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e-Learning Support Centers in Higher Education: Characteristics, Advantages and Challenges

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e-Learning Support Centers in Higher Education: Characteristics, Advantages and Challenges

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Abstract

Over the past two decades, e-learning has emerged as a crucial aspect of Higher Education Institutions (HEIs), necessitating the establishment of an e-Learning Support Center (eLSC) as a fundamental part of the university's infrastructure. An eLSC provides centralized assistance for the digital transformation of education at an institutional level. Considering this development, our study explores the current state in various HEIs and, through the analysis and synthesis of best practices, concludes with a set of specifications that define a qualitative and effective eLSC. Our investigation covers a range of topics that require strategic management and decision-making at an institutional level. These include the key components that regulate the functions, services, administration, and roles within an eLSC, as well as the challenges associated with establishing such a unit. Methodologically, our research relies on the qualitative analysis of secondary data, focusing specifically on the content analysis of websites of corresponding eLSCs at both a national and international level. This approach enables us to gain insights into the characteristics of effective eLSCs across various institutional contexts, thereby contributing to the broader discourse on e-learning and its integration into higher education.

Keywords: Higher Education Institutions, e-Learning Support Center, e-Learning, Digital Transformation.

1. Introduction

eLearning Support Centers (eLSCs) have risen to prominence in Higher Education Institutions (HEIs) as critical facilitators of digital teaching and learning (Pina, Lowell & Harris, 2018). These centers provide the necessary guidance, resources, and operational framework, thereby transforming and enhancing the virtual learning experience for participants.

A key role of an eLSC is the provision of initial and ongoing training to educators. By equipping teaching staff with a comprehensive understanding of digital tools, eLSCs enable them to approach their roles with greater confidence and efficacy. Through this support, educators can integrate e-learning into their teaching practice, enriching the learning experience for students, while harnessing the benefits of emerging technologies.

However, eLSCs do not limit their services to merely training and technical support (Thornton & Koech, 2018). They adopt a multifaceted approach to fostering digital learning, employing various formal and informal methods to assist teaching personnel. These can range from the provision of additional training materials to the organization of relevant seminars.

Furthermore, the integration of eLSCs within HEIs transcends the realm of pedagogy, substantially augmenting their research capacities. eLSCs serve as critical pillars in fostering enhanced collaboration amongst the students, teachers, and their respective communities, thereby contributing to the production of rich and multifaceted research outcomes. This is orchestrated through the optimal exploitation of the resources furnished by the eLSCs, which can be meticulously customized to align with the distinct needs and objectives of the institution (Figure 1).

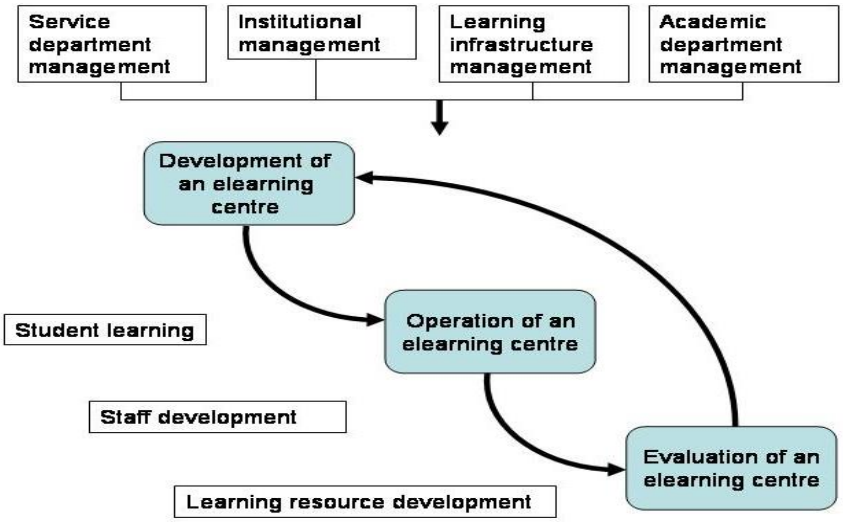

Figure 1: Operation of an eLSC in a HEI (ELEN, 2004)

In conclusion, eLSCs are invaluable assets to HEIs, catalyzing the integration and advancement of digital learning. These centers do more than merely provide resources and guidance; they restructure the entire learning experience while concurrently fortifying the research function of the institutions they serve. The degree of adoption of best practices, as highlighted in ELEN (2004), is crucial to investigate, as it directly impacts the services provided by the centers, thereby defining the quality of e-learning.

However, in the absence of standardized procedures and a unifying strategy, the operation of an eLSC could be marred by overlapping roles and miscommunications within the team. Without adequate convergence with the proposed best practices, the functionality of eLSCs could be diminished, leading to suboptimal support for students and teachers. This could, in turn, negatively impact the quality of educational services provided. It is therefore imperative that eLSCs align their operations with the best practices identified in the E-LEN report (ELEN, 2004) to ensure the effective implementation of e-Learning strategies.

In this context, our study undertakes a comprehensive analysis of the content of websites from over 50 universities. The primary objective is to evaluate the extent of information regarding their eLSCs and to examine the degree of alignment between the actual practices and characteristics displayed by these universities with those outlined in the ELEN report (ELEN, 2004). By doing so, the study aims to offer a better view of the current landscape of eLSCs and assess their adherence to established best practices.

2. Design Considerations and Policy Areas for eLSCs

Before establishing an eLSC, various questions must be answered, which may differ based on the unique characteristics of each HEI (Thornton & Koech, 2018). Many HEIs already have some form of support in place for e-learning, for example technical support for a learning management system, typically provided by the IT department.

Also, it is crucial to strategically align the creation and function of an eLSC with the institution's overall goals and visions. Establishment of an eLSC necessitates meticulous consideration and strategic planning to ensure congruency with the broader objectives of the HEI. Therefore, strategic

planning plays a vital role in the successful implementation of an eLSC (Softić & Bekić, 2008).

This comprehensive approach to establishing an eLSC equips universities with optimal resources and support for their e-learning ventures. Often, initial considerations for setting up an e-learning center are predominantly centered on technological infrastructure. While this is undoubtedly a crucial component, focusing solely on it could be “myopic” as there are several other factors that warrant consideration. These include course design and revision, training for staff and students, student services, and, if needed, governmental licensing.

The establishment of an eLSC necessitates thorough discussions and considerations, given its integral role in shaping decisions related to the technological infrastructure. This decision should be grounded in a holistic understanding of multiple elements, extending beyond the technological framework (Thornton & Koech, 2018). Palloff & Pratt (2001) advocate for the initiation of e-learning efforts to be spearheaded by a working group comprising leaders from all academic departments.

It is also essential for institutions to engage all stakeholders in preliminary discussions regarding the establishment of an eLSC - this could include representatives from academic affairs units, the IT department, lecturers, students, and Registrar's offices. The significance of obtaining support from all stakeholders cannot be understated, especially given the likelihood that eLSCs may be tasked with functions currently carried out by these departments. This may even require some personnel to shift their roles to positions within the new center.

By engaging all relevant parties, those spearheading the establishment of the eLSC can foster an alignment of organizational goals pertaining to e-learning and cultivate a uniform endorsement for the center's objectives (Thornton & Koech, 2018). This collaborative strategy not only facilitates the identification and mitigation of potential challenges early in the process, but also paves the way for the successful establishment and operation of the eLSC.

McGrath (2006) postulates a comprehensive approach towards the conceptualization of an efficacious e-learning policy. The paramount objective of this policy should be to cater to the distinct requirements of online educators and learners, while simultaneously providing a robust support system for the faculty and safeguarding their interests. The

development of such a policy presents a challenge that necessitates an open forum for deliberation.

This process should also involve a committee constituted of departmental heads and faculty members who possess expertise in the realm of e-learning. If the institution already has an established set of guidelines or a policy statement pertaining to e-learning, the committee's initial task should be to review and assess these documents meticulously. If the institution lacks a policy at the organizational level, then the vision for e-learning should be formulated through comprehensive discussions. This vision should include clear statements about the methods and metrics to be employed for the assessment and evaluation of online teaching.

In the process of formulating effective policies for online teaching, there are several imperative steps that should be undertaken, like:

- reviewing of good practices, challenges, and trends in the field,
- consulting and critiquing existing policy models,
- determining students' participation patterns in online classes,
- setting up a mechanism that will facilitate the creation and delivery of online courses,
- determining qualifications for online instructors,
- defining technological and pedagogical requirements,
- addressing issues for intellectual properties and data security,
- ensuring evaluation and sustainability.

In their work, King et al. (2000) proposed the application of models with the primary objective of assisting decision-makers in examining the policy domain. One such model, which they developed, is the Policy Analysis Framework (PAF), which has been described as an efficient and applicable method for the analysis of distance education policies (King et al., 1999).

Furthermore, King et al. (1999) underscores the utility of the PAF as a cognitive tool specifically designed to consider and manage distance education programs and courses. They argued that the policy areas identified in their proposed model are the most influential in decision-making processes. Therein lies the adaptability of the PAF, which can be utilized specifically in scenarios such as the establishment of an eLSC.

As illustrated in Table 1, PAF is constituted by seven policy areas, which are strategically imperative for decision making.

Table 1: Seven Policy Areas (PAF)

Policy	Key issues
Academic	Calendar
	Course integrity
	Transferability
	Transcripts
	Student and course evaluation
	Admission standards
	Curriculum-course approval
	Accreditation
	Course cancellations
	Recruitment-marketing
Governance,	Tuition fees
Administration,	Technology & administration costs
Financial	Government financial regulation
	Tuition disbursement
	Space & staffing
Personnel	Compensation and workload
	Development incentives
	Instructor training
	Agreement with existing union contracts
	Staff support & evaluation
Legal	Intellectual property
	Teaching staff, students & institutional responsibility
Student support	Counselling
services	Library access
	Delivery of educational material
	Student training
	Computer accounts
	Student registration
	Financial assistance
	Workshops
Technical	Reliability of systems
	Connectivity-access
	Hardware & software infrastructure
	Technical support, scheduling & costs
Culture	Adoption of innovations
	Acceptance of on-line-remote teaching
	Understanding of distance education
	Organizational values

These seven policy areas are fundamental to the development and management of distance learning efforts and are highlighted as a first basis for thinking about establishing an eLSC. Prerequisites for this type of initiative are multifaceted and require careful considerations (Thornton & Koech, 2018).

For example, the rationale for transitioning to e-learning must be clearly articulated based on sound pedagogical and technological designs, which will guarantee its efficacy. HEI must be willing to undergo the necessary adjustments to accommodate the shift to an e-learning operation, by thoroughly reassess its institutional policies, infrastructure, and resources in response to new e-learning demands.

This will lead to the formation of an e-learning strategy that should guide the decision-making processes related to the activities within the eLSC, by clearly outlining the "what, why, and how" of the chosen technology, and its role in augmenting traditional teaching methods.

3. Research

3.1. Rationale and Research Questions

Investigating the degree of adherence to the best practices proposed for eLSCs by the ELEN report (ELEN, 2004) is significant. This is primarily because these best practices largely dictate the quality of services provided by these academic units, which, in turn, influence the overall quality of distance education.

In the absence of standardized procedures and policies, eLSCs may risk operating in a disorganized manner. This could result in overlapping roles, gaps in the assignment and execution of responsibilities, and unpredictable variations in the quality of operations. Such inconsistencies could potentially compromise the effectiveness and reliability of e-learning services in the HEIs.

Moreover, any deviation from the recommended best practices could diminish the effectiveness of the support provided to students and teachers. This could have far-reaching implications on the quality of the educational services being provided. Therefore, ensuring a high degree of convergence with the recommended best practices is essential for eLSCs to offer meaningful and effective support.

In this context, aim of this study is to analyze the websites maintained by the eLSCs of 55 HEIs to assess the degree of convergence with the characteristics of best practices as proposed and described in the ELEN report and in a series of studies by Thornton & Koech (2018). More specific, this study will cope with three main questions:

Q1: *What is the current situation regarding the operation of eLSCs*?

Q2: *What are the characteristics and good practices of eLSCs?*

Q3: *What are the challenges for HEIs regarding operation of eLSCs?*

3.2. Methodology

In this study, the methodology employed was guided by the domain of internet-based research, as outlined by Kim & Kuljis (2010). The research involved scrutinizing the content of eLSCs' websites of various HEIs. This method was complemented by web textual analysis, which was utilized to examine the relevant uploaded documents.

The analysis of the websites was undertaken with the specific goal of completing a taxonomic table in a dichotomous manner (yes/no). This was based on whether each eLSC meets the criteria outlined in each field of the table, as mentioned in the ELEN report, and adopted by this study. The taxonomic table functions as a classification tool, providing a systematic order for the eLSCs based on their fulfillment of the stated criteria.

The subsequent analysis was executed with the primary objective of filling out the customized table in conjunction with Thornton & Koech (2018). The table served as a systematized framework, enabling an orderly organization of the data obtained from the content analysis and facilitated its comparison with the pre-established criteria of the report.

The finalized and filled classification table (Table 2), provided a comprehensive insight into the convergence status of the analyzed web pages.

The steps followed are as follows:

- Development of a modified table based on the relevant literature.
- Analysis of the websites of the eLSCs (where available) based on the criteria for inclusion in the sample.
- Coded completion of the table.
- Interpretation of the table and formulation of a summary conclusion.

The top 50 higher education institutions (HEIs) were selected from two of the most recognized university rankings: *QS World University Rankings 2022 and Times Higher Education World University Rankings 2023*. This methodology was intentionally chosen to ensure the inclusion of the most esteemed educational institutions (see Appendix). The goal was to offer an exhaustive and precise appraisal of the current situation of eLSCs in premier universities around worldwide.

This comprehensive approach provided an in-depth understanding of the eLSCs landscape, enabling the identification of prevailing trends, challenges, and opportunities in the e-learning domain. In addition to this criterion, all Greek HEIs that have an online site for their Learning Support Offices were also included in the sample. Finally, each institution was assigned a code to make the table easier to complete.

Table 2: List of HEIs in the study

HEI with eLSCs website (51)	HEI with no eLSCs website (4)	With specifications (15)
AEGU, PATU, DUTH, IONU, UDMA, MITU, UCAM, STAU, OXFU, HARU, CALU, ICLU, UCLO, ETHZ, CHIU, NUSI, PEKU, PENU, TSIU, EDIU, EPFL, PRIU, YALU, NTUS, CORU, HKOU, COLU, TOKU, JOHU, MICU, PSLU, CABU, MANU, SENU, AUNU, MGIU, NWEU, MELU, TORU, KYOU, KCLU, CUHK, NYOU, HKST, UCLA, UNSW, SJTU, BCIT, IPPU, TEUM, DUKU, MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, AUNU, MGIU, NWEU, KCLU	FUDU, SYDU, KAST, ZHEU	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, AUNU, MGIU, NWEU, KCLU

A total of 16 attributes (Table 3) were used for the analysis (4 structures X 4 roles), based on the ELEN report. However, as already mentioned, the table in the ELEN report below is relatively modified to be more concise.

Table 3: Attributes of eLSCs as adopted from ELEN Report

	Roles			
	Support Services	**Innovation**	**Content Creation**	**Research**
Services – Actions	Support of academic stuff and students Application development Services and tools prediction Use and spread of good practices. Staff training	Support of academic stuff Training of personnel Provision of Innovative pedagogical and technological solutions to learning problems Research and evaluation of eLearning across the institution	Support of academic stuff in Content Creation Content Creation Research in eLearning Tools	Research in eLearning New knowledge production Projects / Actions
Human Resources	HR- staff with a range of skills in pedagogy and technology in team	Cognitive psychology and instructional design skills Technological skills Evaluation and research skills	Cognitive psychology and instructional design skills. Design and production skills in content creation.	Research expertise in e-learning pedagogy and technology
Equipment	Training materials, demonstration facilities, production facilities for material	Centre with demonstration facilities	Production equipment, study guides, training materials	Research
Administration	Strategy designer Key roles among staff	Strategy designer Administrative support	Strategy designer Administration function	Strategy designer Administrative support

3.3. Results

Q1: *What is the current situation at international and national level regarding the operation of eLSCs?*

We first examined the distribution of HEIs across the different categories of the table and more specifically across Support Services, Innovation, Content Creation, and Research, crossed with services/actions, human resources, equipment, and administration, resulting to the following table (Table 4).

Table 4: HEIs conforming with attributes of eLSCs

	Roles			
	Support Services	**Innovation**	**Content Creation**	**Research**
Services – Actions	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, BCIT	MITU, UCAM, STAU, OXFU, BCIT, NWEU, KCLU	MITU, PRIU, YALU, NTUS, AUNU, BCIT, MGIU, NWEU, KCLU	MITU, UCAM, STAU, OXFU, BCIT
Human Resources	MITU, PRIU, YALU, NTUS, AUNU, BCIT MGIU, NWEU, KCLU	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, BCIT	CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, AUNU MGIU, NWEU, BCIT	YALU, NTUS, AUNU MGIU, NWEU, KCLU, BCIT
Equipment	UCAM, STAU, OXFU, PEKU, PENU, EPFL, BCIT	CALU, PEKU, PENU, EPFL, PRIU, YALU, BCIT	PENU, EPFL, PRIU, YALU, NTUS, BCIT, AUNU MGIU, NWEU, KCLU	MITU, UCAM, STAU, OXFU, BCIT, MGIU, NWEU, KCLU
Administration	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, BCIT, NWEU, KCLU	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, BCIT, NWEU, KCLU	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, BCIT, NWEU, KCLU	MITU, UCAM, STAU, OXFU, CALU, PEKU, PENU, EPFL, PRIU, YALU, NTUS, BCIT, NWEU, KCLU

It became evident that the numbers are not equally distributed among these categories (Table 5). The maximum value (14) was measured in all four columns of the Administration category underlying the heavy emphasis on

eLSC's role in facilitating and supporting the administrative functions of a university. On the contrary, the minimum value (5) was found in the services/actions of the research category.

Table 5: Distribution of HEIs conforming with attributes of eLSCs

	Roles			
	Support Services	**Innovation**	**Content Creation**	**Research**
Services – Actions	8	7	9	5
Human Resources	9	9	11	7
Equipment	7	7	10	8
Administration	14	14	14	14

This variance suggests either disparities in the prevalence of an eLSC services across the HEIs considered in the sample, or different website update and accessibility levels due to legal, technical, resource, or other reasons.

The possible causes of this potential disparity could be multifaceted:

- Administrative services may have gathered higher numbers because they are essential for basic infrastructure and function, making them a popular feature across most universities.
- Content Creation may have relatively high numbers since these specialized e-resources are essential for learning and teaching process.
- Research being the lowest one, could be due to various factors, including limited funding, inadequate infrastructure, or a focus on exploiting eLSC more for teaching than researching, in some institutions.

The consequences of the significant differences on eLSC services availability across universities could be significant. HEIs seem to approach eLSCs differently and to explore them using different approaches, which might indicate that in some cases eLSCs are not as integrated as they should, or that in some cases eLSCs' web sites are not as transparent and accessible as they ought to be.

Q2: *What are the characteristics and good practices of organizing and operating an eLSC?*

To address the disparities and improve the overall quality of eLSCs across universities, several approaches should be considered:

- HEIs should secure additional funding, enhance infrastructure, and foster a culture of innovation and research.
- Collaboration with industry partners and grant opportunities can also help boost resources for these services.
- HEIs can benchmark against institutions that excel in these areas, learning from their best practices and strategies for success.
- Regulatory bodies and accreditation agencies can play a role in encouraging HEIs to balance their service offerings, ensuring that students receive a high-quality education.
- Organizational policies, infrastructure and resources ought to be re-examined in the light of new e-learning requirements.
- An e-learning strategy is important to realize the organization's vision and intent and provide 'decision-making' processes.

These approaches should align to fulfill five basic prerequisites (Figure 2):

Figure 2: Prerequisites for operating an eLSC

Analysis revealed three different types of **Orientation of Goals** for eLSCs:

- *Type 1 - Providing e-learning support or service:* Focus is on supporting academic staff in the use of learning technology through the provision of assistance and advice and the development of applications and resources. eLSCs works closely with academic staff, helping them to reflect on how to use technology to meet student needs and improve quality.
- *Type 2 - Providing support for developing e-learning courses:* Focus is on the development and delivery of online courses through structured modules.
- *Type 3 - Providing support for innovation in e-learning:* Focus is on the integration of e-learning processes on research, development of innovative learning technology tools and evaluation of e-learning experiences. Long-term designs, where eLSCs would have a wider role in integrating e-learning into curricula.

The PAF Framework (King et al., 1999) highlights seven important topics to be considered during the **Design Phase**:

- Academic
- Governance/Administration/Financial
- Personnel
- Legal
- Student support services
- Technical
- Culture

Regarding the required **Services/Operations** of an eLSC, the following main activities should be considered as mandatory ones:

- *Define* requirements for best practices and personalized e-Learning approaches.
- *Provide* pedagogical and technical e-learning solutions suitable for innovative use in a variety of educational environments.
- *Support* academic staff through collaboration with subject matter experts on the design and creation of the e-learning infrastructure. It can refer either to individual courses, or to modules, or to study programs.
- *Support* HEIs to create modern e-learning tools and services.

- *Generate* new knowledge for e-learning.

Moreover, Thornton & Koech (2018) cite possible services that could be included:

- tracking,
- state authorization,
- LMS management,
- education and educational planning,
- course and media development,
- course accessibility,
- development of online programs,
- course and program evaluation,
- marketing,
- administration of scholarships or faculty grants,
- facilitating institution policy enforcement,
- student services and registration services.

Analysis of the eLSCs and the literature review revealed various aspects of **Administration** issues:

- Successful management of an eLSC requires strong leadership to lead implementation as well as articulate mission, vision, and goals in an educational environment (Keengwe, Kidd, & Kyei-Blankson, 2009).
- A challenge in managing an eLSC involves rapidly evolving technology and building relationships with stakeholders (Chow, 2013).
- Choosing the leadership for a new center is one of the most important decisions to be made.
- Many centers grow organically, starting as a small department with one or two staff members, adding staff as the need grows, or as functions are transferred to other departments that would be better suited to that new center.

Finally, regarding different **Roles** within an eLSC, the following ones ate cited as the most important:

- Instructional Designers (ID)
- ICT Staff Training Group
- Digital Academic Literacy Group

- Content Development Group
- Digital Media Group

Q3: *What are the challenges that HEIs may face in terms of organizing an eLSC?*

The disparities of eLSCs integration across universities can have significant consequences for their competitiveness and academic quality. Addressing these disparities will require strategic investments, collaboration, and mostly more alignment with the theoretical guides of eLSCs' best practices. Ultimately, a more equitable distribution of services and a more massive and widespread adjustment of eLSC guides will benefit students and the broader education community.

Mahor challenges for achieving excellence in eLSCs are the follows:

- *Financing*: identifying the source of funding is the main difficulty. Without adequate funding, it is very difficult to maintain the necessary staff to provide effective support services.
- *Exponential growth of e-learning*: especially if there is no strategic plan to manage it.
- *Need for regular review of HEI's e-learning strategy*: technology is changing so rapidly that it requires teaching and learning pedagogies to be constantly revised.
- *Organizational development*: mission and goals must be clarified to design and develop spacing and positioning for the eLSC.

4. Discussion and Conclusions

The analysis of the current state of eLSCs reveals a significant lack of uniformity and standardization in their operational procedures. There appears to be no existing workflow models that could enhance operational efficiency and productivity. This lack of standardization extends beyond the confines of this study, necessitating a broader reflection on the operational mechanisms of eLSCs. This lack, aligning with the identified deficiency in support services available for eLSCs, could limit their functional capacity and potentially lead to operational disruptions. Furthermore, it has been noticed that not all predefined roles or structures intended for the efficient functioning of eLSCs are being fully exploited. This underutilization could

be attributed to a lack of comprehensive understanding or effective implementation of these roles or structures.

It is clear, that there are many issues to be considered when building an eLSC. The important aspect to consider is that it should be aligned with institutional goals and priorities. Also, in the initial phase, a review and oversight team should be identified and established to ensure a smooth establishment and implementation of the center. Lack of adequate funding and human resources, coupled with the absence of appropriate training, justifies, to a significant extent, the deviation from the standards required in eLSCs operation.

When making the decision to implement an eLSC, a viable source of funding must be identified and incentives for training and productivity must be offered for faculty and staff as well as the needs of the entire e-learning community. It must also have the support of the institution's senior management through policy, budget, and directional support (Lučin et al., 2011). The close collaboration of different support units within the university is an example of a successful strategy in implementing e-learning innovations. According to Goodfellow & Lea (2008), the ability of the center to adapt to current social relationships within the university is another example of factors that lead to the successful implementation of e-learning centers.

Meanwhile, it must be considered that the results from the establishment of a center may take time (Lučin et al., 2011). Once the center is established, regular review and evaluation of institutional e-learning strategies and policies is warranted due to ever-changing educational technologies (Stoltenkamp, Kies, & Njenga, 2007), and a regular review and evaluation gives the e-learning center administration an opportunity to align its goals and services. This realignment of goals and services is necessary to address issues such as selecting e-learning technologies that are reliable, secure for student data, easy to use for both faculty and students, and effective (Bichsel, 2013).

In any case, if e-learning is not a priority, then it may not be the right time to establish an eLSC. If any type of e-learning is offered, it is important to take the time to ensure the quality of course design and delivery and to ensure

that the institution meets required accreditation standards and state regulations (Thornton & Koech, 2018).

As the top 50 higher education institutions were selected from two of the most recognized university rankings, with the aim to provide an in-depth understanding of the eLSCs landscape, this study holds significant value for academic researchers, policymakers, and university administrators interested in e-learning strategies and practices.

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7. Appendix

List of HEIs

HEI	Code	Location
University of the Aegean	AEGU	Mytilene (Gr)
University of Patras	PATU	Patras (Gr)
Democritus University of Thrace	DUTH	Komotini (Gr)
Ionian University	IONU	Corfu (Gr)
University of Western Macedonia	UDMA	Thessaloniki (Gr)
Massachusetts Institute of Technology	MITU	Cambridge (USA)
University of Cambridge	UCAM	Cambridge (UK)
Stanford University	STAU	Stanford (USA)
University of Oxford	OXFU	Oxford (UK)
Harvard University	HARU	Cambridge (USA)
California Institute of Technology	CALU	Pasadena (USA)
Imperial College London	ICLU	London (UK)
UCL	UCLO	London (UK)
ETH Zurich	ETHZ	Zürich (CH)
University of Chicago	CHIU	Chicago (USA)
National University of Singapore	NUSI	Singapore (SG)
Peking University	PEKU	Beijing (CN)
University of Pennsylvania	PENU	Philadelphia (USA)
Tsinghua University	TSIU	Beijing (CN)
The University of Edinburgh	EDIU	Edinburgh (UK)
EPFL	EPFL	Lausanne (CH)
Princeton University	PRIU	Princeton (USA)
Yale University	YALU	New Haven (USA)
Nanyang Technological University, Singapore	NTUS	Singapore (SG)
Cornell University	CORU	Ithaca (USA)
The University of Hong Kong	HKOU	Hong Kong SAR
Columbia University	COLU	New York (USA)
The University of Tokyo	TOKU	Tokyo (JP)
Johns Hopkins University	JOHU	Baltimore (USA)
University of Michigan-Ann Arbor	MICU	Ann Arbor (USA)
Université PSL	PSLU	Paris (FR)
University of California, Berkeley	CABU	Berkeley (USA)
The University of Manchester	MANU	Manchester (UK)

Seoul National University	SENU	Seoul (KR)
Australian National University	AUNU	Canberra (AU)
McGill University	MGIU	Montreal (CA)
Northwestern University	NWEU	Evanston (USA)
The University of Melbourne	MELU	Parkville (AU)
Fudan University	FUDU	Shanghai (CN)
University of Toronto	TORU	Toronto (CA)
Kyoto University	KYOU	Kyoto (JP)
King's College London	KCLU	London (UK)
The Chinese University of Hong Kong	CUHK	Hong Kong (HK)
New York University	NYOU	New York (USA)
Hong Kong University of Science and Technology	HKST	Hong Kong (HK)
The University of Sydney	SYDU	Sydney (AU)
Korea Advanced Institute of Science & Technology	KAST	Daejeon (KR)
Zhejiang University	ZHEU	Hangzhou (CN)
University of California, Los Angeles	UCLA	Los Angeles (USA)
The University of New South Wales	UNSW	Sydney (AU)
Shanghai Jiao Tong University	SJTU	Shanghai (CN)
University of British Columbia	BCIT	Vancouver (CA)
Institut Polytechnique de Paris	IPPU	Palaiseau Cedex (FR)
Technical University of Munich	TEUM	Munich (DE)
Duke University	DUKU	Durham (USA)