

Effectiveness of Distance Education on Sustainability from Learners' Perspective

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Education for Sustainable Development has become an important issue in transforming societal perception about sustainability in the Malaysian higher education scenario. In contending with the challenges posed by the 4th Industrial Revolution, distance education has been acknowledged as a mechanism through which sustainable development can be achieved via digital technology. However, not much importance has been given to investigating the ways in which distance education can be effective in instilling sustainability among learners and the barriers which hinder it. Therefore, this study has been conducted to explore the perceived effectiveness of distance education and the barriers towards sustainability among Malaysian distance learners. A total of 72 participants were interviewed by the researcher and the data obtained was transcribed into meaningful themes for analysis. A wide spectrum of factors was found to have contributed positively towards the effectiveness of distance education in nurturing sustainability despite the barriers encountered by learners. The researchers are confident that some of the findings may contribute to the building blocks of knowledge in the respective areas of study. This study may provide the much needed motivation to policy-makers and university administrators in empowering distance education programmes so that a larger student population may be reached beyond national and international borders. This study will surely benefit other stakeholders of distance education programmes and higher education institutions who are concerned about the sustainability of higher education and future development.

Key words: *Barriers, digital technology, distance education, effectiveness, sustainable development.*

Introduction

Sustainable development has been integral to the Malaysian education system as emphasized in the Malaysia Education Blueprint (2015 - 2025)(Ministry of Education Malaysia, 2013). Universities have played various roles in transforming the nation by educating decision-makers, policy-makers, leaders, entrepreneurs and academics about various aspects of sustainability. Studies have looked into various aspects of sustainability in the higher educational context: implementation of sustainable development (Larran Jorge, et al., 2015); stakeholder participation and engagement (Dentoni & Bitzer, 2015); campus operations (Li, Tan, & Rackes, 2015); sustainability reporting (Lozano et al., 2015) and curriculum design, development and delivery (Lozano et al., 2015). Given the fact that sustainability was found to be not well integrated into mainstream university operations and curricula (Larran Jorge et al., 2015; Waas, Hugé, Verbruggen, & Wright, 2011), the need to incorporate sustainability into university courses and programmes is intense and immediate.

Distance education has been acknowledged as a mechanism through which sustainable development can be achieved (Aleixo et al., 2018; Azeiteiro et al., 2015; Ramos et al., 2015). Distance education has been important in achieving Sustainable Development Goal 4 (SDG4) by ensuring the presence of inclusive and equitable quality education and promoting lifelong learning opportunities for all since it accommodates the needs of working adults in the pursuit of tertiary education. In the interest of increasing public participation in lifelong learning (Ministry of Education Malaysia, 2013), the contribution of developing communication technologies has increased demand due to changing lifestyles. This has created an educational niche opportunity for distance education to be elevated in status from a supplementary tool, to a distinctive and appropriate solution. Since distance education is necessary to serve this digital generation, its essence in nurturing sustainability has become extremely significant and urgent.

The effectiveness of e-learning, upon which distance education lesson delivery is grounded, is an issue which requires further analysis (Azeiteiro, Bacelar-Nicolau, Caetano, & Caeiro, 2015). The evaluation of the effectiveness of distance education in nurturing sustainability indicates that the distance learning experience has been linked to a very high level of student motivation and satisfaction (Martinho et al., 2010; Ana Pinto de Moura, Luís Miguel Cunha, Ulisses Miranda Azeiteiro, Luísa Aires, Pedro Graça, 2010). Student motivation, satisfaction, and quality issues were found to be positively related to the effectiveness of distance education in delivering the sustainability message (Goulimaris, 2015; Harris & Martin, 2012; Markova, Glazkova, & Zaborova, 2017). Even though new virtual technologies are important in distance education, they are believed to be less sufficient because they do not encourage the development of key learning skills, attitudes and values about environmental conservation and sustainable development at the same level as face-to-face fieldwork (Oliveira, 2012; Oliveira, Giannetti, Agostinho, & Almeida, 2017) Therefore, further analysis is warranted in order to

examine the effectiveness of distance education and the utilization of these new and emerging technologies in nurturing sustainability awareness among learners.

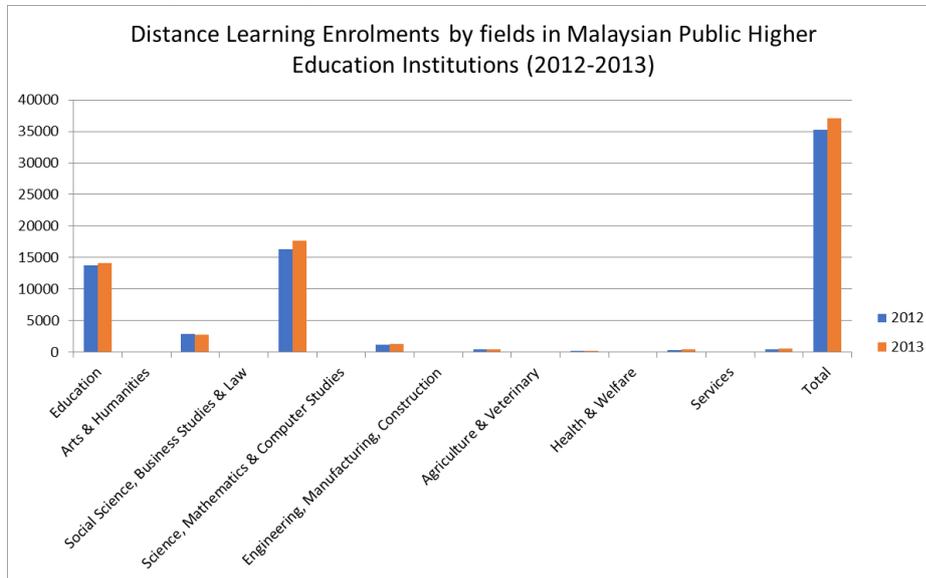
In addition, the study was also motivated by Aleixo, Leal, & Azeiteiro's (2016) recommended future research suggestions regarding the identification of barriers to sustainability in higher educational institutions. Barriers to sustainability remain an issue in higher educational settings (Aleixo et al., 2016; Velazquez, Munguia, Platt, & Taddei, 2006) which may affect the efficacy of distance education in nurturing sustainability among learners. Several barriers which are believed to hinder sustainability in higher education comprise the ambiguity and complexity of the actual sustainability concept, lack of financial resources and funding and lack of commitment (Aleixo et al., 2016; Tavukcu, Arap, & Özcan, 2011; Thürer, Tomašević, Stevenson, Qu, & Huisingh, 2018). Nonetheless, studies have yet to investigate specific barriers to learner sustainability in distance education settings. Therefore, the objectives of the study are to: 1. investigate the effectiveness of distance education in nurturing sustainability among learners and 2. examine the barriers to sustainability in distance education as perceived by learners.

Literature Review

Sustainability in Distance Education

Sustainability is commonly used as a synonym for sustainable development; “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Historically, the concept of sustainability has been based on the triple-bottom-line model (Elkington, 1994) which focuses on three interconnected pillars; environment, economy and society (Giddings, Hopwood, & O’Brien, 2002; Lozano, 2008) Although distance education is deemed important in achieving SDG4, studies which investigated the significant essence of distance education in sustainability have been limited. Distance education can be associated with environmentally-friendly learning options due to less travel required to attend face-to-face lectures, the use of fewer resources through the minimisation of the duration of student time on campus and the utilisation of a paperless environment as a result of online and electronic-based lessons (Campbell & Campbell, 2011; Din, Haron, & Ahmad, 2013; May, Cox, Kroder, & Franklin, 2010; Md Harizan, Hilmi, & Atan, 2015; 2016; 2017). Other aspects pertaining to sustainability such as economic and societal factors have rarely been investigated. Without sufficient understanding as regards the concept of sustainability among learners, it will be much harder for institutions to successfully incorporate sustainable development goals into their distance education programmes. Furthermore, the significant growth of total student enrolments in distance education programmes in Malaysia (see Figure 1 below) offers a flourish platform from which the sustainability agenda can be cultivated particularly in the social science, business studies, law and education fields.

Figure 1. Distance Learning Enrolments by Fields in Malaysian Public Higher Education Institutions (2012-2013)



Source: Ministry of Education Malaysia (2014)

Effectiveness of distance education on sustainability

The effectiveness of distance education in nurturing sustainability can be assessed based on several aspects, including the distance learning experience. Studies have shown that students who have enrolled in distance education programmes, demonstrate a very high level of motivation and satisfaction (Martinho et al., 2010; Ana Pinto de Moura et al., 2010). Other aspects which may contribute to the effectiveness of sustainability in education are pedagogical challenges, teaching techniques and curriculum orientation (Figueiró & Raufflet, 2015). Students' motivation, satisfaction, and quality issues were also found to be linked with the effectiveness of distance education in delivering the sustainability message (Goulimaris, 2015; Harris & Martin, 2012; Markova et al., 2017).

In other study, Azeiteiro et al. (2015) explored six dimensions of student discourse in determining the effectiveness of e-learning which comprise general expectations, learning quality, teaching resources, pedagogical tools and evaluation and sustainability acquired competencies which comprise satisfaction, interactions and reasons for pursuit of distance learning. Thus, in order to gauge the extent of sustainability outcomes internalised by learners as a result of their enrolment in distance education programmes, it is imperative to investigate the effectiveness of distance education in nurturing awareness of sustainability among learners.

Barriers to sustainability in distance education

Most higher education institutions have yet to implement sustainability practices fully (Lozano et al., 2015; Velazquez et al., 2006; Velazquez, Munguia, & Sanchez, 2005). Velazquez et al. (2006) argued that the progress towards the goals established in Rio de Janeiro has been slower than it was hoped and that the implementation in higher education institutions has had its ups and downs. A review by Aleixo et al. (2016), identified several barriers to sustainability implementation in higher education that are also believed to hinder sustainability in distance education. These barriers include ambiguity and complexity of the actual sustainability concept, lack of financial resources or funding and lack of commitments for sustainability activities. Thus, it is important to investigate further barriers which may specifically present challenges for distance education settings.

Methodology

Semi-structured interview sessions were conducted with seventy-two final year students enrolled in a Bachelor's degree programme in business studies delivered via distance education mode in a public university. Based on a set of evidence-based dimensions (Aleixo et al., 2016; Azeiteiro et al., 2015), participants were asked about the concepts of sustainability, a sustainable university and sustainability in distance education. Their perceptions were also investigated with regard to general expectations, learning quality, satisfaction and reasons or motivation for pursuit of distance education programmes and the perceived barriers to sustainability in distance education.

General expectations commonly associated with the acquisition of knowledge, research skills, competences development, professional improvement and validation and also completion of the currently enrolled programmes and potential applicability of knowledge and skills acquired in current/future jobs were gauged. Learning quality was assessed through teaching materials and resources, learning activities, teaching strategies, skills acquired, collaborative work, instructors and e-learning portals (Azeiteiro et al., 2015). Data collected from the semi-structured interview sessions was transcribed and analysed using content analysis procedures. Initial codes were developed from previous literature and adapted while analysing the interview transcripts with necessary changes. The codes were organised into categories which were later formed into meaningful themes. The reliability of the procedure was guaranteed because a second researcher performed the interview coding independently before the data underwent an uninterrupted comparison method, and consensus was obtained.

Results and Findings

The majority of participants interviewed were between the ages of 30 and 39 years (56.3%), female (75.4%), married (58.8%) and earned between RM3,000.00 to RM3,999.99 monthly

(31.4%). The participants came from various states in Malaysia and were all enrolled in the same Bachelor's degree programme. The study results are presented as follows:

Effectiveness of distance education towards sustainability

The effectiveness of distance education in nurturing awareness regarding sustainability can be described in several dimensions: student discourse; sustainability acquired competencies; general expectations; learning quality; satisfaction with teaching resources; pedagogical tools and evaluation and reasons/motivations for pursuit of distance learning programmes.

Sustainability acquired competencies

In the context of sustainability acquired competencies from the distance education programme, the majority of participants reported either moderate or partial or zero understanding of the concept of sustainability. 12.5% of them could describe the sustainability concept satisfactorily while only 6.6% and 5.9% respectively could provide a good explanation regarding the concept of a sustainable university and sustainability in distance education respectively. This shows that the majority of participants are still unable to acquire sustainability competencies successfully in spite of the focus of the course contents and the prevalence of other electronic and online activities that they have experienced while undertaking distance education programmes. However, when participants were prompted with contributions of distance education to the environment, society and economy, most of them were able to provide significant and meaningful feedback.

For instance, learning through the distance education mode was found to assist in improving: environmental quality in general (30.4%), going paperless (26.8%), lowering the rates of emission (19.6%), reducing resource consumption (3.6%) and decreasing on campus waste (5.4%) because participants do not need to travel to physical lectures that much and neither do they need a great extent of on campus accommodation. As regards society, distance education is perceived to contribute towards knowledge enhancement (55.1%), character building (33.3%), creating a harmonious society among diverse ethnicities (8.7%) and building an innovative nation (2.8%). In the context of economics, distance education programmes are perceived to enhance economic development (61.0%), generate more knowledge workers according to national needs (35.6%) and enhancing organisational and business efficiency and competitiveness (3.4%).

General expectations

In terms of general expectations, the majority of participants (26.3%) expected sustained improvements in their enrolled programme which included interactions between the instructor and learners, course content, course structure, facilities and assessment. Expanding the

programme beyond current national borders and enhancing co-curricular activities were also suggested. Despite continuous programme improvement, participants also expected knowledge that they will gain at the end of the programme completion (16.8%), the continuity of the programme (16.8%), shorter time and successful completion (15.8%) and higher achievement which comprises better job promotion opportunities and enrichment (5.4%), personal life achievement (13.7%) and looking for postgraduate opportunities after the completion of the programme (5.3%).

Learning quality

Overall, it can be reported that participants were very positive about the learning quality in distance education as seen in the scores which range from 78.1% to 95%. The highest scores recorded for learning quality were in the areas of skills acquired and participants reported that they gained much experiences and knowledge, useful in their jobs and daily life, from distance education programmes. This is an addition to the ICT literacy skills they acquired because of the need to learn from live-streaming lectures, e-books and e-modules, online assignment submission and quiz participation and other Internet-based resources that are provided by the instructors. Further, having better time management, being more confident, showing greater competence in doing tasks and gaining more independence than ever before, were also reported as part of the skills acquired as a result of enrolling in distance education programmes. Nevertheless, a few participants expressed unfavourable opinions regarding course materials (23.1%) and collaborative work (20.3%).

Satisfaction towards teaching resources; pedagogical tools and evaluation

Overall, participants who were taking distance education programmes expressed positive satisfaction regarding those programmes. Positive scores were recorded for the satisfaction with learning materials or resources (75.8%), pedagogical tools (90.6%) and assessment (75%) in the enrolled distance education programme. Various reasons indicating satisfaction among participants were obtained: the availability of sufficient and helpful online supporting learning materials, comprehensive and up-to-date learning materials which can be accessed directly from the learning management system or portals without having to refer to it physically. This reduces the use of paper required in printing hardcopy versions of the materials and facilitates inclusion of teaching and learning videos and electronic lectures which are effective in delivering content. However, participants noted that the technical aspects of lessons delivered online need to be monitored constantly since transmission is susceptible to the quality of Internet infrastructure and this situation may have affected the audio and visual quality of materials causing a certain level of distraction while students were attempting online quizzes.

Reasons/motivation to pursue distance education programmes

The analysis shows that participants were driven to pursue distance learning programme by several factors: knowledge improvement and recognition (23.1%), job requirements (17.1%), self-development including achieving personal ambition and higher living status (27.3%), desire to experience campus life (15.4%), family and peer pressure (12%) and other external factors such as university reputation and its surroundings (5.1%).

Barriers to sustainability in distance education

The study found several barriers which may impact the effectiveness of distance education in nurturing sustainability among learners. The highest reported factor was the lack of time to manage studies well (25.7%), followed by work commitments (14.9%), family commitments (12.2%), a lack of knowledge regarding sustainability (10.8%), learners' adverse attitude to sustainability in distance education (10.8%), interaction between peers and instructors (6.8%), financial problems in sustaining studies (6.8%), programme structure (5.5%), the calibre of the instructors and the quality of learning materials (2.8%) and accessibility to the Internet (1.4%).

Discussion and Conclusion

Distance education has been found to be effective in nurturing awareness of sustainability despite barriers encountered by learners. Azeiteiro et al.,'s (2015) study focused on the environmental scenario and further expanded the measurement of sustainability acquired competencies by exploring the remaining scope of sustainability among learners: the social and economic spheres. From a technical viewpoint, the learners gave very unsatisfactory responses in expressing sustainability and its related concepts when they were asked about general understanding of sustainability and the way it can be understood within higher educational contexts. It is strongly suggested that future course content should emphasise concepts of sustainability by having more dedicated and focused sustainability courses in the programmes offered in contrast to current practices where sustainability is embedded into the syllabus in the face-to-face courses only.

The study findings suggest that learners expected sustainability to be achieved not only in their future personal lives and careers but also, as learner, in the institutions from which they will complete their degrees. As to their continued study in the currently enrolled programmes, the students expressed an expectation that there be growth in the current course content to accommodate more technology-based and sustainability-related studies, expansion of current programs beyond national borders and the offering of new postgraduate degree courses. The surveyed students also indicated the need for more flexible course structures with a shorter completion period, upgrading of current facilities during their short stays on campus and improved quality of interaction between instructors and learners.



The quality of learning process can be perceived as high by learners involved in this study as reflected by significant positive response regarding the structure and organisation of courses. The quality of teaching materials and resources such as videos and electronic lectures was also perceived as high due to responses to attributes such as ease of comprehension, sufficient in meeting student needs, ease in memorisation, updated contents and convenience in accessing the materials anytime and anywhere as well as broad applicability of knowledge gained in student daily lives. Further to the materials, the quality of online activities was also perceived to be very high. Respondents reported that participation in online activities assisted them to better understand lessons, provide instant feedback in assessing their competency levels and save time by making assignment submission convenient. The respondent perception was that there was better interaction between students and instructors due to flexibility and the provision of enhanced interaction in various study topics.

Distance education is perceived as positive in its capacity to nurture appropriate learning strategies among its learners. The current generation of learners are competent enough in ICT in order to pursue their studies via distance education successfully. Skills acquired were rated the highest in the learning quality dimension of distance education. Among the significant skills acquired by distance learners were ICT skills, research methodology skills and soft skills such as self-learning capability, time management skills and other general management skills. Although the majority of participants reported a high quality of collaborative work, mixed responses were received when they were asked more in-depth questions. The majority of students reported that they the collaborative work was a positive form of formal course assessment as well as encouraging cooperation, tolerance and good relationships between group members. Involvement in collaborative work also reduced the burden of assignments by allocating tasks to every member of the group to lighten the load across the group irrespective of profile, background and location of study. Nevertheless, a few participants reported that the 'free-riding' phenomenon was present and this caused uneasiness and irritation among group members who gave their full commitment to the assignments. Thus, a mechanism which curbs the 'free-riding' phenomenon may need to be strategized and this could include peer-review assessment as part of the overall evaluation for collaborative work.

The calibre of instructors was reported to be very high as they were perceived by respondents to be very helpful in assisting in the learning process and very knowledgeable about the topic of interests and had vast experience in their respective expertise area. Additionally, they were innovative, creative and dynamic and were able to explain complex topics in the easiest possible way to the learners. Learners commented that the quality of online learning through a portal or a learning management system used in the programmes was high. The utilisation of the learning management system was found to be appropriate and aligned with the needs of the prevailing generation. However, having an alternative channel for students to acquire the

above-mentioned benefits can be considered as a further issue for exploration as the access to the portal requires good Internet connection which has yet to be fully achieved in certain areas of Malaysia.

Learners reported a high to very high satisfaction level with regard to the distance education programmes they are pursuing. Pedagogical tools used in teaching gained the highest level of satisfaction followed by learning materials or resources and assessment. The use of leading-edge resources such as videos, online tutorials, electronic lectures, e-books, e-modules, online quizzes and comprehensive online lecture notes contributed to a high satisfaction level among learners. The utilisation of ICT-based pedagogical tools has highlighted the essence of distance education in meeting the needs of current and future generations.

Knowledge advancement and certification remain the most important motivating factors for learners in pursuing distance education programmes including gaining competencies related to sustainability. Further, distance education also acts as a stepping stone for learners in pursuing professional advancement in their jobs and future undertakings. The priority of motivation factors was consistent with previous studies (Azeiteiro et al., 2015; Goulimaris, 2015; Harris & Martin, 2012; Markova et al., 2017; Martinho, Nicolau, Caeiro, Amador, & Oliveira, 2010). The findings also provide additional factors which motivate learners to pursue distance education: the desire for a rich experience of campus life, pressures from family and peers and also the university sustainability reputation.

The factors reported to be amongst the major barriers which contribute to the effectiveness of distance education are: sustainability, poor balance between studies and work and family commitments, followed by the lack of knowledge and positive attitudes pertaining to sustainability and financial problems which hinder studies and sustainability activities. Financial constraints remain the major barrier to sustainability in higher educational institutions as well as time availability, commitment and a misguided concept of sustainability as found by Aleixo et al. (2016). Additional barriers encountered by the study include fewer satisfying interactions, programme structure and limited Internet coverage in certain areas which affect accessibility to online materials, resources and tools. Efforts such as the initiation of change management or institutional transformation by top management and its counterparts are required to overcome the identified barriers to enhance the effectiveness of distance education sustainability.

The study provides further understanding in the area of education for sustainable development by examining the effectiveness and barriers to sustainability in distance education. Sustainability can be nurtured effectively among learners if they are able to relate between sustainability concepts and practices when they are involved in various learning activities during their enrolment in distance education programmes provided that sustainability studies



are well integrated into the curriculum. The perceived barriers which hinder sustainability need to be tackled wisely by higher institutions in order to increase the effectiveness of distance education in instilling a deep seated desire for sustainability practice among learners.

In order for sustainability to be nurtured among learners in an effective manner, it must be holistically integrated into the curriculum as well as in the current learning process and activities within distance education programmes. Among the limitations of this study were budget and time constraints. Future research may embark on a quantitative study by developing instruments which measure the effectiveness of the programme in shaping attitudes towards sustainability. Future research should also engage views from programme administrators and other stakeholders in broadening the scope of study.

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