Evaluating Strategic Knowledge Management Systems: Digital Literacy/Competences in the Effective Implementation of Education for Sustainable Development in Cameroon Higher Education

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ABSTRACT

The main objective of the study was to evaluate the influence of strategic knowledge management systems on the effective implementation of education for sustainable development in Cameroon higher education. The limited knowledge management infrastructure, resources, and digital competencies development have a negative impact on the implementation of education for sustainable development in Cameroon higher education. In this study, we adopted a quantitative research approach with a correlational research design. The data was collected using a 4-point Likert scale questionnaire of 8 eight items each. Simple random and purposive sampling techniques were used to determine the study population. A sample of 287 students was used in data analysis. The SPSS version 27 was used as a statistical tool for data analysis. The Spearman rank correlation was equally used as an inferential statistical model to test the three research hypotheses. The results revealed that Strategic knowledge management has a statistically significant relationship with education for sustainable development in Cameroon higher education. These findings were further explained by correlational coefficients which indicated that electronic/digital document management system=46.0%, learning management systems=36.6%, and digital literacy/competence development= 79.9% respectively. The findings were confirmed at the 95% confidence interval. From this this finding digital literacy/competence development is the most predictive of the three variables. We then recommend that higher education stakeholders at the system and institutional levels should work to improve knowledge management systems (electronic/digital document management systems, learning content management systems, and digital competence development) as a means of ameliorating service delivery and content preservation. We also think that investments in these systems can significantly contribute to the efficiency, quality, and coherency of data, information, and knowledge management processes. These systems have indispensable roles to play in the effective implementation of education for sustainable development in Cameroon higher education as a knowledge-intensive organisation. The Development and promotion of knowledge management systems will guarantee sustainable economic growth and inclusive social change.

Key concepts: Knowledge Management, Digital Competence, Electronic Document Management Systems,

Learning Content Management Systems, Education for Sustainable Development

INTRODUCTION

The emergence of the World Wide Web (W.W.W) and information and communication technologies (ICTs) in the last decades of the 20th century has revolutionised and ushered in a complex competitive knowledge society (Hadad, 2017). Educational institutions have equally embraced these changes in communication and knowledge flow systems. Universities as knowledge-intensive organisations have adopted these high and complex technological developments into the production of knowledge and diffusion research findings. Universities today need effective information and communication systems within their complex Metrix systems to manage complex and varied knowledge ecosystems. The university is a complex and sophisticated system that needs these information and communication tools for efficient management of human resources and development; for effective intramural communication, and for sustainable knowledge management (Haji, 2020). The employment of knowledge management systems enhances the performance management system of an organization in terms of efficient resource deployment, accessibility, readiness, and security of knowledge, data and information (Hajric, 2018). It is generally believed that "knowledge is power" so, securing institutional information and knowledge resources through development of knowledge management systems such as electronic/digital document management systems is a strategic approach for higher education sustainable governance. Sustainability in the development of knowledge repositories and learning management systems. The development and the present of this systems build a strategic knowledge ecosystem that improves visibility and agility in teaching-learning processes, administrative and managerial governance processes, and research and innovation practices within the institutions of higher education (Kahreh, 2011). Knowledge management is central to the development of global knowledge-sharing and exchange mechanisms (Magnusson, Nilsson & Valentin, 2011). This systematic approach to intensive knowledge flow helps construct a comprehensive and intelligible information management system (MIS) for conservation and facilitation of the teaching-learning process, research and development as well as, effective data driven decision-making processes for better institutional change management and sustainable performance. Knowledge management systems are indispensable tools for institutional flexibility and extramural cooperation. Therefore, building responsive university knowledge management infrastructures will guarantee sustainability in the production of quality and competitive graduates as well as, an efficient human resources management system. Cameroon higher education since 2005 has adopted a digital governance policy to ensure effective implementation of digitalisation as a means of enhancing quality assurance and performance in pedagogic, research and managerial processes (Tangmo et al, 2021). However, these developments in the digitalisation policy in Cameroon still experience serious challenges given rapid and disruptive changes in technological innovations. A proactive perspective will be the best approach to the disruptive changes. This proactiveness will only emerges from intensive development of digital competencies of staff and students aligning the new technologies such as artificial intelligence tools.

THEORETICAL LITERATURE REVIEW

Knowledge management (KM)

Knowledge management has become one of the central management practices in knowledge-intensive organisation and international development agencies. Knowledge management ameliorates the performance of managerial governance in both business and higher education. Higher education as a knowledge-intensive complex system is not indifferent to the changes in the knowledge environment (Laal, 2010). In this light, the knowledge management approach is perceived by many scholars as the conscious integration of people, processes, and technology involved in designing knowledge structures, capturing knowledge flow systems, and implementing the intellectual capital architecture of an organization. Knowledge management equally signifies the deployment of a plurality of techniques, frameworks, methods, tools, and epistemologies for organisational competitive advantage and intelligence (Saha, N., et al, 2017). These factors capture information resource management systems in measuring organisational leverage, communication processes and strategies operations of knowledge exchange through coordinated channels, effective database management through data sources and categorisation as well as, coherency in the visualisation of knowledge-by-knowledge workers (Laal, 2010).

In the understanding of the concept of KM in institutional or organisational management, there are a good number of elements to consider. These elements may range from data, information, knowledge, skills, and competencies. They could be classified under tacit and explicit knowledge. Knowledge management also shares an interesting relationship with intellectual capital as an organisational asset. The two concepts seem mutually inseparable (Kok, 2007). Knowledge management in an organisation can be defined by corporate strategy, organisational culture, organisational behaviour, organisational objectives, and policies. Also, Organisational processes, organisational strategic leadership and management, technological innovation, and political configuration can determine knowledge management practices (Hajric, 2018). It aims at new knowledge creation, storage, dissemination, and refinement (Hajric, 2018). The ASEAN Foundation, (2008, p. 14) thinks that the "Process-*oriented definition may describe knowledge management as the systematic management of processes by which knowledge is identified, created, gathered, shared and applied. A technology-oriented definition may present a formula for knowledge management as "business intelligence + collaboration + search engines + intelligent agent*s*."* There are two dimensions in the definition of knowledge management above. The process approach sees KM as a systematic process through which knowledge is **"***identified", "created", "gathered", "shared" and "applied."* It is from this perspective that KM is very strategic to higher education institutions (Saha, N., et al, 2017). The sovereignty of higher education knowledge must be measured in terms of its production, distribution, and application for value and wealth creation. The process and technological approaches to knowledge management in determine higher education knowledge sovereignty. The various activities and processes give the coherency and pertinence of university knowledge to sustainable social and economic development. It develops an institution's complex strategy for sustainable competitive advantage (Magnusson, Nilsson & Valentin 2014).

The technological approach sees KM as "*business intelligence", "collaboration", "search engines" and "intelligent agents."* from the technological perspective, institutions develop management information systems, knowledge management systems, learning management systems, content management systems, and communication systems that help store, refine, search and exchange/share knowledge within and outside the organisation. The technological approach perceives knowledge management as a strategy, tool and agent for organisational development. This approach to KM is central to institutional efficient and effective programme implementation, E-monitoring, and evaluation processes (Khoo, 2017). Knowledge management systems will facilitate administrative practices and ensure time efficiency and decision-making. Knowledge management ensures improved effectiveness in organisational design, visibility, and responsiveness of institutional dynamic capability and brand image. It also focuses on improving quality, and transparency in institutional management. It also fosters accountability in institutional governance and management through programme and activities steering. **"***Knowledge management is the systematic management of an organisation's knowledge assets to create value and meet tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge (Hajric, 2018 p. 15)* This definition focuses on the organisational knowledge management as means of creating tactical and strategy needed in sustainable institutional management(Khoo, 2017). Knowledge Management aims at secure knowledge conservation and accessible retrieval as a strategic means of maintaining institutional power in the face of uncertainties from the external environment. Knowledge management in this line means the development of tools and frameworks as well as channels for scanning, formulation, implementation, monitoring, and evaluation of organisational performance. KM ensures Intelligence gathering and sharing especially in government agencies (Sohail, & Daud, 2009). Cyber insecurity in the knowledge space is becoming a serious threat to organisational intellectual assets and patent rights management. Therefore, knowledge management strategies help mitigate these impending challenges in the corporate and institutional spheres of higher education. KM determines organisational values and creates organisational robustness in the system networks. KM is an intellectual capital which enhances strategic collaboration and cooperation between institutions of higher learning. Knowledge creation, acquisition, and Knowledge exchange improve institutional dynamic capabilities and sustainable institutional visibility (Khoo, 2017).

Electronic/digital Document Management Systems (EDMS)

Document management systems are electronic or digital systems for publishing, storage, indexing management, accessing, creating, collaborating, distributing, disposal, reassignment, and retrieval of documents (Ab-

basova, 2020). Higher education's traditional mission of teaching, research, and contribution to development demands a robust knowledge management information system. The complexity of the university system in which administrative document management, research teams, laboratories projection management system, and external cooperation co-exist require sustainable, efficient, and secured electronic document, management systems. Within document management architecture, systems, and institutional managers should create an atmosphere for innovations and customization of knowledge and information (Kiplie, et al, 2018). This electronic document management system deals with explicit knowledge of an institution. The sustainability in the management of knowledge in an institution can determine the performance and the productivity potential of the institution. In this light, document management systems function in capturing, and classifying metadata, keywords, dates, authors, and indexing metadata. Metadata "is the total of what can be said about any information object at any level of aggregation" (Oberg, 2008, p.224). We can have administrative and descriptive metadata. The metadata involves recordkeeping, preservation, and research libraries. These involve Searching and retrieval through semantic analysis, versioning, administration, and security. Document management systems apply multiple platform support systems, customisable user interfaces, workflow, modules, file format, and conversion. Document management systems work to improve the efficiency of organisational information and knowledge management; they enhance speed and coherency, and provide safety in terms of backup and secure strategies. The document management system is an information and knowledge retrieval system that is indispensable in terms of space and time (Estrera, 2017).

According to Estrera (2017), higher education still faces numerous challenges with electronic document management systems. Document management systems are repositories of information and knowledge in knowledge-intensive organisations. Some of the discrepancies include: tracking recordkeeping and transfers of memoranda and files from one office to another. The systematic organisation of knowledge document management enables organisations to save more resources and time. EDMS are efficient means of knowledge management strategies in a volatile environment. Document management systems ensure the provision of content, and enhance content management in terms of accessibility of knowledge. This accessibility is experienced in terms of records, emails, archives, and organise documents in a hierarchal or network of structures, providing search engines for information retrieval and improving content security (Kittanah, et al, 2016). EDMS helps in the improvement of the efficiency and productivity of lecturers' and students' performances reducing errors, increasing the quality of services, and reducing cost efficiency (Ayez & Yanartas, 2020). Cameroon higher education has serious discrepancies in digital document management systems given that accessibility and visibility are very limited.

Learning Content Management Systems (LCMS)

Learning content management systems deal with the creation, management, and distribution of content on the intranet and websites. This system engages in publishing and creating content for educational use. It is metadata management, in terms of editing content, tracking content changes, ensuring collaborative work, fostering workflow management, and content development. The functionalities of learning content management systems involve technologies and human competencies in designing web-based learning. Content management systems should be able to support content across platforms and determine the scalability of content delivery within institutional management systems; effective web presence management guarantees the lucidity of virtual community learning.

Furthermore, cloud computing as an advanced disruptive technology has significantly influenced the development and use of content management systems (Jankulovski & Mitrevski, 2017). In this perspective, educational managers and curriculum developers in higher education must consider these educational technology developments and their implications in different e-learning platforms. The development of robust digital governance strategies in both academic and managerial processes will give impetus to the internal development of learning content management systems (Tangmo et al, 20201).

The Learning management system (LMS) is a classroom management, communication, and collaboration tool used in higher education to facilitate classroom and online learning activities. The Google Classroom, Gmails WhatsApp, and Jitsi technologies facilitate distance learning in Cameron higher education (Djeumeni 2016). However, there are still several discrepancies in terms of technological infrastructure and internet provision.

Institutional investment in the infrastructure and logistics at system and micro levels of operation will boost the performance of the learning content management system in Cameroon higher education. Content Management Systems (CMS) are developed by web development communities to create websites that allow the management of web content such as animations, video text, audio, and images (Asiri et al, 2012). Asiri et al (2012) opined that internal and external variables such as belief and competency level of using learning management systems have a significant influence on Saudi Arabian higher education. This perception also holds for Cameroon's higher education. The consideration of digital ecology and socio-anthropological practices of the given community will determine the design of learning and content management systems that mainstream the philosophy and culture of the local communities. Therefore, there is a serious need for a contingency approach in content management systems development (Asiri et al, 2012).

Learning Management Systems (LMS) are holistic, integrated software systems that support the development, delivery, administration, monitoring, and assessment of courses and research in traditional face-to-face, blended, or virtual learning environments (Djeumeni, 2020). In this light, Haji (2020) highlights that Cameroon universities have adopted Web 2.0 technologies as learning content management systems. These technologies enhance communication between students and lecturers. Equally instructional material is delivered online through these technologies. These learning content management systems foster blended learning which is a strategic approach for higher education institutions to embrace due to environmental contingencies. Continuous development and effective management of this online platform will lead to education for sustainable development (Aldiab et al, 2019). Learning management systems as a strategy for improving teaching and learning experience in higher education systems is central to internal quality assurance. Cameroon higher education is still grappling with the development of learning content, systems, and digital competence development. The development and adoption of these platforms depend on the availability and development of efficient and effective ICT infrastructure (Aldiab et al, 2019). Learning content management systems enable institutions to build quality E-learning content, edit content, distribute content, and establish interaction between the members of the same community of practice. The platforms also strengthen lecturers' knowledge and competencies on the use of modern educational technology as well as, increase pedagogic and research collaboration (Haji, 2020).

Digital Literacy/Competence Development (DCD)

The emergence of information literacy and computer literacy has created complexity in the understanding of the concept of digital literacy and digital competence. Belshow (2011) capitalises on literacy or competence. He perceives the two concepts as synonymous in their denotational semantics. In knowledge management systems the different appellations share common semantic landscapes with digital proficiency. In this work, we adopted digital competencies because it best suits the context of knowledge workers. Higher Education Institutions can verify the validity, credibility, reliability, and accessibilities of digital competencies at their disposal through the exploration and exploitation of varied knowledge management systems (Flavin, 2017). These technologies equally come with disruptive learning approaches. Higher education digital disruption and opportunities require digital competencies to contend with challenges that come from digital technologies. These will boost digital literacy learning and competencies development, especially in the developing country. Sandkuhl and Lehmann (2017) examined the general approaches or strategies for digital transformation in higher education by employing enterprise architecture portals. They argue that digital strategies should not only focus on teaching, learning, and assessment, but they should equally take a holistic approach to involve governance and management where the institutional structure of the digital portal will consider the knowledge repository which plays key roles in the effective implementation of higher education strategic policies. Enterprise architecture and management portals link endogenous research activities and data sources.

Jensen (2019) looked at the current state of digital transformation in higher education transformation around the world. The results of the study show an absence of holistic vision in digital transformation competency with data structures, networks and connectivity, computing and storage, back-end process, front-end process, new products and services, and business model and improved products and services. It also highlights that technologies in higher education are strategic priorities for nations, but institutional governance and internationalization demand a lot of digital competencies in knowledge management systems. Sustainable development today requires digital proficiency in national and regional economic policy systems. Higher education

practices such as educational services, digital transformation, administration, communication, teaching, research, and assessment in the 21st century is effective only through the integration of electronic literacy (Sandkuhl & Lehmann, 2017). Jones (2017) sees media and information literacy as a professional responsibility. The development of media and information literacy in higher education is a practical strategy for knowledge and innovation dissemination through knowledge management systems. Media and information literacy/competence highlight innovative pedagogic profiling for educators or trainers as well as research and development within higher education. Therefore, to foster learning, research, and managerial governance, there is a significant need for digital literacy. Competences and infrastructure that mark learning scenarios through cloud computing, the Internet of Things, artificial intelligence, and literacy are closely related to digital skills, digital competency, information literacy, media literacy, and digital intelligence. In this line, teachers' digital literacy is important. This means developing a framework of digital literacy for professional development, developing networks, scholarship, critical thinking, and access to technology literacy (Sandkuhl & Lehmann, 2017).

Alexander et al (2019) think that digital literacy advances effective learning in higher education. They describe digital literacy in terms of universal literacy, creativity, and literacy across disciplines. Developing competencies in the ICTs will boost research activities with the use of digital services. Alexander et al (2019) equally think that digital literacy in higher education is fuelled by the fourth industrial revolution where the training of the workforce requires technological innovation. This is evident in fields such as robotic autonomous transportation, biotechnology, and genomics. Topical skills and competencies at this level include cognitive flexibility and emotional intelligence, critical and system thinking, and people management (Sandkuhl & Lehmann, 2017). However, the content and competencies of every higher education system in developing economies still struggle to integrate into this high-tech industrial estate. The challenges are at the level of human resources. At the institutional level working to ensure the development and implementation of the overall digital policy in higher education is crucial to the development of knowledge-based competencies. How digitalization and digital literacy in higher education strategically work toward future institutional development should be a proactive endeavour in strengthening institutional structural and technological development (Bologna Digital, 2020). Working with the digital policy to improve lifelong learning in developing countries is crucial. Strategic policy development requires that new skills and competencies should be developed, the programme should reflect the job market; and assure accessibility, quality, and relevance. Digitalization of Cameroon's higher education has been echoed in the BMD system, but the implementation at the institutional level still leaves much to be desired Alexander et al (2019).

According to Handley (2018) writing on digital skills and literacy in UK higher education explains that information literacy capability involves evaluative, reflective, and planning skills. He went further to say that these include seven pillars which are: media skills, digital literacy, collaboration and communication, career and identity management, ICTs literacy, learning skills, digital scholarship, and information literacy. The concept of ICT proficiency captures digital identity and well-being, digital collaboration, communication and participation, digital learning and development, information data and media literacy, digital creation, problem-solving, and innovation. These elements play a significant role in research and institutional governance. All these dynamic capabilities if well harnessed will go a long to enhance knowledge management in higher education institutions. Khosrow-Pour (2018) opines that digital literacy is the ability to locate, consume, create, and communicate digital content. These include skills such as video production, editing-web, and graphic design. This view is linked to learning content management systems approach to education. Educational technologies within higher education in developing countries must consider the intensification of digital competence development for sustainable development.

Education for Sustainable Development (ESD)

Education for sustainable development is about transformational learning outcomes, it is about lifelong learning and is an integral part of quality education (Salleh et al, 2019). ESD is a holistic and transformational education that addresses learning and research problem content and outcomes, pedagogic, and learning environment. It achieves its objective by the structural transformation of society. Prieto-Jimemez et al (2021) look at universities as agents of changes in social engagement, scientific production, and bibliometric mapping. In this light, sustainable development talks of a multidimensional approach in which education plays a significant role

in mainstreaming competencies for economic growth. The ability to relate sustainability to education has to do with accessibility, equity incisiveness, and quality education management. Quality assurance in knowledge production and diffusion is key to strategic management when it comes to university management. Quality education corroborates the idea of curriculum development; sustainability in contents and innovations in pedagogical approach, sustainability in education also means the effective implementation of evaluation processes and tools for educational achievement, pedagogic innovation through contextualising and Operationalisation of competencies in tertiary education which leads to the valorisation of Indigenous knowledge systems. Higher education has all the capabilities to transform indigenous knowledge into invaluable products. More so, education for sustainable development focuses on pedagogic innovation, didactic competence development, curricula orientation, methodological guide, resource mobilization, and competencies development as a constructive approach in Higher education (Cebrian, et al, 2019).

Salleh et al (2019) identified and developed a measuring model of higher education for sustainable development in Malaysian public higher education institutions. According to them, knowledge is considered a key competency in the sustainability of institutions. They highlighted several barriers or factors lacking in the Malaysian HEI. To them, the sustainability of higher education leads to environmental sustainability and economic development. Institution knowledge creates the consciousness of the sustainability potential. Education for sustainable development addresses global citizens for justice and sustainability. Wiek et al (2015) looked at the qualitative analysis of sustainable development operationalising competencies in higher education for sustainable development. To them, sustainability is a collective willingness and ability, vitality, and integrity over a long period. Higher education institutions as temples of knowledge purification and transformation have the prerogative to infuse in students' competencies that enable them to produce research findings that are responsive to the demands of society. It is clear that many developing countries across the world still lack these collective resources and consciousness in the sustainability of local communities (Waltner, et al, 2019). Wals and Kieft (2010) opined that ESD is an international policy that balances human and economic well-being, cultural traditions, and respect for the environment. The goals to advocate for sustainability is gender equality, equality and equity social justice, and sustainability competency development. Sustainable development also implies human activities, resource consumption, social reforms, policy evaluation, and activities that impact socio-economic development.

Sterling (2016) thinks that ESD deals with change consciousness, reconciling people, the role of education, orienting system of knowledge creation and education, culture of critical commitment- socio-ecological resilience. The contributions of sustainability and interdisciplinarity in policy implementation practices are varied in sustainable higher education teaching and learning. For higher education institutions to focus on improving sustainability in the university system through knowledge management is strategic insight for the knowledge-based economies. The integration of an interdisciplinary approach in research explains the complexity of higher education policy and programmes. Interdisciplinarity and transdisciplinarity bring innovative initiatives to sustainability in higher education. These innovative initiatives engender flexibility and adaptability for institutional growth. Also, Lambrechts and Hindson (2016) think that research and innovation in education for sustainable development contribute to sustainability. Also, the development of networks and collaboration programmes contribute to institutional governance sustainability.

The Statement of the Problem

Strategic knowledge management systems have an indispensable role in the effective implementation of education for sustainability in every higher education realm. Knowledge as the sovereign economic capital thrives thanks to the availability of information resource management and infrastructure. However, Cameroon's higher education digitalization policies still experience institutional discrepancies and challenges due to a lack of adequate efficient knowledge management systems. The slow appropriation of digital competencies within the university system cannot speed higher education integration into global knowledge-based societies. The limited digital human resources as well as limited digital infrastructures in translating strategic policies into concrete actions, display the system's inability to harness knowledge resources for technological transformation, for academic and managerial governance opportunities. The Conspicuous absence of these digital facilities/logistics impedes the effective development of digital core competencies in students and lecturer-researchers who are themselves drivers of knowledge production and diffusion. This also mares Cameroon

Universities' capability in knowledge leverage per the terms of value creation and knowledge pertinence at the national, regional and global knowledge-based horizons. Therefore, to what extent can the strategic knowledge management approach influence the effectiveness and efficiency of knowledge production and diffusion in Cameroon higher education?

Purpose of the study

The main objective of the study is to evaluate the influence of strategic knowledge management systems in the effective implementation of education for sustainable development in Cameroon higher education. The development of digital competencies in academic and management processes within the institution of higher education will ensure sustainability in teaching quality and productivity. The effectiveness and efficiency of education programs and activities today depend on the digital literacy of its human resources.

Specific objectives

1. To assess the relationship between electronic/digital document management systems and effective implementation of education sustainable development in Cameroon higher education.

2. To evaluate the relationship between learning content management systems and effective implementation of education for sustainable development in Cameroon higher education.

3. To examine the relationship between Digital literacy/competence development and effective implementation of education for sustainable development in Cameroon higher education

Main Research Question

To what extent does strategic knowledge management influence the effective implementation of education for sustainable development in Cameroon higher education?

Specific research questions

1. Is there a significant relationship between the electronic/digital document management systems and the effective implementation education sustainable development in Cameroon higher education?

2. Is there a significant relationship between Learning content management systems and effective implementation of education for sustainable development in Cameroon's higher education

3. Is there a significant relationship between Digital literacy/competencies and effective implementation of education for sustainable development in Cameroon higher education?

The Main Hypothesis

There is a relationship between strategic knowledge management and effective implementation of education for sustainable development in Cameroon higher education?

Specific research hypotheses

H01: There is no statistically significant relationship between electronic/digital documentation management systems and effective implementation of education for sustainable development in Cameroon higher education institution

Ha1: There is a statistically significant relationship between electronic/digital documentation management systems and Effective implementation of education for sustainable development in Cameroon higher education institution

H02: There is no statistically significant relationship between learning management systems and effective implementation of education for sustainability in Cameroon higher education institutions.

Ha2: There is a statistically significant relationship between learning management systems and effective implementation of education for sustainability in Cameroon higher education institutions.

H03: There is no statistically significant relationship between digital literacy/competence development and effective implementation of education sustainable development in Cameroon higher education institutions.

Ha3: There is a relationship between digital literacy/competence development and effective implementation of education sustainable development in Cameroon higher education institutions.

Significance of the study

This study examined the contributions of strategic knowledge management systems to the effective implementation of education for sustainability in Cameroon higher education. The study anchored on knowledge management tools and practices such as electronic document management systems. Content/learning management systems and digital literacy/competencies are central to the emergence of the knowledge-based economy. The evolution of knowledge management systems is marked by the internet of things, artificial intelligence, and quantum computing which are crucial to educational technology and knowledge management practices in higher education. The adoption of these tools will improve quality assurance and institutional governance at the system and institutional levels. These will foster human capital formation and lead to sustainable socio-economic development in Cameroon and Africa at large.

METHODOLOGY

Research design: This study adopted a correlational design. This is quantitative research technique which provides the clear methodological strategies in the study.

Population and Sampling Procedure

The target population was all the master's and PhD students of the 2020 / 2021 academic year of the University of Yaoundé 1**.** The accessible population comprised 6766 masters and PhD students in the faculty of education, faculty of arts, letters, and social sciences, and faculty of science of the University of Yaoundé 1. In this study, the faculties involved were selected through purposive and simple random sampling techniques. These techniques permitted every member of the target population to be selected. For purposive sampling master's and PhD students were selected based cardinal role they play in knowledge creation and diffusion in the university. This study is more concerned with the production and dissemination of knowledge. In this regard, research students are more involved in pedagogic, administrative, and research activities. For simple random sampling, it was to enable each element of the population to have an equal and independent chance of being included in the sample. Out of the 4 faculties of the University of Yaoundé I, 3 faculties, were selected for the study. The three faculties are a representation of the four faculties. The students' statistics above were drawn from the 2018 higher education annual statistics report. These statistics give a detailed statistical analysis of state and private higher education institutions in Cameroon. These involve: departments, schools and faculties, teaching, and administrative staff. These statistics enabled us to determine and justify our sample size. From the presentation of the accessible population, we drew our sample size. Of the 365 questionnaires randomly administered to masters and PhD students in the three faculties of the University of Yaounde 1, 287 questionnaires were retained with a retained rate of 78.63%. Therefore, 287 respondents were engaged in the study, 159 of them were male (55.4%) and 128 were female (44.6%).

Data collection instrument

Questionnaire: The instrument used for data collection was the questionnaire because the study took a quantitative research approach. 130 questionnaires were administered in FASS 112 retained with a rate of 86. 15%, 130 were administered, 104 were retained with the score of 80%, and FS 105 were administered and 71 retained with the percentage of 78, 63%. This instrument was considered accurate in that it allowed us to access extensive data size. The questionnaire was operationalised into four sections containing the constructs of the study. These constructs had 8 items each, after the development of the questionnaire, it was submitted for ex-

pert evaluation on which face and content validity were confirmed. The CVI was 0.85. We started by administrating the questionnaire to 10 master's and PhD students.

Table 1: Reliability statistics tested in the SPSS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.659	.715	32

After three weeks of pre-test the questionnaire was redistributed to the respondents and the responses were computed. We obtain coefficient reliability score of 0.72. The coefficient shows the significant and the reliability of the instrument after test and retest.

Data analysis

Data analysis involved descriptive and inferential statistics: for the descriptive statistics we used the mean and STD from the Likert scale to determine the respondents' perceptions on each of the eight items. For inferential statistics spearman correlation rank index was used to determine the statistical correlation and the percentage on which the independent variable influence the dependent variables. Therefore, all three hypotheses were tested based on this model.

Presentation of Results

Table 2: Descriptive statistics on electronic document management system

Statements	N	Mini	Maxi	Mean	Std Deviation
1)Your institution has effective information Storage facilities	287	1.00	4.00	3.2049	.79395
2) your institution provides online platforms for research teams	287	1.00	4.00	3.0000	.76052
3) There is effective provision for instructional resources and course content online	287	1.00	4.00	2.8924	.88279
4) There exist effective online research libraries in your Institution	287	1.00	4.00	2.5938	.91725
5) There exist accessible databases in your institution	287	1.00	4.00	2.8507	.82339
6)There are accessible websites for publishing information	287	1.00	4.00	3.9861	.73713
7)There is provision for search engines in your institution	287	1.00	4.00	3.7778	.73674
8)There is secure recordkeeping system in your institution	287	1.00	4.00	3.6354	.88880
Valid N (listwise)	287				

(source: field data 2020), 1=Strongly Disagreed, 2=Disagreed, 3=Agreed, 4= Strongly Agreed)

Table 2: presents the sample distribution of the respondents' views on electronic/digital document management systems at the University of Yaounde 1. In the first item, the respondents agreed (mean=3.20, STDV= 0.79) with the statement that your institution has effective storage facilities. In the second item, they equally generally agreed (mean=3.30, STDV=0.76) with the statement that the institution provides online platforms for re-

search and teams. On the third item, the respondents agreed (mean=2.89, STDV=0.88) with the statement that There is effective provision for instructional resources and course content online, The respondents agreed (mean= 2.59, STDV=) with the view that there exist effective online research libraries in your institution, on the sixth item the respondents agreed (mean=2.85, STDV=0.92) with the statement that There exist accessible databases in your institution, in the seventh item the respondents agree (mean=3.99, STDV=0.82) with the statement that There are accessible websites for publishing information, on the eighth item the respondents agreed (mean= 3.78, STDV=0.74) with the perception that there is provision for search engines in your institution. The eighth item shows that the respondents generally agreed (3.64, STDV=0.89) that There is a secure recordkeeping system in your institution. The respondents' perceptions indicate that the University of Yaounde 1 is making an effort the develop of electronic document management system, as a knowledge management strategy but there are still a lot of demands to be improved upon in the content and course delivery, databases and online libraries accessibility to research student. The provision of these tools, devices, and tools will enhance performance and quality management in service delivery. This will guarantee efficiency and security in the document, information, and knowledge management system within the university in Cameroon.

From the findings, research objective one shows that the majority of the respondents generally agreed that there is a relationship between electronic/digital document management systems and effective implementation education sustainable development in Cameroon higher education with a cut-off mean of 3.24 and a standard deviation coefficient of 0.82 which is slightly above a normal cut-off mean of 2.5. Among the 8 items that were designed to measure the relationship between electronic document management systems and effective implementation of education sustainable development in Cameroon higher education. All 8 items had a mean of more than 2.5 which is the cut-off mean. This implies that the electronic document management system is an important indicator to predict the effective implementation of education for sustainable development in Cameroon higher education.

Table 3: Descriptive statistics on learning content management systems

Statements	N	Mini	Maxi	Mean	Std. Deviation
1) There exist effective online learning platforms in your Institution	287	1.00	4.00	2.7604	.83158
2)There are effective online platforms for knowledge Exchange	287	1.00	4.00	2.6597	.86884
3)There exist effective internet services in your institution	287	1.00	4.00	2.0382	.86468
4)There is always effective collaborative interaction on online learning platforms	287	1.00	4.00	1.9861	.89510
5)There is coordination of online learning process	287	1.00	4.00	2.8507	.73863
6)There is provision of administrative support of online Learning	287	1.00	4.00	2.8889	.65849
7)There exist effective self-evaluation and feedback on online learning processes	287	1.00	4.00	2.8125	.73222
8)There is effective provision of workflow management on online Platforms	287	1.00	4.00	2.6771	.91249
Valid N (listwise)	287				

(Source: Field Data 2020, 1=Strongly Disagreed, 2=Disagreed, 3=Agreed, 4= Strongly Agreed)

Table 3 shows sample distribution according respondents' perceptions on learning content management systems at the University of Yaounde 1. In the first item, the respondents disagreed (mean 2.76, STDV=0.83) with the statement that There exist effective online learning platforms in your institution. The respondents continued to agree (mean 2.66, STDV=0.87) on the second item that there exist effective internet services in your institution. The ineffectiveness in the provision of internet services within the university system equally mares online learning. In the third item, the respondents disagreed (mean=2.04, STDV=0.86) that there are effective online platforms for knowledge exchange. This signifies that available online is not effective. On the four items, the respondents strongly disagreed (mean=1.99, STDV=0.90) that There is always effective collaborative interaction on online learning platforms. In the absence of effective interactions online, there will be no sustainability in knowledge exchange. The respondents equally agreed (mean 2.85, STDV=0.74) on the fifth that There is coordination of the online learning process, at (mean=2.89, STDV=0.66). For online learning content management systems to be relevant there must be effective coordination and web management. There is the provision of administrative support for online learning. On the sixth item, respondents continued to agree (mean 2.81, STDV=0.73) that There exists effective self-evaluation and feedback on online learning Processes. If there is no effective self-evaluation online, then institution management needs to improve the online supervision process. On the eighth item, the respondents agreed (mean=2.68, STDV=0.91) with the statement that there is effective provision of workflow management on online platforms. Based on the respondents' perceptions, learning content management systems are ineffective and lagging in terms of infrastructure, service delivery, and online administration.

From the findings, research objective two shows that the majority of the respondents generally disagreed that there is a relationship between learning content management systems and effective implementation of education for sustainable development in Cameroon higher education with a cut-off mean of 2.23, the standard deviation of 0.81 which is slightly below a normal cut off mean of 2.5, among the 8 items that were designed to measure learning content management systems and effective implementation of education for sustainable development in Cameroon higher education. 6 of the 8 items had a mean of more than 2.5 which is the cut-off mean. This signifies learning content management systems as effective knowledge management practices have a limited degree as an indicator ensuring effective implementation of education for sustainable development in Cameroon higher education.

Table 4: Descriptive statistics on digital competences development

Statements	N	Mini	Maxi	Mean	Std. Deviation
1)You are trained on how to create and management online content with ease	287	1.00	4.00	.7118	1.46395
2)You have optimal competences navigating and accessing knowledge repositories	287	1.00	4.00	3.0833	.73726
3)Your institution ensures effective computer skills and knowledge transfer	287	1.00	4.00	3.0590	.72774
4)You can effectively do online presentations during seminars and conferences	287	1.00	4.00	3.0556	.73988
5)You can exploit online information and knowledge without assistance	287	1.00	4.00	3.0278	1.96288
6)Your institution encourages the culture of online interactions through peer mentoring	287	1.00	4.00	3.0625	.76253
7)You have full confidence when you engage with your	287	1.00	4.00	2.9306	.72442

community of practice online					
8)you have knowledge on cybersecurity and intellectual property consciousness	287	1.00	4.00	3.0764	.69423
Valid N (listwise)	287				

(Source: Field Data 2020, 1=Strongly Disagreed, 2=Disagreed, 3=Agreed, 4= Strongly Agreed)

Table 4: demonstrates the sample distribution of the respondents' perception on digital competence development at the University of Yaounde 1. On the first item, the respondents agreed (Mean=2.71, STDV=1.46) with the statement that you are trained on how to create and manage. This means that institutional digital competence development is still limited. On the second item, the respondents generally agreed (mean 3.08, STDV=0.74) that they have optimal competencies in navigating and accessing knowledge repositories. This implies students have acquired competencies to navigate knowledge sets. The respondents generally agreed (mean=3.06, STDV=0.73) with the third statement that your institution ensures the effective development of computer skills and knowledge transfer. Digital competence development is still limited to users'-oriented skills. Respondents generally agreed (mean=3.06, STDV=0.74), with the fourth item that you can effectively do online presentations during seminars and conferences. Development of Competencies in online presentation ensures sustainability in inclusive collaborative online interactions. On the fifth item, the respondents also agreed (mean=3.03, STDV=1.96) with the statement that you can exploit online information and knowledge without assistance. This reveals students' confidence in navigating different websites and knowledge repositories. The respondents agreed (mean=3.06, STDV=0.76) with the statement that your institution encourages the culture of online interactions through peer mentoring. Digital competencies can equally be development students' peer mentoring. On The seventh item, the respondents disagreed (mean=2.93, STDV=0.72) with the statement that you have full confidence when you engage with your community of practice online. If there is not full confidence, this limits the degree of interaction with the members of the community of practices. On the eighth item, the respondents agreed (mean=3.08, STDV= 0.69) with the statement that they know about cybersecurity and intellectual property consciousness. For there to be sustainability in education content management and document management systems must be secured. Therefore, students' ability to secure content and avoid plagiarism is crucial for knowledge production and diffusion within the university community.

From the findings, research objective three shows that the majority of the respondents generally agreed that there is a relationship between Digital literacy/competence development and effective implementation of education for sustainable development in Cameroon higher education with a cut-off mean of 3.00, the standard deviation of 0.98 which is slightly above a normal cut off mean of 2.5, among the 8 items that were carefully designed to measure the relationship between Digital literacy/competence development and effective implementation of education for sustainable development in Cameroon higher education. All 8 items had a mean of more than 2.5 which is the cut-off mean. This means that Digital literacy/competency development contributes significantly to the effective implementation of education for sustainable development in Cameroon higher education.

Table 5: Descriptive statistics on Education for Sustainable Development

Statements	N	Mini	Maxi	Mean	Std. Deviation
1)Your institution promotes skills development for problem Solving	287	1.00	4.00	3.1389	.71432
2) Your institution has knowledge and skills anticipative Structure,	287	1.00	4.00	3.0590	.72774
3)Your institution promotes professional and industrial De-	287	1.00	4.00	3.0556	.73988

velopment					
4)Training in your institution considers evidence support Strategies	287	1.00	4.00	3.0278	1.96288
5)There is promotion of critical commitment in your institution	287	1.00	4.00	3.0625	.76253
6)There is socio-ecological resilient framework in knowledge and skills development in your institution	287	1.00	4.00	2.9306	.72442
7)You are provided with skills in the management of Complexities	287	1.00	4.00	3.0764	.69423
8)Your institution promotes strategic thinking in knowledge and skills development	287	1.00	4.00	3.1389	.71432
Valid N (listwise)	287				

(Source: Field Data 2020, 1=Strongly Disagreed, 2=Disagreed, 3=Agreed, 4= Strongly Agreed)

This table presents the sample distribution of the respondents' views on education of sustainable development at the University of Yaounde 1. On the first item, the respondents agreed (Means=3.14, STDV=0.71) with the statement that institution promotes skills development for problems. This is indicative that most disciplines orientated their programmes toward addressing development problems. The respondents continue to agree (mean 3.06, STDV=0.73) with the statement that your institution has knowledge and skills anticipative structures. This signifies that the university has structures forecasting knowledge creation and diffusion. This can be very strategic in development and efficiency. On the third item, the respondents equally agreed (mean=3.06, STDV=0.74) with the view that your institution promotes professional and industrial development. This means institutional administration ensures the development of professional programs and the diffusion of professional knowledge. On the four items, the respondents agreed (mean=3.03, STDV=1.96) with the statement that Training in your institution considers evidence-based support strategies. Take evidence strategies in training as significant implications in academic and managerial sustainability. For the fifth item, the respondents agreed (mean=3.06, STDV=0.76) that there is a promotion of critical commitment in your institution. Critical commitment to knowledge production and pedagogic process reinforce sustainability in higher education policy effectiveness within the university system. On the sixth item, the respondents agreed (mean=2.93, STDV=0.72) with the statement that there is a socio-ecological resilient framework in knowledge and skills development in your institution. This implies that knowledge and skills development may not achieve the social efficiency that is intended by the sustainable development goals. The respondents agreed (mean=3.08, STDV=0.69) with the seventh item that you are provided with skills in the management of complexities. Having the competencies to manage uncertainties is primordial to education for sustainable development. The eighth item shows that respondents agreed (mean=3.14, STDV=0.71) with the statement that your institution promotes strategic thinking in knowledge and skills development. Strategic thinking is indispensable for preparing for future development objectives. Therefore, effective implementation of education for sustainable development relies on these factors for institutional sustainable performance.

From the findings on the dependent variables shows that the majority of the respondents generally agreed with the views on effective implementation of education for sustainable development in Cameroon higher education with a cut-off mean of 3.06, the standard deviation of 0.91 which is slightly above a normal cut off mean of 2.5, among the 8 items that were carefully designed to measure the respondents' opine on the effective implementation of in-education for sustainable development in Cameroon higher education. All 8 items had a mean of more than 2.5 which is the cut-off mean. This implies that effective implementation of education for sustainable development in Cameroon higher education.

Hypothesis one

H_{01}: There is no statistically significant relationship between electronic/digital documentation management systems and effective implementation of education for sustainable development in Cameroon higher education institution.

H_{a1}: There is a statistically significant relationship between electronic/digital documentation management systems and effective implementation of education for sustainable development in Cameroon higher education institution.

Table 6: shows the correlation between electronic document management systems and education for sustainable development

			Electronic/digital Document Management Systems	Education For Sustainable Development
Spearman's rho	Electronic Document Management Systems	Correlation Coefficient	1.000	.460**
		Sig. (2-tailed)	.	.000
		N	287	287
	Education for Sustainable Development	Correlation Coefficient	.460**	1.000
		Sig. (2-tailed)	.000	.
		N	287	287
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 6: shows the correlation between electronic document management systems and education for sustainable development. The PV 0.00 is less than 0.005 which is the alpha and standard error margin. This means that there is statistical significance between electronic document management systems and education for sustainable development in the selected faculties of the University of Yaounde 1. The correlation coefficient is 0.460, which signifies that electronic document management systems have an influence on education for sustainable development at 46.0%. Therefore, the Spearman rank correlation coefficient reveals that an improvement in the electronic document management systems will lead to an exceptional increase in the effective implementation of education for sustainable development in Cameroon higher education.

Hypothesis two

H_{02}: There is no statistically significant relationship between learning management systems and effective implementation of education for sustainable in Cameroon higher education institution.

H_{a2}: There is a statistically significant relationship between learning management systems and effective implementation of education for sustainable in Cameroon higher education institution.

Table7: presents the correlation between learning content management systems and education for sustainable development

			Learning Content Management Systems	Education for Sustainable Development
Spearman'	Learning Content	Correlation Coefficient	1.000	.366**

s rho	Management Systems	Sig. (2-tailed)	.	.000
		N	287	287
	Education for Sustainable Development	Correlation Coefficient	.366**	1.000
		Sig. (2-tailed)	.000	.
		N	287	287
**. Correlation is significant at the 0.01 level (2-tailed).				

Table7: presents the correlation between learning content management systems and education for sustainable development in three selected faculties of the universities of Yaounde 1. The calculated value is 0.00 which is less than 0.005. The 0.005 is the alpha and standard error margin. This indicates that learning content management systems have a statistically significant relation with education for sustainable development in the three faculties of the universities of Yaounde 1. On the other hand, the Spearman correlation index is 0.366 which means that learning content management systems influence education sustainability for development at 36.6%. In this light, enhancement in learning content management systems will show a corresponding impact on the effective implementation of education for sustainable development in Cameroon higher education.

Hypothesis three

H_{03}: There is no statistically significant relationship between digital literacy/competence development and effective implementation of education sustainable development in Cameroon higher education institution.

H_{a3}: There is a statistically significant relationship between digital literacy/competence development and effective implementation of education sustainable development in Cameroon higher education institution**.**

Table 8: presents the correlation between digital literacy/competence development education sustainable development in Cameroon higher education institution.

			Digital Competence Development	Education For Sustainable Development
Spearman's rho	Digital competence development	Correlation Coefficient	1.000	.799**
		Sig. (2-tailed)	.	.000
		N	287	287
	Education For Sustainable Development	Correlation Coefficient	.799**	1.000
		Sig. (2-tailed)	.000	.
		N	287	287
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 8: reveals the correlation between digital competence development and education for sustainable development in the. The PV 0.000 < 0.005, which is alpha and standard error. This is indicative of the fact that digital competence development has a statistically significant relation with education for sustainable development in the three selected faculties of the University of Yaounde 1. Additionally, the Spearman rank correlation coefficient indicates 0.799. Consequently, this implies that digital competence development has a

positive impact on education for sustainable development at 79.9%. Based on this positivity in digital competence development, upgrading digital competence development will tremendously affect the effective implementation of education for sustainable development in Cameroon higher education.

DISCUSSION OF FINDINGS

Electronic/digital document management systems are effective mechanisms for the enhancement of education for sustainable development in higher education.

The findings of the study revealed electronic document management systems has signification impact on the effective implementation of education for sustainable development in Cameroon higher education. This implies that the development of effective and efficient knowledge Storage and conservation facilities are strategic tools for institutional performance management. These findings corroborate Ayez and Yanartas (2020) whose study revealed that document management systems in higher education enhance quality service and management. In this light, the availability of knowledge infrastructures will determine the institutional quality management and agility. Institutional flexibility works in improving organisational processes, communication, data-driven decision-making, and strategy deployment. Electronic document management systems methods and tools in knowledge management practices guarantee data and knowledge security. These knowledge resources make an institution to be proactive in its strategy implementation and evaluation. This view is supported by (Abbasova, 2020). These facilities bridge the institution's internal and external environments. This situates the university as an open system with dynamic knowledge organicism for value creation. They provide efficient knowledge management strategies that enhance institutional competitive advantage (Abbasova, 2020).

Also, the Amelioration of communication tools and document management systems ensures education for sustainable development**.** Communication in Cameroon higher education is improving with the provision of internet and knowledge resources (Estrera, 2017). The faculties have communication channels. The students have platforms like WhatsApp and Telegram forums which are performant. These platforms ensure accessibility and dissemination of administrative decisions, but out of the university, it is a big challenge for either students or other stakeholders to access knowledge or information on given concepts or documents at the faculty and departmental levels. For you to do so, you have to get them on campus. There is a need to improve in the area of electronic document systems as a means of enhancing performance and efficiency in institutional management. The findings align with the view that the development of a groupware system helps in file sharing, publishing, recording, transacting, searching, and interacting within the university. This view is supported by (Hajric, 2018). However, the institutions of higher education on Cameroon still experience challenges in terms of the availability and the quality of digital infrastructure. In line with Haric (2018) we think that developing collaborative management tools such as project management systems, workflow systems, and information systems will improve leadership and management performance. It is often said that the "quality of the manager's decision depends on the information he possesses." Therefore, these knowledge management practices will lead to the development of a robust intellectual capital (human, social and organisational capital) which is obtained via knowledge sharing and exchange. This intellectual capital in turn improves the intellectual capital capabilities of the university (Hajric, 2018). This findings concord Salleh et al (2019) who identified and developed a measuring model of higher education for sustainable development in Malaysian public higher education institutions. Even though, they worked on education sustainable development, the transformational dimension constructs the correlation between the two concepts. In this light knowledge management and sustainable development are important determinant in public policy and international political economy (Salleh et al, 2019).

Furthermore, the findings also assert that the development of up-to-date knowledge infrastructure will enhance institutional visibility. Visibility is in terms of exposure of the knowledge creation capacity and institutional governance. Knowledge management practices such as effective digital document management system enhances Quality training and competence in human resources development for the knowledge society (Estrera, 2017). These infrastructures will ensure knowledge creation, refinement, and dissemination within university knowledge ecosystem. In this way, the university needs to build quality knowledge-mining centres and data warehousing structures where knowledge and information can be processed and disseminated effectively (Hajric, 2018).

The development of robust internet coverage with high debit for all the internal systems is a knowledge management strategy that will ameliorate knowledge storage and transfer for the intended user at the internal and external environments. Findings indicate that there is progress when it comes to the provision of internet services in the faculties and the entire university Yaounde 1. This light, institutional management has to invest more resources in this direction. The accessibility for students and faculties' staff is very challenging (Estrera, 2017). It is also difficult to access websites and learning platforms because the internet connection is not of quality. The digitalization policies are still far from being a reality at the University of Yaounde 1. An effective internet flow will ensure efficiency in the management of institutional programmes and activities (Tangmo et al, 2021).

Also, the findings of this study corroborate with Laal (2010) who in his qualitative study which draws data from scientific articles Shows that knowledge starts as data- raw facts and numbers, put into context which is captured readily from databases or documents. The contrast here is that work carried out a quantitative study which the correlational coefficient expresses a significant contributive impact of electronic document management systems on the effective implementation of education for sustain development. Therefore, developing a quality database for knowledge storage and refinement is an indispensable institutional strategy. Knowledge is considered the most important asset in organisation learning that is reversible. More so, higher education institutions in Cameroon must capitalise on strategic knowledge management for the improvement of institutional dynamic capabilities. Laal (2010) also argues that to improve organisational performance institutions should do the following: develop the basic process competencies; look for the missing metrics; consider benchmarking; work to diffuse internal knowledge and practices; provide a supportive learning environment; address known knowledge, check and recheck assumptions; make the implicit-explicit, and learning from the malfunctions. Therefore, these arguments are supported by our inferential results from the Spearman rank correlation coefficient which revealed that an improvement in the electronic/digital document management systems will lead to an exceptional increase in the effective implementation of education for sustainable development in Cameroon higher education (Tangmo et al, 2021).

Learning content management system is an institutional strategy in the promotion of education for sustainable development in higher education

The findings on the second research objective revealed the contributive impact of learning content management systems on the effective implementation of education for sustainable development. In this light, the enhancement and development of quality online resources and learning platforms that respond to institutional demands are knowledge management strategies that ensure Institutional administrative efficiency. These findings are supported by Asiri et al (2012) opined that internal and external variables such as belief and competency level of using learning management systems have a significant influence on Saudi Arabian higher education. this implies that in Cameroon higher education the continuous improvement on the digital learning management while mainstreaming local beliefs and competency is veritable strategy for extra-intramural sustainability in institutional management. In this perspective, the efficiency in knowledge management practices will leads to the effective implementation of education for sustainable development. The descriptive statistics from our findings reveal that respondents generally agreed with most of the items. This signifies that most items function as indicators for institutional digital content management benchmarking system. The Spearman correlation rank index indicates there is a statistically significant relation between the learning management system and education for sustainable in Cameroon higher education. Therefore, the promotion and development of learning content management systems in Cameroon higher education is a key strategic objective for sustainable educational development (Jankulovski & Mitrevski, 2017).

Furthermore, The Development of distance learning platforms which accommodate self-learning off the campus can be strategies to decongest the faculties. Massification policy grants access to students from low-income homes and has created another problem for students who do not have smartphones and computers to access the learning platform. This perspective is supported Haji (2020) who highlights that Cameroon universities have adopted Web 2.0 technologies as learning content management systems. However, it is evident that these platforms are still ineffective due to poor internet connectivity and limit digital competencies for both staff and students. Further investments in this domain will provide opportunities greater knowledge and content exploration and exploration. In addition, these technologies enhance communication between students

and lecturers. These students equally need digital literacy competencies that can effectively enable them to access the digital content. The development of quality knowledge management infrastructures will also give opportunities for the working class to continue their studies while on active service. Some of the working students face difficulties matching their schedules with the course programmes. The development of effective platforms for distance learning will improve the competitiveness in Cameroon higher education (Tangmo et al, 2021). "Lifelong" learning is one of the determinants of the knowledge-based economy which enables workers to improve skills and competencies while in the active service. They are termed "knowledge workers." Human capital development through knowledge management tools and practices will guarantee sustainable socio-economy development of Cameroon and that of the African region (Haji 2020).

Based on finding we also think that, the Development of effective and efficient online knowledge exchange and transfer platforms with interactions with the external environment is strategic to institutional management. These platforms within the faculties or university central administration will help the researchers or research students to interact with external stakeholders in terms of knowledge creation, acquisition and sharing. This could be at the national, regional, and international levels. This can be an interdisciplinary or transdisciplinary online platform like the one for the postgraduate school which has large telegram platforms for education and social sciences. Research students and lecturer-researchers share and exchange a lot of knowledge and information on these platforms (Djeumeni, 2020). The development of robust knowledge management platforms provides opportunities for the promotion of an institutional culture of knowledge acquisition, content innovation, and creativity for the improvement of academic and digital governance in higher education. By and large enhancement in learning content management systems will show a corresponding impact on effective implementation of education for sustainable development in Cameroon higher education (Tangmo et al, 2021).

The Promotion advanced Digital Competence is a Veritable Strategy for Effective Implementation of Education for Sustainable Higher Education

Findings from the descriptive statistics revealed a positive perception of the institutional promotion and development of digital competence in Cameroon higher education. The inferential statistics showed that digital competence development influences education for sustainable development at 79.9 %. This implies that digital competencies are important factors in sustainable development (Belshaw, 2011). Ensuring quality and competitive higher education in the 21st century demands the effective development of digital competencies and resources. Our findings are supported by Laurent (2014) who opines that "*our future depends on our capacity to adapt, to detect opportunities, and to gather necessary skills and knowledge and transfer them into economic value."* This is the interface between knowledge management, entrepreneurship, and innovation as well as intellectual capital management. Therefore, building university knowledge management infrastructures and platforms will foster sustainable organisational performance and socio-economic development. He continues by stating that "*The rapidity of decision-making and the ability to use new technologies are strategies for knowledge workers and adaptive workers in the knowledge-based economy."* In this view, the university staff need to be trained in the effective management of information management systems (Alexander et al, 2019). As noted above, quality and efficient internet services with a culture of knowledge management will make the university visible and lead to global change. In this dimension, we need more databases, management information systems, and disruptive innovation strategies in intellectual capital management. However, our universities are lagging in this domain. International competitive advantage can only be possible if we engage in this structural investment and transformation in higher education. these are initiatives that will guarantee effective implementation of education in sustainable development (Sterling, 2016).

In this perspective, Laurent (2014) postulated that mental flexibility, knowledge, and ecosystem thinking will propel institutional growth. That digital transformation in higher education demands advanced digital competencies (Jensen, 2019). We conclude that the creation of synergy between education programmes and the development of digital competencies for a dynamic future is crucial to sustainability of institutional management (Laurent, 2014). With the knowledge management theory, environment scanning is important in education for sustainable development. Knowledge management strategies mean understanding organisational culture, organisational behaviour, and organisation commitment in the implementation of knowledge management strategies (Flavin, 2017). Based on this positivity in digital competency development, upgrading in digital competency will have a tremendous effect on the implementation of education sustainable development in Cameroon

higher education (Tangmo et al, 2021).

CONCLUSION

On the whole, strategic knowledge management in terms of electronic knowledge management systems, learning content management systems, and digital competence developments are processes and strategies for the structural transformation of Cameroon higher education institutions. This transformation makes universities smart institutions where knowledge access and content preservation an ideal. Strategic knowledge management has a significant impact on the effective implementation of education for sustainable development. Knowledge management systems create inclusive platforms for collaboration, interactions, and dissemination of information and knowledge resources. The development of institutional mechanisms and structures for the promotion of digital competency development will be an institutional strategic gateway into the country's emergency. Favourable Knowledge and infrastructural management as well as, a favourable knowledge environment are the catalysts of institutional effectiveness and efficiency. In this view, the integration of artificial intelligence in knowledge management is crucial approach the modernisation and innovation in institutional governance. Artificial intelligence as an advance dimension of the knowledge-based economy creates tools and avenue to knowledge accessibility and delivery in real time. This entail efficiency and effectiveness in performance-based or result-based institutional management. All these managerial governance practices will shape and reshape the international and national higher education policy.

Perspectives for Further Research

This study focused only on three dimensions of knowledge management systems in the effective implementation of education for sustainable development in Cameroon higher education. Another study can be carried out with the related concepts on different higher education institutions in Cameroon. This will add more impetus to knowledge management literature in Cameroon higher education.

RECOMMENDATION

Policymakers at the system and institutional level should revisit digitalisation policy implementation in higher education and mainstream new trends like artificial intelligence as well as it related disruptive technology emerging from the complex technological innovation ecosystem. More resources should be deployed for the development of electronic/digital document management systems, learning management systems, and digital competence development. These three dimensions of knowledge management have strategic insights into institutional cost efficiency and cost effectiveness. The promotion of these knowledge management systems will create a conscious action system towards the improvement of education for sustainable development. Reviewing the digital policy implementation will orientate them on the development of new strategic policies that help develop the university's third mission which is still far from reality. There is a greater need for a data mining centre, data warehousing, and an effective online learning platform that promotes lifelong learning. These will consolidate dematerialisation of drive agenda by the ministry of higher education. The development of accessible online libraries at the departmental and faculty levels will speed up knowledge production and exploitation processes. These will boost research and teaching within the institutions. Institutional actors should reinforce the capacity of the staff on ICTs as a way of mitigating the "digital divide" which is a serious challenge. They should be engaged in understanding and supplementing the implementation of higher education strategic objectives and the university's third mission as a driver to wealth creation and sustainable socio-economic growth. These will full integrate Cameroon higher education into the global knowledge economy.

REFERENCES

1. Abbasova, V. S. (2020). "Main Concepts of the Document Management System Required for Its Implementation in Enterprises" ScienceRise, No. **1 (66)** 32–37.
2. Alexander, K. (2020). Bologna Digital 2020 White Paper on Digitalisation in the European Higher Education Area. German Academic Exchange Service (DAAD).
3. Ayaz, A and Yanartas, M. (2020). "An analysis on the unified theory of acceptance and use of technology theory (UTAUT): Acceptance of electronic document management system (EDMS)."

ELSEVIER Computers in Human Behaviour Reports journal homepage: www.journals.elsevier.com/computers-in-human-behavior-reports.

4. Baslom, M. M. M. & Tong, S. (2019). Knowledge management (km) practices in education and learning: establishing a knowledge economy in Saudi Arabia. Humanities and Social Sciences Letters 2019 Volume. 7, No. 1, pp. 1-9
5. Belshaw, D. A. J (2011). What is digital literacy? A Pragmatic investigation. A thesis submitted in Department of Education for a degree of Doctor of education at Durham University,
6. Cebrián, G et al (2019). "Competencies in Education for Sustainable Development: Emerging Teaching and Research Developments." Sustainability 2020**,** 12**,** 579, P 1-9.
7. Djeumeni, M. T. (2016). « Supervision de la recherché en Afrique dans le contexte d'une formation à distance: Médiations, Accompagnement, Approches Interculturel. » Distances et médiations des savoirs
8. Djeumeni, M. T. (2020). « Communauté Virtual développement professionnel pour la qualité de l'encadrement de recherche par les enseignants-chercheurs au Cameroun. » Adjectif : analyses et recherches sur les TICE. Revue d'interface entre rechercher et pratiques en éducation et formation
9. Estrera, P. J. M. (2017). "Electronic Document Management System for Higher Education Institution" International Journal of Innovative Science and Research Technology Volume 2, No5, P. 549-556
10. Flavin, M. (2017) Disruptive Technology Enhanced Learning: The Use and Misuse of Digital Technologies in Higher Education. Macmillan Publishers Ltd. The Campus, 4Crinan Street, London, N1 9XW, United Kingdom.
11. Haji, S. A. (2020). "Exploring the Frequent Use of the Learning Management Systems (LMS) Features and Learners' Interactions in Higher Education." European Journal of Open Education and E-learning Studies - Volume 5, Issue 2, 2020. P .213-228.
12. Hajric, E (2018). Knowledge Management System and Practices: A Theoretical and Practical Guide for Knowledge Management in Your Organization. Copyright © 2018 Emil Hajric All Rights Reserved
13. Handley, F. J. L. (2018). "Developing Digital Skills and Literacies in UK Higher Education: Recent Developments and a Case Study of the Digital Literacies Framework at the University of Brighton." UK. Publicaciones, 48(1), 97–109.
14. Jankulovski, J. and Mitrevski, P. (2017). "Cloud Computing and Content Management Systems: A Case Study in Macedonian Education." International Journal on Cloud Computing: Services and Architecture (IJCCSA) Vol. 7, No. 5, P. 1.13.
15. Jensen, T. (2019) education in digital era: the current state of transformation around the world. International Association of Universities (IAU).
16. Kahreh, M. S. (2011). "Economics of Strategic Knowledge Management: A New Model for Assessment." International Journal of Trade, Economics and Finance, Vol. 2, No. 3, June 2011, PP 257-262.
17. Khoo, S. (2017). "Sustainable knowledge transformation in and through higher education: A case for transdisciplinary leadership." International Journal of Development Education and Global Learning 8 (3) 2017, PP. 5-24.
18. Khosrow-Pour, M. (2018). Encyclopaedia of Information Science and Technology, Fourth Edition. Information Resources Management Association, USA.
19. Kiplie, F. H., Yatin, S. F. M., Angutim, M., & Hamid, N. H. A. (2018). System Development for Document Management System. International Journal of Academic Research in Business and Social Sciences,8(9), P.748–757.
20. Kittanah, K. S. et al (2016). "The Impact of Electronic Documents Management on Performance." Global Journal of Management and Business Research: A Administration and Management Volume 16 No 1.
21. Kok, A. (2007). "Intellectual capital management as part of knowledge management initiative at the institute of higher learning. University of Johannesburg, South Africa." The electronic journal of knowledge management vol. 5 issued 2007 p181-192
22. Laal, M. (2010). "Knowledge management in higher education, Tehran university of medical science." procedia computer science, 3(2011), 544-549.
23. Lambrechts, W., Verhulst, E. and Rymenams, S. (2017,). "Professional development of sustainability competences in higher education: the role of empowerment." International Journal of

Sustainability in Higher Education, P. 1-9

24. ldiab, A. (2019). "Utilization of Learning Management Systems (LMSs) in higher education system: A case review for Saudi Arabia" 2nd International Conference on Energy and Power, ICEP2018, 13–15 December 2018, Sydney, Australia. ScienceDirect, Energy Procedia 160 (2019), p. 731–737.
25. Magnusson, J. Nilsson, A., & Valentin. K. (2011). Knowledge Management Theory in Inter-Organisational Setting. Information and Management Systems, Profactor, Austria klaus.valentin@profactor.at. All content uploaded by Johan Magnusson on 02 June 2014.
26. Orberg, L. (2008). "Metadata use in document management systems, which support business processes." Archives & Social Studies: A Journal of Interdisciplinary Research Vol. 2, no. 1; 218-249.
27. Prieto-Jiménez, E.; López-Catalán, L.; López-Catalán, B.; Domínguez-Fernández, G (2021). Sustainable Development Goals and Education: A Bibliometric Mapping Analysis. Sustainability, 13, P.1-20.
28. Saha, N., Gregar, A., & Saha, P. (2017). Organisational agility and knowledge management strategy: are they the effective tools for achieving sustainable organisational excellence? New trends and issues proceedings on humanities and sciences. 4(10), pp 110-117.
29. Salleh, M. I., Habidin, N. F., Noor, K. M., & Zakaria, S. Z. S. (2019). The Development of Higher Education for Sustainable Development Model (HESD): Critical Success Factors, Benefits, and Challenges.International Journal of Academic Research in Progressive Education and Development, 8(4), 47–54.
30. Sandkuhl, K. &Lehmann, H. (2017). Digital Transformation in Higher Education – The Role of Enterprise Architectures and Portals. Alexander Rossmann, Alfred Zimmermann (eds.): Digital Enterprise Computing Lecture Notes in Informatics (LNI), P. 49-60. Gesellschaft für Informatik, Bon. University of Rostock, Institute of Computer Science, Albert-Einstein-Str. 22, 18057 Rostock, German.
31. Sohail, M. S., & Daud, S. (2009). "Knowledge sharing in higher education institution perspectives from Malaysia." The journal of information and knowledge management system, vol 39, no 2, 2009, pp 125-142.
32. Sterling, S. (2016). "A Commentary on Education and Sustainable Development Goals." Centre for Environment Education, Ahmedabad, Gujarat (Los Angeles, London, New Delhi, Singapore, Washington DC and Melbourne) www.sagepublications.com Vol 10(2): 208–213.
33. Tangmo, M. M. Fonkeng, E. G, & Atem. N. S. (20201). Digitalisation of Higher Education Delivery Processes and the Effectiveness of State University in Cameroon." International Journal on Integrated Education Volume 4, Issue 6, June 2021, P.300-320.
34. Wals. A. E. J. & Kieft, G. (2010). Education for Sustainable Development. Sida Review 2010:13 Swedish International Development Cooperation Agency
35. Waltner, E. & Mischo, C. (2019). Development and Validation of an Instrument for Measuring Student Sustainability Competencies. Sustainability 2019**,** 11**, 1717, P. 1-20.**
36. Wiek, A., Bernstein, M., Foley, R., Cohen, M., Forrest, N., Kuzdas, C., Kay, B., & Withycombe Keeler, L. (2015). Operationalising competencies in higher education for sustainable development. In: Barth, M., Michelsen, G., Rieckmann, M., Thomas, I. (Eds.) (2015). Handbook of Higher Education for Sustainable Development. Routledge, London. pp. 241-260.