WORK SYSTEMS FRAMEWORK FOR TEACHING WORKLOAD MODEL IMPLEMENTATION AT UNIVERSITIES IN SOUTH AFRICA

R. Nnadozie*

P. Chinomona*

*Institutional Research, Planning & Quality Promotion
Rhodes University
Grahamstown, South Africa

ABSTRACT

Academic workload management is a growing concern for public universities in South Africa. Over the period from 2008 to 2021, the student headcount in the higher education system has increased from approximately 800,000 to around 1,100,000 representing a 34 per cent increase. In contrast, the academic staff headcount witnessed a 28 per cent increase, emphasizing the challenges posed by the growing student population on the higher education system. However, state funding has failed to match the rate of inflation and the increase in the student headcount. Consequently, the teaching load has increased without corresponding growth in resources. This situation necessitates optimal planning and distribution of resources, particularly academic personnel. In developing the Teaching Workload Work System, Alter's Work System Framework was adopted to evaluate the teaching workload problem by mapping its components using the concept of Key Elements in Alter's Work Systems Framework. This article proposes a work systems framework for the management of teaching workload.

Keywords: teaching workload, work systems framework, workload management, higher education institutions

INTRODUCTION

The effective management of academic workloads has become an increasingly pressing issue for public universities in South Africa. The surge in student headcount within the higher education system is evident, with a notable rise from approximately 800,000 students in 2008 to around 1,100,000 in 2021, as illustrated in Table 1, sourced from the HEDA Peer Data System.

Table 1: Student Headcount Versus Academic Staff Headcount (Source: DHET (2023) accessed from HEDA Peer Data System)

Year	Student Headcount	Academic Staff Headcount
2008	799,387	15,936
2021	1,068,046	20,414
Change	268,659	4,478
% Change	34%	28%

This data signifies a substantial increase of nearly 300,000 students during this period, indicating a 34 per cent growth in student enrolment. In contrast, the academic staff headcount witnessed a 28 per cent increase, emphasizing the increasing workload challenges posed by the growing student population at public universities in the country.

The implications of such rapid growth in student numbers are profound. Managing this rapid increase effectively is crucial to ensure the effectiveness and quality of teaching and learning at public universities in the country. The 34 per cent rise in student enrolment demands a comprehensive approach to academic workload planning and resource allocation. The 28 per cent increase in academic staff, while commendable, may still fall short of meeting the escalating teaching responsibilities.

HYPOTHESIS

Increasing student enrolment at South African public universities has led to a disproportionate rise in academic workload relative to available resources, necessitating the development a framework for effective teaching workload management system.

RESEARCH QUESTION

How can an integrated work systems framework improve the management of teaching workload at public universities in South Africa?

RESEARCH OBJECTIVES

- To examine the relationship between student enrolment growth and academic workload challenges at South African public universities.
- To propose a comprehensive work systems framework for optimizing teaching workload management public universities in South Africa.

The surge in student enrolment at public universities in South Africa has significantly impacted academic workload management. From approximately 800,000 students in 2008, enrolment rose to around 1,100,000 in 2021 representing 34 per cent increase, outpacing the 28 per cent growth in academic staff headcount. This disparity poses challenges in maintaining teaching quality and ensuring effective learning outcomes. Hence, developing and implementing an integrated work systems framework for teaching workload management is crucial. This framework aims to address evolving institutional needs, optimizing resource utilization and enhancing teaching effectiveness amid growing student numbers.

METHODS

This study adopted a desk-top review approach to investigate the growing concern of academic workload management at public universities in South Africa. The substantial increase in student enrolment, coupled with stagnant state funding, had placed enormous pressure on academic staff, necessitating optimal resource allocation and workload distribution. This review leveraged existing literature and official documents for insights into best practices for academic workload management and optimization.

Data acquisition

The research commenced with a comprehensive search of academic databases, employing targeted keywords to identify relevant scholarly publications and government reports ensuring a multifaceted perspective. Rigorous selection criteria based on quality and relevance of selected publications. Thematic analysis was then employed to identify themes and patterns across the diverse sources. By meticulously synthesizing and comparing findings from various sources, a comprehensive overview of the current landscape of academic workload management in South Africa was constructed.

Integration of the work systems framework

Throughout the analysis, Alter's Work Systems Framework served as a guiding lens. Each source was critically examined to reveal how it addressed the framework's key components, facilitating identification of strengths and limitations within existing approaches. This integration provided valuable insights into the applicability and potential modifications of the framework for the specific context of public universities in South Africa.

Interpretation and implications

The findings of the review were interpreted considering the identified themes, patterns, and the overarching Work Systems Framework. Key implications for academic workload management practices in South African higher education institutions were discussed, including potential strategies for optimizing resource allocation, workload distribution, and policy development. Recommendations for future research directions and practical interventions were provided based on the synthesized insights and gaps identified in the literature.

Ethical clearance

Since this study did not involve the participation of human or animal subjects, ethical clearance was not required. The research solely relied on the analysis of existing literature and publicly

available documents. Consequently, ethical considerations regarding informed consent, privacy, and potential harm to participants did not apply. Nonetheless, the research adhered to ethical principles of academic integrity.

LITERATURE REVIEW

Defining academic workload

The Workload of an academic staff could be worked out as aggregated time spent on all aspects of University Scholarship. The aspects of work are based on two broad strands: direct academic duties and administrative/academic citizenship functions as shown in Figure 1 (Nnadozie 2015).

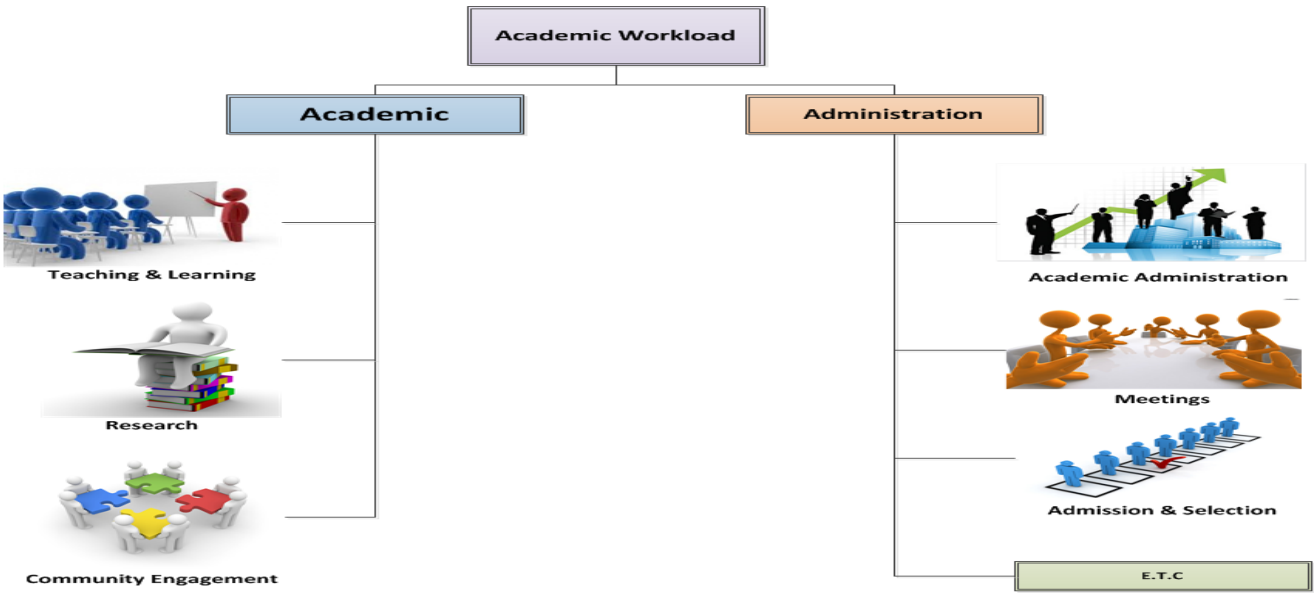

Figure 1: Components of Academic Workload **(**Nnadozie 2015)

The cumulative workload for an academic is calculated as follows (Parks et al. 1995):

$$TW = TL + RI + CE + AD \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

where,

TW = Total Workload

TL = Time on Teaching and Learning

RI = Time on Research and Innovation

CE = Time on Community Engagement

AD = Time on Administrative Activities (academic citizenship).

The various components of academic such as time on teaching could further be formulated using more complex models that take into account various factors. These factors may include class size, mode of delivery, experience of lecturer, frequency of teaching, volume/credits involved, shared teaching, excreta (Nnadozie 2015). The essence of this article is not to recommend a formulaic expression of academic workload. A number of studies have attempted formulaic recommendations. The formulaic models may defer from various Universities and fields of study. One of the main challenges is the implementation of an agreed formulaic model largely attributable to workflow problems arising from the integration of complex data structures in which information for formulaic inputs reside. The data structure is illustrated in Figure 2. The Work Systems Framework (WSF) therefore becomes an important instrument from a process point of view for the recommendation of a systems framework for the development of workload system at public universities. In this article, we have focused on the teaching component of academic workload.

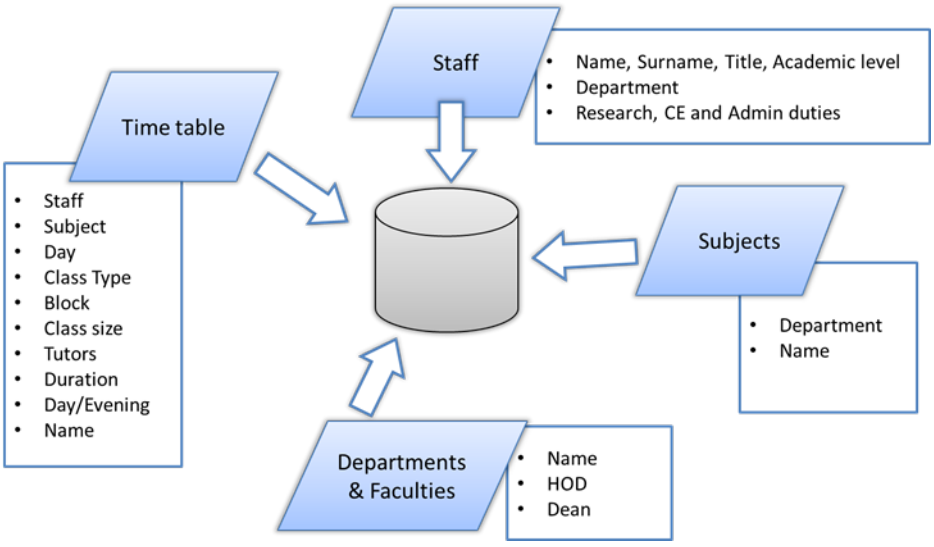

Figure 2: Teaching Workload Data Components (Nnadozie 2015)

Defining Alter's work system framework

According to Alter (2014), a work system is characterized as a setup where individuals and/or machines engage in processes and activities, utilising information, technology, and resources to generate particular products or services for internal and/or external clientele. The work system methodology integrates a static perspective of an existing or potential work system in action with a dynamic understanding of how the system progresses over time due to both deliberate and unforeseen alterations.

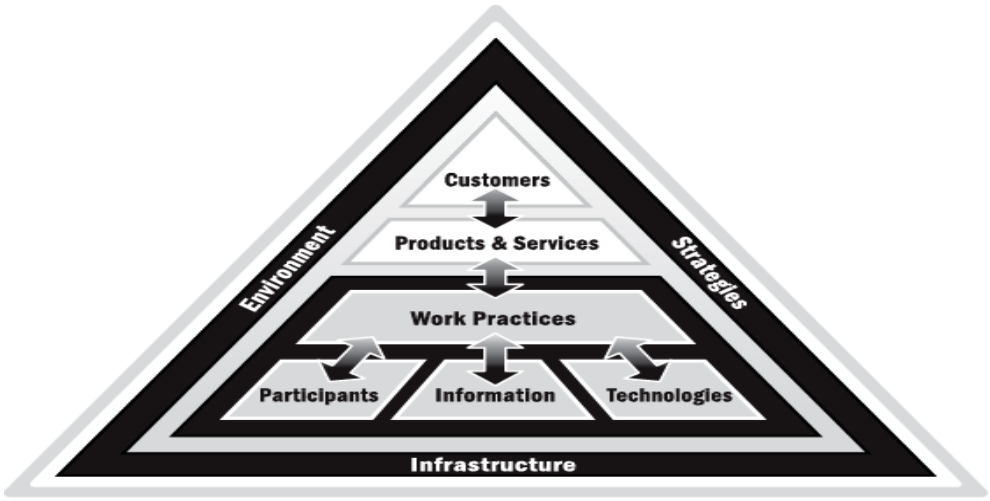

Figure 3: Work System Framework (Source: Alter 2014)

The Work System Framework (WSF) as conceptualised by Alter (2014) is employed to summarise and analyse Information Technology (IT)-dependent work systems within organisations. WSF comprises nine essential components which can be utilised within organisations to comprehend the structure, operation, and surroundings of the work system. These interlinked elements, as illustrated in Figure 3, need to be taken into account when designing a work system.

The Work System Framework (WSF) breaks down organisations into key components: processes, participants, information, technologies, customers, products/services, environment, infrastructure, and strategies. Processes and activities, participants, information, and technologies are integral components within the work system. Customers and products/services, however, may straddle the boundary of the work system, as customers often engage in processes and activities within the system, and products/services take form within it. On the other hand, elements such as the environment, infrastructure, and strategies predominantly lie outside the work system, although they frequently exert direct influences within it. Reflecting the significance attributed to customers, the WSF places them atop its diagram, underscoring that work systems fundamentally exist to deliver services/products to customers. Moreover, arrows within the WSF diagram signify the necessity for alignment among specific elements. Notably, there's no arrow linking participants and technology within the WSF diagram, as the alignment requirement pertains solely to processes and participants, processes and information, and processes and technologies.

The dynamic evolution of a work system over time finds representation in the Work System Life Cycle Model (WSLC), which encapsulates how work systems evolve through both

planned and unplanned changes, facilitated by bricolage, adaptations, and workarounds. Planned changes, depicted as projects within the WSLC, entail initiation, development, and implementation phases. Development encompasses the acquisition or creation of resources essential for effecting desired changes within the organisation, such as software development. The implementation phase of the WSLC pertains to the integration of changes within the organisation, rather than the execution of algorithms on computers. Inward-facing arrows on all four phases of the WSLC signify that emergent changes arise not only through incremental modifications in operational systems but also through alterations occurring across various phases of formal projects.

In the formulation of the Teaching Workload Work System, Alter's Work System Framework is embraced to assess the Teaching Workload issue by dissecting its components using the concept of Key Elements within the Alter's Work Systems Framework. The evolution of the teaching workload system's implementation over time is encapsulated by the Work System Life Cycle Model (WSLC), elucidating how work systems undergo transformations through planned and unplanned changes facilitated by bricolage, adaptations, and workarounds.

Academic workload in various contexts

Even with scarce literature, one could find a few studies that have attempted to probe workload allocation practices in various contexts in higher education.

Cloete, Bunting and Van Schalkwyk (2022) found that student-to-staff ratios in South Africa's public universities have been increasing over the past decade. This means that there are fewer academic staff members per student than there were in the past. For example, in 2007, the average student-to-staff ratio was 20:1, while in 2019, it was 26:1. This increase is due to a number of factors, including the growth in student enrolment and the slow growth in the number of academic staff members.

According to Cloete et al. (2022) academic staff members in South Africa's public universities are spending an increasing amount of time on administrative tasks and other activities that are not directly related to teaching and research. This is due to a number of factors, including the increasing complexity of higher education administration, the need to comply with government regulations, and the demands of fundraising.

Soliman and Soliman (1997) stressed the significance of comprehending the ramifications of heightened academic workload on academics, particularly its influence on the quality of work delivered by them. They proposed a comprehensive approach to tackling workload and quality issues, suggesting the implementation of legislation to regulate academic workload, the establishment of policies and practices shaping workload,

engagement of unions in bargaining agreements favouring improvements in academic work quality, formulation of workload agreements ensuring fairness in workload distribution within departments and individual academics, and considering outsourcing academics as a means of alleviating academic workload. Burgess, Lewis, and Mobbs (2003) delved into academic workload through a study focusing on workload planning within university departments. They advocated for strategic planning within these departments and the adoption of effective Workload-planning Systems (WPSs) to prevent academic work overload. The authors highlighted three key measures universities should adopt to enhance effectiveness: ensuring equitable workload allocation, transparency in work planning systems, and aligning staff behaviour with strategic objectives. Their argument centred on the necessity of an equitable, transparent workload allocation system enabling staff to align their behaviour with departmental goals and fostering staff participation in system development.

Paewai, Meyer, and Houston (2007) addressed academic workload management by researching a collaborative initiative between university management and staff unions in New Zealand. This initiative arose in response to changes within New Zealand universities, including staff retrenchments and subsequent protests. The management and unions collaborated to review academic policy formation and other measures to address staff working conditions. Their study revealed challenges in effectively implementing workload allocation models, including time constraints in model development and discrepancies between nominal and actual task times. Additionally, concerns arose regarding unequal funding allocations within departments, indicating the need for universities to develop policies addressing workload allocation and management within the context of complex organisational structures. Qu et al. (2014) took a distinct approach, developing a mathematical optimisation model applied in an Australian higher education setting to investigate workload allocation's impact on teaching quality. Their findings indicated that the optimisation model improved teaching quality by at least 7 per cent compared to manual allocation methods and suggested a more equitable workload distribution.

Botha and Swanepoel (2015) quantified and measured academic workload in a South African higher education context using a workload model. Their study focused on teaching and learning administration, research, postgraduate supervision, and community engagement as critical performance indicators. They identified imbalances in academic workload among staff members and recommended universities develop policies ensuring balanced workloads to maintain quality. Bezuidenhout (2015) explored the implications of academic workload on the changing role of distance educators within South African open

and distance learning universities. The study revealed challenges faced by distance educators in balancing their roles and maintaining quality outputs. It recommended universities adopt workload allocation models to ensure equitable distribution of workload, fostering a productive and competitive human capital. Hosain (2016) investigated the relationship between teaching workload and performance at a Bangladeshi university, noting increased administrative tasks leading to high workload among lecturers. Recommendations included workload allocation based on career stage and compensating lecturers for additional responsibilities. Harley (2017) examined Marx's theory of alienation of labour in academia, highlighting increasing workload intensity and the casualisation of labour. Harley suggested academics focus on meaningful work and resist capitalist pressures.

Despite differing circumstances, the aforementioned studies collectively indicate a nuanced and noticeable increase in academic workload within higher education institutions in recent times. Consequently, effective workload management emerges as a crucial decision support mechanism for workforce planning within universities. The Work System Method (WSM) presents itself as a flexible approach rooted in systems thinking, drawing upon the foundational principles of both the Work System Framework (WSF) and Work System Life Cycle (WSLC). Widely applicable across organisational settings, WSM serves as a valuable tool for problem-solving and system improvement initiatives, with or without the involvement of software development. As highlighted by Alter (2014), WSM has undergone significant evolution over the years and is increasingly being integrated into undergraduate information systems courses across numerous universities. Its overarching concept remains relevant in addressing a spectrum of process-based challenges, including those inherent in academic workload management.

INTERGRATION AND ADAPTATION OF WORK SYSTEMS FRAMEWORK TO TEACHING WORKLOAD PROBLEM

Alter (2014) explained that the work system snapshot ought not to surpass one page to aid in directing attention towards the scope of the system and to prevent being inundated with details. In accordance with Alter's advice for simplicity and focus, the work system snapshots are showcased. Tables 2 and 3 present snapshots for teaching workload deployment, while Figure 4 illustrates the work system life model. The work system elements are delineated within the context of the academic workload issue in Table 2.

Table 2: Elements for Teaching Workload System (Adapted from Alter 2014)

Elements of Work System Framework for Teaching Workload Management	
Process and Activities	Teaching and Learning
Participants	Academic Staff and Support Staff
Information	Timetable schedules, Class Sizes, Curriculum
Technologies	Timetable systems, E-learning Platforms, Teaching Aids, Telephones, internet
Products/Services	Graduates, research outputs
Customers	Students, Parents, Stakeholders
Environment	Higher education sector, University governance statute/rules,
Infrastructure	Academic spaces, enterprise resource planning (ERP) systems, teaching staff
Strategy	Higher education plan, University's strategic plan

The elements are further elaborated in Table 3.

Table 3: Tabulated Teaching Workload Elements (Adapted from Alter 2014)

<table>
<tr><th colspan="2">Customers</th><th>Products & Services</th></tr>
<tr><td colspan="2">• Students
• Parents
• Stakeholders</td><td>• Graduates
• Research outputs</td></tr>
<tr><th colspan="3">Work practices (Major activities or processes)</th></tr>
<tr><td colspan="3">• At the beginning of every academic year, students register subjects according to the academic structure and their respective academic programmes
• In the various academic departments, subjects are allocated to various lecturers for teaching
• Usually, the common practice is to allocate not more than 2 subjects per lecturer
• This practice does not take into consideration, the class sizes which are increasing every year
• The teaching workload model will take into consideration, classes sizes and levels of sophistication, time for assessment and lecturer consultation will be factored into an agreed algorithm</td></tr>
<tr><th>Participants</th><th>Information</th><th>Technologies</th></tr>
<tr><td>• Academic Staff
• Support Staff
• Students</td><td>• Timetable schedules
• Class Sizes
• Curriculum
• Staff system
• Student system
• Academic structure</td><td>• ERP system
• Relational databases
• Time-table software
• HR system
• Internet
• Telephones</td></tr>
</table>

WORK SYSTEM LIFE CYCLE MODEL FOR TEACHING WORKLOAD MODEL DEPLOYMENT

The life cycle commences with the conceptualisation phase, wherein the teaching workload model is devised, considering various teaching workload factors. Once conceptualised, the model progresses to the initiation stage, where it undergoes thorough scrutiny and refinement. This phase is crucial as it entails aligning the model with the specific requirements, strategic goals, and standards of the university. Subsequently, the conceived teaching workload model advances to the formal approval stage, where it is presented to university structures for endorsement. Formal approval is a pivotal step as it establishes the model as a consensus

framework for managing teaching workloads within the institution. This formalisation ensures that the workload management process aligns with institutional policies and procedures.

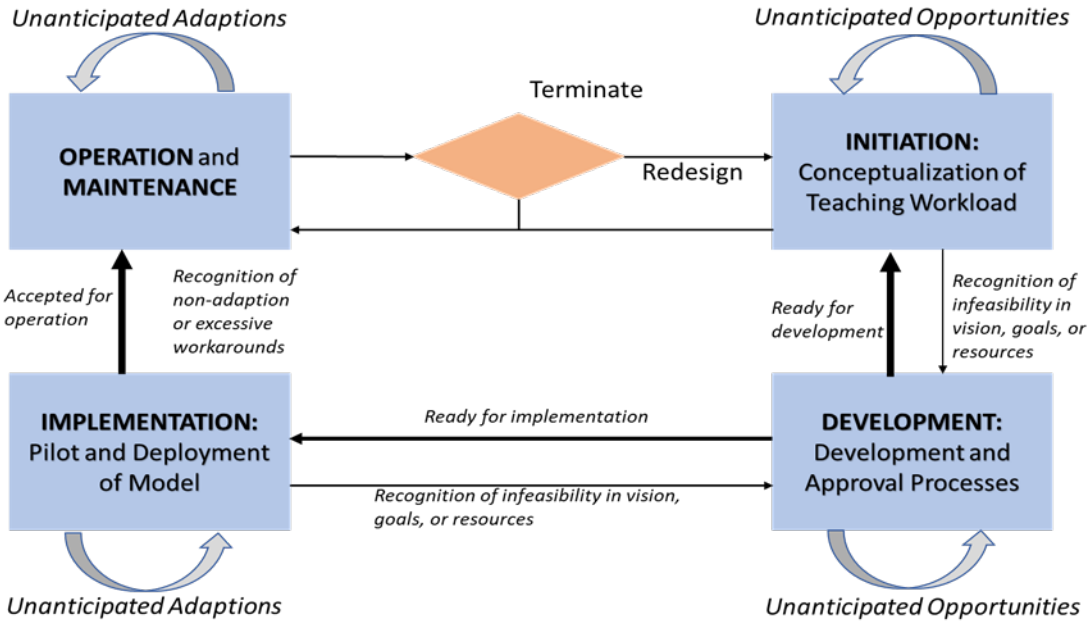

Figure 4: Work System Life Cycle Model for Deployment of Teaching Workload Model (Adapted from Alter 2014)

Upon receiving approval and the ratification of recommendations, the implementation processes commence. The deployment of the teaching workload model involves translating theoretical concepts into practical measures. However, before the full-scale rollout, a testing and piloting phase is imperative. This phase allows for a systematic assessment of the model's efficacy, identifying potential challenges and fine-tuning the processes for seamless integration. The testing and piloting phase serve as valuable opportunities to gauge the model's effectiveness, ensuring that any necessary adjustments are made before implementation. This iterative approach enhances the model's adaptability and responsiveness to the unique dynamics of the educational institution.

The Work System Life Cycle Model provides a structured and systematic approach to the deployment of the Teaching Workload Model, encompassing conceptualisation, initiation, formal approval, implementation, and a critical testing and piloting phase. This model ensures that the management of teaching workloads is not only robust in theory but also practical and tailored to the specific needs of respective academic institutions.

CONCLUSIONS AND FUTURE WORK

The amalgamation of academic and administrative responsibilities, encompassing Teaching

and Learning, Research and Innovation, Community Engagement, and administrative duties, constitutes an individual's academic workload. The aim of an academic workload model is to establish a framework ensuring the optimal, equitable, and transparent distribution of these workloads.

Drawing upon Alter's (2014) definition of a work system as a dynamic amalgamation of human participants, machines, and resources, this article introduces a comprehensive framework for deploying an academic workload management system, particularly focusing on the teaching and learning aspect. It utilises the Work Systems Framework (WSF) to articulate both a static snapshot of the current or proposed work system and a dynamic perspective that considers its evolution over time through planned and unplanned changes.

The study's findings reveal that the components of the teaching workload system align with the nine elements of Alter's WSF. Moreover, it recommends the adoption of the Work System Life Cycle Model for deploying the Teaching Workload Model, offering a structured approach to its implementation.

In the context of South Africa's national development plan (NDP-2030), the government underscores the strategic significance of the education sector in achieving sustainable development. The NDP-2030 outlines ambitious goals for the higher education sector, emphasising increased access and student success. Recognising the pivotal role of efficient workload planning in meeting these objectives, the proposed Work Systems Framework for teaching workload management emerges as a valuable tool in facilitating academic workload planning.

Given the stratification of South African universities into Traditional Universities, Comprehensive Universities, and Universities of Technology, a potential aspect for future research involves exploring differentiated Work System Frameworks tailored to the distinct characteristics of each university type. This tailored approach recognises the unique challenges and requirements faced by different categories of institutions, allowing for a more nuanced and effective academic workload management system.

The deployment framework and Work Systems Framework presented in this article contribute to the ongoing discourse on academic workload management. The future exploration of differentiated frameworks for various university types reflects a commitment to refining and customising workload management strategies, thereby enhancing the overall effectiveness of academic institutions in South Africa.

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