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STRATEGIES FOR ADOPTING DISRUPTIVE TECHNOLOGY AMONG UNIVERSITIES DURING THE COVID-19 PANDEMIC

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ABSTRACT

Universities faced enormous pressure during the COVID-19 pandemic to assimilate eLearning as a disruptive technology and modify their traditional learning to become more sustainable, competitive, and affordable. Governments globally took measures to control the spread of the highly transmissible COVID-19 by developing policies that led to the shutting of schools and the closing of physical learning in universities. It was therefore imperative to conduct this research to revamp eLearning as a disruptive technology in the university education sector. The study adopted a qualitative approach and data collection involved interviews where participants included the faculty and ICT personnel. Findings showed that the strategy for eLearning sustenance and implementation revolved around training, appropriate changeover mechanisms, and availability of critical resources dedicated to sustaining the disruptive technology. In conclusion, universities should continuously solicit innovations since the advantages of adopting disruptive technology are numerous including greater convenience, less complexity, increased performance, and less cost.

Keywords: COVID-19 pandemic, disruptive technology, university education, traditional learning

Strategies for Adopting Disruptive Technology among Universities during the COVID-19 pandemic.

1.0 INTRODUCTION

Since the outbreak of COVID-19, various governments globally took measures to control the spread of the virus through border control (land, air, and sea) (WHO, 2020). Managing the COVID-19 spread also involved raising public awareness and reassuring the public on the best measures to stay safe while also fighting fake news and misinformation, and providing tax relief to citizens (Li et al., 2020). Policies by governments to promote shutting of schools and closing of physical learning in universities came into effect during the COVID-19

pandemic, forcing the universities to adopt eLearning as a disruptive technology during the COVID-19 pandemic in order to keep afloat and remain relevant (Li et al., 2020).

It was therefore imperative to conduct this research to revamp eLearning as a disruptive technology in the university education sector, given that the need for keeping social distance as a COVID-19 preventing strategy was relevant with the increasing prevalence of the pandemic. The aim of the study was to examine the strategies for adopting disruptive technology among universities during the COVID-19 pandemic.

2.0 BACKGROUND

Healthcare workers in Hubei province first described COVID-19 as a pneumonia outbreak with unknown causes in Wuhan City, China (Sohrabi et al., 2020). Epidemiological studies later described COVID-19 as a communicable disease that spreads from one person to another through contact. This transmissible disease is highly contagious; hence, most governments stopped physical learning in universities and encouraged the use of online learning. The advantage of online learning is that it offers the best alternative to physical learning because it increases motivation among students (Surkhali & Garbuja, 2020). However, challenges exist using this platform such as internet connectivity problems, lack of physical interaction between students and lecturers, and inability to conduct practical sessions in physical laboratories. Moreover, leaders and lecturers in colleges and universities also face unique challenges relating to integrating eLearning and poor strategies to sustain the new method of learning (Thi & Dung, 2020).

The universities faced enormous pressure to assimilate eLearning as a disruptive technology and modify their traditional learning to attract students, increase efficiency, and become more sustainable, competitive, and affordable (Figure 1) (Valverde-Berrocoso, et al., 2020).

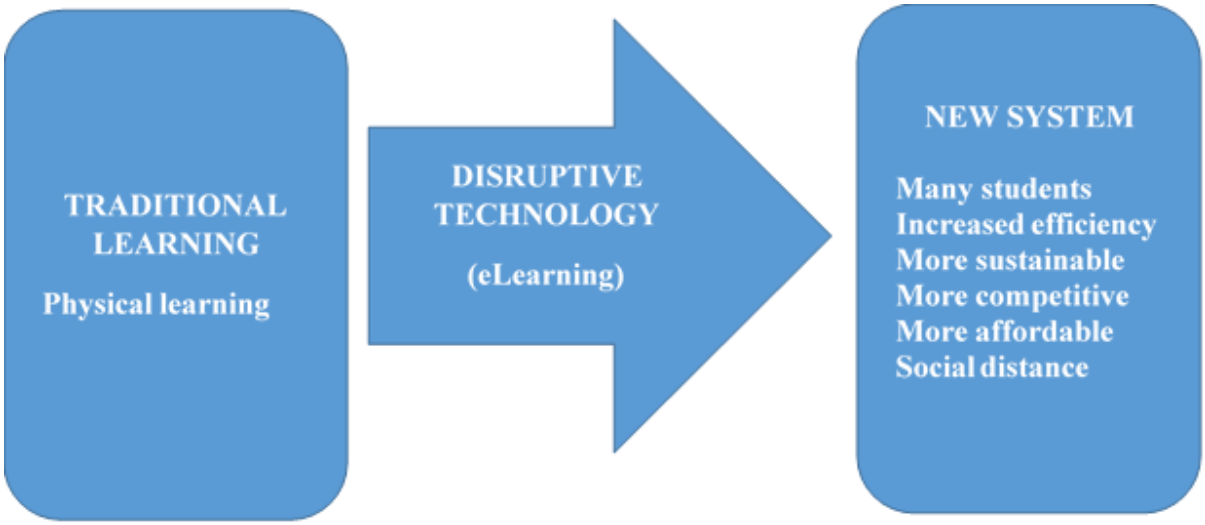

Figure 1. Illustration of the outcomes from adoptive eLearning as a disruptive technology

Adopting eLearning as a disruptive technology requires understanding of stakeholder (e.g. students and staff e.t.c.) perception, performance, and participation, and the best strategies for adopting distance learning. Existing theories in literature such as Diffusion of innovation (DOI) theory and Disruptive Innovation (DI) theory help to explain the adoption of new products in markets, and ways of developing new markets, respectively (Huang et al., 2020).

In Diffusion of innovation (DOI) theory, adopting a new product, behavior, or idea (i.e. disruptive technology) in organizations never occurs simultaneously; instead, individuals adopt the process differently (Figure 2) (Huang et al., 2020; Lien & Jiang (2017).

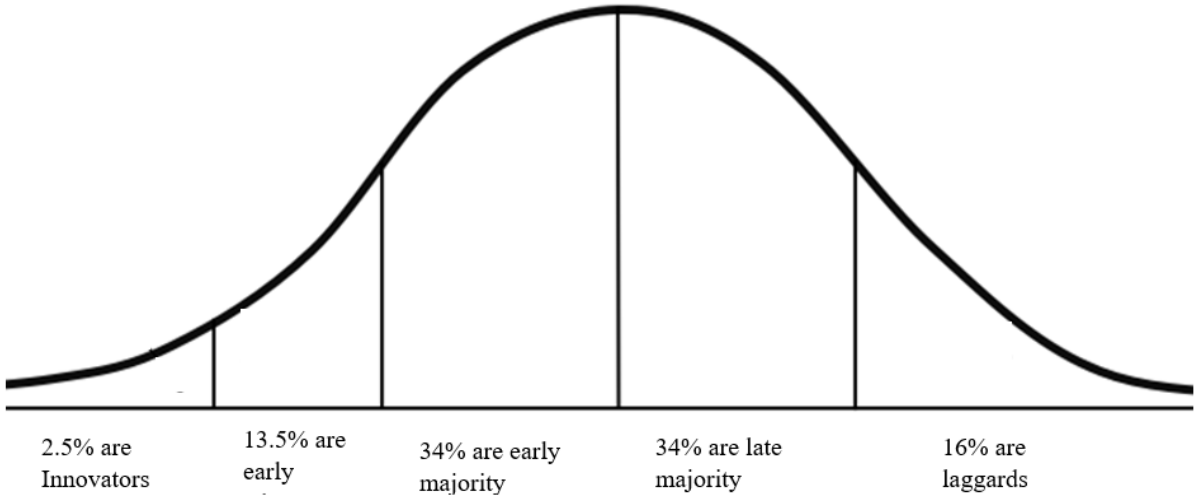

Figure 2: Illustration of the innovation acceptance sequence in DOI theory
Source: Lien & Jiang (2017)

DOI theory posits that innovation diffusion is a process that commences with having knowledge about an innovation (Kapoor et al., 2015). At this stage, exploration of technological advantages and functions tends to occur. Although individuals may have knowledge about technology before getting the right training, the subsequent knowledge acquired from training is 'principles' and the 'how' knowledge. Training is a vital first step to gaining the right knowledge for a specific organizational need. Training plays an important role in positively changing the attitude towards innovation (Huang et al., 2020). Moreover, training contributes towards the development of a management system for sustaining the gained knowledge that fosters new technology adoption.

Disruptive Innovation (DI) theory argues that smaller businesses characterized by inadequate resources can gain a competitive advantage over the established large businesses (with adequate funds and resources) by adoptive disruptive technologies, which enable them to rise up the market from the bottom position (Figure 3) (Christensen et al., 2018).

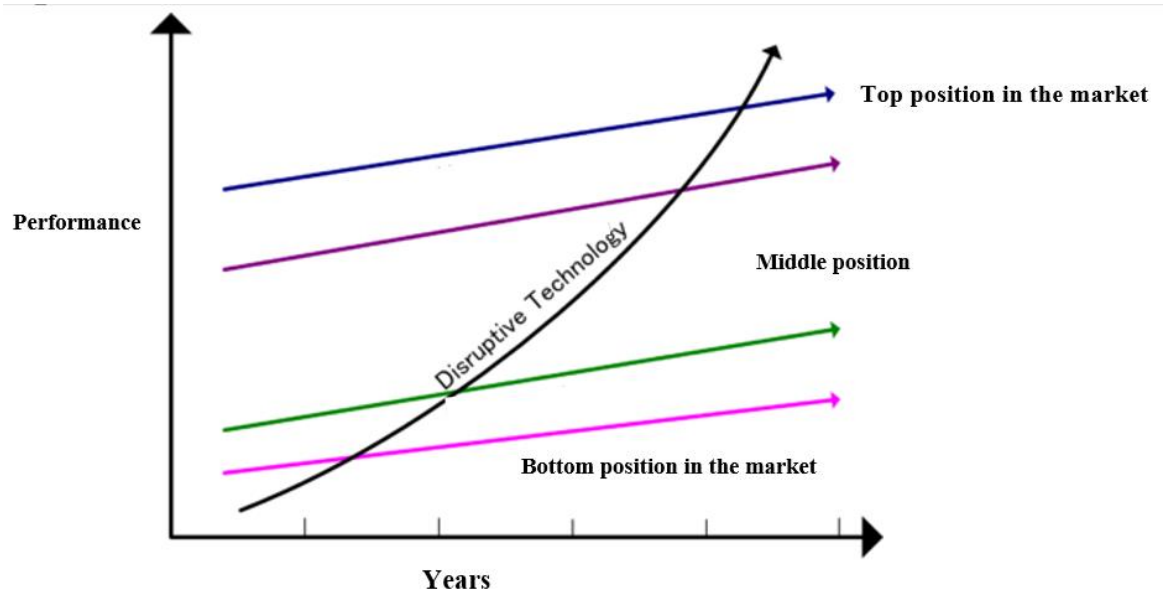

Figure 3: Disruptive Innovation (DI) theory
Source: Christensen et al. (2018).

DI theory postulates that resource utilization plays a big contribution to the sustenance and effective integration of disruptive technology. In essence, incumbent firms can fail or succeed due to factors like an organizational response to new technology, resource availability, organizational values, and the approaches used in resource transformation into outputs (services and products) (Yeh & Walter, 2017). This shows that resource utilization is core to sustenance and effective integration of disruptive technology in Universities. Resources are assets (tangible and intangible) in the framework for disruptive technologies (Yeh & Walter, 2017).

3.0 METHODS

The researcher adopted a qualitative approach to explore the strategies used by universities based on the experience of the key informants when adopting eLearning as a disruptive technology during the COVID-19 pandemic (Ugur, 2020). The exploratory study design involved a case study of two universities (one from Kenya and one from the USA). These universities were selected based on having integrated and trained their staff on eLearning modalities, to which the selected universities were able to successfully adopt, adapt, integrate, and use an eLearning management system, as a disruptive technology, for at least one semester, during the COVID-19 pandemic.

Study participants included two main categories, the faculty and information and communication technology (ICT) personnel. The selection of the study participants required that they were indeed employees of their respective universities to provide an accurate description of events at the study sites. The sampling technique for the study participants included the use of purposive sampling, which is a nonprobability technique. The use of this sampling technique ensured that only those who possessed the major characteristics

appropriate to addressing the study aim answered questions and participated in the study (Campbell et al., 2020).

The sample size was 10 interviewees, five from each of the two universities. Of the five interviewees from each institution of higher learning, three were faculty, and two were ICT personnel. Analysis of their demographic profile indicates a diverse age group ranging between 30 years and 50 years. It was required that these participants must have unique experiences, perceptions, attitudes, and characteristics concerning the eLearning adoption strategies in universities.

Data collection involved interviews to elicit the strategies for adopting disruptive technology among universities during the COVID-19 pandemic (Natow, 2020). Interviews with the participants occurred in their respective countries to explore shared experiences and identify the common strategies that enabled the successful implementation of eLearning during the semesters despite the COVID-19 pandemic. The interview protocol contained various questions about the resource utilization strategy, change over mechanism strategies, and training strategies. The survey instrument used in this study was adopted and modified from Appendix B (Interview Protocol), of a study conducted by Allen (2018). Pre-tasking during the interviews generated data saturation during the establishment of the interviewees' perceived current, future, and past experiences on the subject under study. Voice recorders in smartphones recorded the audios during the interviews, which lasted about 45 minutes for each interviewee. The transcription of the audiotapes produced the interview transcripts for qualitative data analysis involving content analysis. This enabled the accurate representation of the information gathered from the study participants during the interviews.

4.0 ETHICAL CONSIDERATION

In ethical research, investigators used the informed consent process to protect and safeguard the rights of study participants and ensure adherence to lawful procedures that pose no physical or psychological harm or threats (Allen, 2018). In this study, the Institution Review Board (IRB) guidelines were adhered to by applying for and obtaining approval before commencing data collection. Furthermore, the co-author of this study has successfully completed the National Institute of Health (NIH) training on "Protecting Human Research Participants."

5.0 RESULTS AND DISCUSSION

The study examined eLearning strategies adopted by American and Kenyan universities during the COVID-19 pandemic that changed their traditional physical classroom models to enable continuous learning even when the respective governments suspended physical classes to contain the spread of the virus. The study findings can be categorized into themes based on the information received from the interviews.

Theme 1: Training as a Strategy for eLearning Sustenance and Implementation

The importance of training in sustaining and implementing eLearning as disruptive technology was evident from the study. In essence, there was evidence that management in the universities pays attention to training design, technical and organization dimensions.

Results from the interview analysis showed that technical dimensions of training, including the period according to training and budget allocations, are vital. In essence, the interview participants noted coaching during training and mentoring as the most important. Interviewees from the two sampled universities pointed out that training targeted both faculty and students for about one to three-hour blocks in a given day, and spread out for about two to three weeks. Furthermore, the training sessions occurred thrice an academic year. The organization of time dedicated to training in the American university was a key strategy for implementing eLearning. On the other hand, there was no organized training plan in the Kenyan university given the limited time accorded within a given year. For instance, faculty member 2 reported that the time allocation was inadequate to grasp as much information as possible. This implies that there were factors that prevented this university from conducting regular trainings for its students and faculty.

Different factors emerged in this study to be affecting training as a strategy for adopting eLearning in the universities. According to faculty member 9, eLearning is a complex innovation and a disruptive technology for staff who are not technologically 'savvy' hence more time is required to have in-depth understanding and mastery of the model. In this regard, the interviewees supported an increased period of training sessions in a given academic year. This perception tends to be in contrast to the younger faculty member 5 and 8 who needed a lesser time to familiarize with eLearning technology. Overall, the interviewees agreed that experience influenced the amount of time preferred during the eLearning training. In addition, it was clear that if one was less technologically savvy or had less computer and internet skills, then the need for a longer training period increased.

Theme 2: Changeover Mechanisms as a Strategy for Disruptive Technology

Changeover mechanisms concern the approach is taken to address disruptive technology, for instance, complete adoption of eLearning as a distance learning or partial adoption of eLearning and blending it with traditional classroom models. Changeover mechanisms contribute greatly to successful eLearning implementation; hence, it is an important adoption strategy. Technological disruption occurs through changeover mechanisms and organizational attributes, depending on the disruptive technology in question. In the business sector, changeover mechanism and the business attributes enable technological disruption, depending on disruptive technology in question (Yeh & Walter, 2017). Based on these findings, adequate time should be accorded to decision making for a successful changeover process to occur in universities since it also allows for unsatisfied individuals to obtain the right information and get persuaded to adopt and support the process in the long run (Ifinedo, 2017).

This study revealed the transformation process experienced by the universities from the past systems to new systems, including pilot testing eLearning, overlaps, and piecemeal integration of eLearning to give way to the new system. Such changeover mechanism is termed as the key strategies for implementing disruptive technologies (Ifinedo, 2017). Both

universities created eLearning pilot projects in each department and weighed its success and failures before replicating the same project to all the departments. By first having a pilot project in each department, universities are able to test the efficacy and develop remedies appropriately before the complete adoption of eLearning.

In terms of piecemeal integration of eLearning, interviewees asserted that this disruptive technology developed piece-by-piece and blended with the traditional teaching over time. During the pandemic, the traditional teaching in classrooms faded away while the new eLearning took root with the transfer of the key functions online. Moreover, complete uptake of eLearning from the traditional learning approaches occurs when the number of early adopters and innovators is higher. On the other hand, the presence of laggards and a higher proportion of the late majority leads to piecemeal rollout in the organization to allow for addressing of contagious areas.

Organizational factors can also influence changeover mechanisms besides the type of technology and conducting experiments. A complete switch to a new technology occurs if there is an expected increase in new market performance and vice versa (Yeh & Walter, 2017).

Theme 3: Critical Resources as a Strategy for Disruptive Technology Integration

Utilization of essential resources is another major strategy reported by the interviewees for adopting disruptive technology. The study required participants to identify the critical resources available for eLearning integration in the universities. Findings from the study showed that the main critical resources were software technology, technological systems and equipment (e.g. computers, enterprise systems, software applications, and network), Google resources (e.g. Google Drive, Google docs, Gmail, Google sheets), learning centers for faculty, computer labs, websites, eLearning committees (or eLearning boards for trainers), and human resources. Other critical resources mentioned included obtaining external resources, namely quality matters, and accreditation. These resources are vital in sustaining disruptive technologies; hence, IT support should be constantly available to enhance training, teaching, collaboration and interactive learning. Full integration of eLearning requires continued maintenance and management of such resources.

System updates in the universities sampled involved continuous reinforcement, review, and giving information to the organizational members (e.g. students, staff, faculty, and management) on the current trends in eLearning management. Moreover, advancement in innovation each year is a backbone of sustaining disruptive technology since it generates new products (Behara & Davis, 2015). Similar sentiments are present in this study given that system updates occurred continuously thus enhancing and introducing new functionalities in different elements of the system.

Interviewees posited that seeking advanced technological resources had greater benefits compared to maintaining outdated technologies in order to save resources. This finding is in line with the DI theory given that disruptive technologies continuously sought by large organizations in the markets often enable them to be sustainable (Greco, 2016).

6.0 CONCLUSION

Adoption of disruptive technology during the COVID-19 pandemic influenced the overall sustainability, operations, revenue, and even competitive advantage of universities. The universities that faced major challenges in adopting eLearning as a disruptive technology remained closed to the students, unlike those using eLearning that proceeded with online learning. This study explored the organizational strategies to illustrate the characteristics, uniqueness, and similarities of real experiences about eLearning adoption as a disruptive technology among universities. According to the findings, strategy for eLearning sustenance and implementation revolved around training, appropriate changeover mechanisms and availability of critical resources dedicated to sustaining the disruptive technology.

The study reported training and its role in implementing eLearning as a disruptive technology among universities by examining how periods accorded to training and budget allocation influence the process as a whole. Individuals trained include staff and management as well as students. Effective training for learners occurs when there is consideration of the design dimension, technical dimension, and organization dimension (Navimipour and Zareie, 2015). It is also important to note that budget allocation for training influenced the training strategy. The budgeted amount of training is however limited to the size of the university since it dictates the financial capabilities for training facilitation. Consideration of outsourcing, external facilitators, budgeting for stipends, and IT support is important since they affect the training strategy.

The closure of physical learning in universities attributed to the prevention of COVID-19 meant the acceptance of the disruptive technology and immediate implementation of the eLearning system. During the implementation of disruptive technology, individuals themselves seek the technology adoption ways before developing any further commitment. In this regard, confirmation of the various benefits of technology adoption could be possible, resulting in higher acceptance and implementation levels. It is vital to note that testing technology or its experimentation contributes to documenting the system performance and determining the organizational response (Hsu, 2016). DOI theory supports this phenomenon since it groups people because of their tendencies to embrace new technology (Yeh & Walter, 2017).

Technology, over time, comes to be less disruptive, leading to the introduction of other innovations (McHenry, 2016). For this reason, universities (and other organizations) should continuously solicit innovations that can enhance profitability and attract new students. The advantages of adopting disruptive technology are numerous given that there are greater convenience, less complexity, increased performance, and less cost (Lim & Anderson, 2016). In other words, organizations must examine the qualities of new technologies before complete adoption, continued usage, or maintenance of old technology. Exploring and trial of new disruptive technology to determine their appropriateness for changeover need monitoring and evaluation to ensure integration and long-term usage.

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