for LMD (Awokou, 2012), or the harmonisation of academic programmes (Bolu-Steve et al., 2014). Sangaré (2012) investigates whether math teachers should receive didactic and math training, and Pongo et al. (2015) delve deeper into quality assurance in HE in the field of fashion studies. Diallo (2016) is interested in HE's progress in light of LMD, and Diouf (2016) examines the governance modes in HEIs and their influence on LMD in these institutions. Atitsogbe et al. (2018) discuss the impact of social support on academic achievement. Two projects organised experiments within the LMD process: Ettien (2018) examined whether students who engaged in self-directed learning (a method introduced as a consequence of the introduction of LMD) obtained better results than those who attended traditional lectures. Similarly, Massata (2019) focused on the impact of online training in an ICT refresher course.

How is the object of investigation studied?

The selected papers adopted different research approaches, designs and methods (see Table 3 below).

Table 3: Characteristics of reviewed papers

Publication period	Type of research	Number of papers
2007-2020	Qualitative	8
2012-2020	Quantitative	8
2014-2016	Mixed method	2
2018-2019	Experimental	2

Fifteen of the 20 studies were conducted in a single HEI in the respective countries. Ramdé et al. (2018) gathered data in two HEIs, Diop (2016) in three, Diouf (2016), and Pongo et al. (2015) in four, and Diaouné et al. (2011) in seven HEIs.

Thirteen papers employed interviews or observation of students. Nine involved interviews with academic staff, while five involved university and state managers. In addition to other stakeholders, Diaoune et al. (2011) included research support staff, and members of the change committee; Modou Aïssami et al. (2014) and N'Doly's (2018)

study also covered members of the student or staff unions and parents' organisations; and Mignanwande and Hounmenou (2016) solicited parents' views.

The size of the survey samples varied, with student samples ranging from 162 (Goin Bi et al., 2018) to 583 (Diop, 2016) and lecturer samples between 76 (Teclessou et al., 2020) and 200 (Bolu-Steve et al., 2014). Mignanwande and Hounmenou (2016) interviewed 100 parents of students.

Most quantitative papers describe the research results using percentages. However, some go a step further and apply factor analysis and regression analysis (Ramdé et al., 2018; Atitsogbe et al., 2019), variance analysis (Bolu-Steve et al., 2014), or non-parametric tests (Diop, 2016; Atitsogbe et al., 2019). Goin Bi et al. (2018) used 'analyse prototypique' (a prototypical analysis).

The samples for the qualitative projects were mainly small. However, some scholars interviewed a large number of people. For instance, Diaouné et al. (2011) interviewed 24 students, 20 teachers, 11 support staff, 12 programme managers, and two change committee members. Similarly, Diouf (2016) consulted 41 university managers, and N'Doly (2018) 46 students, six student union representatives, 20 lecturers, and four faculty union representatives. Regarding data analysis, one researcher (Diouf, 2016) explicitly refers to grounded theory, while the others do not disclose the method of analysis.

Since the papers address different research problems, it could be expected that the theories used would also be different, which is indeed the case. Some researchers do not explicitly mention a theory (Nyamba, 2007; Modou Aïsami et al., 2014; Diop, 2016; Mignanwande and Hounmenou, 2016; N'Doly, 2018; Teclessou et al., 2020) while others apply theoretical concepts. For instance, two papers draw on social constructivism (Diaoune et al., 2011; Ettien, 2018), and the two experimental studies rely on learning theories (Ettien, 2018; Massata, 2019). The exploratory study by Sangaré (2012) examines the professionalisation of math teachers from the perspective of employability.

In answering the question of how a university came to implement LMD, Ndoye (2009) relies on theories of planned change and innovation, with Awakou (2012) also employing these theories to examine how

ICT skills advance as a result of LMD-oriented reforms. Ramdé et al. (2018) analyse the transfer of LMD to students using the appropriation theory, which posits that interpretation, attitude, and behaviours play an important role. Eyébiyi (2011) refers to an appropriation process together with the importance of globalisation in HE. Organisational and neo-institutional theory guided Pongo et al.'s (2015) analysis of the development of quality assurance in fashion studies. Diallo (2016) relies on humanistic and progressive education theories to answer questions on progress in HE, and governance theory inspired Diouf's (2016) search for the meaning of governance modes in HEIs for the implementation of LMD. Goin Bi et al. (2018) apply a theory regarding social representations (pictures of structure, governance, and documentation in the opinion of students), and Atitsogbe et al. (2018) rely on social support theory and social cognitive career theory for their assessment of students' academic achievements and careers.

How is the Implementation of LMD Perceived?

It should be noted that since the papers pose different research questions and are mainly based on research in one country, at one HEI at a particular moment in time, they do not provide a comprehensive picture of the situation of LMD in the whole of West Africa, or describe the development of the LMD process over time. Nonetheless, ten papers that address the key targets of LMD enabled us to explore West African scholars' perception of LMD.

Although the authors of these ten papers do not explicitly use the concept, all the papers reveal a moment in a policy transfer or policy borrowing process as defined in the theory section. Similarly, N'Doly (2018) and Ramdé et al.'s (2018) papers are guided by the concept of appropriation.

The oldest paper in our selection (Nyamba, 2007) focuses on the University of Ouagadougou (Burkina Faso) and offers insight into HE managers' expectations of LMD. Nyamba (2007) concludes that university managers (both public and private) cherished the hope that LMD targets (harmonisation of programmes, the LMD structure, student mobility, credit recognition) would be attained and that it would solve a variety of challenges (e.g., funding shortages, poor quality staff and staff shortages, a lack of adequate equipment for teaching

and research, and the considerable increase in student numbers) and stimulate cooperation between North and South. For these managers, LMD was mainly about the harmonisation of knowledge and preparing students for the labour market. Nevertheless, they acknowledged that there was a lack of information about LMD and the effects it could have on West African HE. They feared that implementing LMD could mean succumbing to a European project, and that stakeholders would see it as another form of colonialism. Instead, they asserted that West Africa needs a project set up "by the Africans and for the Africans" (Nyamba, 2007, p. 22). It should be noted that although Nyamba's study focuses on one university, he also writes about observations made elsewhere (including comparing African and European implementation of LMD/BP), giving his conclusions broader relevance.

Ramdé et al. (2018) examined Burkina Faso students' understanding of the principles of LMD. They conclude that "students have limited knowledge of the reform, and moderate adherence and low commitment to its implementation" (Ramdé et al., 2018, p. 114). The authors establish a correlation between students' gender and field of study and their attitude toward the LMD framework, with female and humanities students showing less adherence to the LMD principles than male or science students (Ramdé et al., 2018).

In Senegal, the LMD reforms began earlier in Cheikh Anta Diop University. While its implementation was publicly announced in the 2004/2005 academic year, the first step was taken in 2003 when the university's rector announced the reform. The second step involved sensitisation of staff and students, with debates on the pros and cons facilitated by appointed coaches and four French experts. The third step was the establishment of the principles of LMD in the structure of the university (with some leeway for departments) (see Ndoye, 2009). Ndoye concluded that most of the formal LMD principles were achieved after two years. Moreover, there were positive changes regarding faculty's didactics, units' functioning, openness to professionalisation and enterprises, and students' study environment, etc. Ndoye (2009) concluded that the university was moving in the right direction because he believed LMD to be inevitable and that harmonising HE in a globalised world is necessary.

Some years later, Diop (2016) reached less positive conclusions

about the situation in Senegal. As with earlier reforms in Senegalese HE, his study found that students felt that LMD did not solve prevailing problems, although perceptions varied across departments, levels of study, and universities. On the one hand, students indicated discontent with the implementation of LMD. They stated that they lacked sufficient information and were not involved in the decision. They also did not feel that they were adequately prepared for the labour market. On the other hand, students were positive about the principles of LMD and the opportunities it offers for mobility, but were unhappy about the way it was implemented by university management and the government. They also believed that LMD reduced, rather than increased student access to university. Lastly, the study pointed to regular protest action in Senegalese universities, which shows that students and staff were not satisfied with the situation (Diop, 2016).

Problems with the supposed employability benefits of implementing LMD are also reported in Benin by Eyébiyi (2011). In this country, the principles of LMD are accepted by state and private universities. Private universities were faster in implementing LMD, but allowed themselves some leeway. Eyébiyi uses the agriculture faculty of one university in Benin to assess the implementation of LMD in West Africa. In 2007-2008, this faculty opted for the LMD structure, with a diversification of courses to adapt HE to local needs and to improve students' professionalisation. Only a small number of 'license' students were allowed to go on to master's; all others became 'higher technicians', with a view to achieving a 'green revolution' and fast incorporation of graduates into the labour market (Eyébiyi, 2011).

Mignanwande and Hounmenou's (2016, p. 159) study in Benin found that, a decade after implementation, the cardinal LMD principles to "teach differently, study differently, evaluate differently, manage differently and professionalize" had been adopted. However, these principles "are still far from [being] mastered by the different actors" (Mignanwande and Hounmenou, 2016, p. 169). For example, 65.33% of the students that participated in the study stated that their degrees were not recognised in other universities or countries; 73.39% lacked information about LMD; and 59.82% indicated that they lacked information on how to capitalise on credits earned (Mignanwande and Hounmenou, 2016).

Modou Aïssami et al. (2014) focused on a university in Niger, where LMD started as an experiment in 2007, but was formally introduced in 2010. By 2014, most LMD innovations (LMD structure, professionalisation, the semester system, credit system, etc.) had been applied. However, implementation differed among faculties and institutions and there were many weak points. For example, the academic calendar was not followed, modern technologies were infrequently used, students were not made sufficiently responsible for their studies, staff (academic, administrative and technical) did not have appropriate qualifications, and the technological structure was too weak to support implementation (Modou Aïssami et al., 2014).

The LMD system was introduced in Togo in 2009. Teclessou et al.'s (2020) 2018 survey found that lecturers in a medical school perceived the change as positive in terms of the evaluation system, the credit system, and new ICT equipment. Nevertheless, not all the challenges confronting the medical school were solved by the introduction of the LMD framework. There was still an excessive number of students, no intermediate diplomas[6] were offered, and there was a shortage of resources. (such as funding, and laboratory and workshop equipment/facilities). About 20% of the lecturers indicated that LMD is unsuitable for a field such as medicine.

Goin Bi et al.'s (2018) exploratory study of the 'social representations' of students at the University of Ivory Coast, revealed the situation regarding LMD after a long period of implementation, interrupted by turmoil at the university and its closure for a long period (2011-2012). The study demonstrated that while from the outside, all appeared to be well, the university confronted many challenges. For example, there was a lack of didactic equipment and lecture rooms and LMD was not properly understood and applied, although students appreciated it for the valorisation of diplomas. Access to academic resources was limited (including Wi-Fi and library material). The authors found that the 'new start' that followed the turmoil was not really new due to poor governance and political interference in the management of the university (Goin Bi et al., 2018).

6 The intermediate diploma is awarded to students upon successful completion of specific phases or levels of education within the BP/LMD framework. In competency-based education, students demonstrate their mastery of competencies through assessments, projects, portfolios, or other means.

The same university was the subject of a study by N'Doly (2018). His qualitative research revealed that the implementation of LMD in Africa was not yet at the same level as in Europe. The lecturers that participated in the research believed that it would promote professionalisation, but indicated that they were ill-equipped to clearly define course content, to 'teach differently', and to apply e-teaching. Lecturers and students also complained that the university's infrastructure was insufficient to serve the number of students. According to N'Doly (2018), an important reason for the lack of proper appropriation of LMD is African universities' limited freedom to adapt this European innovation to what is required in the context of Africa.

The way Forward

While many of the reviewed papers focus on one country and a single HEI, their reflections on what could be done to solve some problems could be helpful for other West African countries. Nyamba (2007) calls for HEIs to undertake strategic planning and prepare to operate in a liberalised market as well as for less political influence in HE. He also notes that the growing private education sector needs to be taken into account, a view shared by Ndoye (2009), Eyébiyi (2011), and Mignanwande and Hounmenou (2018). Ndoye (2009) recommends the design of administrative and academic structures that fit the LMD framework and that universities need to build closer ties with the professional world. He also highlights the need to devote attention to the African character of HEI.

For their part, Bolu-Steve et al. (2014) recommend that harmonisation of HE should be promoted among the Member States of the Economic Community of West African States (ECOWAS) and propose that ECOWAS provide financial support to support the follow-up process. Modou Aïssami et al. (2014) call for the quality and quantity of human and infrastructural resources to be increased, including ICT (see also Mignanwande and Hounmenou, 2016; Goin Bi et al., 2018; N'Doly, 2018; Ettien, 2018). They also note that universities should nurture an environment that enables students to take ownership of their learning process, academic progress, and personal development as a lack of resources and tensions caused by political disagreements among students, render innovation difficult, Diop (2016) stresses that the state

should seek solutions to students' problems because they are among the most important actors who pose hindrances to the implementation of LMD. In addition to arguing for improved human resources and academic and administrative infrastructure, Mignanwande and Hounmenou (2016) support the adaptation of LMD principles and conditions to address local realities (see also Eyébiyi, 2011). Goin Bi et al. (2018) suggest that in order to attain a real 'new start' for LMD, the challenges of poor infrastructure, incorrect application of LMD, weak information, and poor governance need to be addressed.

Like other scholars, N'doly (2018) notes that universities need more autonomy, more and better didactic equipment, and improved lecture rooms and ICT, etc. Ramdé et al. (2018, p. 128) state that more attention should be devoted to students' concerns, particularly female students and those "in disciplines whose competitive horizon is more limited". Teclessou et al. (2020) do not directly suggest a policy for a medical faculty but indirectly infer that intermediate diplomas be considered to link medical and paramedical training and create pathways between them, and to improve human and material resources.

Conclusion

The launch of the BP in Europe was a wake-up call for many countries to reflect on the future of HE. Its vision for the harmonisation of HE across Europe was perceived as having important consequences for student and academic exchange and the employability of HE graduates in a globalised economy. Not all countries decided to follow this process. For instance, Australia retained its HE structure (Verhoeven and De Wit, 2022). However, Africa was an eager follower, despite its colonial past. Many African countries faced economic and political challenges and regarded the implementation of LMD as an instrument to solve some of them. International organisations focused on inter-university collaboration strongly supported the process.

The LMD process has been researched by both West African and foreign scholars. This article reviewed research on LMD in West Africa undertaken by local scholars. As close observers of the innovation process, they are key sources of information on its progress.

While the reviewed papers do not cover all facets of the LMD/BP framework and often focus on one country and a single HEI, they offer interesting views on the development of LMD in West Africa. Most of this research conceptualised the LMD implementation process as a policy transfer one (Dolowitz and Marsh, 1996), while some regarded it more as an appropriation process (Ramdé et al., 2018). The studies employed different theoretical concepts, including social constructivism (Diaouné et al., 2011), theories of planned change (Awokou, 2012), organisation theory and neo-institutional theory (Pongo et al., 2015). Others focused on how HE stakeholders perceived LMD (Nyamba, 2007; Modou Aïssami et al., 2014; Diop, 2016; Mignanwande and Hounmenou, 2016; N'Doly, 2018; Teclessou et al., 2020).

The papers adopted different methodologies, including survey, qualitative, and experimental research. Most gauged the opinions of one or two stakeholder categories, mainly students (in 13 of 20 studies) and lecturers (nine out of 20). The representativeness of the samples was seldom assessed, and data analysis was usually limited to a description of the distributions in percentages, although in a few projects, scholars applied regression analysis, variance analysis, or non-parametric tests. None of the research was longitudinal. In qualitative projects, purposive sampling was applied depending on the kind of stakeholders the researchers sought to include in the study. No special reference was made to a theory underlying the interpretation of the qualitative data, except by Diouf (2016), who opted for a grounded theory approach.

Most studies did not assess the result of LMD but rather what influenced its development, for instance, online training (Massata, 2019), teaching methods (Ettien, 2018), quality assurance (Pongo et al., 2015), or social support (Atitsogbe et al., 2018).

All authors report the transition to the formal LMD structure, although it was not always correctly applied (see, for instance, Goin Bi et al., 2018). Other goals formulated by the 'Guide' (GTES, 2008), namely, that LMD would help to teach differently, study differently, evaluate differently, manage differently, and professionalise, were often not achieved (Modou Aïssami et al., 2014; Mignanwande and Hounmenou, 2016; Goin Bi et al., 2018; N'Doly, 2018). According to some researchers, an important reason was the universities' lack of autonomy (Goin Bi et al., 2018; N'Doly, 2018). Hopes (see, for instance, Nyamba, 2007) that LMD reform would deliver more and better lecture rooms,

didactic equipment, libraries, and ICT systems did not materialise. Although many students in some countries demonstrated a positive attitude towards the principles of LMD (Diop, 2014; Mignanwande and Hounmenou, 2016; Goin Bi et al., 2018), they were not happy about the way it was implemented and doubted that it has contributed to employability (Nyamba, 2007; Diop, 2014).

While the policy proposals offered by these scholars based on their research are very diverse, some general principles can be identified. The conclusions include West African HEIs' need for more real autonomy and funding, improved infrastructure, and staff that has the means and capacity to teach the huge number of students enrolled in the region. Given that the HE landscape differs across these countries, LMD should be adapted to fit local contexts, and the position of private HEIs should be considered.

Our study's limitations include the fact that only publications published by local scholars in journals, books, or conference reports reported on Google Scholar and Web of Science were selected, excluding the work of other local researchers, research by non-African researchers, and reports published by the research institute ROCARE. Some nuances might, therefore, be missing from the analysis. However, our main purpose was to bring the observations of local scholars to the fore.

The picture of LMD in West Africa painted by these scholars is very diverse and rich. On the one hand, they note that LMD was established in West Africa as a solution to existing problems and as a way to situate West African HE in global developments. On the other, they are critical observers who report on the real concerns of HE stakeholders, painting a picture of a contested reform and the challenges that still confront West African HE.

In terms of future research, a longitudinal study that includes different countries and HEIs would provide a better picture of how LMD/BP-driven reform is unfolding in West Africa, what it is achieving, or failing to achieve, and its failures and successes.

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Academic Resilience and Academic Engagement as Predictors of Academic Burnout among Postgraduate Students at the University of Cape Coast, Ghana

Mark Owusu Amponsah, Kyei Anane Ampofo, Ruth Keziah Annan-Brew, and Justice Dadzie

Abstract

This article investigates the predictive roles of academic resilience and academic engagement in academic burnout among postgraduate students at the University of Cape Coast, Ghana. Guided by seven objectives transformed into three research questions and four hypotheses, a descriptive survey design with a quantitative approach was employed. The population consisted of 847 postgraduate students, with 265 participants selected through stratified and simple random sampling. Questionnaires were adapted to measure the study objectives, and data were analysed using simple linear regression and multiple linear regression analyses. The findings revealed significant predictive relationships between academic resilience, academic engagement, and academic burnout. A positive relationship was also established between academic resilience and academic engagement. The study concluded that academic resilience and engagement play crucial roles in predicting and understanding academic burnout among postgraduate students. It recommended collaborative efforts between university management, lecturers, and counsellors to implement policies and measures to address this issue.

Key words: academic resilience, academic engagement, academic burnout

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Résumé:
Cet article étudie les rôles prédictifs de la résilience académique et de l'engagement académique sur l'épuisement académique chez les étudiants de troisième cycle de l'Université de Cape Coast, au Ghana. Guidé par sept objectifs transformés en trois questions de recherche et quatre hypothèses, un modèle d'enquête descriptive avec une approche quantitative a été utilisé. La population était composée de 847 étudiants de troisième cycle, 265 participants ayant été sélectionnés par échantillonnage aléatoire stratifié et simple. Des questionnaires ont été adaptés pour mesurer les objectifs de l'étude et les données ont été analysées à l'aide d'analyses de régression linéaire simple et multiple. Les résultats ont révélé des relations prédictives significatives entre la résilience académique, l'engagement académique et l'épuisement académique. Une relation positive a également été établie entre la résilience académique et l'engagement académique. L'étude conclut que la résilience et l'engagement académiques jouent un rôle crucial dans la prédiction et la compréhension de l'épuisement académique chez les étudiants de troisième cycle. Elle recommande des efforts de collaboration entre la direction de l'université, les enseignants et les conseillers pour mettre en œuvre des politiques et des mesures visant à résoudre ce problème.

Mots clés: résilience académique, engagement académique, épuisement académique

Introduction

In the demanding landscape of higher education, students grapple with significant pressure stemming from the academic workload, deadlines, and various obligations, often leading to a state of constant stress known as academic burnout (Kpodoe et al., 2023; de Lima, 2021). This phenomenon encompasses feelings of emotional exhaustion, inadequacy, and cynicism towards the learning process, ultimately dampening students' enthusiasm for their studies (Domaley et al., 2020). Recent research has highlighted the prevalence of academic burnout among students, shedding light on its repercussions within educational settings (Wang et al., 2021; Ye, Huang et al., 2023).

Academic resilience has emerged as a pivotal factor in mitigating academic burnout's adverse effects (Atman Uslu, 2023). Resilient students exhibit positive self-beliefs and effective coping skills, enabling them to regulate their actions and perceive setbacks as opportunities for growth (Asiedu et al., 2018; Odonkor and Frimpong, 2020). Studies have demonstrated that academic resilience acts as a protective shield against the negative emotions associated with academic strain, allowing students to maintain their well-being in the face of academic challenges (Oyoo et al., 2020; Kaggwa et al., 2021).

Moreover, students' level of academic engagement significantly influences their experience of burnout and overall academic outcomes. Academic engagement entails active participation and investment in the learning process, correlating with positive outcomes such as higher completion rates, improved job prospects, enhanced self-perception, and overall well-being (Li and Lerner, 2011; Salmela-Aro and Upadyaya, 2012; Wang and Peck, 2013). Conversely, students grappling with burnout symptoms may display incompetence and disinterest in academic responsibilities, hampering their academic performance and achievement (Dadzie et al., 2023; Alshobaili et al., 2021).

In the African context, academic burnout poses significant challenges for students across various educational settings (Dadzie, 2022; Oyoo et al., 2020; Kaggwa et al., 2021). Research conducted in countries like South Africa, Kenya, and Ghana underscores the prevalence of burnout among students and its impact on academic achievement (Annan-Brew et al., 2023; Winga et al., 2016; Domaley et al., 2023). However, there is a gap in understanding how factors such as resilience and academic engagement influence burnout among students, particularly in postgraduate programmes (Opoku and Apenteng, 2014; Asiedu et al., 2018; Odonkor and Frimpong, 2020; Osei et al., 2021). Addressing this gap is vital to develop targeted interventions to support students' well-being and academic success in African higher education contexts.

The study on which this article is based investigated academic resilience and academic engagement as predictors of academic burnout among postgraduate students. It aimed to address two primary research hypotheses:

1. H_o1: Academic resilience will not predict academic burnout amongst postgraduate students.

H_A1: Academic resilience will predict academic burnout amongst postgraduate students.

1. H_o2: Academic engagement will not predict academic burnout amongst postgraduate students.
   H_A2: Academic engagement will predict academic burnout amongst postgraduate students.

Literature Review

Theoretical Framework

The theory of student involvement conceptualised by Alexander Astin and published in 1984 emphasises the significance of students' active engagement in their college experience (Astin, 1984). According to Astin, student involvement refers to the quantity and quality of the physical and psychological energy that students invest in their academic pursuits and campus activities (Astin, 1984). This theory suggests that the more students immerse themselves in school-related activities, such as interacting with faculty and peers, participating in extracurricular activities, and dedicating time to studying, the more likely they are to learn and develop academically. Astin contends that institutions can enhance the learning environment by fostering greater student involvement, as academically engaged students tend to perform better academically and exhibit behaviours conducive to academic success.

In contrast, the resilience theory developed by Masten in 2011 and further refined in 2014 focuses on individuals' capacity to successfully adapt to adverse circumstances (Masten, 2011, 2014). Masten defines resilience as the ability to navigate significant changes or disruptions without compromising one's stability, viability, or development (Masten, 2011, 2014). Unlike earlier definitions that emphasised withstanding adversity, Masten's revised perspective underscores the importance of adaptation and positive transformation in response to challenges (Masten, 2014). According to Masten, resilience is characterised by positive adaptation or development despite the existence of conditions that threaten to disrupt one's well-being (Masten, 2014). This theory highlights the dynamic nature of resilience and the role of various adaptive systems such as attachment relationships and self-regulatory mechanisms in promoting positive outcomes in the face of adversity.

Both theories offer valuable insights to understand students' experiences and outcomes in educational settings. While the theory of student involvement underscores the importance of active engagement and participation in academic and extracurricular activities, resilience theory highlights individuals' capacity to adapt and thrive in the face of challenges. Together, these theories contribute to a comprehensive understanding of how students navigate their academic journeys and overcome obstacles to achieve success.

Academic Burnout

Recent research such as that conducted by Warlick et al. (2021) has highlighted the widespread prevalence of burnout among both students and workers, indicating its impact across diverse demographics. Numerous studies, including those by Grace (2018), Xie et al. (2019), and Hodge et al. (2020), have identified burnout as a significant challenge within educational settings, emphasising its detrimental effects on students' academic success.

Defined as a syndrome characterised by emotional exhaustion, cynicism, and diminished efficacy in an educational environment, academic burnout is often attributed to chronic interpersonal stressors encountered during schooling or work (Maslach and Leiter, 2016; Ferreira and Lucca, 2015). Students experiencing academic burnout commonly report feelings of energy depletion, emotional exhaustion, and detachment from their studies, accompanied by cynicism and decreased personal or professional effectiveness (Costa et al., 2012). The demanding nature of university education, with its myriad pressures including coursework, relationships, and examinations, places many students at risk of experiencing burnout (Galbraith and Merrill, 2015).

The consequences of academic burnout extend beyond academic outcomes to encompass students' overall health and well-being. Described as a consequence of chronic work-related stress, burnout manifests as emotional exhaustion, depersonalisation, and a reduced sense of personal accomplishment (Durán et al., 2006). Student burnout has been associated with increased rates of absenteeism, reduced motivation to complete coursework, and a higher likelihood of dropping out, all of which negatively impact academic achievement (Bikar et al., 2018).

Researchers have also explored the implications of academic burnout on students' academic achievement, efficacy, resilience, and engagement in the African context (Freidman, 2014; Winga et al., 2016; Kamalpour et al., 2017; Oyoo et al., 2020). These studies underscore the significance of academic burnout in shaping students' academic experiences. Furthermore, previous research suggests that academic resilience may act as a protective factor against burnout among students (Oyoo et al., 2018; Janatolmakan et al., 2021; Romano et al., 2021). However, there is a need for further extensive research, particularly within the Ghanaian context, to fully understand the dynamics of academic burnout and its implications for student well-being and academic success.

Academic Resilience

Academically resilient students exhibit remarkable abilities to overcome significant challenges during their schooling, often achieving excellent academic outcomes despite adversity (Romano et al., 2021). They can benefit greatly from supportive school environments that foster positive relationships and provide the necessary support (Yuan et al., 2018).

Academic resilience involves students facing and overcoming adversities or challenges encountered within the educational setting, leading to personal growth and adaptation (De la Fuente et al., 2017). It enables them to achieve academic success despite facing difficult circumstances during their educational journey (Amuwa, 2015). Essentially, academic resilience reflects a student's capacity to effectively navigate obstacles, pressures, and challenges encountered in the school environment.

Recent research has delved into the characteristics of resilience, highlighting their efficacy in shielding students from severe negative outcomes such as academic burnout (Fiorilli et al., 2020; Romano et al., 2021). Resilience is widely acknowledged as an individual's ability to effectively cope with setbacks, challenges, and stressors, adapting and thriving despite adverse circumstances (Fiorilli et al., 2020). In the academic context, it is defined as the ability to maintain high levels of achievement, motivation, and performance despite facing challenging educational conditions (Grace, 2018).

Conceptual Framework

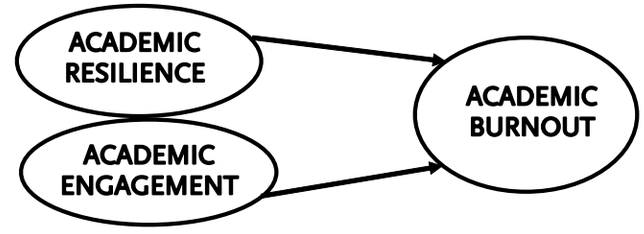

Figure 1: Academic Resilience and Academic Engagement as predictors of Academic Burnout

Source: Authors' construct (2024)

As shown in Figure 1, our conceptual framework illustrates the interplay between the study's independent and dependent variables. Academic resilience and engagement are the independent variables, while academic burnout is the dependent variable. The framework shows that academic resilience and engagement may positively or negatively predict the academic burnout that postgraduate students face.

Methodology

The study utilised a descriptive survey research design. The target population comprised all postgraduate students at the University of Cape Coast, totalling 1 786 individuals and encompassing both Master's and Doctoral students across various colleges and academic levels (800, 850, 900, and 950). However, the accessible population, limited to regular first-year Master's and Doctoral students from the same colleges, amounted to 847 students.

Krejcie and Morgan's (1970) table to determine the sample size was consulted, indicating that a population of 847 called for a representative sample of 265 participants. Proportionate stratified sampling was employed to select participants in equal proportions from their respective colleges. Subsequently, simple random sampling was used to ensure fairness and unbiased representation, guaranteeing each member of the accessible population an equal chance of being selected.

Table 1: Distribution of Students

College	800	900	Total	Sample	800		900	
					M	F	M	F
Agricultural and Natural Sciences	98	51	149	46	26	4	12	4
Education Studies	280	97	377	119	48	40	18	13
Health and Allied Sciences	21	4	25	8	4	2	1	1
Humanities and Legal Studies	205	91	296	92	40	24	21	7
			847	265	265			

Source: Fieldwork (2022)

A close-ended questionnaire was utilised as the primary data collection instrument. The Academic Resilience Scale (ARS) developed by Cassidy (2016) was adapted to measure the level of academic resilience among postgraduate students. It aims to capture the multidimensional nature of academic resilience by assessing students' responses to educational challenges. The ARS comprises 30 items scored on a 5-point Likert scale ranging from unlikely (1) to likely (5). The scale encompasses three sub-dimensions: perseverance, reflecting and adaptive help-seeking, and negative affect and emotional response. The reliability coefficients for these sub-dimensions were .83, .78, and .80, respectively, with an overall Cronbach's reliability coefficient for the scale of .90. The Cronbach's alpha coefficient measures the internal consistency of the scale, indicating how closely related a set of items are as a group. A coefficient value of .90 indicates high internal consistency, suggesting that the items in the scale reliably measure academic resilience.

The University Student Engagement Inventory (USEI) by Maroco and Tecedeiro (2009) was adapted to measures the academic engagement variable. The USEI conceptualises student engagement across behavioural, emotional, and cognitive dimensions. Behavioural engagement refers to students' participation in classroom tasks and extracurricular activities, while cognitive engagement reflects their investment in comprehending complex ideas and skills. Emotional engagement captures students' attention to teachers' instructions and

perceptions of school belonging. The inventory comprises 15 self-reported items with Likert-type response options. The reliability coefficients for the behavioural, emotional, and cognitive dimensions were .74, .88, and .82, respectively, with a total Cronbach's alpha coefficient of .88, indicating high internal consistency.

Lastly, academic burnout was measured using the Maslach Burnout Inventory-Student Survey developed by Schaufeli et al. (2002). It includes three subscales with 15 items that assess emotional exhaustion, cynicism, and academic efficacy. High scores on emotional exhaustion and cynicism, alongside low scores on academic efficacy (reverse-scored items) indicate burnout. The reliability coefficients for the three subscales were .869, .856, and .852, respectively, with an overall Cronbach's alpha coefficient of .75. According to Dadzie et al. (2023), a Cronbach's alpha coefficient greater than .65 indicates acceptable internal consistency.

Result and Discussion

Demographic Characteristics of Respondents

This section presents the respondents' demographic characteristics, including gender, college and academic level.

Gender Distribution of Respondents

Table 2: Gender of students

Gender	Frequency	Percent
Male	170	64.2
Female	95	35.8
Total	265	100.0

Source: Field Survey (2022)

The results in Table 2 indicate that, of a sample of 265 respondents, 170 were males (64.2%) and 95 were females (35.8%). This suggests that, the responses were dominated by male students. It is understandable as the population of the University of Cape Coast postgraduate students is dominated by males.

Distribution of Respondents' College

Table 3: Students' College

College	Frequency	Percent
Education Studies	119	44.9
Health and Allied Sciences	8	3.0
Humanities and Legal Studies	92	34.7
Agricultural and Natural Sciences	46	17.4
Total	265	100.0

Source: Field Survey (2024)

The results in Table 3 indicate that, of the 265 respondents, 119 were affiliated to the College of Education Studies (44.9%), eight to the College of Health and Allied Sciences (3.0%), 92 to the College of Humanities and Legal Studies (34.7%), and 46 to the College of Agriculture and Natural Sciences (17.4%).

Distribution of Academic Level of Respondents

Table 4: Academic Level of Students

Level	Frequency	Percent
800	188	70.9
900	77	29.1
Total	265	100.0

Source: Field Survey (2024)

The results in Table 4 show that, 188 of the 265 students were in level 800 or pursuing their Master's degree in first year, while 77 were in level 900 or pursuing their doctoral degree (29.1%). Thus, the majority were Master's students.

Results

The study tested two hypotheses. Prior to testing, the normality assumption, which is fundamental to all parametric assumptions was tested using the mean, median, 5% trimmed mean, and the normal Q-Q plot. The results are presented in Table 5.

Table 5: Test for Normality

Parameters	Academic Resilience	Academic Engagement	Academic Burnout
Mean	133.6453	67.8717	82.2377
Standard deviation	4.70922	2.96165	3.16588
5% Trimmed mean	133.5094	67.8973	82.1342
Median	133.0000	68.0000	82.0000

Source: Fieldwork (2024)

As presented in Table 5, the mean, median, and 5% trimmed mean of the students' academic resilience, academic engagement and academic burnout were approximately equal. This implies that the scores of the aforementioned variables were normally distributed (Pallant, 2011). The normal Q-Q plots for all the variables were also examined. These showed that the distribution of all the scores was closer to the straight line. Prior to running the regression analysis for the first and second hypothesis, it was important to ensure that assumptions for running the regression analysis were met, taking into consideration the histogram plot showing the normality curve as well as the test of multicollinearity and that to check autocorrelation.

Hypothesis 1

$H_0 1$: *Academic resilience will not predict academic burnout amongst postgraduate students.*

$H_A 1$: *Academic resilience will predict academic burnout amongst postgraduate students.*

Hypotheses one aimed to test whether or not academic resilience could predict academic burnout. Both simple and multiple linear regressions were deemed appropriate to predict the extent to which academic resilience predicts academic burnout, taking into consideration all three dimensions of academic resilience (perseverance, reflective and adaptive help seeking, and negative affect and emotional response) as well as their combined effects. Tables 6 and 7 present the correlation results between the predictor variable and the criterion variable as well

as the correlation between the subscales of the predictor variable and the criterion variable, respectively. Tables 8 and 9 provide the multiple regression results between the predictor variable and the criterion variable as well as the regression results between the subscales of the predictor variable and the criterion variable, respectively.

Table 6: Correlation between Academic Resilience and Academic Burnout

		Academic burnout	Resilience
Pearson Correlation	Academic burnout	1.000	-.177
	Resilience	-.177	1.000
Sig. (1-tailed)	Academic burnout	.	.002
	Resilience	.002	.

Source: Field Survey (2024)

The correlation analysis in Table 6 reveals that there was a statistically significant relationship between academic resilience and academic burnout, r=-.177, p=.002. This represents a weak negative relationship. It means that as academic resilience increases, academic burnout decreases and vice-versa.

Table 7: Correlations between Academic Resilience (Sub-Scales) and Academic Burnout

		Academic Burnout	Perseverance	RAHS	NAER
Pearson Correlation	Academic Burnout	1.000	-.185	-.090	-.006
	Perseverance	-.185	1.000	.131	-.152
	RAHS	-.090	.131	1.000	.109
	NAER	-.006	-.152	.109	1.000
Sig. (1-tailed)	Academic Burnout	.	.001	.071	.459
	Perseverance	.001	.	.017	.007
	RAHS	.071	.017	.	.038
	NAER	.459	.007	.038	.

RAHS = Reflective and adaptive help seeking, NAER = Negative affect and emotional response

Source: Field Survey (2024)

Table 7 presents the correlation analysis between the sub-scales of academic resilience (perseverance, reflective and adaptive help seeking, and negative affect and emotional response) and academic burnout. It illustrates that there was only a statistically significant relationship between perseverance and academic burnout, r=-.185, p=.001. This indicates a weak negative relationship. It means that as perseverance decreases, academic burnout increases and vice-versa. All the other correlations were not statistically significant at .05 level.

Table 8: Academic Resilience as a predictor of Academic Burnout

Variables	B	R^2	*SE B*	*B*	*T*	*P*
Constant	98.118	.031	5.456		17.982	.000
Academic Resilience	-.119		.041	-.177	-2.912	.004

Source: Field Survey, 2022

F = 8.481 df = (1, 263)

Table 8 presents the results of the simple linear regression analysis conducted to analyse the data and test the hypothesis. A linear regression model was used to establish how academic resilience predicted academic burnout. The results revealed that academic resilience predicted academic burnout, B= .119, F (1,263) = 8.481, p=.004. The model accounted for 3.1% of the variation in academic burnout such that a unit increase in academic resilience results in a .119 decrease in academic burnout. Therefore, individuals with lower academic resilience experience higher academic burnout. Since academic resilience significantly predicted academic burnout, the null hypothesis which states that "*Academic resilience will not predict academic burnout amongst postgraduate students*" is rejected in favour of the alternative hypothesis.

Table 9: Academic Resilience (Sub-Scales) as predictors of Academic Burnout

Variables	B	R^2	*SE B*	*B*	*t*	*P*
Constant	98.966	.039	5.816		17.017	.000
Perseverance	-.192		.066	-.181	-2.917	.004
Reflective and adaptive help seeking	-.089		.086	-.064	-1.033	.302
Negative affect and emotional response	-.040		.092	-.027	-.435	.664

Source: Field Survey

2022 F = 3.577 df = (3, 261)

Table 9 presents the results of a multiple linear regression analysis conducted to predict academic burnout based on academic resilience (perseverance, reflective and adaptive help seeking, and negative affect and emotional response). A significant regression equation was found and the results revealed that the model predicted academic burnout, F (3,261) = 3.577, p=.000 and accounted for 3.9% of the variation in it. This means that the model is responsible for 3.9% of the differences in academic burnout among students. In addition, the perseverance sub-scale predicted academic burnout such that a unit increase in perseverance accounts for a .192 decrease in academic burnout. Individuals with lower perseverance experience higher academic burnout. However, reflective and adaptive help seeking, and negative affect and emotional response did not predict academic burnout.

Hypothesis 2

H_o2: *Academic engagement will not predict academic burnout amongst postgraduate students.*

H_A2: *Academic engagement will predict academic burnout amongst postgraduate students.*

Research hypotheses two aimed to test whether or not academic engagement could predict academic burnout. Both simple and multiple linear regressions were deemed appropriate to predict the extent to which academic engagement predicts academic burnout, taking into consideration all three dimensions of academic engagement (behavioural, emotional and cognitive) as well as their combined effect. Tables 10 and 11 present the correlation results between the predictor variable and the criterion variable, and the correlation between the sub-scales of the predictor variable and the criterion variable, respectively. Tables 12 and 13 show the multiple regression results between the predictor variable and the criterion variable, and the regression results between the sub-scales of the predictor variable and the criterion variable, respectively.

Table 10: Correlation between Academic Engagement and Academic Burnout

		Academic burnout	Academic Engagement
Pearson Correlation	Academic burnout	1.000	-.230
	Academic engagement	-.230	1.000
Sig. (1-tailed)	Academic burnout	.	.000
	Resilience	.000	.

Source: Field Survey (2024)

The correlation analysis revealed that there was a statistically significant relationship between academic resilience and academic burnout, r=-.230, p=.000. It also indicated that there was a weak negative relationship between academic engagement and academic burnout. This means that as academic engagement decreases, academic burnout increases and vice-versa.

Table 11: Correlations between Academic Engagement (Sub-Scales) and Academic Burnout

		Academic burnout	Behavioural	Emotional	Cognitive
Pearson Correlation	Academic burnout	1.000	-.248	-.057	-.052
	Behavioural	-.248	1.000	-.162	.162
	Emotional	-.057	-.162	1.000	-.164
	Cognitive	-.052	.162	-.164	1.000
Sig. (1-tailed)	Academic burnout	.	.000	.177	.200
	Behavioural	.000	.	.004	.004
	Emotional	.177	.004	.	.004
	Cognitive	.200	.004	.004	.

Source: Field Survey (2024)

The correlation analysis revealed that there was only a statistically significant relationship between behavioural engagement and academic burnout, r=-.248, p=.000. This further indicates that there was a weak negative relationship between behavioural engagement and academic burnout. It means that as behavioural engagement decreases, academic burnout increases and vice-versa. All the other correlations were not statistically significant at .05 level.

Table 12: Academic Engagement as a predictor of Academic Burnout

Variables	B	R^2	*SE B*	*B*	*t*	*P*
Constant	98.913	.053	4.358		22.696	.000
Academic Engagement	-.246		.064	-.2.30	-3.830	.000

F = 14.668 df = (1, 263)

Source: Field Survey (2024)

Table 12 presents the results of the simple linear regression analysis conducted to analyse the data and test the hypothesis. A linear regression model was employed to establish how academic engagement predicted academic burnout. The results revealed that academic engagement predicted academic burnout, B= .246, F (1,263) = 14.668, p=.000. The model accounted for 5.3% of the variation in academic burnout, such that a unit increase in academic engagement results in a .246 decrease in academic burnout. Therefore, individuals with lower academic engagement experience higher academic burnout. Since academic engagement significantly predicted academic burnout, the null hypothesis which states that "*Academic engagement will not predict academic burnout amongst postgraduate students*" is rejected in favour of the alternative hypothesis.

Table 13: Academic Engagement (Sub-Scales) as predictors of Academic Burnout

Variables	B	R^2	*SE B*	*B*	*t*	*P*
Constant	96.762	.072	4.996		19.368	.000
Behavioural	-.416		.097	-.261	-4.274	.000
Emotional	-.144		.085	-.104	-1.699	.091
Cognitive	-.077		.175	-.027	-.439	.661

F = 3.577 df = (3, 261)

Source: Field Survey (2024)

Table 13 shows that a significant regression equation was found. The results revealed that the model predicted academic burnout, F (3,261) = 3.577, p=.000 and accounted for 7.2% of the variation in academic burnout. This means that the model is responsible for 7.2% of the differences in students' academic burnout. In addition, the behavioural engagement sub-scale predicted academic burnout such that a unit increase in behavioural engagement accounts for a .416 decrease in academic burnout. Individuals with lower behavioural engagement experience higher academic burnout. However, emotional and cognitive engagement did not predict academic burnout.

Discussion

Academic Resilience as a Predictor of Academic Burnout

The study investigated how academic resilience predicts academic burnout among postgraduate students using both simple and multiple linear regression analyses. These analyses aimed to assess the individual effects of academic resilience sub-dimensions and their combined effects on academic burnout.

In considering the three sub-dimensions of the academic resilience scale, the study identified perseverance as the only significant predictor of academic burnout. The findings indicated a weak inverse association between perseverance and academic burnout, suggesting that as perseverance increased, academic burnout decreased, and vice versa. This negative correlation underscored the importance of perseverance in mitigating burnout. Overall, the study revealed a weak inverse association between academic resilience and academic burnout, indicating that higher levels of academic resilience were associated with lower levels of burnout.

In addition, a simple linear regression model was employed to analyse how academic resilience predicts academic burnout among postgraduate students. The results revealed a statistically significant regression equation, with academic resilience emerging as a significant predictor of academic burnout. The model accounted for 3.1% of the variation in burnout, indicating that a unit increase in academic resilience resulted in a 0.119 decrease in academic burnout. Thus, individuals with higher academic resilience were less likely to experience burnout, while those with lower resilience were more susceptible.

These findings are consistent with previous research by Oyoo, Mwaura, and Kinai (2018) and Romano et al. (2021), which also demonstrated a negative correlation between academic resilience and burnout. Similarly, studies by Bahrami, Amiri, and Abdollahi (2017) and Lee (2019) support these findings, highlighting the predictive power of academic resilience on burnout. However, the results of this study differ from those of Trigueros et al. (2020) who reported a significant positive relationship between academic resilience and burnout. This may be attributed to methodological differences such as sampling techniques between the studies.

In summary, academic resilience was found to be a significant predictor of academic burnout, and there was a negative relationship between the two. This can be explained in line with the Demands and Resources Theory which posits that when one's demands (academic challenges) become unbearable, this depletes one's resources (ability to deal with them). Thus, when postgraduate students are not able to effectively meet their academic demands, this is likely to deplete their resources such as being academically resilient.

Academic Engagement as a predictor of Academic Burnout

Our research also explored how academic engagement predicts academic burnout among postgraduate students. Both simple and multiple linear regression analyses were conducted to examine the individual effects of the academic engagement sub-dimensions and their combined effects on academic burnout.

The findings revealed that among the three sub-dimensions of academic engagement, only behavioural engagement emerged as a significant predictor of academic burnout. Specifically, a weak inverse association was observed between behavioural engagement and academic burnout, indicating that as behavioural engagement increased, academic burnout decreased, and vice versa. Overall, the study found a weak inverse association between academic engagement and academic burnout, implying that higher levels of academic engagement were associated with lower levels of burnout.

Furthermore, the simple linear regression model demonstrated that academic engagement was a significant predictor of academic burnout, explaining 5.3% of the variance in burnout. The results suggested that for every unit increase in academic engagement, there was a corresponding decrease of 0.246 units in academic burnout. Thus, individuals with higher levels of academic engagement were less likely to experience burnout, while those with lower engagement levels were more susceptible.

These findings align with previous research by Yuan et al. (2018) and Fiorilli et al. (2020), which also identified a negative correlation between academic engagement and burnout. Similarly, studies by McCallen, and Johnson (2020) and Ofori et al. (2020) support these findings, highlighting the predictive power of academic engagement on burnout.

However, the results of this study differ from those of Ye et al. (2021), who reported a significant positive relationship between academic engagement and burnout. This may stem from methodological differences, variations in sample characteristics, or contextual factors within educational environments.

In summary, academic resilience emerged as a significant predictor of academic burnout, indicating a negative relationship between the two variables. This finding aligns with the Demands and Resources Theory, suggesting that when academic demands become overwhelming, they

deplete individuals' resources, including resilience, potentially leading to burnout.

Conclusion and Recommendations

Based on the findings of this study, it can be concluded that the academic resilience levels of most postgraduate students at the University of Cape Coast were low. The majority of first-year postgraduate students at the university engaged in Master's and doctoral study believed that they did not have the requisite resilience to overcome adversities encountered during their academic journey. This suggests that postgraduate students at the University of Cape Coast were not optimistic that they could overcome obstacles in their studies. Again, it can be concluded that these students had lower levels of academic engagement. Thus, the majority of first-year postgraduate students at the university engaged in Master's and doctoral studies believed that they were not engaged with their studies. Furthermore, they believed that they were suffering from severe academic burnout as they scored high on all dimensions of the academic burnout scale.

Based on the findings, it is recommended that management of the University of Cape Coast in collaboration with the guidance and counselling unit should put measures in place to assist postgraduate students to develop academic resilience. Furthermore, lecturers at the university should identify innovative, new pedagogical strategies to ensure that postgraduate students are fully engaged with their studies. It is also recommended that management put policies in place to ensure that academic burnout is reduced among postgraduate students as this has implications for their academic resilience and engagement. Recreational programmes could be offered as part of semester activities to help students to manage their burnout levels.

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Social Networks for Learning: Performance Expectancy Vs Social Influence

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Abstract

This article examines the factors that determine students' acceptance of social networks for learning at the Virtual University of Côte d'Ivoire. It investigates whether the expected added value in terms of performance was the primary factor motivating their adoption in learning or training activities. The Unified Theory of Acceptance and Use of Technology model was adopted as the theoretical framework, with data gathered by means of an online survey, to which 315 students responded, and analysed using a partial least squares structural model. The study found that the intention to use social networks for learning is primarily determined by effort expectancy, while social influence is the second most important determinant. While performance expectancy was found to be the least important factor, the results show that it had a positive effect on men's intention to use social networks for learning, but a negative effect for women.

Key words: social networks, Unified Theory of Acceptance and Use of Technology (UTAUT), acceptance, learning, partial least squares structural model

Résumé:

Cet article examine les facteurs qui déterminent l'acceptation par les étudiants des réseaux sociaux pour l'apprentissage à l'Université virtuelle de Côte d'Ivoire. Il cherche à savoir si la valeur ajoutée attendue

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en termes de performance est le principal facteur motivant leur adoption dans les activités d'apprentissage ou de formation. Le modèle de la théorie unifiée de l'acceptation et de l'utilisation de la technologie a été adopté comme cadre théorique. Les données ont été recueillies au moyen d'une enquête en ligne à laquelle 315 étudiants ont répondu et ont été analysées à l'aide d'un modèle structurel des moindres carrés partiels. L'étude a révélé que l'intention d'utiliser les réseaux sociaux pour l'apprentissage est principalement déterminée par l'attente d'un effort, tandis que l'influence sociale est le deuxième déterminant le plus important. Alors que l'attente de performance s'est avérée être le facteur le moins important, les résultats montrent qu'elle a un effet positif sur l'intention des hommes d'utiliser les réseaux sociaux pour l'apprentissage, mais un effet négatif pour les femmes.

Mots clés: réseaux sociaux, théorie unifiée de l'acceptation et de l'utilisation des technologies (UTAUT), acceptation, apprentissage, modèle structurel des moindres carrés partiels.

Introduction

The Virtual University of Côte d'Ivoire (UVCI), which was established by decree No. 2015-775 of 9 December 2015, aims to develop and popularise distance education. In the 2021/2022 academic year, it enrolled more than 10 000 students residing in both rural and urban areas.

Through a digital platform, Moodle, the UVCI trains students in digital and computer science professions according to the Licence, Master, Doctorat system employing a wholly distance learning modus operandi.

Scattered across the country, UVCI students have formed communities in different regions and in neighbourhoods around Abidjan to support one another. Each has an elected official who coordinates activities and mentors new members. He/she is also the interface between the administration and students for any problems encountered.

Each community has created a WhatsApp group to support the communication initially carried out on Facebook. This tool will also be used for training purposes. In addition to social concerns, students

exchange information on socio-cultural activities, the integration of newcomers and courses and learning.

In the communities of Korhogo in the north of the country, Daloa in the centre-west and Man in the west, social networks are used for learning activities. Smartphones are employed for personal exchanges and sharing of resources (texts, images, videos, etc.). This corroborates Hamdani's (2019) assertion that modern learners are inclined to make use of social networks in learning activities. Mlaiki et al. (2012) note that they enable learners to continue learning activities outside the classroom using web tools, while Bandura and Walters (1963) state that social networks promote collaborative learning through rich exchanges between members. They facilitate peer exchange and improved learning, and enrich teaching and learning by enhancing their effectiveness (Alhedaithy and Almobarraz, 2017). Given that social networks were initially considered as entertainment platforms used during students' spare time to maintain friendly relationships (Thivierge, 2011), what factors have contributed to their acceptance in the field of teaching and learning? Nouhou et al.'s (2022) study at Niger's universities and colleges found that students' intention to use social networks was significantly influenced by performance expectancy, effort expectancy and social influence. This was also found to be the case among Indonesian students (Sidik and Syafar, 2020). A study conducted in Saudi Arabia concluded that variables such as learning expectancy, effort expectancy and social influence were significant predictors of students' intention to use mobile learning technologies (Alasmari and Zhang, 2019). Similarly, performance expectancy, social influence and facilitating conditions primarily determined Taiwanese physical education students' decision to use social networks in their training (Liu et al., 2016). Jung and Lee (2015) showed that in Japan, students' intention to use YouTube was primarily determined by performance expectancy. However, when learning occurs solely through distance learning platforms, social influence appears to be the only significant determining factor of such intention (Lin and Lin, 2019). In the African context, Adjanohoun and Agbanglanon (2022) found that social influence and effort expectancy rather than performance expectancy mainly determined the decision to employ social networks for learning among students at the Senegalese Virtual University. Our study sought to ascertain whether these findings

hold in the context of students at the UVCI and to investigate the factors that might influence their intention to use social networks for learning. It aimed to establish whether performance expectancy is of greater significance than social influence and whether the desire to perform well is the most significant factor.

The article begins by discussing the theoretical framework employed, followed by the methodology, the results of the data collection and analysis, and a discussion on the findings.

Theoretical Framework

Boyd and Ellison (2007) define digital social networks as communities of users connected through web platforms. Using the tools available on these platforms, users define profiles and share digital content within the network.

This study employed the Unified Theory of Acceptance and Use of Technology (UTAUT) model that sets out the factors that influence individuals' intention to adopt and use digital technologies in different environments (Venkatesh et al., 2016). In 2003, four researchers conducted an in-depth study of eight models of technology acceptance (Venkatesh et al., 2003). The UTAUT is a synthetic model that was built on the Theory of Reasoned Action (Ajzen and Fishbein, 1980); Technology Acceptance Model (Davis, 1989); Motivation Model; Theory of Planned Behavior (Ajzen, 1991); Combined Model of Technology Acceptance and Theory of Planned Behavior; PC Use Model; Diffusion of Innovations Theory (Rogers, 2003); and Social Cognitive Theory (Bourdon and Hollet-Haudebert, 2009). It posits that four factors determine user acceptance of technology, namely, performance expectancy, effort expectancy, social influence, and facilitating conditions. In the context of the UVCI, the use of the UTAUT model enabled us to identify the predictors of students' intention to accept and use social networks for learning, based on performance expectancy, effort expectancy, social influence, facilitating conditions, intention to use, and expectation of use (Venkatesh et al., 2003).

Performance expectancy relates to the belief that one will achieve better results by using social networks in one's learning. Many studies have established a positive correlation between performance expectancy and intention to use a technology (Attuquayefio and Addo, 2014; Khechine et al., 2016; McKeown and Anderson, 2016; Venkatesh et al., 2003). Performance expectancy has been found to be related to age and gender; the effect is generally stronger for men, especially younger men, than among women (Lin et al., 2017). This social difference between men and women is often linked to the priority placed by men on task success (Venkatesh et al., 2003).

Perceived ease of use of a technology also influences the decision to use it, particularly at the outset of its use in the phase often called the discovery phase. The longer the technology is used, the lower the perceived effort required; indeed, it may cease to be a factor once use of the technology becomes routine (Venkatesh et al., 2003). Perception of effort is linked to gender, age and experience, with perceived ease of use being the main determining factor for women, older people, and those with little experience of the technology (Venkatesh et al., 2003). For the purposes of our study, effort expectancy related to students' perception of the ease of use of social networks in their learning activities.

Social influence refers to an individual's perception of what those who are important to him/her think he/she should or should not do (Venkatesh et al., 2003). It affects behaviour through several psychological processes. Social influence relates to what an individual believes the social group to which he/she belongs would do (Thompson et al., 1991) rather than to what the individual believes significant others would think of him/her if he/she were to participate in learning using digital tools (Fishbein and Ajzen, 1975). This is also true in the case of teachers using digital tools in their teaching practices (Coulibaly, 2019). Lastly, social influence refers to the fact that the individual believes that using technology will improve his/her image in relation to his/her social group (Moore and Benbasat, 1991). Venkatesh et al. (2003) show that these factors are only really significant in cases where the use of technology is an obligation. In this case, conforming is the result of social pressure. However, it should be noted that social influence also gradually decreases over time with use. The more experienced an individual becomes in using the technology, the less social influence will be felt, even if its use was initially a compulsion. In our study, social influence related to students' perceptions of who they trust to know whether or not to use social networks in their learning activities (Venkatesh et al., 2003).

Facilitating conditions encompass an individual's belief that organisational and technical infrastructure exists that will assist them in using the technology (Venkatesh et al., 2003). This leads him/her to believe that the necessary resources and skills are available and that assistance will be on hand at any time. Lastly, facilitating conditions correspond with the individual's way of working (Venkatesh et al., 2003). Their importance increases as the individual gains more experience and encounters difficulties in using the technology. Older people have been found to be more sensitive to these factors (Mensah and Onyancha, 2021). In our study, the facilitating conditions related to students' perception of the presence of organisational and technical infrastructure to support them to use social networks effectively for learning.

In the UTAUT model, intention to use measures the degree of acceptance of the technology. It is thus the explanatory variable. It includes a temporal dimension, i.e., the fact that an individual considers, predicts or plans to continue using the technology, or to re-use it in the short or medium term. In our context, the intention to use and the expectation of use of social networks for learning were linked to students' desire and ambition to use social networks for learning.

With reference to the UTAUT model, we formulated the following hypotheses:

H1: Effort expectancy positively influences the intention to use social networks for learning.

H2: Performance expectancy has a positive effect on the intention to use social networks for learning.

H3: Social influence has a positive effect on the intention to use social networks for learning.

H4: Facilitating conditions have a positive influence on the intention to use social networks for learning.

H5: Intention to use social networks for learning has a positive effect on the expectation of use of social networks for learning.

Methodology

Data Collection

Data were gathered by means of an online questionnaire based on the UTAUT model (Venkatesh et al., 2003). The primary aim was to ascertain whether performance expectancy was more influential than social influence in determining UVCI students' intention to use social networks for learning. The questionnaire was adapted from previous research to make it relevant to the African context (Adjanohoun and Agbanglanon, 2020; Nouhou et al., 2020; Nyebe Atangana et al., 2020). It was administered from 30 September to 10 November 2021 using the UVCI students' mailing list for the 10 125 students enrolled from first-year Bachelor's to Master's level in the 2021/2022 academic year.

After obtaining authorisation from the university to conduct the research, we were granted access to the UVCI's technological infrastructure, enabling us to send the link for the questionnaire to students. They were assured that their participation was voluntary and that they would remain anonymous.

This online questionnaire included 21 items with ordered answers on a 7-level Likert scale, oriented according to the variables of the UTAUT model. It began with general demographic data and the respondents' attitudes towards social networks. A total of 315 students returned completed questionnaires, representing a response rate of 3.11%.

Data Processing

The responses to the questionnaire were exported to Excel before processing. The spelling of the training specialties indicated by students and the different social networks in the responses was corrected to ensure consistency. In order to obtain the frequencies of training specialties and social networks, the Excel file was exported to *R software* (R Core Team, 2021), a programming language and free software for statistics and data science supported by the R Foundation for Statistical Computing.

The processing of the UTAUT data was based on a partial least squares structural equation model. The *SEMinR* package (Ray et al., 2021) of the R software was used for this purpose. Structural equation models enable an examination of the latent variables defined by manifest variables (see Table 1) and the complex relationships between them

(Bollen, 1989; Hoyle, 2012; Rivera, 2015; Schumacker and Lomax, 2015). Known as second generation multivariate statistical methods, they are based on two approaches to parameter estimation, namely, analysis of covariance and analysis of variance. The latter method underlies partial least squares structural equation models. The fact that partial least squares structural equation models are free from any assumption of normality of the data distribution (Latan and Noonan, 2017; Hair et al., 2019) justified our decision to use them.

Results

Characteristics of the Sample

Figure 1 shows that more than three-quarters (78.7%) of the respondents were male. As illustrated in Figure 2, their age ranged from 15 to 56 years, with a median of 24 years.

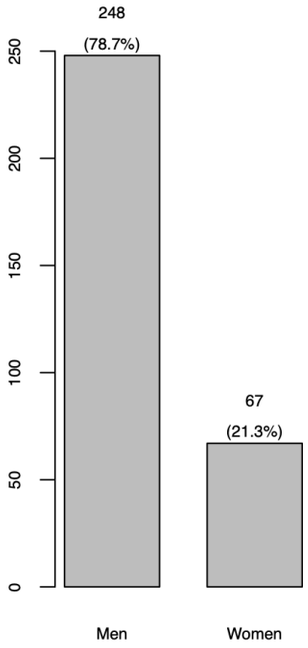

Figure 1: Structure of the sample by gender

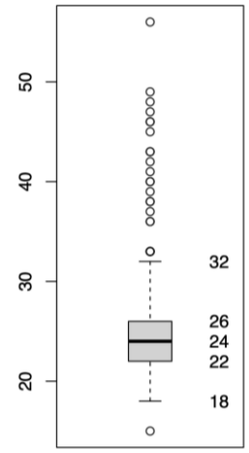

Figure 2: Age distribution of the respondents

The majority of the respondents were in the final year of the Bachelor's level (69.8%), followed by those in the second year of this level (20%).

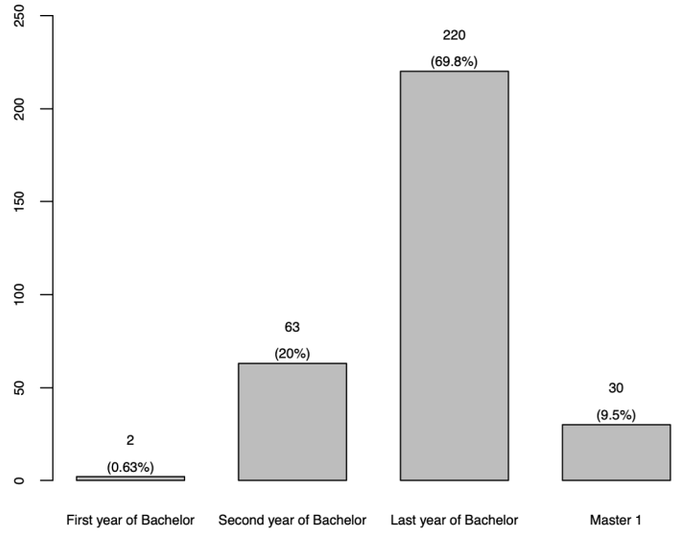

Figure 3: Structure of the sample by level of study

The results revealed that 77.1% of the respondents used social networks for learning, with the remaining 22.9% using the UVCI's teaching platform (LMS), which is the institutional training space laid down in the curriculum.

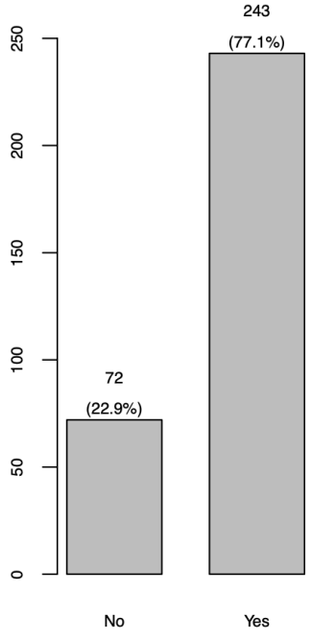

Figure 4: Proportion of students who reported using social networks for learning

The findings showed that WhatsApp was the social network most used by the respondents for learning, ahead of YouTube and Facebook.

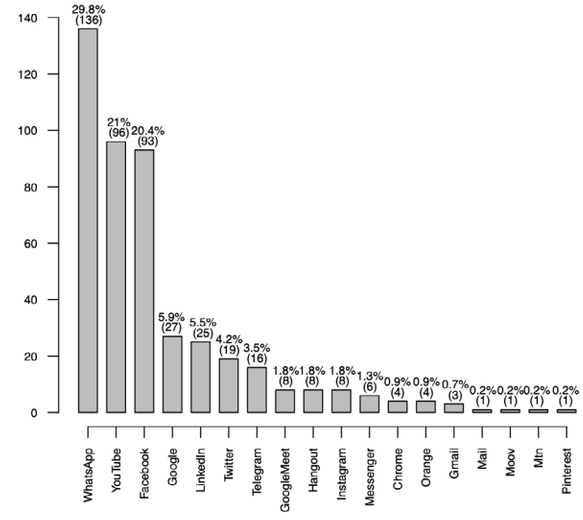

Figure 5: Frequency of reported social networks used for learning

The majority of the participants in the study were enrolled in the Digital Communication programme, and were studying technology.

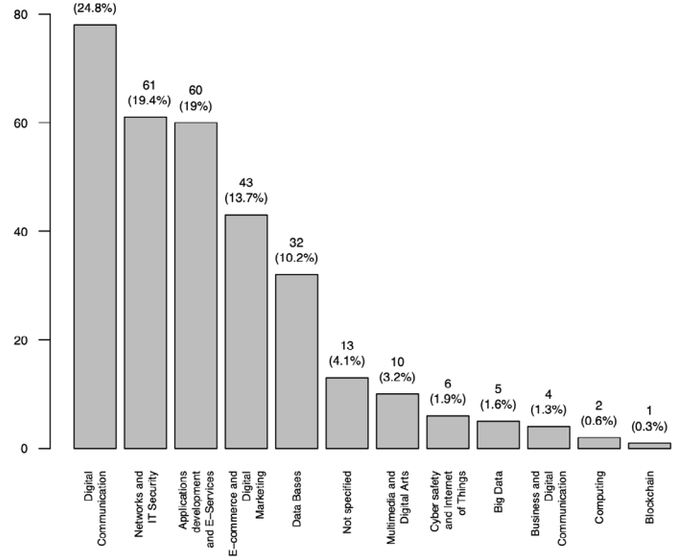

Figure 6: Respondents' field of study

Measurement Model

Prior to evaluating the research model to detect the links between the different constructs, namely, effort expectancy, performance expectancy, social influence, facilitating conditions, intention to use and expectation of use, the quality of the measurement model was assessed by examining the reliability of the indicators, the reliability of the internal consistency of the constructs, their convergent validity and their discriminant validity. The reliability of the indicators was assessed by examining their factor loadings; factor loadings above 0.708 are considered satisfactory. Observation of composite reliability (CR) values allows the reliability of the internal consistency to be assessed. These must be between 0.7 and 0.9 to be considered acceptable to good, but without reaching the 0.95 threshold, which would be problematic. Convergent validity is assessed by examining the average variance extracted (AVE) values. Acceptable AVE values are above 0.5. Discriminant validity is assessed through the heterotrait-monotrait criterion (HTMT). Values of the criterion greater than 0.9 are undesirable, as they show that the indicators of the construct concerned are more correlated with other constructs than with the one they are supposed to define (Hair et al., 2019).

We noted moderately satisfactory reliability of the indicators of our measurement model as the factor loadings of the different constructs were above 0.708, except for the second construct of facilitating conditions (FA_CON2) and the fourth one of performance expectancy (PE_EX4), for which the loadings were 0.6 and 0.68, respectively (Table 1). However, the values of the average variance extracted were all above 0.5, suggesting that the convergent validity of the measurement model was suitable. Composite reliability was satisfactory for performance expectancy (0.87), effort expectancy (0.92), social influence (0.87) and the facilitating conditions (0.83). In contrast, for intention to use and expectation of use, the values (0.97) exceeded the problematic threshold of 0.95. This suggests that the items relating to intention to use and expectation of use presented nuances that our respondents found difficult to detect, even though they have given rise to satisfactory CR in other studies (Adjanohoun and Agbanglanon, 2022; Nouhou et al., 2022).

Table 1: Quality of the measurement model

Latent variable	Item (manifest variable)	Factorial loading	Average variance extracted (AVE)	Composite reliability (CR)
Performance expectancy (PE_EX)	PE_EX1: I find social networks useful in my education.	0.80	0.63	0.87
	PE_EX2: Using social networks allows me to complete learning tasks more quickly.	0.83		
	PE_EX3: Using social networks improves the quality of my learning.	0.85		
	PE_EX4: If I use social networks, I will increase my chances of getting good grades.	0.68		
Effort expectancy (EF_EX)	EF-EX1: It would be easy for me to become skilled in using social networks for my education.	0.83	0.74	0.92
	EF_EX2: My interaction with social networks in my education is clear and understandable.	0.84		
	EF_EX3: I find social networks easy to use for my education.	0.91		
	EF_EX4: Learning to use social networks in training is easy for me.	0.88		
Social influence (SO_INF)	SO_INF1: People who are important to me (parents, friends...) think I should use social networks for my education.	0.81	0.63	0.87
	SO_INF2: My peers, colleagues, or people close to me think I should use social networks for my education.	0.80		
	SO_INF3: The opinion of the authorities at my institution (university, faculty, school or institute) was decisive in using social networks for my education.	0.79		
	SO_INF4: In general, my institution (university or school) encouraged the use of social networks for my education.	0.76		

Facilitating conditions (FA_CON)	FA_CON1: I have the knowledge to use social networks in my education.	0.86	0.62	0.83
	FA_CON2: A specific person (or group) is available for assistance in case of difficulties in using social networks for my education.	0.60		
	FA_CON3: I have the necessary resources to use social networks in my education.	0.88		
Intention to use (INT_US)	INT_US1: I intend to use social networks for my education in the next six months.	0.94	0.91	0.97
	INT_US2: I predict that I will use social networks for my education in the next six months.	0.96		
	INT_US3: I plan to use social networks for my education in the next six months.	0.97		
Expectation of use (EX_US)	EX_US1: I expect to use social networks for my education in the next six months.	0.96	0.92	0.97
	EX_US2: I will use social networks for my education in the next six months.	0.96		
	EX_US3: I am likely to use social networks for my education in the next six months.	0.95		

Table 2: Hétérotrait-Monotrait criterion

	FA_CON (facilitating conditions)	EF_EX (effort expectancy)	PE_EX (performance expectancy)	SO_INF (social influence)	INT_US (intention of use)
EF_EX (effort expectancy)	0.75				
PE_EX (performance expectancy)	0.54	0.81			
SO_INF (social influence)	0.71	0.71	0.64		
INT_US (intention of use)	0.63	0.65	0.59	0.64	
EX_US (expectation of use)	0.60	0.63	0.58	0.62	0.96

Structural Model

The main determining factor of the intention to use social networks for learning among UVCI students was effort expectancy (β = 0.34 and p < 0.001). The results also showed that social influence (β = 0.28 and p < 0.001) was more important than performance expectancy (β = 0.15 and p < 0.05). According to the results, intention to use predominantly determined the expectation of using social networks for learning among UVCI students (β = 0.9 and p < 0.001), unlike facilitating conditions (β = 0.032 and p > 0.05) which had no significant effect.

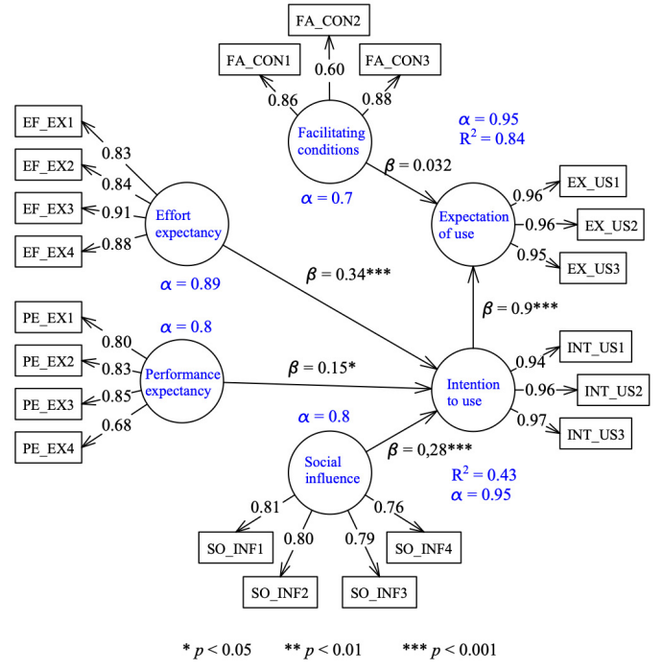

Figure 7: Results of the structural model

A multi-group analysis showed a significant difference (p = 0.0015) between men (β = 0.24) and women (β = -0.34) regarding performance expectancy's influence on the intention to use social networks for learning. This was positive for men, but negative for women. This suggests that men expect their use of social networks for learning to improve their academic performance, while the opposite is noted for women.

No significant difference was found in terms of the determining factors of intention to use and expectation of use of social networks for learning between Master's students (Master 1 and Master 2) and Bachelor's students (first year, second year and final year).

Discussion

The aim of this study was to identify the factors that promote students' intention to use social networks in their learning. It was conducted in the context of UVCI distance education, where students are required to use ICT. While social networks have been presented as mainly geared towards entertainment, the results showed that students use them for learning and that effort expectancy is the main factor that motivates them to do so at the UVCI.

Five hypotheses were formulated in relation to students' expectations when using social networks for learning. The first, which related to effort expectancy, is accepted as it was found to be the main factor that determined intention to use social networks among UVCI students. This result is consistent with those of Venkatesh et al. (2003) who correlated users' perceptions of effort with their experience of this technology, as well as Nouhou et al. (2022) and Alasmari and Zhang (2019) who found that effort expectancy determined the decision to accept social networks for learning. In the case of the UVCI, students confirmed that they had little experience of employing such networks for learning. Students who feel that learning using social networks requires much effort are likely to be less inclined to use them. The fact that they are user-friendly and enjoyable promotes a sense of ease of use in a learning environment.

The second hypothesis that performance expectancy impacts intention to use social networks for learning was found to be conditioned by gender amongst UVCI students as it was positive for men and negative for women. Thus, men expect to perform better academically by using social networks for learning, whereas women do not. This result is consistent with those of Venkatesh et al. (2003) who concluded that, in terms of the UTAUT model, young men's performance expectancy was much higher than that of women. This is essentially because men are more task-oriented than women and due to the fact that these differences in behaviour are induced by specific characteristics shaped by gender roles (Eagly et al., 2012). Nouhou et al. (2022) concluded that performance expectancy was a determining factor in Niger students' choice to use social networks, without specifying gender particularities.

However, our results show that performance expectancy was of less importance than social influence, which validates our third hypothesis. The image conveyed to others seemed to be more important for UVCI students in virtual communities across the cities of Côte d'Ivoire. This is supported by the findings of Moore and Benbasat (1991), who note that individuals aim to enhance their image by participating in activities that employ technological tools. Being outside the communities of learners that mainly use social networks to communicate and learn would isolate the student. These results are in line with those of Coulibaly (2019), who concluded that teachers are influenced by the immediate environment in which they evolve, particularly with regard to the use of digital technology in their teaching practices. Alasmari and Zhang (2019), Nouhou et al. (2022), and Adjanohoun and Agbanglanon (2022) also found that social influence determines students' willingness to learn through social networks.

The study found that facilitating conditions had no effect on the use of social networks among UVCI students, in contrast to the small but significant effect found at the Virtual University of Senegal (Adjanohoun and Agbanglanon, 2022). Despite having only recently begun using social networks for learning, students do not wait for facilitating conditions before starting. Indeed, they are of the view that they have the necessary knowledge to do so, based on their personal experiences with social networks. This also means that they do not feel any need for assistance. Lastly, it was concluded that the intention to use has a primary influence on the expectation of using social networks for learning among UVCI students. This conditions future use and thus influences their expectations.

Conclusion

The study on which this article is based drew on the UTAUT model to identify the factors that determine UVCI students' use of social networks for learning. These students are enrolled in a higher education institution where teaching is mediated by digital tools. The question was

whether students' intention to use social networks for learning purposes was influenced by perceptions that it would improve their academic performance. The study also investigated whether UVCI students' use of social networks for learning purposes was primarily driven by the social influence exerted by their close circle.

Our research revealed that effort expectancy was the most important factor determining UVCI students' intention to use social networks for learning purposes, while the second most important was social influence, followed by performance expectancy. This result was unexpected, as performance expectancy was predicted to take precedence over other factors. It can thus be concluded that the added value that UVCI students hope to gain from using social networks for learning purposes, in terms of improving their academic results, was less important than the influence of those around them.

Further research is suggested on possible links between UVCI students' acceptance of social networks for learning and teachers' use of these networks in their teaching practices. It would also be interesting to compare the factors that determine the use of social networks for learning among students at the Virtual University of Senegal (UVS) and those at the UVCI, given their common specificities, i.e., the use of digital tools in teaching and learning.

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The Influence of Plagiarism Policy Implementation on the Quality of Academic Writing Among Postgraduate Students at the University of Dar es Salaam

Moshi Amsi Mislay and Ahadi Mzumbwe Anania

Abstract

Plagiarism policies have become an important feature of quality assurance practices in higher education institutions around the world, with a focus on improving the quality of academic writing and other research products. The University of Dar es Salaam (UDSM) purchased Turnitin software in 2015 to detect plagiarism in academic writing, including postgraduate theses, dissertations, term papers and assignments. This article examines the implementation of the university's plagiarism policy using the case of postgraduate students' theses and dissertations in selected academic unit (SAU). A sample of 556 postgraduate theses and dissertations submitted to SAU for plagiarism testing between January 2016 and December 2021 was collected, tested using Turnitin, and analysed to establish the trend and extent of plagiarism following policy adoption. Moreover, the study aimed to identify the limitations of using Turnitin to detect academic cheating among postgraduate students. The findings indicated that although the adoption of Turnitin software has reduced the trend in plagiarism in theses and dissertation writing, its effectiveness is limited because it fails to detect plagiarism levels within individual chapters of theses or dissertations. It is recommended that the plagiarism policy be reviewed to take into account new strategies that focus on individual chapters as well as the tolerance level of 30%, which seems high. Policies that address plagiarism content in postgraduate curricula should also be considered.

Key words: plagiarism, plagiarism policy, theses, dissertations, Similarity Index, academic writing, literature review

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Résumé:
Les politiques de lutte contre le plagiat sont devenues une caractéristique importante des pratiques d'assurance qualité dans les établissements d'enseignement supérieur du monde entier, l'accent étant mis sur l'amélioration de la qualité des écrits universitaires et des autres produits de la recherche. L'Université de Dar es Salaam (UDSM) a acheté le logiciel Turnitin en 2015 pour détecter le plagiat dans les écrits académiques, y compris les thèses de troisième cycle, les dissertations, les mémoires et les devoirs. Cet article examine la mise en œuvre de la politique de l'université en matière de plagiat à l'aide du cas des thèses et mémoires des étudiants de troisième cycle dans les unités académiques sélectionnées (SAU). Un échantillon de 556 thèses et mémoires de troisième cycle soumis à l'UAS pour un test de plagiat entre janvier 2016 et décembre 2021 a été collecté, testé à l'aide de Turnitin et analysé pour établir la tendance et l'étendue du plagiat après l'adoption de la politique. En outre, l'étude visait à identifier les limites de l'utilisation de Turnitin dans la détection de la tricherie académique parmi les étudiants de troisième cycle. Les résultats indiquent que bien que l'adoption du logiciel Turnitin ait réduit la tendance au plagiat dans les thèses et les mémoires, son efficacité est limitée car il ne parvient pas à détecter les niveaux de plagiat dans les différents chapitres des thèses ou des mémoires. Il est recommandé de revoir la politique en matière de plagiat afin de prendre en compte les nouvelles stratégies axées sur les chapitres individuels ainsi que le niveau de tolérance de 30 %, qui semble élevé. Les politiques qui traitent du contenu du plagiat dans les programmes d'études de troisième cycle devraient également être envisagées.

Mots clés: plagiat, politique en matière de plagiat, thèses, mémoires, indice de similitude, rédaction universitaire, analyse documentaire.

Introduction

Plagiarism policies have become an important aspect of quality assurance (QA) and control practices in higher education institutions around the world (Ryan, 2015). The focus is on improving curriculum, pedagogy, and evaluation processes. State regulations require every institution to develop, adopt, and implement a QA policy which includes plagiarism detection and prevention in academic writing (UNESCO, 2015).

Quality assurance is understood as a systematic process whereby an institution conducts assessment and verification of inputs, outputs, and outcomes against standardised quality benchmarks (Ryan, 2015). The purpose is to enhance and maintain quality, ensure greater accountability, and facilitate harmonisation of standards across academic programmes, institutions, and systems. Quality assurance practices also include several other approaches, including institutional self-assessment, inspection, accreditation, and curriculum review, or academic audits conducted by external bodies, and independent peer reviews (UNESCO, 2018).

Plagiarism detection and prevention are important aspects of QA as they affect the quality of graduates and institutional academic integrity (Smith, 2013). Thus, higher education institutions need to develop, adopt, and implement QA policies that include plagiarism prevention and detection strategies to meet both national and international standards. Investment in technology and training has been a recent feature of QA policy strategies (UNESCO, 2018).

Plagiarism is a form of academic cheating that occurs when students submit academic work that is not their own that has been taken or directly copied from other sources without proper acknowledgement (Yacine and Radia, 2021). Universities reserve the right to protect the academic integrity of degree awards by all means, including the adoption of anti-plagiarism policies. As such, these policies are not set as a trap, but aim to protect the university's academic integrity and reputation.

Research indicates that students' awareness of plagiarism tends to reduce its incidence in their academic work. For example, Curtis and Tremayne (2019) found that plagiarism trends decreased in Australia following increased student awareness of this phenomenon. However, despite universities' formulation, adoption, and implementation of various policy strategies to reduce academic cheating, studies indicate that plagiarism remains a problem among students in many higher education institutions around the world (Farahian et al., 2020; Yacine and Radia, 2021; Clarke et al., 2022). Empirical evidence indicates that the University of Dar es Salaam (UDSM) suffers a similar problem (Mbilinyi and Msuya, 2018; Muga, 2019).

Higher education in Tanzania expanded rapidly following the implementation of the Education and Training Policy in 1995 (Ministry of Education and Culture, 1995) and the National Higher Education

Policy in 1999 (Ministry of Science, Technology and Higher Education, 1999). These policies liberalised the higher education subsector, resulting in an increase in the number of higher education institutions and students' enrolled (Mkude et al., 2003). The UDSM was tasked to expand its postgraduate programmes to produce graduates to work in newly-established higher education institutions and other sectors. This was also aimed at enabling the UDSM to compete in the higher education market (UDSM, 2016). The *University Vision 2061* states that:

> UDSM will in the coming years and decades prioritize the focus on postgraduate training. This will see a major transformation to a renowned graduate university with befitting programmes and learning environment. Therefore, appropriate capacity will be built with heavy emphasis on the number of programmes and on the relevance, quality of training and competitiveness of training programmes and delivery. Recruitment of staff will be open – considering from the country, region and internationally. Sustainable arrangements will be made to promote availability of students' scholarships and to improve the training and research as well as living facilities for postgraduate training (UDSM, 2012, p. 3).

The expansion and prioritisation of postgraduate training meant that more programmes were introduced. Since research is a major component of most postgraduate programmes and training, there was a need to improve the teaching and learning environment, including facilities, funding, and staffing.

Before the year 2000, the *University Teaching and Learning Improvement Programme* (UTLIP) was introduced to improve teaching and learning at the UDSM (Mbwette, 2001; UDSM, 1995, 1986). From 2000 to 2007, the university conducted a review to prepare, adopt, and implement its *Quality Assurance Policy* (UDSM, 2007). The policy was implemented across its academic units through curriculum reviews, academic audits, and plagiarism policy formulation, among other strategies (UDSM, 2007). It was an important step given increasing student enrolment and Internet use amidst declining human and material resources (UDSM, 2012).

Before the adoption of the UDSM plagiarism policy in 2015 and the subsequent purchase of Turnitin software, there were no specific

strategies to detect and prevent plagiarism among academic staff, supervisors, and students in assignments, theses, or dissertations. The policy raised students' awareness by informing them that if they were found to be guilty of academic dishonesty they would be considered for "an examination irregularity and shall be discontinued forthwith from studies" (UDSM, 2013, p. 10). It was also stated that if such practices were "discovered after the candidate has been awarded a degree, the University shall have the power to withdraw the award" (p. 10).

In 2016, the policy document, *Guidelines and Regulations for Plagiarism and Deployment for Postgraduate Students for Teaching or Technical Assistants* (UDSM, 2016) was produced to define, and set strategies for plagiarism prevention, detection, the tolerance level, disciplinary measures, and appeals for both staff and students. It stated that "Turnitin software will be the main tool for detecting plagiarism" (UDSM, 2016, p. ii).

Turnitin is an "internet-based originality checking service that was launched in 1997 to check files against its database in addition to the content of other websites to secure academic integrity" (Balbay and Kilis, 2019, p. 26). It is commercially available at https://www.turnitin.com. An institution pays to access the website and use Turnitin to test academic papers. Turnitin generates a Similarity Index (SI) which expresses the percentage of words in a text that matches other sources in the Internet databases (Bruton and Childers, 2016).

Following Turnitin's purchase, academic staff throughout the university received training to ensure that all academic units operate on the same understanding of plagiarism and encourage its use in testing students' academic work. As noted in the policy document:

> The University of Dar es Salaam has installed the Turnitin Software ... to detect plagiarism and will provide training in the use of this or other plagiarism detection software and the interpretation of the automatically generated originality report. Once an assignment is submitted by a student, it will be uploaded to the software by the supervisor. The software generates the originality report showing the parts of the assignment that may have been plagiarized, together with a list of probable plagiarized sources used by the student... There is no clear threshold percentage for defining the safe cut-off point of plagiarism. But as a guide, a returned percentage of below

15 from the Turnitin originality report may indicate that plagiarism has not occurred. A returned percentage of 30 and above could be considered plagiarism has occurred (UDSM, 2016, p. 2).

The policy statement sets a tolerance level of 30%. This means that an assignment, dissertation, or thesis with an SI of more than 30% indicates that plagiarism has occurred. Those with an SI below 30% will be accepted for the award of a degree.

The implementation of the UDSM plagiarism policy also involved making it part of the university's strategic planning and management (see the *Five-Year Rolling Strategic Action Plan 2020/2021–2024/2025* (UDSM, 2020). University management considers the production of quality academic output as one of the core values of the University "in line with international quality standards and academic integrity" (UDSM, 2020, p. 5).

Problem Statement

Plagiarism is a prevalent practice in academic writing, with a significant impact on the integrity of postgraduate research and the quality of academic programmes. Its prevalence not only undermines the credibility of assignments, theses, or dissertations, but also raises concern about the effectiveness of existing institutional QA policies that aim to enhance the quality of programmes. While many higher education institutions have adopted plagiarism policies, their influence on the quality of postgraduate students' academic writing remains unclear. Our study examined the influence of the implementation of the UDSM plagiarism policy on the quality of academic writing, focusing on postgraduate students' theses and dissertations.

Purpose and Objectives of the Study

The purpose of this study was to examine the influence of the implementation of the UDSM plagiarism policy on the quality of postgraduate students' academic writing with a specific focus on theses and dissertations. Its objectives were to:

1. Examine the influence of Turnitin as a plagiarism policy implementation tool on the quality and originality of postgraduate students' theses and dissertations;

2. Identify the limitations of using Turnitin software to detect plagiarism in postgraduate students' theses and dissertations.

Research Questions

The study aimed to answer the following two research questions:

1. How has the adoption of Turnitin as a plagiarism policy implementation tool influenced the quality and originality of postgraduate students' theses and dissertations?

2. What are the limitations of using Turnitin software to detect plagiarism in postgraduate students' theses and dissertations?

Significance of the Study

This study's findings contribute to the body of knowledge on higher education quality in the following ways: First, they contribute to the ongoing debate on the effectiveness of institutional QA policy strategies aimed at improving the quality of academic writing among postgraduate students. Second, the findings inform higher education policy-making by raising the question on the effectiveness of plagiarism policy strategies. Third, they inform higher education postgraduate programme managers, course instructors, and students on the causes, impact, and strategies to reduce plagiarism in academic writing, including theses and dissertations. Fourth, the findings inform the postgraduate supervision process by raising supervisors and students' awareness of the influence of Turnitin in plagiarism testing in theses and dissertations. Lastly, they provide feedback to university management on the effectiveness of Turnitin in improving the quality of postgraduate theses and dissertations.

Literature Review

Conceptualising Plagiarism and its Causes

There are varied conceptualisations of plagiarism in the literature, with scholars referring to it as "academic dishonesty", "academic cheating", "academic misconduct", or "academic fraud" (Selemani et al., 2018). These concepts all refer to the same phenomenon. Plagiarism is conceptualised as a form of academic cheating and an offence that involves presenting another person's words, ideas, data,

design, or artwork without acknowledging the author (Coughlin, 2015). It is a serious matter as it tends to devalue degree programmes, to the detriment of both students, and the university (Farhian et al., 2020).

There are different views on the causes of plagiarism. Pecorari (2008) considers it as a "linguistic phenomenon" rather than a violation of rules or ethical principles as conceptualised by Clarke et al. (2022), because the act is incomplete until the plagiariser "writes or speaks about the work or idea, identifying it as his or her own" (p. 1). Thus, for Pecorari, plagiarism is a matter of language use. The literature identifies three forms of textual plagiarism. The first is *prototypical plagiarism* which refers to the use of words and/or ideas from another source without appropriate attribution in order to deceive (Howard, 1995; Pecorari, 2008). The second is *patch-writing*, which refers to copying from a source text and then deleting some words, altering the grammatical structure, or replacing a word with a synonym. Coughlin (2019) identifies the third type, namely, using other authors' unique ideas, data, or evidence without referring to the source. Students who commit plagiarism fail to acknowledge, paraphrase, summarise, and use quotation marks.

Students' decision to plagiarise is influenced by, among other things, peers' approval or disapproval, and observation of their good or bad behaviour, which if not controlled, attracts other students to do the same (Coughlin, 2015). Recent studies such as Farha et al. (2021), Mbilinyi and Msuya (2018), Selemani et al. (2018), Riasati and Rahimi (2013), Zafarghandi et al. (2012); Anney and Mosha (2015), and Ose et al. (2016) identify pressure to score high grades; students' laziness; tight deadlines and a lack of good academic writing skills as causes of plagiarism. Other causes include a lack of knowledge among students of what constitutes plagiarism; easily accessible resources; the high cost of studying; family pressure; a heavy academic workload; poor design of assignments by lecturers; and the inability to select, review and properly acknowledge sources (Riasati and Rahimi, 2013; Clarke et al., 2022).

According to Anney and Mosha (2015), low levels of English competence among second-language speakers is among the factors that cause plagiarism, while Zimba and Gasparyan (2021) add a lack of creative thinking. Increased student enrolment could also be a factor as staff do not have the time to check for plagiarism in students' work (Zimba and Gasparyan, 2021).

Understanding Plagiarism Using the Social Learning Theory

Students' plagiarism behaviour can be explained by Bandura's (1963) Social Learning Theory which states that any behaviour can be learned, unlearned, and regulated through the interaction of various factors operating in the student's mind, the environment, and the surrounding society. Bandura notes that cognitive factors such as reciprocal determinism/causation, modelling, self-efficacy, and self-regulation can influence plagiarism.

Reciprocal determinism posits that the world and a person's mind and behaviour influence each other. Thus, postgraduate students' thinking may determine their propensity to plagiarise. Modelling refers to the fact that postgraduate students learn to plagiarise by observing or imitating other students or lecturers (Bandura, 1963). The concept of self-efficacy infers that students plagiarise due to poor academic writing skills. Self-regulation involves students self-monitoring their behaviour and its effects on academic writing standards and environmental circumstances. In other words, it is about students' ability to understand and manage their behaviour and reactions to events around them. Environmental and social factors include reinforcement and punishment. Reinforcement is "a form of incentive motivation operating through outcome expectation rather than automatic strengtheners of responses" (Bandura, 1963, p. 36). In the case of postgraduate programmes, reinforcers may include limited time for assignments, proposal and thesis writing, or pressure to complete one's studies in the scheduled time (Ormrod, 2012). The UDSM plagiarism policy discussed above includes punishment as a disciplinary measure.

Overview of Plagiarism Policies and Their Implementation in Higher Education

The concept of plagiarism gained prominence in the US in 1884 when the American Historical Association adopted and defined it as the use of someone's else concepts, theories, rhetorical strategies, and interpretations as well as word-for-word copying (Fishman, 2015).

Plagiarism policy formulation, adoption, and implementation gained traction in higher education institutions during the 1990s. Since the year 2000, such policies have been adopted by all the members of

the European Union (EU) (Glendinning, 2013). A joint project, *Impact of Policies for Plagiarism in Higher Education Across Europe* was implemented to identify strategies to combat plagiarism in higher education institutions across the EU. It captured case studies with good practice, evaluated new interventions to prevent or detect plagiarism, and developed strategies to discourage it (Glendinning, 2013).

The Tanzania Commission for Universities (TCU) requires all higher education institutions to develop, adopt, implement, and evaluate institutional QA policies (TCU, 2014, 2019). Its policy document states that "Every University shall establish an institutional policy and guidelines focused on upholding and preserving the culture and attitude of academic integrity with respect to both staff and students and in all academic functions and social settings in the University" (TCU, 2019, p. 144). It adds that "Every University shall require candidates for dissertation/thesis examination to submit electronic copies as well as hard copies of the dissertations, theses and any other material submitted for examination or assessment to authenticate their originality" (TCU, 2019, p. 145).

An important step in plagiarism policy implementation involves setting an accepted SI level. This varies from one higher education institution or publisher to another. Thus, some higher education institutions and journals accept SI tolerance levels of between 5% and 15% (Miller, 2020). The UDSM has set an acceptance level of 30% (UDSM, 2016). Other universities like Harvard have plagiarism policies but they do not specify the accepted SI level. Instead, they emphasise that staff and students should avoid plagiarism (Harvard College, n.d.). Similarly, the University of Oxford's plagiarism policy defines Turnitin and sets out how to use it, the support and training provided, and appropriate sanctions when plagiarism is detected in a student's work (https://help.it.ox.ac.uk/turnitin).

In India, the University Grants Commission categorises plagiarism into three levels. Level One is when SI is between 10% and 40%, in which case the student is not awarded any marks or credits and is advised to revise and resubmit the manuscript within six months. Level Two falls between 40 and 60%, when students receive no marks or credits but may revise and resubmit after a year but not exceeding 18 months. Level Three is above 60%. In this case, no marks or credits are awarded and the student's course registration is cancelled (Nundy et al., 2022).

Many publishers of books and journals have also adopted plagiarism policies. For example, Taylor and Francis' website provides explanations to authors on the meaning and types of plagiarism, detection strategies, and how to avoid it (https://authorservices.taylorandfrancis.com). It states that "Any allegations of plagiarism or self-plagiarism/text-recycling made to a journal will be investigated by the editor of the journal and Taylor and Francis, following COPE [Committee on Publication Ethics] guidelines".

The implementation of plagiarism policies varies from one university to another, but generally includes setting policy objectives, providing training to raise awareness and promote avoidance, and adopting plagiarism detection software.

Experience from other universities such as those in Botswana shows that plagiarism can be eliminated or reduced by empowering students with knowledge of its effects on education quality (Batane, 2010; Bethany, 2016). This can be achieved by introducing plagiarism-related content as part of undergraduate and postgraduate curricula. Smith (2013) advocates for student-centred approaches to plagiarism management based on the assumption that implementing plagiarism policies through teaching enhances the quality of inexperienced and novice writers. However, recent studies (Farha et al., 2021; Mbilinyi and Msuya, 2018; Selemani et al., 2018; Anney and Mosha, 2015) point to high levels of plagiarism among postgraduate students despite their awareness and understanding of this phenomenon. This can be attributed to personal attitudes, poor language proficiency, and poor academic writing skills (Habali and Fong, 2016).

Plagiarism policy implementation includes the adoption of plagiarism detection tools such as Ithenticate; JPlag; the Glatt Plagiarism Screening Program (GPSP); plagiarism checker; Plagiarism scanner; plagScan; PlagTracker; Exatus Like; Grammarly; and DupliCheck (Khaled and Al-Tamimi, 2021; Zimba and Gasparyan, 2021; Nafsa, 2021; Jiffriya et al., 2021). Khaled and Al-Tamimi (2021) list the various methods used by scholars to detect plagiarism including the latent semantic analysis (LSA) method; sematic-based method; syntax-based method; structure-based method; citation-based method; and classification and cluster-based method, amongst others. Other plagiarism detection software includes Check.org©; checkforplagiarism.net©; Copyleaks; Copyscape;

copytext©; Duplichecker©; Turnitin®; Unicheck; Whitesmoke©; and Wordpress Plugin©. However, few studies have been conducted on their effectiveness in higher education settings.

Studies conducted at the UDSM by Mbilinyi and Msuya (2018) and Muga (2019) point to the existence of plagiarism in students' work and thus, the need for policies and strategies to detect and control it. While the university developed and implemented its plagiarism policy in 2016, its impact on the quality of academic writing has not yet been investigated. Our study aimed to fill this gap by focusing on postgraduate students' theses and dissertations.

The Impact of Plagiarism Policies on Academic Integrity and Research Skills

There are mixed findings on how the implementation of plagiarism policies fosters academic integrity among postgraduate students. Fiona et al. (2014) show that plagiarism policy enhances students' overall knowledge and skills in writing scholarly work and that language confidence and language background helped to improve such skills. The majority of studies highlight the need to educate students about the meaning and impact of plagiarism rather than focusing on punitive measures (Zimba and Gasparyian, 2021; Hafsa, 2021). However, Anney and Mosha (2015) found that despite students' awareness of plagiarism and its effects, they still committed it.

Turnitin has been used for almost two decades by many universities across the world to detect and control plagiarism in academic writing, including essay assignments, theses, dissertations, and term papers (Nketsiah, et al., 2023). Studies show that it is effective in detecting plagiarism in academic writing because it shows the percentage of texts taken from other databases published in books, book chapters, Internet blogs, journal articles, conference papers, and related articles (Balbay and Kilis, 2019; Bruton and Childers, 2016; Gallant et al., 2019; Nketsiah et al., 2023). Miller (2020) noted that "the similarity score is a heterogeneous construct. For example, a score of 20% could mean that 20% of the manuscript matches a single source, or 20 different sources each with 1% similarity" (p. 31). Other studies indicated that plagiarism testing software fails to distinguish self-plagiarism and the location of similar text within a manuscript, such as the use of similar phrases to describe a particular laboratory technique or statistical methodology (Carter and Blanford, 2016).

Policy on the use of computer software to detect and prevent plagiarism has improved the reputation of researchers, editorial boards, journals, and academic fields of study (Miller, 2020). Thus, many international journals and book publishers conduct plagiarism testing using different computer software to generate SIs. The outcome could lead to manuscript revision or outright rejection.

According to Sibomana et al. (2018), some higher education institutions' plagiarism policies fail because they focus less on prevention and more on detection and sanctions. They thus have limited effect in addressing the primary reasons for plagiarism in academic writing. The authors recommended policies that strengthen reading and academic writing skills, institutionalising and disseminating anti-plagiarism policies, and the adoption of software technology.

A number of scholars highlight the need to educate students in order to reduce plagiarism (Breen and Maassen, 2005; Perkins et al., 2020; Dawson and Sutherland-Smith, 2018). This could involve the use of computer simulations and games to actively engage students to learn what, why, and how to avoid plagiarism (Bradley, 2015). Foltýnek and Glendinning (2015) found that training in scholarly writing was uncommon, particularly in countries like Portugal, Spain, and France. In Austria, Greece, the UK, and Finland as well as eastern countries such as Estonia, Slovenia, and Slovakia, training was conducted on plagiarism. Zimba and Gasparyian's (2021) research indicated that Polish students lacked training on plagiarism, while Western and Eastern European Bachelor's and Master's students demonstrated low levels of awareness of plagiarism.

The literature also notes that some higher education students do not attach much value to using plagiarism check tools, while supervisors' heavy workloads due to the increased number of students they supervise leave no time to conduct checks (Zimba and Gasparyan, 2021; Nafsa, 2021; Jiffriya et al., 2021; Anney and Mosha, 2015).

Theoretical Framework

The study employed the interpretive policy analysis (IPA) approach which is based on the philosophy of hermeneutics and focuses on human

expressive actions, values, beliefs, and feelings as a set of meanings (Wagenaar, 2015; Yanow, 2015). All these variables are embodied in and transmitted through artifacts of human creation such as language, dress, patterns of action and interaction, written texts, and sculptures (Yanow, 2015). The focus of IPA is the language used in policy communications and "other human artifacts that convey policy and organisational meanings, such as people's acts and whatever objects they might use in those acts" (p. 110).

Policy analysis that relies on interpretation focuses on the existing links between language, cognition and action. As individuals, people act in relation to objects, events, situations or experiences. As such, the student theses and dissertations that were the focus of this study are artifacts created by students interacting with their supervisors, other students, and texts.

Interpretive policy analysis "entails identifying the various individual and/or collective actors relevant to the issue under study and their varying interpretations of policy materials and/or events" (van Bommel et al., 2015, p. 72). The need for interpretation in policy analysis arises because policies have multiple, competing, and sometimes contradictory meanings for the policy actors. Interpretation is a value-laden process because people bring to the process their inter-subjective knowledge, beliefs, perceptions, preconceptions, and desires that may influence the meanings constructed. In this regard, Yanow (2015) argues that policy analysts cannot separate themselves from the policy issues being analysed. They cannot avoid the values and the meanings of the policy and they bring their values, beliefs, and feelings into the interpretation process, which is the major means by which subjective knowledge is acquired. Subjective knowledge is interpretative because it reflects an analyst's background in terms of education, experience, and training. For Yanow, what is interpreted in the analysis is the human artifacts and actions which include policy documents and legislation.

In analysing the UDSM plagiarism policy, the values, beliefs, ideologies, power, knowledge, and desires of policy implementers and students who are the targeted beneficiaries of the policy were considered. Interpretive policy analysis helped to achieve the study's objectives by enabling the researchers to interpret the meanings arising out of the theses and dissertations produced by postgraduate students. The process

of interpretation involved active engagement with the policy texts and contexts to uncover the variety of hidden and complex meanings.

Methodology

This study was conducted at the UDSM. One academic unit, blindly referred to as SAU was selected as a case study due to the following reasons. First, it enrolled a large number of postgraduate students compared to other academic units offering postgraduate programmes at the UDSM (UDSM, 2021, 2022). Second, most postgraduate students in this unit were expected to demonstrate sound knowledge of academic writing because of their academic and professional background and competence in essay writing. Third, it was selected because its academic staff were experienced in research and academic writing.

A mixed method research approach was employed based on document analysis. The documents were mainly Master's and PhD theses and dissertations submitted to SAU for plagiarism testing between January 2016 and December 2021. During the five-year period, a total of 556 postgraduate theses and dissertations were tested using Turnitin software. The researchers sampled 556 plagiarism reports and analysed for the trend and patterns of plagiarism among postgraduate students (see Table 1). The trend and patterns were analysed by calculating the average SI for all the theses and dissertations tested between 2016 and 2021. Thus, the sampling was purposive because the theses and dissertations' testing was compulsory for all students before they were submitted for examination and final graduation.

Moreover, 200 of the 556 theses and dissertations were randomly selected to examine the extent of plagiarism in each chapter. According to the UDSM format, a PhD thesis has six chapters, and a Master's dissertation five. The only difference between the two is that a PhD thesis separates the discussion from the study's findings, while a Master's dissertation combines the two in one chapter. To maintain uniformity, five chapters were taken from the theses and dissertations, with each separately tested for SI using the Turnitin software (see Figure 1). Again, the trends and patterns in plagiarism were analysed by calculating the average SI for the 200 theses and dissertations.

In addition, 20 plagiarism reports were selected for qualitative

content analysis (Wang and Lee, 2016). These reports highlighted all words (usually more than four words from one source were considered plagiarism), sentences, and paragraphs that were copied directly from other published literature (journal articles, blogs, books, book chapters, conference papers, theses, dissertations, web pages, and government documents) that were available online at the time of plagiarism testing. Content analysis of the Turnitin reports provided insights into the students' weaknesses and strengths in thesis and dissertation writing, as well as the limitations of using software to control plagiarism in students' work.

Ethical issues were considered through three strategies. First, clearance was obtained from university management to access the sampled theses and dissertations. Second, the academic unit's identity within the UDSM was not disclosed. Third, the students' names were not used in reporting the study's findings.

Findings

The findings are presented based on the research objectives.

Turnitin Software's Influence in Reducing Plagiarism

The study's first objective was to examine the influence of the adoption of Turnitin as a policy tool to detect and control plagiarism in postgraduate students' theses and dissertations. The findings are presented in Table 1. The average SI of the 556 postgraduate theses and dissertations tested for plagiarism between 2016 and 2021 was obtained by adding together the SI for all the theses and dissertations, divided by the total number tested each year.

The results indicate that the adoption of Turnitin helped to keep the SI below the set level of 30%. As shown in Table 1, there is a consistent decline in the average SI from 25.5% in 2016 to 16.7% in 2020. However, between 2020 and 2021, it increased by 4.4%. Overall, the findings suggest that the adoption of Turnitin had a positive influence in reducing plagiarism in postgraduate students' theses and dissertations at SAU.

Table 1: Average Similarity Indices for Theses and Dissertations Submitted to SAU Between 2016 and 2021

Year	Number of Theses and Dissertations Tested	Average Similarity Index (%)	Difference From the Tolerance Level (30%)
2016	67	25.4	4.6
2017	82	21.3	8.3
2018	132	18.2	11.8
2019	120	16.9	13.1
2020	61	16.7	13.3
2021	94	21.1	18.9
	Total = 556	Average = 19.9	

Source: Authors' construction based on theses and dissertations' plagiarism reports.

The Extent of Plagiarism Within the Theses and Dissertations

Turnitin's influence in detecting plagiarism in theses or dissertations' chapters was also examined. A sample of 200 postgraduate theses and dissertations was selected from the original sample of 556. According to the UDSM format, a thesis or dissertation has five chapters. Figure 1 points to six major findings. First, postgraduate students at SAU plagiarised at a tolerable level as the average SI for all the theses and dissertations was 19.9%. This implies that, on average, postgraduate students' theses and dissertations met the university requirements.

Second, the findings revealed SI variations across the chapters of theses and dissertations. The average SI for the *Introduction Chapter* was 23.5% which is about 6.5% below the university's set tolerance level of 30%. This implies that students plagiarised about 23.5% of content from other sources to develop their introductory chapter and that they thus confront challenges in using such sources.

Third, the average SI for the *Literature Review Chapter* was 52.1%, which was higher than the university's set tolerance level of 30%. Therefore, there was a higher level of plagiarism in this chapter than in the other chapters. This implies that postgraduate students at SAU plagiarised more than half the content that made up the *Literature Review Chapter*. As discussed later, one of the reasons is that some students had little knowledge of the literature review process. Consequently, they failed to paraphrase the reviewed literature and copied and pasted material, or failed to properly acknowledge the sources.

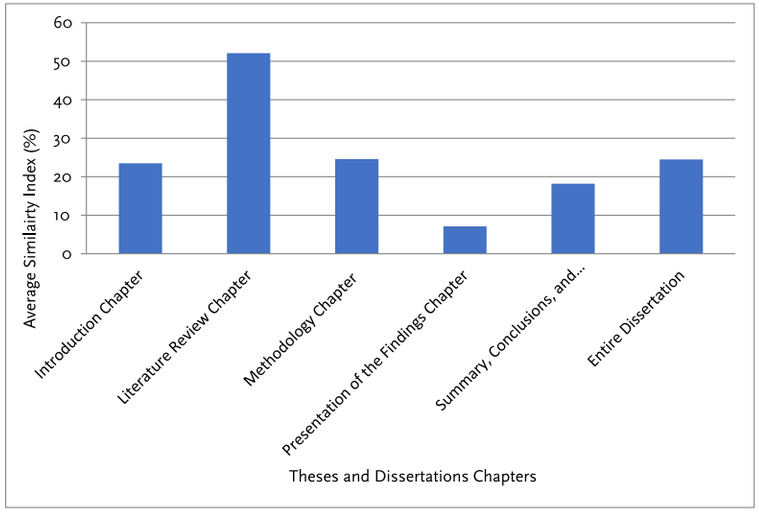
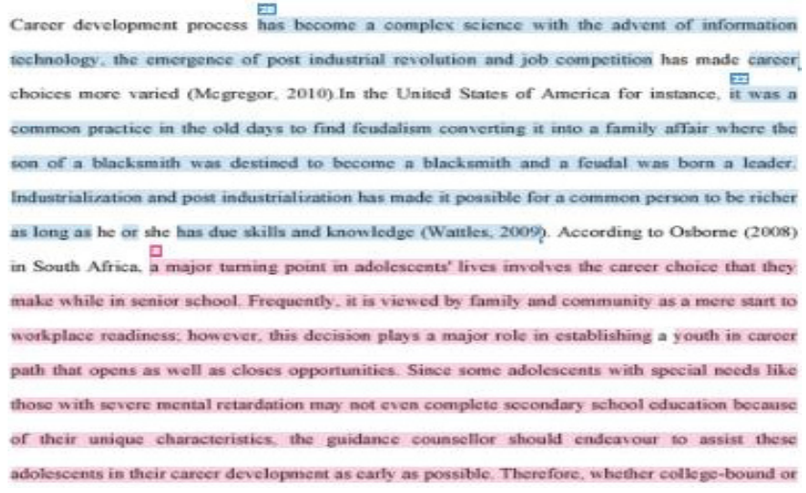


Figure 1: Similarity Index for the chapters and the theses and dissertations

Figure 2 presents a sample of a paragraph that was copied without paraphrasing and acknowledging the sources.

Fourth, the average SI for the *Research Methodology Chapter* was 24.6%. This is below the UDSM tolerance level of 30%. Postgraduate students at SAU thus plagiarised 24.6% of the content that made up the *Research Methodology Chapter* of their theses and dissertations.

Fifth, the average SI for the *Presentation of the Findings Chapter* was 7.1%, a lower level of plagiarism than other chapters. This means that postgraduate students at SAU plagiarised only 7.1% of the content that made up the *Presentation of the Findings Chapter* of their theses and dissertations. A possible explanation is that this chapter comprised of empirical findings that a student could hardly copy from already published works, and that the level of plagiarism was due to the empirical literature used to discuss the findings.



Career development process has become a complex science with the advent of information technology, the emergence of post industrial revolution and job competition has made career choices more varied (Mcgregor, 2010).In the United States of America for instance, it was a common practice in the old days to find feudalism converting it into a family affair where the son of a blacksmith was destined to become a blacksmith and a feudal was born a leader. Industrialization and post industrialization has made it possible for a common person to be richer as long as he or she has due skills and knowledge (Wattles, 2009). According to Osborne (2008) in South Africa, a major turning point in adolescents' lives involves the career choice that they make while in senior school. Frequently, it is viewed by family and community as a mere start to workplace readiness; however, this decision plays a major role in establishing a youth in career path that opens as well as closes opportunities. Since some adolescents with special needs like those with severe mental retardation may not even complete secondary school education because of their unique characteristics, the guidance counsellor should endeavour to assist these adolescents in their career development as early as possible. Therefore, whether college-bound or

Figure 2: Extract of a paragraph from a dissertation tested for plagiarism

Sixth, the average SI for the *Summary, Conclusions, and Recommendations Chapter* of the postgraduate students' theses and dissertations was 18.2%. This means that postgraduate students in the SAU plagiarised 18.2% of the content that made up the *Summary, Conclusions, and Recommendations Chapter* of their theses and dissertations. It indicates that the chapter used less content from published sources since it is primarily a winding up of the study.

Limitations of Using Turnitin Software in Detecting Plagiarism

The study's second objective was to identify the limitations of using Turnitin software and other specific forms of academic cheating practiced by postgraduate students. The findings revealed five forms of academic cheating, including failure to detect misreported references; failure to use quotation marks properly; failure to adhere to the recommended referencing style; recycling titles of previous works; and copying entire sentences and paragraphs from previous published literature.

Failure to Detect Misreported References and Incorrect Information

Table 2 shows that some students misreported references for the literature they consulted. Such errors were not detected by Turnitin software or the

students' supervisors. As the table shows, some students replaced the authors' names with others or misspelled words in the titles or authors' names. The incorrect year of publication, and improper use of upper and lowercase, and punctuation marks such as full stops, commas, colons, and semicolons in writing the references were also detected. For example, in the first row of Table 2, the student reported the author of the book as "Atan, T. B." and the year of publication as "2005", while the correct author was "Baradon, T." and the correct year was "2010". Similarly, in the third row, the student reported only one author of the book and omitted the co-author. See also the spelling mistakes for New Delhi and "Prentice Hall", and the missing country of publication which was "India" as required by American Psychological Association (APA) referencing and citation rules, sixth edition.

Similarly, in the last row, the student reported the author of the book as "Masawe, M. F." while the correct authors were "Flee, M. and Pramling, N." and the correct year of publication was "2015" and not "1995" as reported by the student. By studying Table 2, it can be noted that students committed several similar forms of cheating in their theses and dissertations.

Further findings on misreporting of references using different names from those of actual authors, and failure to adhere to the recommended referencing style are presented in Table 2.

Table 2: Reference List Developed from Students' Submitted Dissertations

Reported Plagiarised/Cheated References	Actual References
Atan, T. B. (2005). Relational Trauma in Infancy: Psychoanalytic, Attachment and Neuropsychological Contributions to Parent-Infant Psychotherapy. Routledge.	Baradon, T. (2010). *Relational trauma in infancy: Psychoanalytic, attachment and neuropsychological contributions to parent-infant psychotherapy.* London, England: Routledge.
Berger, H. (1991). Parent Involvement: Yesterday and today. The Elementary school, 91 (3), 209 – 219.	Berger, H. (1991). Parents' involvement: Yesterday and today. *The Elementary School Journal, 91*(3), 209 – 219.
Best, W. J. (2002). Research methodology in Education. Newe Delhi: Prentce.	Best, W. J. & Kahn, J. V. (2002). *Research in education* (7th ed.). New Delhi, India: Prentice Hall.
Bradley, J. (1993). Methodological issues and practices in practices in qualitative in research. Quaterly.	Bradley, J. (1993). Methodological issues and practices in qualitative research. *The Library Quaterly, 63*(4), 431-449.
Campion, M. A. (1994). Structured interviewing: A note on incremental validity and alternative equations types. Journal of apllied psyschology, 79, 998-1002.	Campion, M. A, Campion, J. E, & Hudson, J. P., Jr. (1994). Structured interviewing: A note on incremental validity and alternative equations types. *Journal of Applied Psyschology*, 79(6), 998-1002.
Brwon, T. W. (2003). School Violence and Primary Prevention. Springer-Verlag New York.	Brwon, T. W. (2003). *School violence and primary prevention.* New York, NY: Springer-Verlag.
Caruth, G. H. (2011). Parental Involvement in Childhood Education: Building Effective School-Family Partnerships. New York: Springer-Verlag New York.	Caruth, G. H. (2011). *Parental involvement in childhood education: Building effective school-family partnerships.* New York, NY: Springer-Verlag.
Masawe, M. F. (1995). A Cultural-Historical Study of Chidren Learning Science: Foregrounding Affective Imagination in Play-based Settings. Springer Netherlands.	Fleer, M., & Pramling, N. (2015). A cultural-historical study of chidren learning Science: Foregrounding affective imagination in play-based settings. Dordrecht, The Netherlands, Springer Science & Business Media.

Source: References in sampled students' theses and dissertations.

Failure to Show Students' Limitations in Adhering to the Recommended Referencing Style

SAU adopted the APA referencing style for all theses and dissertations. However, Table 2 presents a sample of references that violated the APA referencing rules (6th edition) by, for example, not italicising book titles and journal names, improper use of punctuation marks, and failure to indicate the place of publication.

Failure to Detect Cheating During Plagiarism Testing

Experience shows that since plagiarism testing is done by academic staff who are human beings, thorough checking of plagiarism reports is required because there is a high possibility of cheating by unethical staff. Cheating in plagiarism testing is possible because in uploading a thesis or dissertation on Turnitin, one can avoid submitting the entire file by eliminating areas that are more prone to plagiarism. If not checked properly, the report generated by Turnitin does not explicitly show the missing pages which could have produced a higher plagiarism score if included. This means that the testing process itself needs to be ethical; simply submitting a plagiarism report which only shows the percentage of plagiarised material may not be effective. Thus, what matters is who tests the thesis or dissertation although the policy requires the supervisor to do so. Not all supervisors knew how to test for plagiarism. Moreover, the growth of technology has resulted in more plagiarism software being used to test plagiarism by students for submission and degree awards.

Discussion of the Findings

The study's findings showed that the application of Turnitin software as a tool to implement the UDSM's plagiarism policy has resulted in less plagiarism in postgraduate students' theses and dissertations at SAU. This can be explained by the following factors. First, plagiarism testing was made compulsory for all stages of theses and dissertations' production and presentation for Master's and PhD degree awards from 2016. As time went by, plagiarism testing was done in four submission stages: (1) during proposal submission for departmental level presentation, (2) during proposal submission for approval for data collection, (3) during thesis or dissertation submission for internal and external examination, and (4) during thesis or dissertation submission for graduation. Thus, a copy of the SI report became part of the list of documents required for submission at all these stages.

Second, the thesis or dissertation supervision process was also involved as supervisors were required to enforce plagiarism policy implementation by testing and signing the SI report. Third, since the tolerance level was set at 30%, no thesis or dissertation with more than this level was accepted at any stage of presentation and graduation. This

is the reason why the average SI for all theses and dissertation accepted stood at 25.4% and declined from that point. Fourth, since postgraduate students and supervisors were able to learn from the plagiarism testing process, they learned to reduce SI that went above the tolerance level by using other academic writing strategies like paraphrasing, proper quoting, and correct citation of sources (Chen et al., 2016; Badenhorst, 2019; Shahsavar et al., 2020).

This finding is supported by Farahian et al.'s (2020) study in Australia that showed that students' awareness of plagiarism reduced the plagiarism rate. It can also be explained by Bandura's (1963) Social Learning Theory that posits that students' behaviour can be learned, unlearned, and regulated through the interaction of several factors operating in their minds, the environment, and the surrounding society.

The UDSM's SI level of 30% seems to be twice as high as those adopted by other universities and most journals which set a level between 15% and 20%. This suggests that the university should review its policy on the tolerance level.

The UDSM plagiarism policy is limited in terms of empowering students and academic staff to eliminate plagiarism because it focuses on curricular products rather than the curricular processes that would reduce plagiarism. This is contrary to Smith's (2013) recommendation that plagiarism policies should promote teaching to enhance the quality of novice researchers. The UDSM plagiarism policy statements emphasise the imposition of penalties at the end of the programme or course rather than imparting knowledge and skills to combat plagiarism as part of the curricular processes of teaching and learning. Such approaches are limited in reducing plagiarism because they come into effect at the last moment when students are not in a position to learn new skills. However, there is also reluctance among some students to acquire academic writing skills.

Only a few courses in SAU postgraduate programmes teach the effects of plagiarism. For example, the course on Quality Assurance and Quality Control includes a section on "Academic fraud, accreditation and quality assurance in higher education". Such initiatives need to be extended to all programmes.

The study found that Literature Review chapters recorded the highest average SI, while the Presentation of Findings chapters had

the lowest average SI. Chen et al. (2016), Menter and Hulme (2012), Badenhorst (2019), Shahsavar et al. (2020), and Denney and Tewksbury (2013) noted that novice researchers confront challenges in conducting literature reviews. These include linguistic challenges (Cheng et al. 2016) which relate to students' ability to use language and its major elements. English is the language of instruction in Tanzania's education system from secondary to higher education level. Thus, postgraduate students submit their theses, dissertations, and all other academic work in English. This could have contributed to plagiarism in theses and dissertations since English is a foreign language.

A literature review requires students to develop their arguments from the reviewed literature using different vocabularies, constructing sentence patterns, connecting sentences, and linking and transiting to another section of the chapter. Habali and Fong (2016) attributed the challenges students confront to individual differences and cultural backgrounds.

To overcome these challenges, the principles of a literature review need to be taught, discussed, understood, and conducted step-by-step so that postgraduate students are able to approach it systematically and avoid plagiarism. Courses in research methods should follow these steps which involve more in-depth coverage and practice, with adequate time allocated to the process.

Postgraduate courses in research methods capture the literature review through a specific objective which states that the course aims to develop the "ability to search for appropriate literature and make sense of its practical educational value or implications and use". "Reviewing the literature, conceptual/theoretical framework" was included as a minor section of the course content. This means that no more than three hours are spent on it during the course. Given the nature of postgraduate programmes, students need to be taught, learn, and practice literature reviews more than they are currently doing (Habali and Fong, 2016). As discussed above, Cheng et al., (2016); Badenhorst (2019); Shahsavar, Kourepaz, and Bulut (2020); Denney and Tewksbury (2013); Kucan (2011); Wee and Banister (2016); and Elander (2015) suggest strategies to produce a sound literature review for theses and dissertations that may develop students' writing skills.

The findings on the limitations of using Turnitin software and other specific forms of academic cheating practiced by postgraduate students suggest that some students misreported references and failed to adhere to the recommended referencing style. Furthermore, plagiarism was evident in their failure to acknowledge the consulted sources, copying entire paragraphs from previous published literature; and failure to use quotation marks properly. These findings suggest that reliance on Turnitin is inadequate to produce plagiarism-free theses and dissertations. Therefore, despite the adoption of anti-plagiarism software, significant academic cheating is committed within the set tolerance level, despite the role played by awareness of plagiarism policy in reducing plagiarism as found in this study as well as previous studies such as Farha et al. (2021) and Curtis and Tremayne (2019).

Conclusions and Recommendations

The following conclusions can be drawn from the findings: First, the study showed that the adoption of Turnitin as one of the strategies to implement its plagiarism policy has enabled the UDSM to reduce plagiarism in theses and dissertations writing among postgraduate students. This was evident in the declining trend in average SI since policy adoption in 2016. However, the effectiveness of the Turnitin software as a policy measure to reduce plagiarism remains limited as it only tests the overall SI of the whole thesis or dissertation. Second, Turnitin fails to test plagiarism in individual thesis or dissertation chapters, such as the literature review chapter. Thus, plagiarism was high in the literature review chapters, indicating that many postgraduate students have limited knowledge and skills in writing a literature review. Third, some cases of academic dishonesty cannot be detected by Turnitin software, including misreporting references. This implies that the use of Turnitin and other software is not a panacea for eliminating plagiarism among postgraduate students to improve the quality of programmes as well as teaching and learning. The role of thesis and dissertation supervisors remains paramount in detecting plagiarism and other forms of academic dishonesty.

It is recommended that the UDSM plagiarism policy should go beyond plagiarism testing to include training of staff and students on the

meaning, effects, and how to avoid plagiarism in postgraduate curricula. The current postgraduate courses on research methods at SAU should be reviewed to introduce course content that emphasises issues related to plagiarism and practical aspects of conducting a literature review to enhance students' academic writing skills. The literature review process should be covered in detail. Moreover, the tolerance level of 30% for the whole thesis or dissertation should be reviewed because it does not set a level for each thesis or dissertation chapter. As a result, much plagiarised content is hidden in specific chapters as observed in the Literature Review chapter.

Conflict of Interest: The authors confirm that there is no conflict of interest related to this article.

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Personality Measurement of Students Using Item Response Theory Models: Stability Responses from Nigerian Institutions

Olawale Ayoola Ogunsanmi, Temitope Babatimehin, and Yejide Adepeju Ibikunle

Abstract

Item Response Theory (IRT) is utilised to detect bias in assessment tools and address issues such as faked or manipulated responses, enhancing the reliability and stability of conclusions in personality assessment. This article examines the item parameter estimates of a scale and the effectiveness of one-, two-, and three-parameter logistic models in analysing response stability in personality measurement from repeated administration. Three hundred undergraduate students at three tertiary institutions in Nigeria were sampled using a multi-stage sampling procedure. Data was collected using an adapted version of the Big Five Inventory (BFI) with a reliability coefficient of 0.85. The results showed that the item parameter estimates (mean threshold) are within the recommended benchmarks. A comparison of the three IRT models based on the Likelihood ratio (InL), Akaike Information Criterion (AIC), and Bayesian Information Criterion (BIC) values revealed that the two-parameter logistic model best fit the personality data among undergraduates from repeated administration. It is recommended that, rather than relying solely on a statistical decision-making process, IRT fit and model comparison should be applied to gain insight into the functioning of items and tests.

Key words: response stability, personality traits, personality measurement, Item Response Theory

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Résumé:

La théorie de la réponse à l'item (TRI) est utilisée pour détecter les biais dans les outils d'évaluation et traiter des questions telles que les réponses truquées ou manipulées, améliorant ainsi la fiabilité et la stabilité des conclusions dans l'évaluation de la personnalité. Cet article examine les estimations des paramètres d'une **échelle** et l'efficacité des modèles logistiques à un, deux et trois paramètres dans l'analyse de la stabilité des réponses dans la mesure de la personnalité à partir d'une administration répétée. Trois cents **étudiants** de premier cycle de trois **établissements** d'enseignement supérieur au Nigeria ont **été échantillonnés** à l'aide d'une procédure d'échantillonnage à plusieurs degrés. Les données ont **été** collectées à l'aide d'une version adaptée de l'inventaire Big Five (BFI) avec un coefficient de fiabilité de 0,85. Les résultats ont montré que les estimations des paramètres des items (seuil moyen) se situent dans les limites des repères recommandés. Une comparaison des trois modèles IRT basée sur le rapport de vraisemblance (InL), le critère d'information d'Akaike (AIC) et le critère d'information bayésien (BIC) a révélé que le modèle logistique à deux paramètres correspondait le mieux aux données de personnalité chez les **étudiants** de premier cycle à partir d'une administration répétée. Il est recommandé, plutôt que de s'appuyer uniquement sur un processus de prise de décision statistique, d'appliquer l'ajustement IRT et la comparaison de modèles pour mieux comprendre le fonctionnement des items et des tests.

Mots clés: stabilité des réponses, traits de personnalité, mesure de la personnalité, théorie de la réponse aux items.

Introduction

Personality measurement is significant in psychological research as it promotes comprehension of human behaviour and individual differences. This is crucial in tertiary education settings like Nigeria, where the transition from adolescence to early adulthood may significantly impact academic achievement, social interactions, and overall well-being. Advanced statistical models such as Item Response Theory (IRT) have gained traction among researchers seeking to unravel the complexities surrounding personality stability among students

at tertiary institutions (Alexander et al., 2020; Yang et al., 2023; Zhu et al., 2021). While helpful, traditional assessment methods often fall short of capturing the subtle dynamics of personality traits over time (Nadkarni and Herrmann, 2010; Riaz et al., 2012). In contrast, IRT models offer a comprehensive framework to simultaneously assess item attributes and latent trait stability, thus providing invaluable insights into the performance of individual items in personality questionnaires and the stability of latent personality traits among students over time. Nigeria's heterogeneous tertiary education landscape, which includes universities, polytechnics, and colleges, plays a vital role in educational experiences that may influence personality development and stability. Moreover, the tertiary student population's transitional nature provides a unique opportunity to explore potential changes in personality traits during this critical stage of personal growth and development.

Measurement of personality and attitudes has historically shaped the progression of psychology and remains pivotal in empirical studies. However, recent decades have seen limited progress in refining the statistical methodologies underpinning the development of measurement scales in this field. Psychological constructs, including personality traits, are often intangible and inferred, raising questions about the value of quantifying them using physical features (Cuthbert and Kozak, 2013; Yang et al., 2023). Despite these challenges, it is important to effectively measure these theoretical elements in order to gain a comprehensive understanding of human behaviour (Smith, 2005; Seidman, 2013; Stoughton et al., 2013).

Various assessment strategies, including peer reports, life outcomes data, and self-reported data, contribute to the diverse landscape of personality studies (Kelley et al., 2016). However, concerns persist within the academic community regarding the potential for skewed, faked, or manipulated responses in personality assessments (Morizot et al., 2007; Revelle and Wilt, 2013; Paulhus, 2014). In response to these challenges, IRT has emerged as a valuable tool, supplementing classical test theory (CTT) methods and enhancing the reliability and stability of personality evaluations (Waller et al., 1996; Ibikunle, 2021). It has also been instrumental in identifying and addressing bias in assessment instruments, contributing to more equitable and accurate evaluations (Adedoyin,

2010; Ogunsanmi and Faleye, 2021; Adediwura and Asowo, 2020, 2021).

Item Response Theory serves as a comprehensive statistical framework to evaluate item and test performance, facilitating deeper understanding of the relationship between performance and the abilities tested (Hambleton and Jones, 2013). Its application extends beyond cognitive data to potentially benefit the study of personality data, offering a promising avenue to advance research in this domain. The development, evaluation, and scoring of tests, questionnaires, and other instruments to gauge mental prowess or psychometric features all benefit from the use of IRT (DeMars, 2010; Chalmers, 2012; Hambleton and Jones, 2013; Zanon et al., 2016). Through its nuanced approach to assessing character qualities, IRT enhances the reliability and validity of personality assessments, thereby contributing to more robust conclusions in psychological research (Kubinger, 2002; Benson and Campbell, 2007; Hambleton and Jones, 2013).

Item Response Theory models

Mathematical models can be used to establish a connection between the latent variables of interest and the probability of responding to an assessment question. These connections can be employed to predict the evaluation's outcome. One-, two-, and three-parameter logistic models are widely used in IRT (Hambleton et al., 1991; Carvalho, Primi and Baptista, 2015; Annan-Brew, 2020; Gyamfi and Acquaye, 2023). In contrast to more holistic approaches to modelling, IRT-based models focus on analysing test takers' responses to specific questions. Item-level modelling offers more versatility for a wide range of uses, including but not limited to development testing; evaluating differential item functionality; deploying computer-adaptive testing; and aggregating score summaries.

The Rasch Model

The Rasch Model developed by psychologist Georg Rasch is a paradigm in the field of psychometrics that has attained near-universal acceptance. The term "Item Response Theory" is often used interchangeably with "one-parameter model." The Rasch Model is widely used to analyse students' answers in reading comprehension tests used for statistical purposes in a wide range of contexts, including reading evaluations.

Our study investigated the correlation between participants' aptitudes, attitudes, or personality traits and the level of difficulty associated with the items evaluated. The logistic function is used to build a correlation between the probability of a correct response and the scale of ability. The study's primary emphasis was the difficulty parameter, while maintaining a constant value of 1.0 for the discrimination parameter, indicated as "a". Nevertheless, it is worth noting that, as stated by De Ayala (2009) and Gyamfi and Acquaye (2023), the difficulty parameter, represented as b, has the potential to fluctuate across different values. The one-parameter model postulates that the score is only influenced by questions' level of difficulty and the latent trait. The equation for the one-parameter model is as follows:

$$P(\theta) = \frac{1}{1+e^{-D(\grave{e}-b)}} \quad (1)$$

Where θ = latent trait, b = difficulty parameter, è = ability level

Two-Parameter Logistic Model (2PLM)

The emergence of the two-parameter model can be attributed to the limitations of the one-parameter model. One of the disadvantages of this approach is its failure to include the variability in the discriminating power of items, which could lead to erroneous conclusions in terms of model fit. The 2PL model is used to estimate the likelihood of a correct answer to a given test item based on the individual's level of ability and two specific item attributes. The primary distinction with regard to the first-person plural (1PL) paradigm is the substitution of the term exp (è - bi) with exp[ai(è - bi)]. Similar to the first-person logistic (1PL) model, the parameter bi represents the level of difficulty. The newly-introduced parameter, denoted as ai, is often referred to as the discrimination parameter. The equation for the two-parameter logistic model is as follows:

$$P(\theta) = \frac{1}{1+e^{-Dai(\grave{e}-bi)}} \quad (2)$$

Where, θ = latent trait, a = discriminating parameter b = difficulty parameter è = ability level

Three-Parameter Logistic Model (3PLM)

While the 2PL model is an expansion of the Rasch Model, which is also known as the 1PL model, other models can be seen as expansions of the 2PL model. The inclusion of an additional item parameter is a distinguishing characteristic of the three-parameter logistic model (3PL). A notable phenomenon in the field of testing is that examinees have the potential to answer correctly by guessing. Hence, the likelihood of providing the right answer includes a small factor attributable to random guessing. Guessing was not taken into account in the two preceding models. The 3PL model has an additional parameter, denoted as c, that is often referred to as the "pseudo-chance" or "pseudo-guessing" parameter. Skrondal and Habe-Hesketh (2004) and Gyamfi and Acquaye (2023) defined the concept of three-parameter logistic IRT (3PL IRT), which accounts for the possibility of examinees responding correctly to items due to chance or guessing. This parameter introduces a lower asymptote to the item characteristics curve (ICC). The 3PL can be expressed as follows:

$$P(\theta) = \frac{c+(1-c)1}{1+e^{-Da(\grave{e}-b)}} \quad (3)$$

Where θ = latent trait, a = discriminating parameter, b = difficulty parameter, è = ability level c = guessing parameter.

In theoretical terms, it can be posited that as the degree of talent or attribute diminishes towards zero, the likelihood of producing a right answer should also move towards zero. Nevertheless, individuals with very low scores on a particular attribute may have the ability to accurately infer the correct response. Consequently, examinees with the lowest and highest abilities have an equal likelihood of answering the question correctly by random guessing. The parameter c is theoretically bounded within the range of $0 \leq c \leq 1.0$. Initially, IRT models were formulated to accommodate dichotomous replies, namely, binary responses characterised by values of 0 (indicating wrong) and 1 (indicating correct). However, contemporary advancements have led to the development of models capable of accommodating a wide range of educational and psychological data (De Ayala, 2009; Gyamfi and Acquaye, 2023).

Personality questionnaires continue to serve as a crucial tool to

assess personality traits. However, several issues are associated with their utilisation. The literature highlights that this includes the potential for faking (where individuals may withhold objectively honest information due to fear of being misjudged), manipulation (where they may present themselves as having a different personality than their own), distortion, and psychometric challenges. Psychologists and researchers thus seek to comprehend why individuals alter their responses to identical item stimuli on two separate occasions. They also aim to determine the item properties that contribute to response stability or more frequent inconsistent responses. Utilisation of a sophisticated mathematical model such as IRT is necessary to address these concerns (Chalmers, 2012). However, there is limited empirical research on the stability of responses in personality measurement, specifically with regard to inconsistent or changing responses to the same item during repeated administration. These studies have primarily focused on a descriptive analysis of the relationships between item and examinee characteristics and the stability of item responses. Furthermore, most have utilised CTT as their mathematical framework to demonstrate a curvilinear association between the fraction of endorsement and the stability of personality assessment.

Moreover, the existing body of research on model fit has mainly focused on two specific IRT models (MacDonald and Paunonen et al., 2003; Wyatt, 2016). Consequently, several essential inquiries on this topic have yet to be addressed. The appropriateness of the 3PL model in comparison to the 1PL and 2PL models for personality data remains uncertain. Therefore, it is necessary to evaluate the stability of responses and analyse the model fit of the 1PL, 2PL, and 3PL models when applied to personality data. Against this background, our research aimed to identify the most appropriate application of the IRT model in analysing personality data obtained from many administrations. The following research questions were formulated to achieve this objective:

i. What are the item parameter estimates of the personality scale from repeated administration?
ii. Which of the one-, two and three-parameter logistic IRT models is more effective in analysing the stability of responses from the personality scale?

Methodology

This study adopted a survey research design. Three hundred undergraduate students from three tertiary institutions in Osun State, Nigeria, were selected using a multi-stage sampling technique. The three senatorial districts in Osun State include Osun Central, Osun East, and Osun West. Three Local Government Areas (LGAs) in these senatorial districts were selected using a purposive sampling technique. Three tertiary institutions (a university, a polytechnic, and a college of education) were selected from the three LGAs using purposive sampling. A hundred undergraduate students residing in the hostels of each chosen tertiary institution were purposefully selected to participate in the study. This selection method was employed to ensure consistency in the sample group across the initial and subsequent administrations of the assessment instrument. Students accommodated in hostels were specifically chosen to facilitate access to the second administration of the assessment tool. The study utilised an adapted research instrument known as the Big Five Inventory (BFI) initially developed by Goldberg (1993). The original BFI based on the 1999 version by John and Srivastava comprises 44 items designed to assess an individual's personality across the dimensions of Extraversion, Openness, Neuroticism, Agreeableness, and Conscientiousness. However, for this study, a modified version of the BFI was employed consisting of 40 items. This was created by removing four items to ensure an equal distribution of eight items across each dimension. The reliability coefficient of the instrument using Cronbach's Alpha yielded a value of 0.85. The test-retest interval was two weeks. Data were analysed using Bilog-MG and SPSS statistical software.

Results

Research Question One: What are the item parameter estimates of the personality scale from repeated administration?

Table 1: Item Parameter Estimates for 1PL Model for Time 1 (T1) and Time 2 (T2)

Item	Intercept S.E.	Slope S.E.	Threshold S.E.	Loading S.E.	Asymptote S.E.	CHISQ (Prob)	DF
PM01 T1	1.191	0.470	-2.535	0.425	0.000	224.9	8.0
	0.026*	0.004*	0.054*	0.003*	0.000*	(0.0000)	
T2	1.112	0.470	-2.365	0.425	0.000	194.7	9.0
	0.025*	0.004*	0.054*	0.003*	0.000*	(0.0000)	
PM02 T1	3.767	0.470	-8.015	0.425	0.000	376.0	8.0
	0.070*	0.004*	0.149*	0.003*	0.000*	(0.0000)	
T2	3.454	0.470	-7.349	0.425	0.000	571.3	9.0
	0.061*	0.004*	0.130*	0.003*	0.000*	(0.0000)	
PM03 T1	1.788	0.470	-3.804	0.425	0.000	434.6	8.0
	0.031*	0.004*	0.067*	0.003*	0.000*	(0.0000)	
T2	1.765	0.470	-3.754	0.425	0.000	463.2	9.0
	0.031*	0.004*	0.066*	0.003*	0.000*	(0.0000)	
PM04 TI	0.948	0.470	-2.017	0.425	0.000	320.5	8.0
	0.024*	0.004*	0.052*	0.003*	0.000*	(0.0000)	
T2	0.979	0.470	-2.082	0.425	0.000	237.2	9.0
	0.024*	0.004*	0.052*	0.003*	0.000*	(0.0000)	
PM05 T1	2.880	0.470	-6.128	0.425	0.000	77.4	7.0
	0.046*	0.004*	0.099*	0.003*	0.000*	(0.0000)	
T2	2.883	0.470	-6.133	0.425	0.000	65.9	7.0
	0.047*	0.004*	0.099*	0.003*	0.000*	(0.0000)	
PM06 T1	1.527	0.470	-3.249	0.425	0.000	527.9	8.0
	0.028*	0.004*	0.059*	0.003*	0.000*	(0.0000)	
T2	1.558	0.470	-3.314	0.425	0.000	467.3	9.0
	0.028*	0.004*	0.059*	0.003*	0.000*	(0.0000)	
PM07 T1	1.769	0.470	-3.763	0.425	0.000	168.8	8.0
	0.031*	0.004*	0.066*	0.003*	0.000*	(0.0000)	
T2	1.703	0.470	-3.622	0.425	0.000	154.9	9.0
	0.030*	0.004*	0.064*	0.003*	0.000*	(0.0000)	
PM08 T1	2.690	0.470	-5.723	0.425	0.000	128.1	8.0
	0.043*	0.004*	0.091*	0.003*	0.000*	(0.0000)	
T2	2.656	0.470	-5.650	0.425	0.000	124.7	9.0
	0.043*	0.004*	0.090*	0.003*	0.000*	(0.0000)	
PM09 T1	2.668	0.470	-5.677	0.425	0.000	48.3	7.0
	0.042*	0.004*	0.090*	0.003*	0.000*	(0.0000)	
T2	2.705	0.470	-5.755	0.425	0.000	40.0	7.0
	0.043*	0.004*	0.092*	0.003*	0.000*	(0.0000)	
PM10 T1	1.205	0.470	-2.565	0.425	0.000	337.2	8.0
	0.026*	0.004*	0.056*	0.003*	0.000*	(0.0000)	
T2	1.209	0.470	-2.571	0.425	0.000	309.0	9.0
	0.026*	0.004*	0.056*	0.003*	0.000*	(0.0000)	
+ +	+	+	+ +	+	+	+	+ +
+ +	+	+	+ +	+	+	+	+ +
+ +	+	+	+ +	+	+	+	+ +
PM30 T1	0.920	0.470	-1.957	0.425	0.000	377.6	8.0
	0.025*	0.004*	0.053*	0.003*	0.000*	(0.0000)	
T2	0.804	0.470	-1.711	0.425	0.000	344.7	8.0
	0.024*	0.004*	0.052*	0.003*	0.000*	(0.0000)	
PM31 T1	2.795	0.470	-5.947	0.425	0.000	179.7	7.0
	0.045*	0.004*	0.096*	0.003*	0.000*	(0.0000)	
T2	2.533	0.470	-5.390	0.425	0.000	124.4	9.0
	0.040*	0.004*	0.086*	0.003*	0.000*	(0.0000)	
PM32 T1	1.679	0.470	-3.571	0.425	0.000	78.6	8.0
	0.030*	0.004*	0.063*	0.003*	0.000*	(0.0000)	
T2	1.419	0.470	-3.019	0.425	0.000	93.7	9.0
	0.030*	0.004*	0.058*	0.003*	0.000*	(0.0000)	
PM33 T1	-0.245	0.470	0.522	0.425	0.000	1117.8	8.0
	0.022*	0.004*	0.046*	0.003*	0.000*	(0.0000)	
T2	-0.183	0.470	0.390	0.425	0.000	872.9	9.0
	0.022*	0.004*	0.046*	0.003*	0.000*	(0.0000)	
PM34 T1	0.948	0.470	-2.016	0.425	0.000	580.9	8.0
	0.025*	0.004*	0.054*	0.003*	0.000*	(0.0000)	
T2	0.969	0.470	-2.062	0.425	0.000	626.1	9.0
	0.025*	0.004*	0.054*	0.003*	0.000*	(0.0000)	
PM35 T1	0.340	0.470	-0.724	0.425	0.000	318.2	8.0
	0.023*	0.004*	0.049*	0.003*	0.000*	(0.0000)	
T2	0.307	0.470	-0.653	0.425	0.000	392.6	8.0
	0.023*	0.004*	0.049*	0.003*	0.000*	(0.0000)	
PM36 T1	0.392	0.470	-0.834	0.425	0.000	251.8	8.0
	0.023*	0.004*	0.063*	0.003*	0.000*	(0.0000)	
T2	0.358	0.470	-0.762	0.425	0.000	344.9	8.0
	0.023*	0.004*	0.058*	0.003*	0.000*	(0.0000)	
PM37 T1	1.086	0.470	-2.311	0.425	0.000	504.3	8.0
	0.025*	0.004*	0.052*	0.003*	0.000*	(0.0000)	
T2	1.098	0.470	-2.337	0.425	0.000	415.2	9.0
	0.025*	0.004*	0.052*	0.003*	0.000*	(0.0000)	
PM38 T1	-0.128	0.470	0.272	0.425	0.000	109.7	7.0
	0.022*	0.004*	0.047*	0.003*	0.000*	(0.0000)	
T2	-0.155	0.470	0.329	0.425	0.000	86.8	7.0
	0.022*	0.004*	0.047*	0.003*	0.000*	(0.0000)	
PM39 T1	-0.187	0.470	0.397	0.425	0.000	45.5	8.0
	0.022*	0.004*	0.047*	0.003*	0.000*	(0.0000)	
T2	-0.108	0.470	0.229	0.425	0.000	53.1	9.0
	0.022*	0.004*	0.047*	0.003*	0.000*	(0.0000)	
PM40 T1	0.194	0.470	-0.413	0.425	0.000	178.9	7.0
	0.023*	0.004*	0.048*	0.003*	0.000*	(0.0000)	
T2	0.274	0.470	-0.583	0.425	0.000	179.0	9.0
	0.023*	0.004*	0.048*	0.003*	0.000*	(0.0000)	

Time1 * STANDARD ERROR
LARGEST CHANGE = 0.000764 49746.3 290.0
(0.0000)

Time2 * STANDARD ERROR
LARGEST CHANGE = 0.000764 49746.3 290.0
(0.0000)

PARAMETER	N	MEAN	STD. DEV.	ADJUSTED MEAN
TIME: 1	40			
THRESHOLD		-2.823	2.673	0.000
TIME: 2	40			
THRESHOLD		-2.758	2.586	0.064

Note: S.E. = Standard Error, CHISQ = Chi-square, Prob = Probability, Df = Degree of Freedom

Table 1 shows the parameter estimates of the 1PLM for Time 1 (T1) and Time 2 (T2), respectively. The INTERCEPT column contains the estimated item intercept, the SLOPE column contains the "a" parameter (discrimination), the THRESHOLD column contains the "b" parameter (difficulty), and the ASYMPTOTE column includes the "c" parameter (pseudo-guessing). The parameter table shows the relationship between responses on each item and the latent trait. The mean threshold value is at (T1= -2.823, T2= 2.673) and the adjusted threshold mean value at (T1= 0.000, T2= 0.064). These results indicated that the items possessed adequate item difficulty index.

Table 2: Item Parameter Estimates for 2PL Model for Time 1 (T1) and Time 2 (T2)

Item	Intercept S.E.	Slope S.E.	Threshold S.E.	Loading S.E.	Asymptote S.E.	Chisq (Prob)	DF
PM01 T1	1.135	0.047	-24.113	0.047	0.000	173.3	9.0
	0.025*	0.010*	5.308*	0.010*	0.000*	(0.0000)	
T2	1.061	0.470	-22.543	0.047	0.000	139.1	9.0
	0.025*	0.010*	4.946*	0.010*	0.000*	(0.0000)	
PM02 T1	4.852	2.320	-2.092	0.918	0.000	58.4	9.0
	0.177*	0.203*	0.117*	0.081*	0.000*	(0.0000)	
T2	4.549	2.320	-1.961	0.918	0.000	29.4	9.0
	0.163*	0.203*	0.110*	0.081	0.000*	(0.0005)	
PM03 T1	3.012	2.725	-1.105	0.939	0.000	9.3	9.0
	0.066*	0.087*	0.019*	0.030*	0.000*	(0.4124)	
T2	3.011	2.725	-1.105	0.939	0.000	15.0	9.0
	0.065*	0.087*	0.019*	0.030*	0.000*	(0.0919)	
PM04 T1	0.903	0.075	-12.105	0.074	0.000	294.2	9.0
	0.024*	0.014*	2.353*	0.014*	0.000*	(0.0000)	
T2	0.936	0.075	-12.550	0.074	0.000	213.0	9.0
	0.024*	0.014*	2.430*	0.014*	0.000*	(0.0000)	
PM05 T1	8.857	8.202	-1.080	0.993	0.000	346.3	9.0
	1.421*	1.607*	0.039*	0.194*	0.000*	(0.0000)	
T2	8.865	8.202	-1.081	0.993	0.000	185.0	9.0
	1.420*	1.607*	0.039*	0.194*	0.000*	(0.0000)	
PM06 T1	1.457	0.018	-81.865	0.018	0.000	607.4	9.0
	0.028*	0.004*	18.868*	0.004	0.000*	(0.0000)	
T2	1.487	0.018	-83.560	0.018	0.000	483.0	9.0
	0.028*	0.004*	19.233*	0.004*	0.000*	(0.0000)	
PM07 T1	1.986	1.047	-1.898	0.723	0.000	101.0	9.0
	0.046*	0.062*	0.086*	0.043*	0.000*	(0.0000)	
T2	1.950	1.047	-1.863	0.723	0.000	48.0	9.0
	0.044*	0.062*	0.086*	0.043*	0.000*	(0.0000)	
PM08 T1	4.286	3.080	-1.391	0.951	0.000	17.1	8.0
	0.123*	0.140*	0.030*	0.043*	0.000*	(0.0294)	
T2	4.265	3.080	-1.385	0.951	0.000	163.0	9.0
	0.125*	0.140*	0.029*	0.043*	0.000*	(0.0000)	

PM09 T1	2.730	0.687	-3.971	0.567	0.000	106.1	9.0
	0.052*	0.069*	0.358*	0.056*	0.000*	(0.0000)	
T2	2.791	0.687	-4.059	0.566	0.000	62.5	9.0
	0.053*	0.069*	0.365*	0.056*	0.000*	(0.0000)	
PM10 T1	2.029	2.246	-0.903	0.914	0.000	31.7	9.0
	0.057*	0.083*	0.017*	0.034*	0.000*	(0.0002)	
T2	2.070	2.246	-0.922	0.914	0.000	23.0	9.0
	0.057*	0.083*	0.018*	0.034*	0.000*	(0.0061)	
+ +	+	+	+	+	+	+	+ +
+ +	+	+	+	+	+	+	+ +
+ +	+	+	+	+	+	+	+ +
PM30 T1	2.176	3.12	-0.690	0.952	0.000	95.6	9.0
	0.051*	0.065*	0.010*	0.020*	0.000*	(0.0000)	
T2	2.064	3.126	0.660	0.952	0.000	134.8	9.0
	0.048*	0.065*	0.009*	0.020*	0.000*	(0.0000)	
PM31 T1	3.329	1.560	-2.135	0.842	0.000	7.7	8.0
	0.095*	0.123*	0.119*	0.066*	0.000*	(0.4626)	
T2	3.086	1.560	-1.979	0.842	0.000	60.5	9.0
	0.088*	0.123*	0.109*	0.066*	0.000*	(0.0000)	
PM32 T1	1.752	0.717	2.444	0.583	0.000	230.2	9.0
	0.031*	0.024*	0.082*	0.020*	0.000*	(0.0000)	
T2	1.521	0.717	-2.122	0.583	0.000	201.1	9.0
	0.028*	0.024*	0.074*	0.020*	0.000*	(0.0000)	
PM33 TI	-0.231	0.023	9.916	0.023	0.000	247.9	9.0
	0.022*	0.005*	2.451*	0.005*	0.000*	(0.0000)	
T2	-0.172	0.023	7.406	0.023	0.000	244.9	9.0
	0.022*	0.005*	1.945*	0.005*	0.000*	(0.0000)	
PM34 T1	1.140	1.072	-1.064	0.731	0.000	141.2	9.0
	0.037*	0.057*	0.039*	0.039*	0.000*	(0.0000)	
T2	1.202	1.072	-1.122	0.731	0.000	130.0	9.0
	0.038*	0.057*	0.041*	0.039*	0.000*	(0.0000)	
PM35 T1	0.324	0.096	-3.382	0.096	0.000	101.4	9.0
	0.022*	0.015*	0.570*	0.015*	0.000*	(0.0000)	
T2	0.298	0.096	-3.103	0.096	0.000	126.1	9.0
	0.022*	0.015*	0.521*	0.015*	0.000*	(0.0000)	
PM36 T1	0.374	0.085	-4.371	0.085	0.000	90.2	9.0
	0.022*	0.014*	0.770*	0.014*	0.000*	(0.0000)	
T2	0.346	0.085	-4.044	0.085	0.000	97.9	9.0
	0.022*	0.014*	0.708*	0.014*	0.000*	(0.0000	
PM37 T1	1.084	0.460	-2.355	0.418	0.000	173.9	9.0
	0.025*	0.024*	0.127*	0.022*	0.000*	(0.0000)	
T2	1.119	0.460	-2.430	0.418	0.000	117.7	9.0
	0.026*	0.024*	0.125*	0.022*	0.000*	(0.0000)	
PM38 T1	-0.120	0.083	1.438	0.083	0.000	320.7	9.0
	0.022*	0.014*	0.355*	0.014*	0.000*	(0.0000)	
T2	0.142	0.083	1.698	0.083	0.000	265.2	9.0
	0.022*	0.014*	0.394*	0.014*	0.000*	(0.0000)	
PM39 T1	-0.177	0.279	0.634	0.269	0.000	98.5	9.0
	0.022*	0.018*	0.089*	0.017*	0.000*	(0.0000)	
T2	-0.085	0.279	0.304	0.269	0.000	124.0	9.0
	0.022*	0.018*	0.083*	0.017*	0.000*	(0.0000)	

PM40	T1	0.199	0.413	-0.482	0.381	0.000	64.0	8.0
		0.022*	0.019*	0.057*	0.017*	0.000*	(0.0000)	
	T2	0.301	0.413	-0.729	0.381	0.000	81.4	8.0
		0.022*	0.019*	0.060*	0.017*	0.000*	(0.0000)	

Time1 * STANDARD ERROR
LARGEST CHANGE = 0.078502 36878.5 214.0
(0.0000)

Time2 * STANDARD ERROR
LARGEST CHANGE = 0.078502 36878.5 214.0
(0.0000)

PARAMETER	N	MEAN	STD. DEV.	ADJUSTED THRESHOLD
SLOPE		1.993	3.101	
LOG(SLOPE)		-0.402	1.737	
TIME: 1	40			
THRESHOLD		-3.746	13.544	0.000
TIME: 2	40			
THRESHOLD		-3.794	13.687	-0.048

Note: S.E. = Standard Error, CHISQ = Chi-square, Prob = Probability, Df = Degree of Freedom

Table 2 shows the parameter estimates of the 2PLM for T1 and T2, respectively. The INTERCEPT column contains the estimated item intercept, the SLOPE column contains the "a" parameter (discrimination), the THRESHOLD column contains the "b" parameter (difficulty), and the ASYMPTOTE column contains the "c" parameter (pseudo-guessing). The parameter loading column refers to the relationship between responses on each item and the latent trait. The mean threshold value at (T1= -2.823, T2= -2.758) and the adjusted threshold mean value at (T1= 0.000, T2= -0.048) indicate no response change for T1 and T2. The items also possess adequate item difficulty and discrimination indices.

Table 3: Item Parameter Estimates for 3PL Model for Time 1 and Time 2

ITEM		THRESHOLDS MU	THRESHOLDS SIGMA	SLOPES MU	SLOPES SIGMA	ASYMPTOTES ALPHA	ASYMPTOTES BETA
PM01	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM02	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM03	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM04	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM05	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM06	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM07	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM08	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM09	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM10	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
+	+	+	+	+	+	+	+
+	+	+	+	+	+	+	+
+	+	+	+	+	+	+	+
PM30	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM31	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM32	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM33	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM34	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM35	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM36	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM37	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM38	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM39	TI	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00
PM40	T1	-	-	1.000	1.649	5.00	17.00
	T2	-	-	1.000	1.649	5.00	17.00

Table 3 shows the parameter estimates of the 3PLM for T1 and T2, respectively. The INTERCEPT column contains the estimated item intercept, the SLOPE column contains the "a" parameter (discrimination), the THRESHOLD column contains the "b" parameter (difficulty), and the ASYMPTOTE column contains the "c" parameter (pseudo-guessing). The LOADING column refers to the relationship between responses on each item and the latent trait. For the 3PLM, there is no calculated threshold mean value, the slopes are (MU = 1.0, SIGMA = 1.649), and the asymptotes (ALPHA = 5.00, BETA = 17.00). The findings suggest that the 3PLM is not suitable for the personality data since the threshold value used as the benchmark of model fit is not computed.

Research Question Two: Which of the one-, two- and three-parameter logistic IRT models is more effective in analysing the stability of responses from the personality scale?

To determine the best-fit model among the three IRT models (1PLM, 2PLM, and 3PLM), their loglikelihood and goodness of fit values were estimated and compared (see Table 4).

Table 4: Likelihood-based Values and Goodness of Fit Statistics for IPLM, 2PLM, 3PLM from Repeated Administration

Statistics based on Goodness of Fit	1PLM	2PLM	3PLM
-2loglikelihood:	655999.59	637115.27	647386.26
Akaike Information Criterion (AIC):	2993.9	2853.6	2878.9
Bayesian Information Criterion (BIC):	3072.4	3010.7	3114.5

Table 4 presents Likelihood-based Values and Goodness of Fit Statistics for the 1PLM, 2PLM, and 3PLM models, respectively. The 1PLM yielded a 2loglikelihood value of 655999.5925, an AIC value of 2993.9, and a BIC value of 3072.4. Similarly, the 2PLM produced a 2loglikelihood value of 637115.2710, an AIC value of 2853.6, and a BIC value of 3010.7. Additionally, the 3PLM displayed a -2loglikelihood value of 647386.269, an AIC value of 2878.9, and a BIC value of 3114.5. To ascertain the efficacy of the one-, two- and three-parameter logistic IRT models in analysing response stability, their -2loglikelihood, AIC, and BIC were evaluated and compared (see Table 5).

Table 5: Comparison of overall fit for models (1PLM, 2PLM and 3PLM)

Model	No of Sample	- 2InL	AIC	BIC
IPLM	300	655999.59	2993.9	3072.4
2PLM	300	637115.27	2853.6	3010.7
3PLM	300	647386.26	2878.9	3114.5

Note: 1PLM = one-parameter model; 2PLM = two-parameter model; 3PLM = three-parameter model

Table 5 above shows the overall model fit of the IRT models (1PLM, 2PLM, and 3PLM). The values obtained were -2loglikelihood (655999.59), AIC = 2993.9, and BIC = 3072.4, for the 1PLM, -2loglikelihood = 637115.27, AIC = 2853.6, and BIC = 3010.7 for the 2PLM and -2loglikelihood = 647386.26, AIC = 2878.9, and BIC = 3114.5 for the 3PLM, respectively. From these results, the -2InL, AIC, and BIC values for the 1PLM, 2PLM, and 3PLM were compared, and the results showed that the 2PLM had the lowest values of -2InL, AIC, and BIC, indicating that it is the model of best fit.

Discussion

The purpose of this research was to evaluate the item parameter estimates and the goodness of fit of IRT models, namely the 1PLM, 2PLM, and 3PLM when applied to personality data obtained through repeated administration of the modified BFI. The results obtained from the estimation of item parameters for the 1PLM and 2PLM revealed that both models exhibited satisfactory difficulty and discrimination indices from repeated administration. These findings implied that the level of challenge or ease presented by individual items within the test and the respondent's ability to endorse or respond correctly to the item over repeated administration are satisfactory, indicating the stability of the instrument over time. The findings also implied that the items could differentiate between individuals who scored high and low on the trait measured from repeated administration, indicating the stability of the personality test over time.

These findings suggest that item difficulty and discrimination contribute to the overall effectiveness of personality tests. They offer standard metrics to compare items across different personality domains and ensure that the test accurately captures the distinctions of the trait assessed. Ludewig et al. (2023) emphasise that item difficulty reflects the proportion of individuals capable of answering the item correctly; thus, items with a high level of difficulty are more challenging and may require deeper self-reflection or introspection to answer accurately, supporting the importance of this metric at an acceptable benchmark. Furthermore, Date et al. (2019) recommend that those who construct the tests aim for acceptable levels of item difficulty and discrimination, underscoring the

significance of these factors in ensuring the validity and reliability of the assessment. The results also indicated a distinct correlation between the estimations of item parameters and the fraction of observed changes in item responses when the same instrument was administered for a second time. Nevertheless, the 3PLM failed to provide sufficient estimates for item parameters due to the absence of a computed threshold mean value in the model. This indicates that the 3PLM is not suitable for the personality data, i.e., an individual's personality traits should not be guessed. It concurs with Ahmad and Mokshein's (2016) assertion that when tests involve guessing, the 3PLM produces robust parameter estimates. Moreover, the results of the optimal model demonstrated that the 2PLM exhibited the lowest values in terms of -2InL, AIC, and BIC. These findings suggest that the 2PLM provided the most suitable fit for the current dataset when compared to other models. They align with the American Association of Educational Research, American Psychological Association, and National Council on Measurement in Education's (2014) recommendation that evidence of model-data-fit be established when employing an IRT model to draw inferences from a real dataset, as per the standards for educational and psychological testing. The findings also support those of MacDonald and Paunonen et al.'s (2003) study that revealed that the 2PLM had the best match when applied to personality traits, as well as those of Kose (2014) who asserted that the 2PLM is superior to other IRTs. In contrast, Ahmad and Mokshein, (2016) and Nye et al. (2019) concluded that the 3PLM and Mixed Model (2 and 3PLM) were the best fit. However, the 3PLM produces the least model fit, which could explain its infrequent use for personality data in the scholarly literature. From a psychologist's perspective, it is argued that the 3PLM is not an appropriate framework to analyse personality data as personality tests should not involve guessing. This assertion aligns with the findings of Morizot, Ainsworth, and Reise (2007) and Zanon et al. (2016) that when it comes to achievement statistics, the c parameter is crucial. Nevertheless, IRT estimation should employ different models if the test consists of items with many responses such as in personality assessment.

Conclusion and Recommendations

In conclusion, both the 1PLM and 2PLM exhibited satisfactory item parameter estimates, reflecting adequate item difficulty and discrimination indices. The 2PLM demonstrated the best fit among the three models based on -2InL, AIC, and BIC values. Based on the findings of this study, researchers and practitioners in personality assessment should consider employing the 2PLM, as it demonstrated superior fit compared to the 1PLM and 3PLM in analysing personality data from repeated administration. It is essential for researchers to continuously evaluate the effectiveness and appropriateness of assessment tools such as personality inventories using advanced statistical techniques like IRT. Regular assessments ensure the reliability and stability of conclusions drawn from personality assessments, especially in dynamic environments like tertiary education settings. The limitations of different IRT models and their suitability for specific datasets should be borne in mind as this assists in selecting the most appropriate model to accurately analyse psychological constructs.

Implications of the Findings

Our findings demonstrate the applicability of IRT models to assess item functioning for non-achievement assessments. They also provide valuable insights into item and test performance, enhancing the reliability and validity of personality assessments. By employing the most suitable IRT model, researchers and practitioners can achieve more accurate interpretations of individual differences in personality traits among undergraduate students. Robust personality assessments that accurately capture students' traits and behaviours over time will enable policymakers, educators, and psychologists to make more informed decisions regarding student support programmes, counselling services, and academic interventions.

Limitations and Suggestions for Future Research

The study was limited to undergraduate students from three tertiary institutions in Osun State, Nigeria. Students who reside in the hostels made up the sample. Furthermore, while several personality inventories and scales are available, the study only employed the BFI.

Drawing on the findings and conclusions, the following suggestions are made for future research:

1. The use of recent or newly-developed personality instruments/ scales could provide stronger evidence of response stability in the personality domain.
2. It would be of interest to compare dichotomous and polytomous IRT models' fit in the area of personality measurement.

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