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The Role of Adaptive E-Learning Co-Design as Main Solution to Higher Education's Marketing Performance

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Abstract. This study investigated the role and influence of adaptive e-learning co-design on marketing performance of higher education institutions and provides recommendations for the academic community for improving learning and marketing performance. This paper employed a mixed method approach to better understand the role of adaptive e-learning co-design. The qualitative approach reviewed the relevant literature and used unstructured interviews. The quantitative method applied a questionnaire based on the instruction of each variable. It was shared with 257 participants, and then the data were processed with the structural equation modelling technique. In collecting information, a sharing session class was created with lecturers and students at universities in Toba, Indonesia. It was found that adaptive e-learning co-design mediates the influence of quality information on successful business intelligence. Adaptive e-learning co-design increases continuous innovation, whilst successful business intelligence improves higher education marketing performance. Adaptive e-learning co-design invites students and lecturers to be part of the design team of co-production knowledge and experience. Additionally, it demands higher education be a co-creator of values and implies a strategic orientation towards collaboration between stakeholders to integrate e-learning processes. Adaptive e-learning describes the role of stakeholders in the design and bidding creation process. This study assessed active students in two consecutive semesters participating in e-learning. adaptive e-learning co-design can improve higher education marketing performance through successful business intelligence.

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Keywords: adaptive e-learning co-design; successful business intelligence; continuous innovation; higher education; marketing performance

1. Introduction

The coronavirus (Covid-19) pandemic caused higher education (HE) institutions (HEIs) to adopt online learning management systems. The implementation of online education systems entered a new dimension. Institutions implementing formal and informal learning introduced electronic learning systems.

HEIs ought to complement online education infrastructure, modules, libraries, training, and other operational issues by involving e-learning co-design. Co-design could be in the form of value co-creation, using the service dominant logic (SDL) theory (Vargo & Lusch, 2004) and is often associated with co-production and co-innovation (Lusch et al., 2011; Saha et al., 2021).

Service co-design can be understood as creative and interactive human-centered. Co-design concerns co-creation as a service innovation in value adding, technology, and resources, creating shared value. Co-design uses an active human-centered approach (Simanjuntak, 2022b) and dominant logic's phenomenological value (Vargo & Lusch, 2007). Therefore, co-design implies shared use and the interaction of shared value creation in configuring joint supporting resources (Dietrich et al., 2017). The concept of adaptive e-learning shows achievement solutions (Barus et al., 2018), benefiting from overcoming differences in space and time, co-creation, motivation and the attitude of applying successful business intelligence users in various conditions (Feng & Hui, 2022).

This e-learning adaptive solutions' study focuses on designing and developing online learning innovations for all HE stakeholders. For HEIs, adaptive e-learning minimizes infrastructure and substantial costs (Simanjuntak et al., 2016), negating the need for classrooms and lecture buildings, free of space and time limits. The student responses substantially indicate that e-learning systems are more in demand. E-learning is a process that uses information and communications technology (ICT) in lectures, advertising, administrative registration, document production, lecturer communication with students and assessment. E-learning leads to new, more independent pedagogical approaches in spaces and programs tailor-made by HEIs (Villesseche et al., 2019). E-learning has a broad domain. Adaptive e-learning in this study is defined as the development of learning experiences and environments that promote digital technology in acquiring knowledge and skills. Lecturers must constantly validate and update their abilities to help students become capable, competitive, and integrated individuals. E-learning helps lecturers and teachers to develop, manage, and promote various learning processes in remote areas (Tulo & Lee, 2022).

In learning process, adaptive e-learning is required through the value co-creation of products and services, processes, involvement of lecturers, staff, students and infrastructure resources of HEIs. Given the development of information and changes in needs, both due to external and internal conditions of the organization,

it is necessary to adapt adequate technology along with organizational transformation. ICT supports the e-learning and innovation function of the HEIs business as a progressive relational shift (Simanjuntak, 2022a).

These phenomena were the motivation for this study. In addition, there is a gap in previous research that shows that quality information (QI) is yet to be proven to improve successful business intelligence (SBI) (Ahmad, 2015) and organizational performance (Suša Vugec et al., 2020). The inability to increase SBI is caused by a lack of technical support, self-efficacy, social norms (Boateng et al., 2016), adaptive process (Feng & Hui, 2022), education space (Duggal, 2022) and learning-management (Rughoobur-Seetah & Hosanoo, 2021). A learning organization is not adequate only to SBI, but also problematic to the sustainability of HEI's marketing performance (Cabrera-Solano et al., 2023; Zarandi et al., 2022). Therefore, to overcome these phenomena and gaps, it is necessary to build a research model and add moderation, namely adaptive e-learning co-design (AEC).

Furthermore, continuous innovation (CI) and higher education marketing performance (HEMP) were added to expand the role of AEC. Alternatively, others show that QI can improve SBI (Cham et al., 2021). The vast majority (90%) of organizations can increase digital priorities in strategic planning, such as e-learning, because of the greatness of QI (Boateng et al., 2016). Adaptive co-design is referred to the logic of SDL service changes, which states that the system not only requires tangible products but also needs to expand to intangible services (Saha et al., 2021; Vargo & Lusch, 2004). The value of co-created services is based on their use (Manser Payne et al., 2021; Vargo & Lusch, 2007).

SDL recognizes shared value creation as the cornerstone of lecturer-student relationships, lecturers and other stakeholders. In the context of AEC, shared value creation occurs when lecturers and students jointly use digital technology, especially when there is an alignment between QI and SBI through AEC. Thus, the research question is whether AEC can improve SDI and how much AEC plays a role in supporting CI and HEMP achievements.

The AEC research model was tested at HEIs in the Toba district, in Indonesia. This study aimed to provide the role and recommended solutions for HEIs, particularly the mapping of focus points in creating designs with stakeholders in the interactive learning process. Furthermore, this study defined the concept of adaptive e-learning co-design within the SDL framework, resolved the gap between quality information and successful business intelligence, and proposed role solutions to improve the performance of HEIs professionals. Adaptive e-learning co-design will be a solution for interactive and structural learning design and HE marketing performance.

2. Literature Review

2.1 Quality Information

QI helps map the design of learning materials as a whole, determine content delivery methods and establish the interactive technologies used (Abumandour,

2021). Modules, presentation materials, exciting support materials, and videos are all quality sources of information for adaptive e-learning programs (Fleming & Kowalsky, 2022). Higher quality leads to strategic decision-making and adds opportunities to enter the market (Bjørnskov & Schröder, 2022). Information technology accessibility refers to devices, computer programs, or services (computer-based) that are to assist the process and increase the role of students, including those students with disabilities (Skourlas et al., 2016). QI integration combines computing, communication, and data management technologies to determine the learning quality (Tang My et al., 2022). QI is defined as HEIs' ability to collaborate with their external collaborative consumers. QI enhances process innovation capabilities, leading to innovations in designing interactive learning techniques (Tajudeen et al., 2021). The creation of new service values and end-use values relies on the dominant logic of the service (Argo & Lusch, 2017). QI improves learners' problem-solving competence and increases comfort during learning. Concerning the concept of QI, Abumandour (2021) presented two e-learning teaching methodologies: semi-guided in virtual reality and rendering 3D video through an editing process. According to Ratten and Jones (2021), QI can be designed and adopted in online lecture platforms (e.g., chatbots, virtual collections, virtual labs, 3D animation, digital gamification, artificial intelligence, augmented and virtual reality, video conferencing, storytelling and live streaming).

2.2 Adaptive E-Learning Co-Design

The concept of adaptation in online learning with flexibility in time and space is an achievement (Simanjuntak et al., 2022). E-learning adaptation is an online learning method that allows various learning situations, such as study from home, increasing knowledge and skills, and facilitating learners with platforms where actors do not have to have offline interactions. Adaptive e-learning, in particular, can help special needs learners, who do not have physical access, to interact with others physically. Adaptive e-learning also includes various activities, such as teaching and education delivered online (Parra & Abeysekera, 2022). E-learning co-design is a learning system jointly designed by at least three main actors: educators, students and infrastructure management systems (Tang My et al., 2022). Co-design describes the ability of human resources to strengthen institutional performance (Rughoobur-Seetah & Hosanoo, 2021). E-learning co-design demands adaptation by stakeholders so that online learning and teaching produce contents as planned and create effective interaction between lecturers and students (Sumalinog, 2022). Adaptive e-learning shows instructions delivered on digital devices, such as computers, laptops, tablets, or smartphones, intended to support learning. Technological devices support adaptive e-learning platforms. The devices support mobility in nature and are tasked with democratizing access to education. As the dominant logic theory expresses with value co-design, learning actors will jointly transform to build experiences (Sorkun et al., 2022). This co-design e-learning platform connects everyone to optimize learning outcomes and improve learning performance (Sumalinog, 2022).

SDL views adaptive value co-design as an active and dynamic process driven by students and graduate user industries (Sarmah et al., 2018). As dynamic interaction, the processes, such as customer value creation, planning, testing, and prototyping, value creation opportunities with students and users, and implement consumer solutions (Bagdonienė & Valkauskienė, 2018). AEC has improved learning mechanisms and quality at low costs and changing market trends, models, processes, and learning platforms (Hongdao et al., 2022). AEC is an effective solution in improving learners' aspects and objectives and stakeholder performance.

The advancement of e-learning suggests that using platforms is an adaptive and efficient solution for teaching and learning (Villesseche et al., 2019). AEC focuses on co-creating services and becoming a relatively independent and overarching entity to absorb and manage the rapidly changing complexity of learning (Štrukelj et al., 2021). AEC encourages lecturers and students to be more effective in accessing global education. AEC provides everything necessary to replace conventional education, extending a capacity beyond borders, space and time. AEC shows the right attitude of lecturers and students towards e-learning (Alami & El Idrissi, 2022).

This study developed the following hypotheses:

H1 The higher the quality information, the easier it will be to realize adaptive e-learning co-design.

H2 Adaptive e-learning co-design can directly enhance successful business intelligence.

H3 Adaptive e-learning co-design can directly enhance continuous innovation.

H4 Adaptive e-learning co-design can directly improve higher education marketing performance.

2.3 Successful Business Intelligence

HEIs' success strategies should reconsider business intelligence software to enable HEIs to make decisions based on logical e-learning patterns. HEIs must reimagine their business models by adopting digital solutions (Hongdao et al., 2022). The environment measures the success of SBI through the systematic acquisition, collection, interpretation, and exploitation of information to support learning. SBI's role in HEIs is data collection, storage, and knowledge management with e-learning sustainability (Suša Vugec et al., 2020), such as customer intelligence, competitors, markets, products, and the environment (Ahmad, 2015).

SBI obtains customer needs, decision-making processes, competition, industrial conditions, general economy, technology, and cultural trends. SBI also uses e-learning programs that allow HEIs to collect, manipulate, and use actionable information in making correct decisions easily. SBI, as computing algorithms and data storage capacity, becomes more powerful. SBI solutions have integrated, collected, ingested, and strategically influenced external information. As a result, SBI significantly contributes to learning and HE's management efficiency. The dominant logic of SBI supports learning and decisions for acquisition,

assimilation, transformation, and exploitation and their effect on institutional efficiency (Al-Eisawi et al., 2020).

Business intelligence success positively affects HEI is an overall success then needs a higher level of business intelligence excellence. SBI consists of regulatory and informative assets that can be used fully to maintain or increase market reach. The SBI function can control the analytical tools (Nuseir, 2021) and maximize their performance. SBI's information warehousing specialists will add convenience for lecturers and students in making competitive strategic choices in the learning process.

Therefore, this study developed the following hypothesis:

H5 Successful business intelligence can directly improve higher education marketing performance.

2.4 Continuous Innovation

CI aimed at compelling synergy between operational effectiveness, strategy and flexibility. HEIs' performance requires continuous improvement as Kaizen management (Ermasova, 2021). In co-design, Kaizen's role is to improve performance between lecturers, employees, students, and the environment in a balanced manner. Constant innovation in online learning processes and services is essential for long-term success. CI's role in improving continuous and incremental marketing performance makes a systems' approach, added value and state-of-the-art (Kumar & Sharma, 2018) processes, competence, culture, and fast responsible (Santarsiero et al., 2022).

CI is characterized by new products, designs and technologies that have designed the growth of HEIs' marketing performance. The success, uniqueness, and iconic bring a "leap of quality" to HE marketing. The collaboration of HEIs with industry shows the innovation of sustainable learning technologies. The sustainability of CI will support HE marketing performance (Li, Chen, & Su, 2018). Co-design creates new products, formulates service concepts, generates ideas, and is concerned with designing service processes and systems. Value co-design mechanisms consist of lecturers, students and HE cooperation partners (Vargo & Lusch, 2016) to produce human resources and processes for creators of value in use. Customers join to lead the value-determination process by integrating their resources (Yu & Sangiorgi, 2017). The role of CI is to facilitate sustainable innovation, as strategies, systems dynamics, and processes (Saunila, 2017).

Hence, this study developed the following hypothesis:

H6 Continuous innovation can directly improve higher education marketing performance.

2.5 Higher Education Marketing Performance

The value co-design of the skills, knowledge and expertise of lecturers, staff and students realizes an institution's marketing performance. HE refers to intangible values in individual competencies. Marketing co-design is an invaluable asset that contributes to the success of HE. HEMP is increasing with instruments and knowledge to manage staff and student lecturers effectively towards strategic goals. HE marketing performance can be achieved by ensuring oversight,

promoting accountability and assessing productivity (Martin-Sardesai & Guthrie, 2018). This study has noted that the competition of HEIs need to be balanced by active innovation in marketing practices. HE marketing practices require business intelligence to verify co-design e-learning (Chun Sing Ho & Lu, 2019).

Highly committed lecturers and staff are essential for continuous competitive advantage (Sahibzada et al., 2019). Marketing co-design is an activity that is no less important than learning at HEIs. Curriculum design, evaluation and learning methods are innovative strategies that can improve academic engagement and performance and ultimately affect marketing performance (Crick & Crick, 2021; Simanjuntak et al., 2022).

3. Methodology

This study applied a mixed method approach (Yi et al., 2013), where the qualitative method was conducted through literature searching (Vigren et al., 2022) and unstructured interviews to corroborate the analysis (Priyono et al., 2021), with restrictions, according to the indicators of each variable. Interviews were conducted amid staff training activities and knowledge sharing for students (Institut Teknologi Del, Deaconess School of HKBP, Academy of Nursing HKBP). Sharing session activities consisted of discussions, questions, and answers to be carried out in two hours. Quantitative methods (Ko et al., 2021) started with formulating hypotheses and continue the division of closed-ended questionnaires (Pham & Vu, 2022). The respondents were academic communities from three tertiary institutions in Toba, Indonesia, who were randomly selected. The respondents were 257 participants: lecturers, HE managers, and students who have participated in or implemented online learning methods for at least two semesters. The respondents' profile consisted of 46.69% males, 53.31% females, with age ranges of 18–30 (64.20%), 31–45 (28.02%), 46–55 (6.23%), and 56–65 (1.56%). E-learning structures were 64.20%students, 29.57% lecturers, and 6.23% leaders.

Data recapitulation was processed with AMOS SEM software. Data processing aims to test hypotheses or relationships between various variables for quantitative data obtained through the distribution of questionnaires. The variables were measured by dimensions which were then described in the questionnaire questions. The questionnaire was constructed using a seven-point Likert-like scale pattern (Mohd Rasdi & Tangaraja, 2020).

The development of the questionnaire concerned the following aspects:

QI: Add value knowledge, improve work efficiency, task completion, consistent and concise, accessibility, interpretability, ease of operation, and understandability (Rasool et al., 2019).

AEC: A lecturer as a facilitator and coach who promotes self-paced education. Learners can access educational materials anywhere, anytime. It provides virtual laboratories, simulations and experimental workshops to learners, reaches broad audiences, and possesses easy accessibility, collaboration, and interaction (Abumandour, 2021).

CI: All activities are measured. The measurement result is then assessed on the relation with external links exist, Processes and structures are measured, and leaders' orientation, linked to the lecturer's development, is used to identify areas of a business (Saunila, 2017).

SBI: Obtain critical external data, enables the analysis and interpretation, newly role knowledge by having set processes and multi-disciplinary teams; communication and collaborative manner, gained knowledge and efficient services, integration with legacy systems, customer perception towards the system (Al-Eisawi et al., 2020; Farzaneh et al., 2018).

HEMP: Quality of teaching, number of research publications, community engagement, an increasing number of fans, economic value and operational efficiency, increased competitive advantage, and increased institutional cooperation (Martin-Sardesai et al., 2020).

4. Results

The structural equation model (SEM) was adopted to determine the role of AEC in moderating the relationship of QI with SBI; and the development of its influence on CI and HEMP quantitatively. SEM has been successful and popular with researchers for its ability to measure unobserved variables (latent variables) and examine their relationship with observed variables (Ferdinand, 2014). With SEM AMOS, each variable was tested as shown in Figure 1.

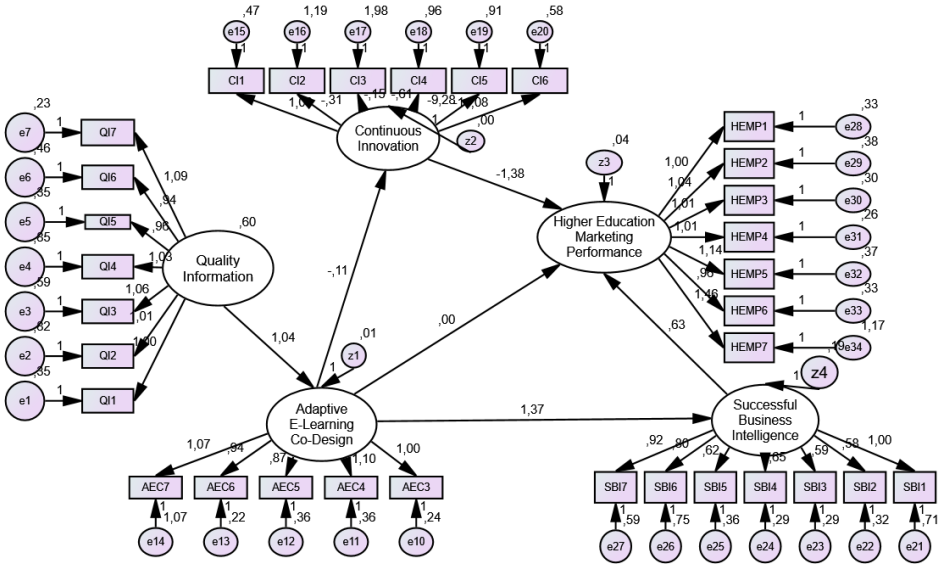

Figure 1: Adaptive e-learning co-design model

The dimensions of AEC1 and AEC2 were dropped from the analysis because the T-Value is < 1.96. The results of measuring the relationship between variables found that AEC was proven to moderate QI with SBI firmly. First, QI has proven to be potent in increasing AEC (H1) and AEC has proven to be potent in increasing SBI (H2). Thus, the e-learning co-design performed its task through a creative, human-centered approach. Second, interactive lecturers, students and campus management are proven to be able to create service innovations that include

exploring the experiences of lecturers and students and learning content. The design concept idea is relevant to the Indonesian government's program called "Independent Learning Independent Campus" (MBKM). Third, AEC results were the reflective solutions for prototyping, testing, and implementing the final design of e-learning learning.

The results of measuring the relationship between variables are indicated in Table 1.

Table 1. The role of AEC result

			Estimate	S.E.	C.R.	P	Assessment
AEC	<---	QI	1,044	,066	15,703	***	Supported
SBI	<---	AEC	1,369	,089	15,449	***	Supported
CI	<---	AEC	-,106	,048	-2,214	,027	Supported
HEMP	<---	AEC	,003	,135	,024	,981	Rejected
HEMP	<---	SBI	,630	,086	7,303	***	Supported
HEMP	<---	CI	-1,385	,837	-1,654	,098	Rejected

The table further demonstrates the decisive role of AEC in improving HE marketing performance. It was proven that SBI could increase HEMP (H6). The commitment of campus lecturer-student-management as a design partner (Durl et al., 2017) assures that AEC is appropriate for improvement. HE marketing performance is more substantial as a recommendation for education providers, lecturers and even students. The role of AEC is the right solution for adding value to learning and developing sustainable institute programs. AEC is not just championing QI with SBI but also demonstrating an improvement of co-creative and co-design towards the sustainability of HE (Menchini et al., 2021). Co-design is essential to e-learning adaptation. E-learning co-design becomes meaningful for the management and sustainability of the campus with its marketing performance.

AEC has accelerated with CI in the development of HE (H3 was confirmed). CI will be more robust if the adaptation of the entire e-learning co-design is implemented and uniformed into a dynamic and energetic campus learning culture innovation (Simanjuntak et al., 2022). AEC becomes a requirement for CI realization. This position aligns with the dominant logic in understanding the user's value creation process. Stakeholder engagement through co-design is a crucial concept of sustainability of service innovation as it allows faculty, students and campus management to innovate. Co-design allows lecturers and students to be selected for a team of e-learning design experts because they are also end users. E-learning co-design solutions are participatory and coordinative practices and enable them to contribute skills and share knowledge during the design process (Barhoumi et al., 2022).

E-learning co-design is generally regarded as an example of innovative creativity that has a direct impact on the sustainability of HE. The e-learning co-design service shows that physical and emotional participation can influence the interaction of the academic community in its role as contributors.

Alternatively, it is indicated that AEC is unable to increase HEMP (H4 rejected) directly. This condition is likely to happen due to the integration of resources in shared learning rather than directly providing feedback on marketing promotions. AEC activities require the exchange of knowledge, the search for information, research, and the structuring learning. AEC is in the design stage of all information owned before conducting campus-marketing activities.

Although H4 is rejected, HEMP can be supported and improved when AEC moderation is done by SBI (H5 confirmed). AEC has SBI to achieve HE marketing performance. SBI is able to increase HEMP (H6 confirmed). E-learning exploits digital innovation to realize SBI in improving teaching and learning. SBI underlies the HEMP model when adopting e-learning and determines factors, such as information, usefulness, attitudes, controls, feasibility, and achievements, in the SBI database.

5. Discussion

AEC, as a novelty, shows a role in increasing SBI. The role of AEC in instructional design also enhances CI. This is concurrent with various studies (Cabrera-Solano, Ochoa-Cueva, & Castillo-Cuesta, 2023), that SBI is a means of sharing scientific knowledge, digital technology, and a new culture. The results of this study also prove that AEC and SBI affect the sustainability of HE. This study emphasizes that the role of AEC in the dominant logic of services is to create shared value by integrating SBI-guided resource creation (Behnam et al., 2023).

Qualitatively, the results show that e-learning can help in completing the three pillars of HE (lecturers) and the educational programs without reducing quality, as evidenced by the level of understanding and deepening the learning materials (Lianto et al., 2020). HE focuses more on digital innovation and adaptation towards a digital campus (Sorkun et al., 2022). Motivation and adaptability are increasingly essential to improve the quality of learning by using technological advances (Trischler et al., 2018).

E-learning may provide an excellent opportunity for education managers, lecturers, and students to share the responsibilities of strengthening learning and promotion to achieve sustainable marketing performance. AEC assists students in overcoming time constraints, geographic, affordability, and physical disability (Haridy et al., 2022; Rahmani et al., 2021).

However, the challenges of adopting e-learning co-design that still needs to be considered by HEIs' managers are quality assurance and evaluation of learning outcomes (Looi, 2022). AEC is also an opportunity for subsequent researchers to compare offline and online learning outcomes (Behl et al., 2023). AEC outputs, such as science, quality, skills, communication, responsibility, and professionalism, are adequate capitals in HE marketing (Behnam et al., 2023).

AEC is a thriving learning performance that positively affects practical methods and provides dynamic experiences in achieving college marketing performance. The future existence of AEC guarantees the success of HEIs' marketing

performance. AEC creates a campus to provide virtual labs, simulations, and experimental workshops to reach students or consumers. AEC builds communication, collaboration, and interaction between faculty and students and has unique functionality, accessibility, and flexibility in the long run (Cabrera-Solano et al., 2023). Based on the quantitative and qualitative analyses, AEC solutions improve learning, institutional and marketing performance.

Table 2. Log activity adaptive e-learning co-design

Lecturer	**Students**	**HE Management**
Providing conceptualization, design, execution	Conducting the learning process (individual investment)	Building infrastructure based on electronic media
Adopting e-learning as a teaching mode	Provide feedback while in class, presentations, discussions	Providing hardware, software, and technical support
Building knowledge, modules, videos, voice recordings	Have a series of activities that are carried out independently	Adopting the application of an e-learning system
Empowering digital technology and making learning materials accessible to consumers	Actively and proactively participating in shared learning	Build full internet access
Providing knowledge and practicum information	Improving ICT skills	Adopting an e-learning system
Actively sharing knowledge and experience	Promoting application-oriented competencies	Providing virtual classrooms, virtual meetings, forums, and regular training
Building learning literacy creatively, updated and accessible	Being committed to building online communication	Building ICT literacy
Providing electronic tests	Experiencing changes in behavior, and competence	Promoting e-learning, Reaching consumers
Building consistent online communication	Following the interactive question answering	Helping academics to promote the use of ICT
Improving learning evaluation	Creating self-evaluation	Hiring staff lecturers who have excellent skills in digital
Performing the *tridharma* of PT consistently and committed	Building a competitive advantage	Building a campus information system that can be accessed from anywhere

6. Conclusion

This study recommends the e-learning method based on the SDL perspective. The role of the AEC instructional design model can effectively and solidly organize SBI and realize institutions' marketing performance. AEC is a quality co-creation and co-production learning checklist and provides direct benefits to end users. The AEC lists considerations, strategies and broad capacity towards CI, SBI, and then HEMP. AEC is actionable and applicable as long as distance of learning and teaching is prioritized to improve dynamic HEIs' performance. AEC invites students and lecturers to be part of the design team as co-production knowledge and experience.

This argument is in line with the dominant logic-based thinking that characterizes HEIs as co-creators of values and implies a strategic orientation towards stakeholder collaboration to integrate e-learning processes. The campus is a student-focused resource integrator aimed at creating a unique source of customer value. AEC describes the role of supply chains in the design and offering creation process. It is assumed that IQ can increase SBI. Therefore, AEC is constructed as a novelty variable.

The role of AEC represents new service design concepts, interactions and business models. It explains that the relationship between CI and SBI directly engages stakeholders in the new service development process. According to Behl et al. (2023), to improve service performance, institutional internationalization programs, technology strategies and servicing are required.

7. Implications and Recommendation

The implication is that AEC, which characterizes collaboration and interaction between lecturers and students, staff and education managers, plays an essential role in any learning and motivates students to achieve specific achievements on an ongoing basis. AEC solutions involve lecturers in a variety of roles. There are times when lecturers become mentors, facilitators and coaches, and online discussion partners. Lecturers and students create add-value for promoting lifelong and independent learning.

A sense of independency can be achieved when anyone can access educational materials anywhere at any time. AEC's role is how stakeholders create add-value in collaboration and integration. AEC's role proves that value co-creation synergizes with processes and learning outcomes. AEC's role can be explored, analyzed, or documented during learning activities and, through SBI, data centers or information can be developed to improve HE marketing performance. Therefore, AEC is a strong recommendation for subsequent research in evaluating the e-learning industry in wealthy HEIs in a city center. Furthermore, AEC prepares the best e-learning solutions for other crises by evaluating the current e-learning process.

8. Limitations and Directions for Further Research

The sample is the academic community of higher education in Toba, where many students are in rural areas when participating in e-learning in the last two years. This condition is very likely to explain AEC not to be able to increase SBI directly. For this reason, it is necessary to continue research by expanding the sample range, for example, from areas with high internet access.

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