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Application of agile management theory in higher education in the United Republic of Tanzania

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Abstract

The application of Agile Management Theory in higher education institutions has emerged as a transformative approach to address the challenges faced by traditional methods in the United Republic of Tanzania. This study explores the integration of Agile principles into the core structure of higher education, assessing its potential to enhance the learning experience, improve student outcomes, and prepare graduates for the dynamic future of work. Agile, known for its flexibility, collaboration, and iterative development, provides an alternative to rigid curriculum structures and lengthy planning cycles. The research investigates effective strategies for incorporating Agile principles, the challenges encountered in traditional academic settings, and the impact on student engagement, learning outcomes, and graduate employability. Methodologically, the study adopts a qualitative approach, relying on semi-structured interviews, document analysis, and a diverse participant pool, including faculty, administrators, students, and Agile coaches. Results suggest promising strategies for Agile integration, such as designing modular curricula, emphasizing specific skills, and incorporating real-world projects. However, challenges include resistance to change, resource constraints, and the need for innovative assessment methods. The impact assessment reveals potential benefits, including increased student engagement, improved critical thinking skills, and enhanced graduate employability. The study concludes with recommendations for the ongoing process of Agile implementation, emphasizing the importance of commitment, adaptation, and creative problem-solving. By addressing challenges and considering cultural nuances, Tanzanian higher education institutions can create a learner-centred, responsive system that prepares graduates for success in the 21st century.

Keywords: Agile Management Theory, Curriculum Design, Higher Education, Student Engagement, Tanzania

Introduction

Agile project management, rooted in the early 1990s with Agile manufacturing and formally established in 2001 through the Agile Manifesto by a group of technologists, emphasizes flexibility, collaboration, and iterative development (Shah et al., 2023, Plotnikov et al., 2022). The Agile

Manifesto's four key principles prioritize individuals and interactions, working software, customer

collaboration, and responding to change, guiding teams towards creating superior software products (Khovrat et al., 2022). The Agile methodology, rapidly becoming the industry standard, aids businesses in swiftly adapting to market changes, enhancing customer satisfaction and overall productivity (Mroz, 2022). Classical management theories have influenced the development of Agile approaches, highlighting the evolution of management practices towards more adaptable and innovative strategies (Gupta et al., 2022). The effectiveness of Agile in various industries, including drug development, has led to its widespread adoption and consideration for enhancing project management methodologies.

The Agile methodology was developed as a response to the limitations of traditional project management methodologies, emphasizing flexibility, collaboration, and customer satisfaction. Before Agile, teams predominantly used the Waterfall approach, which followed a rigid path from setting project requirements to launching a finished product, often leading to outdated solutions due to the fixed nature of the plan and the lengthy development cycles. Agile, with its roots in the Agile Manifesto's values of individuals and interactions, working software, customer collaboration, and responding to change, offers a more adaptive and customer-centric approach to project management, particularly beneficial in software, manufacturing, aerospace, and defence industries (Gupta et al., 2022).

Agile methodologies, such as Scrum, Extreme Programming (XP), and Kanban, have revolutionized the software development industry by emphasizing teamwork, customer satisfaction, and iterative progress (Bose et al., 2023). Scrum, a project management framework, focuses on collaboration, accountability, and incremental development, while XP places a strong emphasis on customer satisfaction, teamwork, and continuous improvement. Kanban, on the other hand, is a visual system designed to manage workflow efficiently as it progresses through different stages. The principles of Agile management have not only transformed software development but have also found applications in diverse industries like manufacturing, healthcare, and education, showcasing the versatility and effectiveness of Agile practices beyond the realm of software development (Sankhe et al., 2022).

Traditional methods of managing higher education are encountering obstacles in adapting to the dynamic demands of today's world. The need for reform in the management system of higher education institutions is evident, emphasizing principles like goal orientation, transparency, and a broad management framework (Islomovich, 2023). Higher education plays a crucial role in societal development, necessitating effective resource provision and quality organization of the learning process. To thrive in the evolving landscape, universities must embrace organizational agility, enabling them to sense and implement change efficiently while continuously learning and creating value for stakeholders (Gul et al., 2022). Information and communication technologies are pivotal in enhancing educational management, yet many institutions still underutilize them, missing out on opportunities to improve quality, effectiveness, and accountability in tertiary education (Mesiono et al., 2023). Embracing Agile management principles can revolutionize higher education by fostering flexibility, collaboration, and iterative development to better align with industry needs and student expectations.

Traditional curriculum design struggles to keep pace with the rapid emergence of new fields and knowledge, highlighting the need for agile methodologies in education (Hutson & Ceballos, 2023). Agile's iterative approach allows for quick adaptation, incorporating updated information and relevant skills into the curriculum, ensuring its relevance in a fast-changing landscape (Awad et al., 2023). Moreover, agile's focus on collaboration and continuous feedback fosters deeper student engagement and enables personalized learning pathways, creating a more interactive and effective learning environment (Vaganova et al., 2022). By leveraging agile methodologies, educators can respond rapidly to industry needs and evolving student career aspirations, tailoring educational offerings to remain impactful and aligned with real-world requirements, thus enhancing the overall

educational experience and outcomes (Owen & Wasiuk, 2021).

This study aimed to explore the specific applications of Agile management theory within higher education institutions, evaluating its potential to improve the learning experience, enhance student outcomes, and prepare graduates for the dynamic future of work. Despite the apparent benefits of Agile in other industries, its application within higher education remains largely unexplored. Existing research primarily focuses on the implementation of Agile in administrative functions or specific academic projects, leaving the broader implications for curriculum design, teaching methods, and student learning largely unaddressed.

This study addressed this gap by investigating the following: Effective strategies for integrating Agile principles into the core structure of higher education institutions; Challenges and barriers encountered when implementing Agile methodologies in traditional academic settings; and Impact of Agile management on student engagement, learning outcomes, and graduate employability. By addressing these objectives, this study sought to provide valuable insights and practical recommendations for integrating Agile management theory into higher education, paving the way for a more adaptable, responsive, and student-centred learning experience.

Literature Review

Effective strategies for integrating Agile principles into the core structure of higher education institutions.

Integrating Agile principles into the core structure of higher education institutions involves adopting flexible, adaptive frameworks like Agile Enterprise Architecture (AEA) (Sararuch et al., 2023). This integration requires a focus on adaptability to changing conditions, collaborative work environments, continual innovation, and monitoring market needs. Additionally, Agile IT Governance (ITG) plays a crucial role in responding to disruptions and ensuring superior performance in the digital age (Stei et al., 2022). The COVID-19 pandemic has further emphasized the need for agility in higher education institutions, pushing them to relax institutional structures and policies to deliver online education effectively (Ofoeda & Ami-Narh, 2022). As higher education institutions face increasingly volatile and complex conditions, embracing the Agile Paradigm can provide a relevant model for organizational development and equip future management students with the competencies needed to navigate 21st-century challenges (Francis, 2022).

Challenges and barriers encountered when implementing Agile methodologies in traditional academic settings.

Implementing Agile methodologies in traditional academic settings faces challenges such as limited team size, minimal student professional experience, time constraints, and reduced project scope, hindering a comprehensive learning experience. The struggle lies in balancing agile principles with academic constraints, leading to a mix of traditional and agile methods in workshops due to organizational culture (Calvo & Dombrovskaia, 2019). While academia increasingly adopts Agile to align with industry demands, traditional approaches like the Waterfall model receive less attention despite their effectiveness in teaching complex project management and software engineering skills (Włodarski & Poniszewska-Maranda, 2019). Moreover, resistance to change in teaching methodologies poses a barrier, especially in Latin American countries, where adapting to new paradigms and student profiles is crucial for effective learning outcomes (Vilchez-Sandoval et al., 2020). Additionally, the dynamic nature of educational program development, influenced by various stakeholders and evolving market demands, requires skilled project management to navigate challenges effectively.

Impact of Agile management on student engagement.

Agile management approaches have shown a positive impact on student engagement in higher education settings. By aligning the values of student-staff partnerships with agile frameworks,

imbalances of power between students and staff can be addressed, leading to increased confidence in co-creating teaching and learning (Owen & Wasiuk, 2021). Additionally, incorporating agile strategies for team regulation and project management enhances students' engagement with learning activities and collaborative processes (Arora & Sondhi, 2016). The Agile methodology not only encourages students to take responsibility for their learning but also fosters continuous improvement through reflection, increased learner engagement, and more effective data collection and assessment of outcomes (Noguera et al., 2018). Implementing Agile principles, such as splitting tasks into sprints and utilizing tools like Kanban boards, has proven successful in managing complex educational projects and improving the engagement of students in international programs (Gannod et al., 2015).

Impact of Agile management on student learning outcomes.

Agile management in education, as highlighted in various research papers, has shown a positive impact on student learning outcomes. By integrating technology and agile methodologies, such as Agile Management and Challenge Learning (CBL), educational institutions have been able to enhance teaching strategies, improve student engagement, and boost learning results. Studies have demonstrated that Digital Competencies (DC) significantly influence student learning agility (LA) and perceived learning (PL) (Awad & Al Adwan, 2023). While the implementation of Agile Management in physical education and sports has positively affected the performance of athletes and students (Cojocaru et al., 2022). Additionally, an agile learning management method based on Scrum has shown significant results in supporting students in a challenging learning cycle, leading to improved learning outcomes and the administration of learning objectives (Patwardhan et al., 2022). These findings collectively emphasize the importance of Agile management in driving positive student learning outcomes.

Impact of Agile management on graduate employability.

Agile methodologies have a significant impact on graduate employability by enhancing student motivation, learning outcomes, and readiness for the dynamic workforce. Incorporating Agile project management approaches in educational settings, as seen in various studies (Madhuri & Goteli, 2018, Griffin et al., 2013, Säisä et al., 2019, Pócsová et al., 2020), not only improves team morale, feedback cycles, and value delivery but also equips students with relevant skills for the rapidly evolving job market. By treating graduates as "potentially shippable products" and integrating Agile frameworks into university-industry collaborations and curricula, students gain both disciplinary and interdisciplinary knowledge essential for professional success. The adaptability, efficiency, and focus on continuous improvement inherent in Agile methodologies prepare graduates with the soft and hard skills required by employers, ultimately increasing their employability and readiness for deployment in the workforce.

Methods

Knowledge is co-created through interactions and shared experiences between individuals and their environment. In this study, the understanding of Agile's application in higher education emerges from the perspectives and experiences of stakeholders within academic institutions. Meaning is subjective and shaped by individual interpretations and understandings. The study acknowledges the diverse interpretations of Agile principles and practices among different academic actors. Emphasis on understanding the lived experiences and perspectives of participants through in-depth, context-specific inquiries. Generating knowledge through the iterative analysis of qualitative data allows for the emergence of themes and insights grounded in the data itself.

I recognized the potential power imbalances and unintended consequences of implementing Agile in higher education, particularly regarding the potential exploitation of academic labour and student well-being. I aimed to contribute to the development of transformative educational practices that empower students, enhance

academic freedom, and promote social justice within higher education institutions. I utilized a combination of semi-structured interviews and document analysis to triangulate findings and enhance the richness and credibility of the data.

I acknowledged my positionality and potential biases, employing techniques like member checking and triangulation to minimize their influence on the research process and findings. I selected participants based on their knowledge and experience with Agile implementation in higher education institutions in Tanzania. Initial participants recommend additional individuals to interview, expanding the network of informants and enriching the data set. The total sample size included 40 participants, including faculty members, administrators, students, and Agile coaches involved in Agile initiatives within Tanzanian higher education institutions.

I conducted semi-structured interviews with individual participants, exploring their experiences, perspectives, and insights on Agile implementation in their institutions. I also reviewed institutional documents, Agile project artifacts, and relevant literature to gain a broader understanding of the context and implementation strategies. Interviews conducted in Swahili were transcribed and translated into English for analysis. I also identified recurring themes and patterns in the data through iterative coding and analysis using qualitative data analysis software.

In terms of data analysis, I constructed detailed narratives capturing the lived experiences and perspectives of participants regarding Agile implementation in their institutions. I also examined the underlying power dynamics, ideologies, and assumptions embedded within the discourses surrounding Agile in higher education. I also identified similarities and differences in experiences and perspectives across different participant groups (faculty, administrators, students) and institutional contexts. I obtained written informed consent from all participants before data collection. I maintained participant confidentiality by anonymizing interview transcripts and publications. I also ensured participants understood their right to withdraw from the study at any time. I employed multiple data collection methods and sources to corroborate findings. I shared preliminary findings with participants for feedback and validation. I also maintained detailed records of the research process, including interview transcripts, coding decisions, and analytical memos.

Results

Effective Strategies for Integrating Agile Principles into The Core Structure of Higher Education Institutions

Integrating Agile principles into the core structure of higher education institutions in the United Republic of Tanzania presents a promising opportunity to enhance educational agility, adaptability, and responsiveness to dynamic societal needs. Here are some effective strategies to consider:

Design curricula in smaller, iterative modules that allow for continuous feedback and improvement. This fosters a culture of continuous learning and adaptation, aligning with Agile's iterative approach. Focus on developing specific skills and competencies rather than traditional course credits. This allows students to progress at their own pace and master skills before moving on, echoing Agile's emphasis on delivering value incrementally. Incorporate real-world projects into the curriculum, encouraging students to collaborate and apply their knowledge in practical settings. This aligns with Agile's focus on cross-functional teamwork and iterative value delivery.

Interactive teaching methods like flipped classrooms, group discussions, and problem-solving activities. This aligns with Agile's emphasis on communication, collaboration, and rapid feedback loops. Create interdisciplinary teams of faculty, staff, and students to design, develop, and deliver educational programs. This fosters collaboration and breaks down silos, mirroring Agile's emphasis on self-organizing teams. Empower faculty and staff to make decisions at the program and department level, fostering ownership and responsiveness to local needs. This

aligns with Agile's principles of distributed leadership and autonomy.

Implement regular feedback mechanisms like student surveys, peer reviews, and data analysis to continuously improve programs and processes. This aligns with Agile's emphasis on introspection and iteration. Utilize online platforms, learning management systems, and collaborative tools to support agile workflows, communication, and feedback loops. This aligns with Agile's reliance on technology to facilitate rapid response and adaptation.

Encourage a culture of learning, experimentation, and failure as opportunities for growth. This aligns with Agile's emphasis on embracing challenges and learning from mistakes. Value collaboration and communication: Foster a culture of open communication, collaboration, and teamwork across departments and disciplines. This aligns with Agile's principles of transparency and shared ownership. Recognize and reward innovative approaches, experimentation, and successful iterations. This reinforces the Agile values of continuous improvement and delivering value.

Develop creative solutions to overcome resource constraints, such as leveraging technology, partnerships, and open-source resources. Integrate Tanzanian perspectives and knowledge systems into the curriculum and pedagogy, making education more relevant and culturally appropriate. Collaborate with government agencies, NGOs, and industry partners to develop training programs that address current and future workforce needs.

Implementing Agile principles is an ongoing process that requires commitment and adaptation. Start small, pilot initiatives in specific programs, and continuously iterate based on feedback and data. With dedication and creativity, integrating Agile principles can transform higher education in Tanzania, fostering a more adaptable and responsive system that equips graduates with the skills and knowledge needed to thrive in the 21st century.

Challenges And Barriers Encountered When Implementing Agile Methodologies in Traditional Academic Settings

Tanzanian education emphasizes rote learning and teacher-centred instruction, contrasting with the collaborative and iterative nature of agile. Change can be met with resistance from both faculty and students accustomed to these traditional methods. Many academics may not be familiar with agile principles and practices, making it difficult for them to adopt and adapt them to their teaching. Implementing agile can require changes to technology, classroom layout, and assessment methods. Resource constraints in Tanzanian universities might hinder the implementation of these changes effectively.

Fixed syllabi and standardized testing often leave little room for the flexibility and adaptation inherent in agile approaches. Evaluating learning outcomes in an agile environment can be difficult, as traditional methods like exams may not capture the iterative and collaborative nature of agile learning. Integrating agile methodologies into existing university structures and bureaucratic procedures can be complex, requiring a significant shift in how courses are planned, managed, and delivered. Unequal access to technology and reliable internet in Tanzania can pose challenges for online collaboration and resource sharing, crucial aspects of agile. Reliance on English as the primary medium of instruction might disadvantage students who are not proficient, potentially hindering active participation and collaboration in agile settings. Managing large classes effectively in an agile environment can be challenging, requiring innovative approaches to facilitate group work and individual engagement.

Impact of Agile on Student Engagement, Learning Outcomes, And Graduate Employability

The introduction of Agile methodologies into higher education in Tanzania has the potential to significantly impact student engagement, learning outcomes, and graduate employability. Here's a breakdown of the potential effects:

Agile emphasizes hands-on projects, iterative development, and collaboration, which can move students away from passive learning and towards active participation in their education. Working in Agile teams encourages students to identify, analyze, and solve problems in real time, fostering critical thinking and adaptability. Agile projects require constant communication and collaboration, equipping students with valuable interpersonal skills sought after by employers. Agile's focus on iterative development allows students to see the tangible results of their work, which can boost motivation and engagement.

The iterative nature of Agile projects allows students to revisit and refine their understanding as they progress, leading to more comprehensive knowledge retention. Agile's emphasis on flexibility and responding to change prepares students for the dynamic and unpredictable nature of the modern workplace. Agile projects often involve real-world scenarios and practical applications, equipping students with skills directly relevant to current industry needs. Working in Agile teams exposes students to project planning, resource allocation, and risk management, preparing them for leadership roles in the future.

Employers value graduates who can showcase real-world project experience, problem-solving skills, and teamwork abilities, all of which are nurtured through Agile learning. Strong communication and teamwork skills are highly sought after by employers, and Agile projects provide students with ample opportunities to develop and demonstrate these qualities. The ability to adapt to change and thrive in unpredictable environments is crucial for success in the modern workplace, and Agile methodologies help students develop these essential skills. Agile's emphasis on innovation, creativity, and taking initiative can foster an entrepreneurial spirit in graduates, making them more attractive to potential employers or as future business owners.

Discussions

Effective Strategies for Integrating Agile Principles into The Core Structure of Higher Education Institutions

Integrating Agile principles into higher education institutions in Tanzania can enhance educational agility and responsiveness (Sararuch et al., 2023). Effective strategies include designing curricula in smaller, iterative modules for continuous improvement (Okanda & Andugo, 2023), focusing on specific skills over traditional credits, incorporating real-world projects for practical application, utilizing interactive teaching methods (Landa et al., 2022), forming interdisciplinary teams for program development, empowering faculty for local responsiveness, implementing feedback mechanisms for continuous improvement, leveraging online platforms for agile workflows, fostering a culture of learning and experimentation, promoting collaboration and communication across departments, recognizing and rewarding innovation, overcoming resource constraints creatively, integrating local perspectives into education, and collaborating with external partners for workforce needs. This iterative process, starting with pilot initiatives and continuous adaptation, can revolutionize Tanzanian higher education for the 21st century.

Challenges And Barriers Encountered When Implementing Agile Methodologies in Traditional Academic Settings

Implementing agile methodologies in Tanzanian education faces significant challenges due to the prevalent rote learning and teacher-centred instruction (Kapinga, 2023). Resistance to change from faculty and students, unfamiliarity with agile principles, and the need for changes in technology, classroom layout, and assessment methods hinder adoption (John, 2020). Fixed syllabi and standardized testing limit the flexibility inherent in agile approaches, complicating the evaluation of learning outcomes (Hiza, 2020). Integrating agile into university structures requires a major shift in course planning and delivery, while unequal access to technology and English as the primary medium of instruction pose additional obstacles (Hennesey et al., 2023). Managing large classes in an agile setting demands innovative strategies for effective group work and individual engagement (Halai et al., 2022). Addressing these challenges will be crucial

for successfully implementing agile methodologies in Tanzanian educational institutions.

Impact of Agile on Student Engagement, Learning Outcomes, And Graduate Employability

The integration of Agile methodologies in higher education, as seen in various studies (Sararuch et al., 2023, Awad et al., 2023), can profoundly impact student engagement, learning outcomes, and graduate employability in Tanzania. Agile's hands-on projects and collaborative approach shift students towards active learning, fostering critical thinking and adaptability (Zouhanier, 2023). By emphasizing iterative development and real-time problem-solving, Agile equips students with valuable interpersonal skills and boosts motivation through tangible results, enhancing engagement and knowledge retention. The flexibility and adaptability inherent in Agile prepare students for the dynamic workplace, offering practical skills aligned with industry needs and leadership readiness (Tavani et al., 2024). Employers value graduates with real-world project experience, problem-solving abilities, and teamwork skills nurtured through Agile learning, enhancing students' employability and entrepreneurial potential.

Strengths of the proposed strategies

Focus on learner-centred education: The emphasis on smaller, iterative modules, real-world projects, and interactive teaching methods aligns with current trends in education that prioritize active learning and student engagement. Development of relevant skills: Moving away from traditional course credits towards specific skills and competencies can better prepare students for the job market and equip them with practical knowledge. Collaboration and teamwork: Incorporating interdisciplinary teams and fostering a culture of collaboration mirrors the real-world working environment and develops essential soft skills. Continuous improvement: Regular feedback mechanisms and a culture of experimentation encourage ongoing development and adaptation, ensuring educational programs remain relevant and effective. Technology as an enabler: Utilizing online platforms and collaborative tools aligns with the digital age and facilitates communication, feedback, and rapid response. Embracing challenges: Encouraging a culture of learning from mistakes and embracing challenges fosters resilience and adaptability in students.

Challenges and considerations

Resistance to change: Implementing Agile methodologies may face resistance from faculty and students accustomed to traditional approaches. Addressing concerns and providing adequate training and support will be crucial. Resource constraints: Resource limitations in Tanzanian universities might hinder the implementation of technology and infrastructure changes required for effective Agile practices. Seeking creative solutions and exploring partnerships could be helpful. Assessment and evaluation: Evaluating learning outcomes in an Agile environment requires innovative approaches that move beyond traditional exams and capture the iterative and collaborative nature of learning. Cultural considerations: Integrating Tanzanian perspectives and knowledge systems into the curriculum and pedagogy can make education more culturally appropriate and relevant. Language barrier: Reliance on English as the primary medium of instruction might disadvantage students not proficient in the language. Exploring multilingual approaches or providing additional language support could be beneficial.

Potential impact on student outcomes

Integrating Agile principles has the potential to significantly impact student engagement, learning outcomes, and graduate employability. The focus on active learning, hands-on projects, and real-world applications can lead to Increased student engagement and motivation. Improved critical thinking, problem-solving, and adaptability skills. Development of valuable interpersonal and communication skills. Deeper knowledge retention and understanding. Enhanced preparation for the dynamic job market.

Further research and considerations

Empirical studies: Researching to measure the actual impact of Agile methodologies on student

learning outcomes and graduate employability in the Tanzanian context would strengthen the arguments presented in the paper. Faculty training and development: Providing adequate training and support for faculty in adopting and adapting Agile principles in their teaching is crucial for successful implementation. Scalability and adaptation: Exploring how these strategies can be adapted and scaled to different disciplines and program sizes within the Tanzanian higher education system. Overall, there is a compelling case for integrating Agile principles into higher education in Tanzania. By addressing the challenges and considerations, Tanzanian universities have the potential to create a more adaptable, responsive, and learner-centred education system that equips graduates with the skills and knowledge needed to thrive in the 21st century.

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