

GOT PROJECT: WORK PACKAGE 2

(D2.5 SUSTAINABLE DIGITAL TEACHING AND LEARNING FRAMEWORK)

Introduction

Digital tools and resources have transformed education extensively. This trend of affairs has forced education delivery to assume innovative, technology-driven learning initiatives (UNESCO & MGIEP, 2019). As a result, educational institutions are in charge of developing sustainability for education, which entails providing equal and equitable education and providing opportunities for lifelong education for all through the use of technology-enhanced tools, resources, and services (UNDP, n.d.). The GOT project is seeking to address the technology uptake challenges in higher education institutions to enhance digital teaching and learning. In this current write-up, an attempt is made to gain insight into how digital teaching and learning could be sustained in universities. Two GOT Projects reports, namely WP 2: D2.1 and D2.2, supported further projections to address the Sustainable Digital Teaching Strategy (SDTL) subject.

A baseline study conducted in Ghana revealed that even though digital tools and resources are available in universities, they are mostly desktops and laptops. Notwithstanding, Moodle, Google Classrooms, and social media have immensely contributed to promoting digital teaching and learning in universities. Additionally, faculty members have used word processing, spreadsheet, and presentation applications to help with instructional delivery because students are proficient users of these tools. However, the lack of dependable internet connectivity, digital infrastructure, and institutional leadership for whole-school digitalization severely hampered these efforts. Faculty members have positive beliefs about the impact of ICT education; however, more needs to be done to support technology integration into their pedagogical practises (see WP2, D2.1).

The GOT Project WP 2 (D2.2) contains the results of the analysis of ICTs in Education Policies of Ghana, Digital Strategies of Tallinn University, and Ulster University, and is compared to the ICT Policies of the University of Cape Coast and the University of Education. In the report, collective parameters were composed to help define ICT in education at universities and where improvements are required. In this current report, the 20 indicators are seen as indicators and are considered factors capable of defining the contents of digital teaching and learning (Table 1).

Table 1: Factor capable of defining the contents of digital Teaching and Learning

Thematic Areas	Description of the theme(s)
Thematic Area 1:	Infrastructure, technical system and digital learning technologies
Thematic Area 2:	Educational Management and Administration (ICT leadership and Technical Lead)
Thematic Area 3:	Regulations, Operational Guides (technical and professional/pedagogical guides/handbooks)
Thematic Area 4:	Training for ICT uptake and digital culture formation (with gender equity/inclusion considerations)
Thematic Area 5:	Support structure for ICT uptake
Thematic Area 6:	ICT in Curriculum and discipline (specialities) Integration
Thematic Area 7:	Professional Development in ICTs for Practise Staff/Development for Metacognition Skills (Students)
Thematic Area 8:	Partnership Development (Local and International agenda)
Thematic Area 9:	ICT in/for Research and Development
Thematic Area 10:	ICT and Instructional Modalities and emerging practices/approaches
Thematic Area 11:	ICTs learning assessments and staff appraisal; learning analytics and EMID
Thematic Area 12:	ICT in Networking Local and International (staff and students)
Thematic Area 13:	Content Creation for DE, Online or Self-regulated activities (Student benefits)
Thematic Area 14:	Safety and security; online well-being (staff and students focused)
Thematic Area 15:	Rewards, benefits and student satisfaction agenda
Thematic Area 16:	ICT is knowledge share - community problem-solving (University knowledge transfer community improvement)
Thematic Area 17:	Sustainable initiatives (Funding strategy; Public Private relations/collaboration plan)
Thematic Area 18:	Experience Institution - Alumina and current student apps/environments
Thematic Area 19:	Feedback and help structure
Thematic Area 20:	Smart and digital lifestyle readiness plan

It is worth noting that most of the indicators were in place at the University of Cape Coast and the University of Education; nonetheless, there were some areas requiring more emphasis. This assertion is consistent with GOT Report D2.1, but further insights are needed to help create the framework(s) to inform interventions.

Rationale

This report taps into two previous work pages, D2.1 and D2.2, and, together with other literature, obtains insight as to how digital teaching and learning could be sustained.

To this end, the specific objective of this report was to provide a framework for a sustainable digital teaching and learning strategy.

Models of Digital Teaching and Learning

This section of the report explores various ICT strategies, models, and elements informing digital teaching and learning and further looks out for what factors inform or suggest what needs to be done to attain SDTL.

A. Affordances in Digital Teaching and Learning

In the works of UNESCO and MGIEP (2019), digital teaching is summarised into three (3) dimensions: 1. the defined landscape for tools and resources for digital education; 2. pedagogical facilitation using technology; and 3. access and usage. The key takeaway from this assertion is that digital education media and resources orchestrate innovative pedagogical possibilities. That the implementation of digital teaching and learning entails affordances for both teachers and students to access and use the resources to support teaching and learning. An affordance should give rise to the attainment of desirable pedagogical and social outcomes. Therefore, affordance should embrace and set into motion the harmony of technology, pedagogy, and the human actors in the educational landscape (teaching and learning), as depicted in Figure 1.

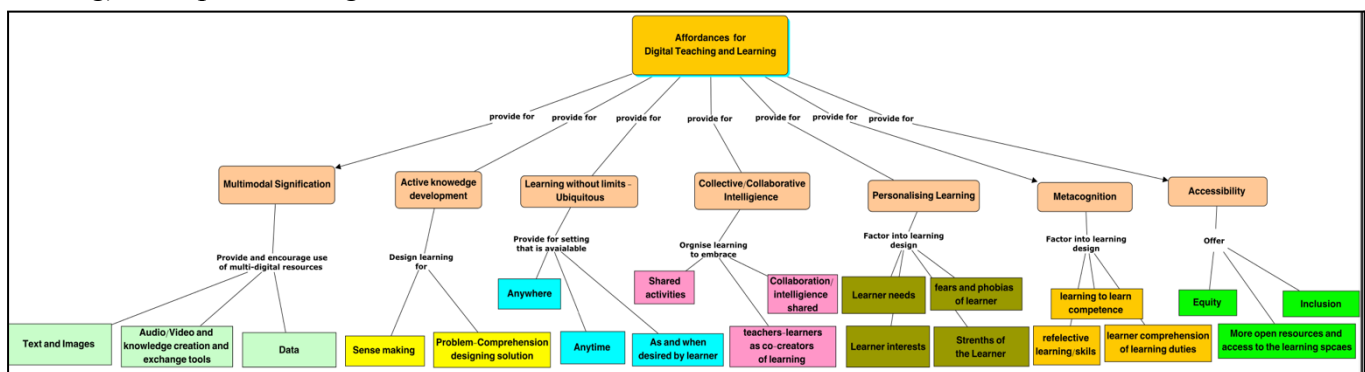


Figure 1: Suggested areas of focus in Digital Teaching and Learning; contents were generated with support from (UNESCO AND MGIEP, 2019)

The affordance model is a measure of sustainability because both the facilitator of learning and the recipient of learning are offered the opportunity to experience teaching and learning.

Fullan's Model of Education Change

The model of educational transformation proposed by Michael Fullan is centred on pedagogy, technology, and transformational knowledge change and management. Fullan's preoccupation with the education system and how teaching and learning activities were conducted led to the development of the model (Fullan & Langworthy, 2013; Hargreaves & Fullan, 1984; Miller, 2016). In this model, the emphasis is on teaching and learning with technology as the medium, underpinned by knowledge change and management within the organisation or institution. Figure 2 below illustrates the core focus areas of the model.

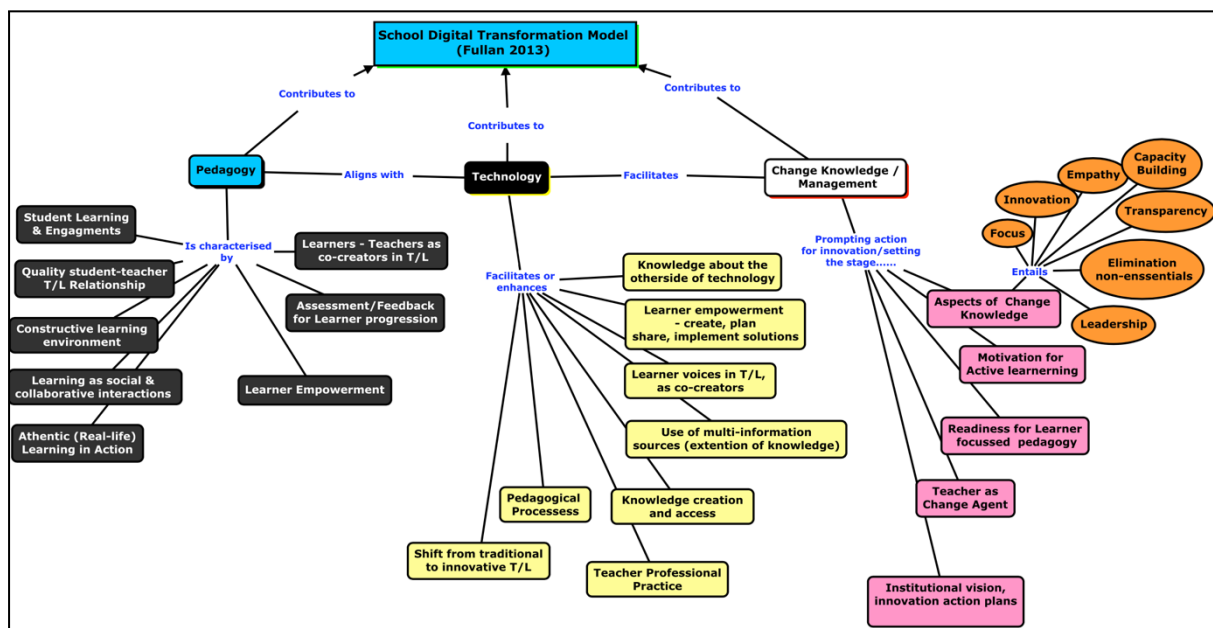


Figure 2: Innovative Teaching and Learning Model Based on Fullan's Ideology (Fullan & Langworthy, 2013; Hargreaves & Fullan, 1984; Miller, 2016); diagram extracted from Quaicoe et al., 2023; modified

As shown in Figure 2, innovative pedagogy replaces conventional learning, where the learner is passive. Elements such as collaborative learning, authentic learning, active student engagement, and teacher-student co-creators in the learning spaces are sure ways of providing meaningful education to the satisfaction of stakeholders. Technology is more of a tool supporting innovative pedagogy, whereas knowledge and change management prepare actors for innovation readiness. The focus here is shared vision and human-faced change, modelled on quality leadership underpinned by empathy. One significant contributor to possible sustainability is the focus on the teacher as the change agent and not the one under scrutiny.

The Ulster University Model

The Ulster model has six areas: 1. Digital Foundations 2. Digital Communications 3. Experience Ulster 4. Digital Support 5. Research Management 6. The Ulster Network Each of

the focal areas enumerates how it is relevant to staff and students and benefits the university. The first area the Digital Foundation focuses on is creating the conditions for the utilisation of smart technologies and the promotion of a technologically enhanced campus life. The respective benefits to teachers, students, and the university are shown in Figure 3. The second area is digital communication, which is about creating a landscape where both teachers and students have means of communication and are updated about dealings at the university. The university projects the benefits that both the students and staff, as well as the institution, will receive; Figure 3 contains the respective benefits. Experiencing the University (Ulster) is the third area, and the focus is more on showcasing life at the university to prospective students and keeping regular students informed about university activities. Practically, this opens the university to the public and counts as a strong sustainability factor. The respective benefits to both the human actors and the university are presented in Figure 3. The fourth area is "digital support. As the name implies, the focus is on offering support to learners throughout their period of admission. Just like the other areas, Figure 3 shows the benefits to the students, staff, and university. The fifth area is research management, and the focus is on supporting faculty research and professional development. Like the other areas of focus, this area innovates in sustainability. The additional benefits in this area are presented in Figure 3. The final area is the Ulster Network. This area focuses on university-external partner relations as well as sustaining connections with alumni. Practically, this area is about taking the university to the public and the community. Like the other focus areas, this one practically has an institutional sustainability intent. As usual, Figure 3 showcases the list of benefits for the human actors and the university.

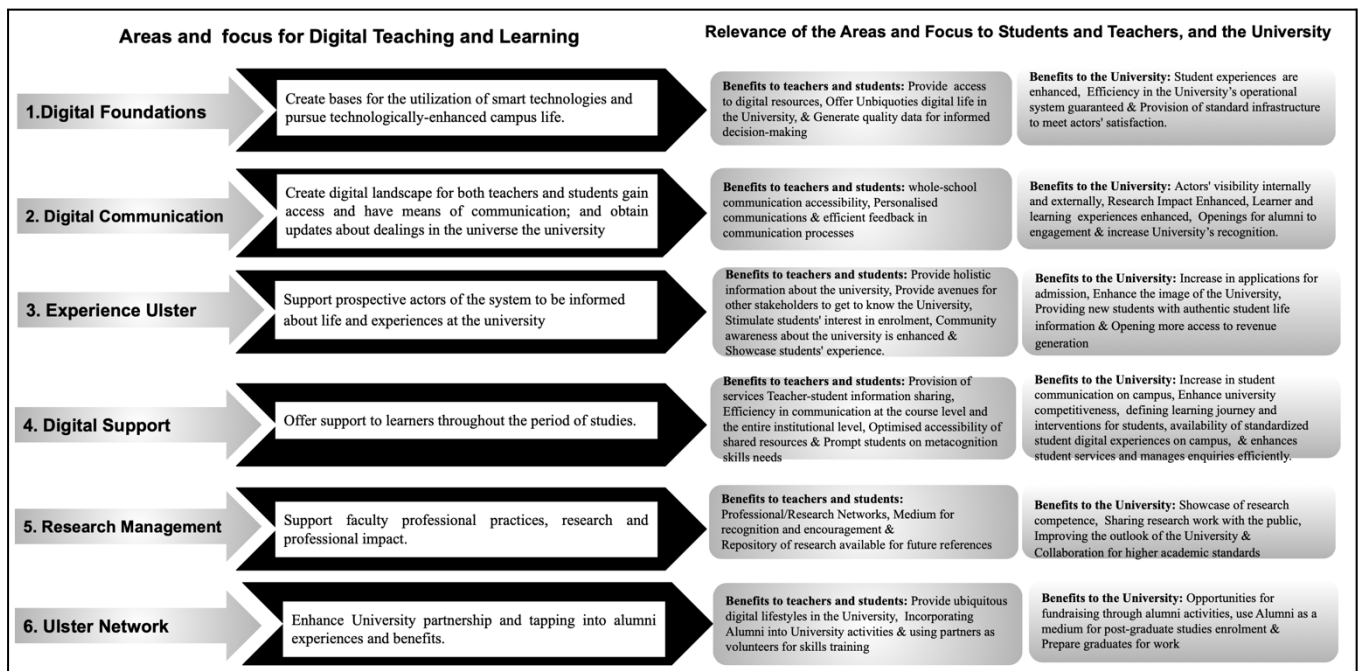


Figure 3. Alignment of Ulster University's digital strategy areas and the benefits it offers the staff, students, and the university; the figure contents were built with ideas from Ulster University (Ulster University, 2022).

Tallinn University Model

The compressed Tallinn University model focuses on five areas: digital infrastructure and services; data analysis and change management; digital competence and educational innovation; study resources; and study organisation. TLU's overall expectation is to meet students' needs and satisfaction. Therefore, staff activities and resources are meant to meet those expectations. Figure 4 aligns Digital Strategy Focus areas with the expected benefits for students.

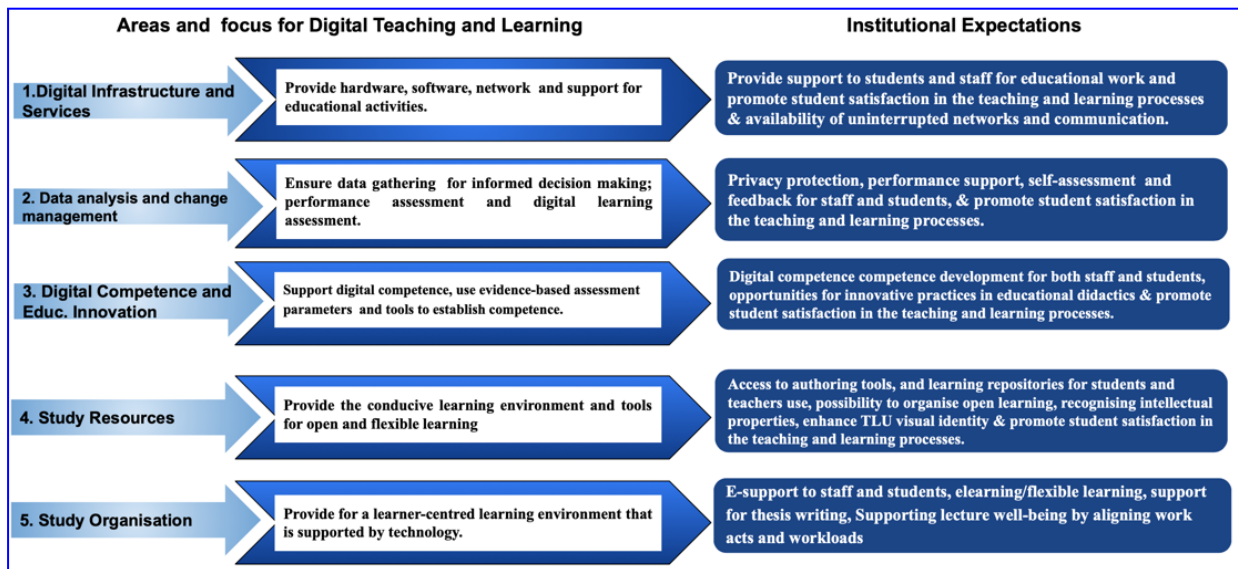


Figure 4. Alignment of Tallinn University's digital strategy areas and the expectations; the figure contents were built with ideas from (Tallinn University, 2021)

Conversations about sustainability in Digital Teaching and Learning

What is sustainable digital teaching and learning (SDTL)? A basic comprehension of what SDTL could be is a strong base for making a case for what the constituents of SDTL could be. The work of Nair and Kumar (Rajendran Nair & Kumar, 2021) offers relevant insights into the subject of sustainable teaching and learning, which entails the application of sustainable practises in the educational system to ensure viability, efficiency, effectiveness, and reward for stakeholders. The implication is that sustainable digital teaching and learning means ensuring that no negative impacts are characterised by the teaching and learning process, not on the teachers, students, the university, the processes, or the settings (environment) where DTL takes place.

SDTL, therefore, entails using best and tested practises, theories, and principles to bring about opportunities for change, opportunities for uninterrupted continuous learning, eliminating legacy systems, and opening doors for collaboration and the application of collective intelligence for all positive reasons. Sustainable activities should therefore breed teacher and student satisfaction. This starts with the contents of education and the associated delivery methods and processes; these in themselves need to be sustainable in function and use.

From an environmental viewpoint, sustainable development guarantees the availability of resources and services to both present and future generations without jeopardising the well-being of the ecosystems that support those resources and services (Morelli, 2011). The implication in education is digitization to the advantage of the digital learning ecosystem. The Digital Learning Ecosystem is an adaptive socio-technical system composed of mutually interacting digital species, where the species are the tools, services, and content used in the learning process, and the species interact with the communities of users, namely the learners, facilitators, and experts, manifesting in the socio-economic and cultural environment (Laanpere et al., 2014). Sustainability in digital teaching and learning pursuits should therefore be viewed as a system activity; elements and components should be set into harmonious working relations.

Therefore, the university's sustainable digital and instructional agenda should be created with the idea that it is a system with a distinct social and cultural context. As a system characteristic, such as dependable connections, discussions of the system's requirements, the need for change, cooperation for sustainability, and adoption of institutional-wide implementation of initiatives. An institution-wide implementation plan based on sustainable thinking addresses issues bordering on policy, creating content for action, and making decisions concerning the culture and relations in the system. Within this system, the needs of the students should be met; teaching and learning should lead to knowledge acquisition, improve life quality, and enhance a sense of worth. Within the system, the personal and social values of the actors should be pursued within the framework of transparency and accountability (UNESCO, 2012).

In this discourse, we tap into the works of Heller (2022) to make a case for the importance of sustainable digital teaching and learning. Firstly, digital inequalities and inequity in education are mostly disregarded. It is observed that institutions normally ignore this situation. However, at the end of the day, the discrepancies come to light. In light of this report, this issue needs attention in the pursuit of sustainability in designing teaching and learning in institutions. Additionally, university education has failed to appreciate how students in the digital age learn. Students in the information society have shown that their lives are built around technological devices. There, they prefer learning scenarios and approaches that are technologically driven. Online or virtual learning activities are appealing to them as opposed to the face-to-face lecture method, which they consider boring. A close analysis of the situation reveals that universities in general have not tapped into the potential of designing learning around the learning preferences of today's students. The outcome is educational delivery that is not sustainable.

In addition, universities have not made the most of their students' skills to make up for the instructors' lack of technological expertise in managing the challenges posed by digital teaching and learning. Students may offer to assist other students or professors in the installation of new technology as a method for ensuring the institution's continued existence, while academics may offer to demonstrate to the group how to make use of the new instruments. The fact that most teachers lack the confidence, bravery, and/or ability to

effectively utilise technology is not a valid reason to disregard its importance. In situations like this, having student volunteers can be incredibly helpful. Once more, instructors at universities need to accept the idea that technology cannot be ignored in the modern setting of educational delivery. It is required that instructors incorporate the use of the most cutting-edge digital tools into their work. The use of artificial intelligence in the classroom, along with virtual and augmented realities, is already a reality. Education stakeholders have a responsibility to make students aware of the technological orientation of the curriculum. Regarding the implementation of environmentally responsible pedagogic techniques, educational institutions ought to acknowledge the rise of online and distance learning as the preferred educational movement for today's younger generation. Even if there will still be an occasional requirement for face-to-face sessions, space should be made available for flexible forms of education. Learning that takes place online ought to be dynamic and supported with formative assessment (continuous feedback throughout the process of learning), ought to be interactive, and ought to offer self-directed learning opportunities. It is essential to understand that online education does not simply consist of providing lectures and distributing educational resources online. In a nutshell, access to a variety of learning materials must support educational practices. When combined with online instruction, open educational resources give students access to a wider variety of instructional materials. Local colleges may make resources stored in the cloud available to local schools' faculty members and students. Each one of them is responsible for supporting the objective of reducing disparities in access to educational opportunities and the services that make that possible.

By and large, in planning the SDTL strategy, the following factors should be considered:

1. A vision that is well-defined and founded on research, established protocols, and an awareness of past or present circumstances in the area.
2. Conversations with participants should be conducted to establish a vision for sustainability.
3. A target that all the organisation's constituents are working towards together in the spirit of a shared vision.
4. The vision should be incorporated into the design of the other components of the system, units, departments, schools, faculties etc.
5. The actualization of the goal should be designed to exhibit shared or collective experiences.
6. The strategy should contain components that support the modification of behaviour.
7. Encouragement for the ownership of the innovation or strategy should be embedded in the implementation plan of the strategy.
8. The institution rewards and motivation for the acquisition of new behaviours
9. Evaluate the level of pleasure and relevance, and get rid of any outdated practises or obstacles. (Woolis, 2018).

Components and Framework of Sustainable Digital Teaching and Learning Strategy

Literature suggests that even though there is a lot of literature about the university and sustainability, not much is found about digital teaching and learning and sustainability. Hamadi and El-Den (2023) observed that many studies in this area fall into three major tracks: education for sustainability, integrating sustainability thinking into courses, creating sustainability awareness structures, and identifying the challenges to sustainability in universities. This report relies on various pieces of literature and institutional digital strategies to comprehend what SDTL would imply. Consequently, the summary on the previous page is used as background to identify the components of SDTL and eventually use them to compose the framework. Brunori et al. (2023) listed the areas of focus in digitalization as follows: addressing the digital divide and promotion of digital inclusion; provision of digital infrastructure; digital competence and related literacies and skills; training for digital competence; software procurement; and monitoring the digitization process. Considering what could be added to the SDTL Strategy by way of digital learning tools Hamadi and El-Den (2023) proposed Collaborative tools, mobile tools, game-based tools, upcoming technologies (big data, the Internet of Things, cloud computing, artificial intelligence, wearable technologies, and mixed realities), and course administration systems are examples of classified digital learning tools. Additionally, in finding out about what could be possible challenges with an SDTL setting, Hamadi and the colleague listed the following: technical constraints, digital competence challenges on the part of both students and instructors, personal cultural and predetermined dispositions and beliefs towards technology uptake or relevance to education, staff workloads, and uncertainty surrounding the argument whether the use of technologies improves one's academic performance. Following are the inferences drawn from the previous discourses that served as a guide for developing the SDTL strategy:

- Digital teaching and learning cannot be treated as an isolated case in the institutional digital strategy. Digital strategy in an institution is treated as a system and could be described in the domain of the digital learning ecosystem. Where all components of the system are interrelated and depend on each other to maximise the operations of the system.
- DTL is not only about teaching and learning it is about how the activities benefit the teacher, students and the university. It also has the additional component of extending the benefits to alumni and prospective students who intend to apply to the university.
- DTL should be seen as making the teacher the agent of change equipped with the resources to empower learners to be partners in the teaching and learning process; thus teachers-students become co-creators in the teaching and learning journey.
- Creating the needed affordances for all the enumerated, together with operations offers the threshold for gaining sustainable DTL.
- The benefits and relevance gained by the teacher, students, alumni, community, and university have an impact on sustainable DTL. It is about how the DTL strategy sustains the viability of the university and its operations to the satisfaction of the education beneficiaries, the stakeholders who facilitate the education, and the

community. For the DTL system to add value, all processes should be based on effectiveness, efficiency, and leadership.

The Sustainable Digital Teaching and Learning (SDTL) Strategy

Based on the literature and ICT policies reviewed, the framework for the SDTL strategy is recommended and presented in Figure 5. The SDTL Strategy is formulated with eight (8) themes and sustainability thoughts (integral consideration of a theme in the context of purpose, focus, benefits, affordances, and sustainability) to add value to the DTL System without disrupting operationality or impeding progress and innovation.

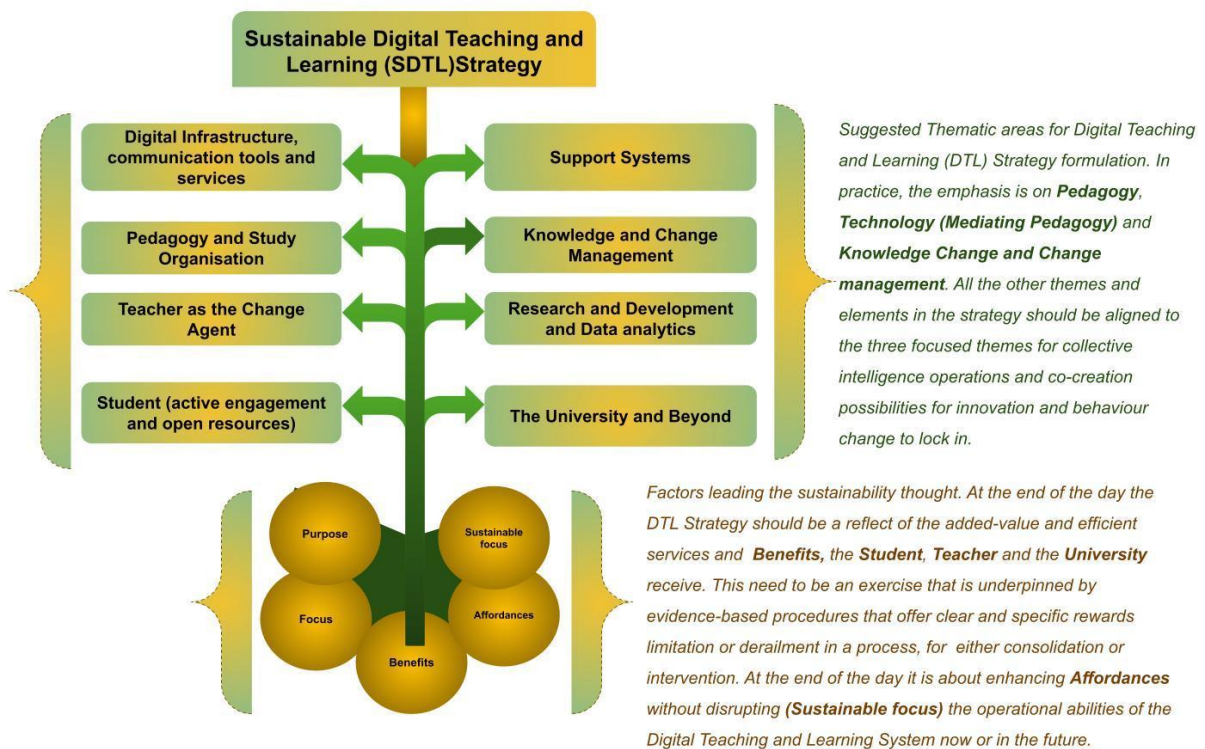


Figure 5. Framework for Sustainable Digital Teaching and Learning (SDTL) Strategy

As already indicated in Figure 5, the SDTL Framework places more emphasis on pedagogical innovation, with technology serving as the medium for orchestrating the innovation and supporting the management of the innovation. In all these considerations, the framework suggests that the DTL themes should be aligned with those factors, such as purpose, focus, benefits, affordances, and sustainable focus, so that sustainable pursuits would be factored into the SDTL strategy. Figure 6 provides a detailed description of the various themes and factors that form the components of the SDTL strategy. In this framework,

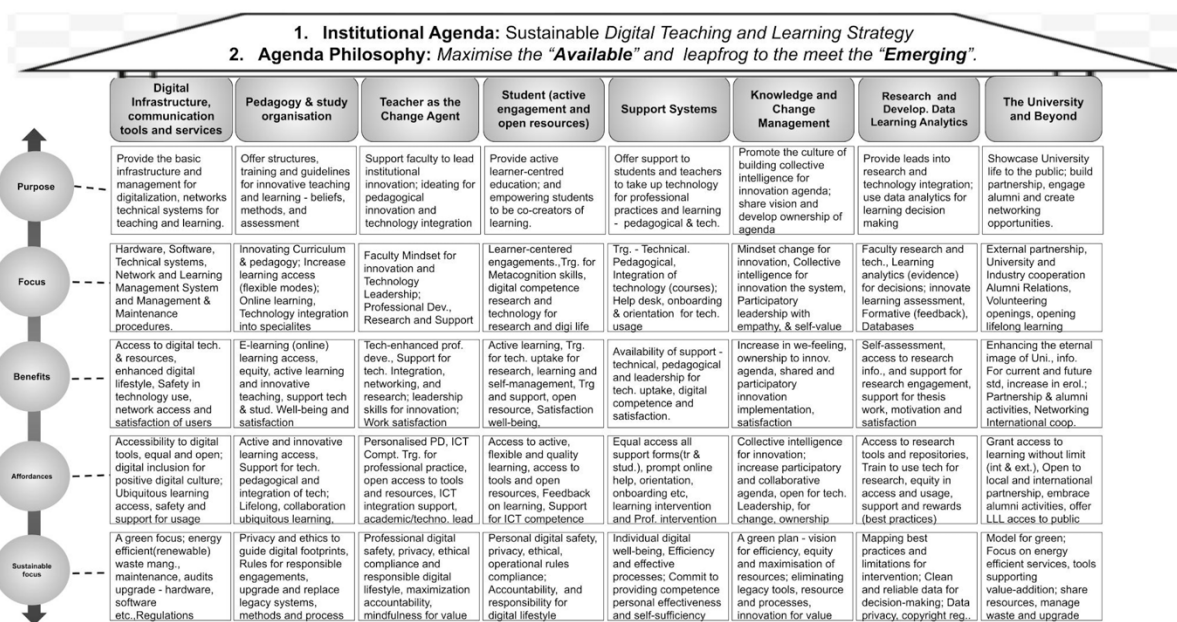


Figure 6 Matrix offering explanation of the SDTL Strategy Framework (Figure 5)

In Figure 6, a detailed interpretation of the SDTL strategy is provided. A matrix that aligns what each digital theme should consider under the dimensions of i) purpose, ii) focus, benefits, iii) affordances, and iv) sustainable focus could be. It is worth mentioning that the suggested content on the matrix is not exhaustive. Institutions are encouraged to interpret the contents from the perspective of their unique circumstances. As the agenda philosophy states (see Figure 6), the existing or prevailing digital tools should be maximised, and in the process, updates and upgrades are required to meet the contemporary and emerging technologies pedagogical practises. In conclusion, stakeholders should be aware of the system's dynamism and should use the SDTL Strategy as a framework for innovation ideas.

Conclusions

The objective of this report is to formulate a sustainable framework for digital teaching and learning strategies. In two previous reports of the GOT project, together with literature reviews and extracts from institutional digital strategies, the SDTL Strategy was formulated. It is made up of eight (8) thematic areas that reflect the digital culture traits of an institution. The report encourages stakeholders in respective institutions to see the framework as guidelines and use it as a reference model to formulate their own SDTL strategy, taking into consideration cultural, external, and internal circumstances that inform their operations.

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