Understanding Utility Essentials of E-Learning Management Systems in Higher Education: A Multi-Generational Cohort Perspective

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ABSTRACT

This research aimed to explore the nuances of utility in components of E-Learning systems by using a multi-generational undergraduate business school cohort programme and an e-learning utility-satisfaction evaluation model. Our empirical research demonstrates differences between the three generations for the utility of all the variables of the E-Learning systems components, with varying differences in the relationships between Generation X, Y and Z. Furthermore, we show course development, learner support and user characteristics influence results demonstrability which has a high influence on overall satisfaction. We established nuances in the learning utility essentials in courses on E-Learning systems for multi-generational cohorts; revealed the utility of learner support as a key differentiator and developed a model on utility-satisfaction with reasonable explanatory and predictive power. The model possesses the dual advantages of fewer constituent items and the connective capability to link utility to satisfaction to enable E-Learning systems evaluation and ease for identifying areas for improvement in E-Learning course delivery.

KEYWORDS:

E-Learning system utility, multi-generational student experience, Undergraduate E-Learning, learning experience, Multi-Group Analysis

Introduction

The role of information technology in society has accentuated (Tsohou et al., 2020) to the extent that educational institutions are increasingly relying on information technology-supported systems for educational provisions. Higher Education Institutions globally have rapidly deployed E-Learning Management Systems for their students due to the global restrictions of movement precipitated by the COVID 19 pandemic. As part of emergency measures, the period between decision-making and deployment is rather short, thus warranting critical interrogation of the utility essentials by end-users of these systems to improve satisfaction and success (Al-Fraihat, Joy & Sinclair, 2020). Before this acceleration of E-Learning usage, there has been the emergence of multiple generations of students in the traditional undergraduate cohort degree-awarding programmes (Giunta, 2017) with known distinct identities (Sandeen, 2008; Howe & Strauss, 2003) and characteristics (Seters et al., 2012; Coomes & DeBard, 2004) that depicts their learning utility preferences (McCuskey, 2020; Williams, Matt & O'Reilly, 2014; Kolb & Kolb, 2005). Notably, these two phenomena have not been studied together in any academic research. In E-Learning System research, Eom and Ashill (2018) have argued that majority of studies have examined individual parts of key determinants of the e-learning systems success and have ignored the synergistic effects of the success variables interacting together. This work, therefore, studies an important imperative of how the current multi-generational students found in the degree awarding undergraduate cohort programmes in Higher Education Institutions (HEIs) utilise an E-Learning Management System to provide inputs into strategies of online course design, which will enhance student learning and experience.

The literature on E-Learning has a wide agreement that satisfaction is an attitude held by individual users (Thong & Yap, 1996), for which Remenyi and Money (1991, p.163) defined user satisfaction as a measure of the discrepancy between a user's expectations about a specific information system compared to the perceived performance of the system. The use of user-satisfaction is recognized by many IT researchers as an appropriate surrogate for IT effectiveness (Remenyi and Money 1991).

On the other hand, the literature of birth generations argues that birth generation is an important variable as a social construct that categorises people into birth cohorts (Howe & Strauss 1993) with differences in values, needs, preferences, and behaviours among generations (Reeves & Oh 2008; Howe & Strauss 1993; 2003; Strauss & Howe, 1991). This construct we argue is a more embracing one which encapsulates important attributes that socially affects people and may determine their learning utility preferences (McCuskey, 2020; Williams, Matt & O'Railly 2014). However, these differences have been researched by a few in higher education targeting traditional degree-awarding institutions addressing academic and student affairs issues (Giunta, 2017; Strauss & Howe 2007; Dziuban, Moskal & Hartman, 2005; Howe & Strauss, 2003) and continuing higher education (Sandeen 2008). However, none of the extensive body of literature on generations specifically addresses the emergence of the multi-generational cohort students currently found in the undergraduate degree-awarding institutions and their utility of the emerging E-Learning systems technology applied to education.

This research paper contributes to the current literature on characteristics of students' utility effects on e-learning in four ways: Firstly, the study proposes that student utility and satisfaction of E-Learning can be studied in an alternative smaller model enabling the examination of students' birth generations effects. Secondly, we found that differences in students' utility of elements of e-learning systems are influenced by birth generations which are marked by the social categorisations of Generations X, Y and Z. These categorisations in a multi-generational learning environment produce different inter-generational learning distinct characteristics. Thirdly, we show that undergraduate multi-generational cohorts utilise e-learning components in context for their overall satisfaction in an e-learning based curricula. Fourthly, we establish that contextualising different multi-generational learning cohorts is likely to improve student overall satisfaction in e-learning delivered courses in undergraduate programmes.

Other sections of the paper present; the existing literature; conceptual development and research questions. Then the methodology consisting of the design, method; procedure and the instrument used to gather evidence

are presented. Finally, the empirical results are shown and discussed; and the paper concludes by accentuating its contributions and implications, and noting the limitations of the research and future research.

E-Learning Evaluation Models

Al-Fraihat et al., (2020) argued that attempts to define the success of information systems have been myriad and, in some cases, imprecise due to the complexity and interdisciplinary nature of the discipline. Thus, the evaluation of E-Learning systems has been conceptualised with success models; examples being the DeLone and McLean studies (Lin, 2007; DeLone, & McLean, 1992), the technology acceptance model (TAM) studies (Venkatesh et al. (2012); Venkatesh & Davis 2000; Davis et al., 1989), user satisfaction models (Harter & Hert, 1997; Seddon, 1997; Thong & Yap, 1996; DeLone, & McLean, 1992) and quality models (MacDonald et al., 2001; MacDonald & Thompson, 2005). Some of these models have included use (Thong & Yap 1996; Remenyi, & Money 1991) and individual characteristics (Kerr et al., 2006)

Since we are interested in student utility of the components of the E-Learning to their study programme, we proceed to review the literature on user satisfaction and quality models. Literature shows there are two approaches to measure user satisfaction, one based on assessing the level of satisfaction of a specific instance of information systems, which can be at the individual level (Sun et al., 2008) or at the organisational level (Omar, Kalulu & Alijani, 2011; Landrum, Prybutok, & Zhang, 2010). Another approach is based on assessing the success of information systems based on satisfaction as a single comprehensive construct (Leclercq, 2007), or incorporated in the model as a construct together with other constructs (DeLone & McLean, 1992). Utility seen as usefulness is incorporated in the DeLone and McLean's model by Seddon (1997) and considered to be a general perceptual measure of benefits, operationalized as a determinant of user satisfaction. After reviewing several of e-learning quality models, Al-Fraihat et al., (2020) concluded that a considerable amount of research and effort has focused on the quality of e-learning. However, due to the complexity of e-learning systems, diversity of e-learning stakeholders, and the generality of the 'quality' concept, there is uncertainty and ambiguity among what constitutes a quality e-learning approach. Additionally, it becomes challenging to identify precise measurements suitable to evaluate e-learning systems based on quality approaches as the criteria vary from one organization to another. However, Hadullo, Oboko, & Omwenga, (2017) developed an e-learning quality evaluation model which they characterised as designed for higher education in developing countries. This model has been modified and applied in a higher education context in Hadullo, Oboko, and Omwenga (2018). This evaluation model is employed in the conceptualisation development of the study with the concept of user satisfaction to assess information systems success, conceptualised as, if an information system meets users' needs, then their satisfaction will increase and a lower satisfaction level about the information systems will hinder system usage.

Social Categories of Generations and Education

Historical-sociological categorisations are termed as generations and defined as a cohort of people born within a particular period with an interval of approximately 20 years (Sandeen 2008; Strauss & Howe, 1991, Franz & Scheunpflug, 2016). Literature in education acknowledges that students construct knowledge by making meaning of their experiences, and construct learning from their experiences which ensure differences in learning preferences and experiences within the generations (McCuskey, 2020; Williams et al. 2014; Kolb & Kolb, 2005; Cambiano et al., 2001), an area which is sparsely researched. Besides, the evaluation of e-learning by students in multi-generational cohorts in business management education has not received much attention. Also, these emerging multi-generational cohort learning environments present opportunities for the complex phenomenon of intergenerational learning (Franz & Scheunpflug, 2016; Corrigan, McNamara, & O'Hara, 2013) and the study of E-Learning utility preferences of the composite generations (Yawson & Yamoah, 2021).

In this study, we use the historical – sociological categorisation of Generation X (1965-1979), Generation Y (1980 – 1995), and Generation Z (1996-2003) (Giunta, 2017; Edelman/StrategyOne, 2010; Wendover, 2002). According to Sandeen (2008) Generation X (1965-1979) category were the first to grow up with computers, albeit engaging it out of school. They are also associated with the appreciation of feedback and generally want information about their progress. As adults, they constantly look for and appreciate opportunities for

professional development. A characteristic that sees them emerging in the undergraduate programmes of study (McCuskey, 2020) to meet a different learning environment, a more digitised learning environment requiring new learning skills impacting learning preferences (Selingo, 2018; Sims, 1995).

Generation Y (1980-1995) (Millennials) is a generation that grew up with computers and encountered its use in education. Where also they experienced the rapid adoption of technology (i.e. internet, cell phones, and other mobile devices) (Sandeen 2008; Monaco & Martin, 2007) and are highly digitally connected (Prensky,2001a; Frand, 2000). McCuskey (2020) characterised them as willing to share, social media pioneers and learn in groups. Education is treasured in this generation as concerned for quality education increased during this period with an intense focus on learning and achievements with an appreciation for continuous learning opportunities (Sandeen 2008; Strauss & Howe, 2007).

Generation Z (1996 -2003) are also labelled as "Digital natives" (Prensky, 2001a), besides literature is rife with other labels as "iGeneration", "Internet Generation", "Computer Generation", and "Net Natives", due to their dependency on computer technology, as they have no experience of the pre-Internet era (Giunta, 2017; Slavin, 2014; Koutropoulos, 2011). As "Digital natives", they are active in electronic communities participating and leading in these communities but have a short attention span (Prensky 2001a;2001b). Selingo (2018) suggest they are focused on value and seek a relevant education they can apply which has implications on higher education recruitment, pedagogy and lifestyle. They have a preference for self-directed learning and the integration of practical experiences within their study programme and are career-focused (McCuskey, 2020).

In education literature, the influence of these generational characteristics and learning preferences in undergraduate cohort programmes has been sparsely researched (Yawson & Yamoah, 2021). This study is therefore situated to examine the nuances of E-Learning utility in the emerging multi-generational cohorts found in the undergraduate degree-awarding programmes expected to undertake E-Learning in place of the traditional face-to-face mode of delivery.

Conceptual Development

In a review of literature in developing evaluation models of E-Learning Systems, Al-Fraihat et al., (2020) had argued that research in the area suffers from an excessive number of measurements among dependent and independent variables as the main challenge. Unfortunately, they went ahead to develop a comprehensive E-Learning evaluation model that has 58 items which fall into the same quagmire. Furthermore, the discourse in literature has not only been about whose model to use or which model is the best with the required theoretical foundations (Goodhue 1986). But the debate has been about the excessive number of measurements (Al-Fraihat, et al., 2020) among dependent and independent variables translating into lengthy questionnaires with its practical field collection problems, which has more important implications that far outweighs the current astronomical computing power available for analysis. Thus, we agree with Noel-Levitz (2004), who posited that the key to measuring satisfaction is in determining what is important to the learner. Al-Fraihat et al., (2020) recommended an extension of their model for the investigation into universities in developing countries. However, a prior study by Hadullo, Oboko, and Omwenga, (2017) had developed a model for evaluating e-learning systems quality in higher education in developing countries that takes into consideration the idiosyncrasies of developing countries. We, therefore, deem this model appropriate foundation for our research context.

The Hadullo, Oboko, and Omwenga (2017) model, is conceptualised as having six constructs of course development, learner support, assessment, user characteristics, institutional factors and overall performance. In this model Hadullo et al., (2017) posited that the overall performance measures of the E-Learning system quality are affected by course development, learner support, institutional factors and assessment constructs and overall performance. These are mediated by user characteristics.

Since this work is about utility, we propose a new framework based on the Hadullo et al., (2017) model. E-learning literature has established that there is a relationship between perceived usefulness as among the key

reasons acting on the disposition of university undergraduates to use e-learning (Raspopovic et al., 2014; Ngai et al., 2007). The updated Delone and McLean Model (Delone & McLean 2003) introduces the concepts of intention to use, use and user satisfaction into the evaluation of information systems. We posit that these constructs be measured not at the macro level but the micro-level of the individual components of the system. Besides, Venkatesh and Bala (2008, p.280) drawing from the work on the determinants of perceived usefulness, introduced the variable results demonstrability as having a relationship with perceived use in their TAM 3 (Technology Acceptance Model 3). Results demonstrability is defined as the degree to which an individual believes that the results of using a system are tangible, observable, and communicable (Venkatesh & Bala, 2008; p.277). We, therefore, postulate that the perceived usefulness of the components of the E-Learning System has a relationship with the results demonstrability leading to overall satisfaction. Thus, we argue that a discrete evaluation of usefulness to the user of the various component of the e-learning system will be more beneficial to lecturers and e-learning creators to enable them to modify elements of the e-learning system to contextualise user characteristics to enhance overall satisfaction. This is shown in our model in figure 1 below.

INSERT FIGURE 1

Based on the preceding arguments. we propose the following hypotheses:

H1: There is a positive relationship between perceived usefulness of course development factors to the usefulness of results demonstrability factors of an e-learning system.

H2: There is a positive relationship between perceived usefulness of Learner support factors to the usefulness of results demonstrability factors of an e-learning system.

H3: There is a positive relationship between perceived usefulness of assessment factors to the usefulness of results demonstrability factors of an e-learning system.

H4: There is a positive relationship between perceived usefulness of institutional factors available to the usefulness of results demonstrability factors of an e-learning system.

H5: There is a positive relationship between perceived usefulness of user characteristics factors to the usefulness of results demonstrability factors of an e-learning system.

H6: There is a positive relationship between perceived usefulness of results demonstrability factors to overall satisfaction in using an e-learning system.

For this study and from the literature reviewed, we posit that the birth generation of the user which is an important social categorical construct of the user (student), is an important determinant of how useful he/she evaluates the usefulness of the components of E-Learning and therefore making it an important consideration in determining the E-Learning results demonstrability and ensuring individual satisfaction. We, therefore, posit the following hypotheses:

H7: Statistically significant differences between the three generations exist in the utility of the variables of the E-Learning systems components.

H8: Statistically significant differences between the three generations exist in the relationships between the variables of the utility of the E-Learning system leading to differences in overall satisfaction.

Materials and Methods

Methodology

This research, therefore, employs the usage of the Moodle Learning System (Chaubey & Bhattachary, 2015) used to introduce a blended mandatory course in a leading business school's undergraduate study programme as the research context. Then, 700 students of multi-generational birth cohorts from the first two levels of a four-year bachelors' programme who took the course in the first semester of the 2019/2020 academic year were served. The characteristics of this student population were 300 from year one and 400 from year two as

registered students. Out of this, 624 students submitted their surveys of which 611 responses were usable, resulting in 89% response rate. Descriptive statistics of the samples are shown in Table 1. Ethical approval was sought per the Institute's ethical guidelines and respondents were informed of the possibility of their data being used for publication as the provided the information voluntarily. The student population were surveyed at the end of the semester using an electronically administered Satisfaction Survey. The survey form stated clearly on the front page that it was not part of the course assignment to minimize students' perception that they were obliged to complete the survey. Students' grades were also not part of this research. One Way ANOVAs was used to analyse if generational differences exist in the different constructs of the proposed model. Then a partial least square approach to structural equation modelling was used to test the model. Multi-Group partial least squares analysis was then conducted to analyse the differences in the scores of the variables in the model. All analysis was done using SPSS 23 and Smartpls 3 (Ringle et al., 2015) software.

INSERT TABLE 1

Measures

The research instrument was taken from a larger survey administered for evaluating the learning experience and learning management system. The portion of the survey instrument relevant for this study dealt with participant learning user experience which utilized a set of twenty-five items measuring the seven components in the model. The instrument measures the six components of the proposed model using items from the Hadullo et al., (2017) model. These are: 1) Course Development Factors 2) Learner Support Factors 3) Institutional Factors 4) Assessment Factors 5) User Characteristics Factors 6) Results Demonstrability Factors Participants were asked to rate the usefulness of these items on a seven-point scale of usefulness (Extremely Useful (7) to Totally Useless (1)). An additional item was used to measure overall satisfaction on a 7-point scale (Very Dissatisfied (1) to Very Satisfied (7)). The three generations were specified as Generation X (40 - 54 years), Generation Y (24 – 39 years), and Generation Z (16 - 23 years) (Giunta, 2017; Edelman/StrategyOne, 2010; Wendover, 2002). The instrument also included items on background information on the course of study, student status, student's work experience and students' programme time and gender since the literature indicated there were gender differences in generational characteristics (Cambiano et al., 2001).

Data Analysis and Results

One-way ANOVAs at 0.050 level of significance were used to determine statistically significant differences between the three generations in the utility of the variables of the E-Learning systems components. It was found to be statistically significant for differences in utility of Course Development Factors for generations ($F(2,608) = 3.204$, $p = 0.041$, $\eta^2 = .010$). A Tukey HSD test revealed statistically significantly differences for Generation X *($M = 5.95$, $SD = 0.673$)* compared to Generation Z ($M = 5.50$, $SD = 1.214$, $p = .037$) and Generation Y *($M = 5.54$, $SD = 1.149$, $p = .046$)*. However, there was statistically non-significant difference between Generation Z *($M = 5.50$, $SD = 1.214$)* and Generation Y *($M = 5.54$, $SD = 1.149$, $p = .937$)*.

The results reveal generations have statistically significant differences in utility of Learner Support Factors ($F(2,608) = 1.334$, $p = 0.264$, $\eta^2 = .004$), Assessment Factors ($F(2,608) = 1.654$, $p = 0.192$, $\eta^2 = .005$) and Institutional Factors ($F(2,608) = 3.467$, $p = 0.032$, $\eta^2 = .011$). A Tukey HSD test revealed that utility of these factors did not reach statistical significance. Furthermore, the analysis found statistically significant difference between generations for utility of User Characteristics ($F(2,608) = 3.508$, $p = 0.028$, $\eta^2 = .012$). A Tukey HSD test revealed statistically significantly difference of utility for Generation Z ($M = 5.63$, $SD = 1.211$) compared to Generation X ($M = 6.11$, $SD = .881$, $p = 0.028$). However, there was statistically non-significant difference between Generation Z *($M = 5.63$, $SD = 1.211$)* and Generation Y *($M = 5.80$, $SD = 1.169$, $p = 0.225$)*. Also, there were statistically non-significant difference between Generation Y ($M = 5.80$. $SD = 1.169$) and Generation X ($M = 6.11$, $SD = 0.881$, $p = 0.192$).

The results also revealed generations have statistically significant differences on utility of Results Demonstrability ($F(2,608) = 4.539$, $p = 0.011$, $\eta^2 = .015$). A Tukey HSD test revealed statistically significantly difference of utility of Results Demonstrability for Generation X ($M = 6.13$, $SD = 0.896$) compared to Generation Z ($M = 5.56$, $SD = 1.233$, $p = 0.008$) and Generation Y ($M = 5.70$, $SD = 1.180$, $p = 0.046$). However,

there was statistically non-significant difference between Generation Z *(M =5.56, SD =1.233)* and Generation Y *(M =5.70, SD = 1.180, p = 0.385)*. Furthermore, there was statistically significant difference between generations for utility of Overall Satisfaction (F (2,608) =8.703, p < 0.001, $\eta 2$ = .028). A Tukey HSD test revealed statistically significantly difference of utility of Results Demonstrability for Generation X (M = 6.19, SD = 0.734) compared to Generation Y (M = 5.64, SD = 1.213, p = 0.007) and Generation Z (M = 5.41, SD = 1.193, p < 0.001). However, the difference between Generation Z *(M =5.41, SD =1.193)* and Generation Y *(M =5.64, SD = 1.213, p = 0.076)* did not reach statistical significance.

From the One-Way ANOVA and Tukey HSD tests analysis, the results indicated statistically significant differences between the three generations for the utility of all the variables of the E-Learning systems components with varying differences in statistical significance in the relationships between Generation X, Y and Z. Therefore, hypothesis H7 (**H7:** Statistically significant differences between the three generations exist in the utility of the variables of the E-Learning systems components.) is accepted.

Results of the Structural Model

To test the hypotheses in the model, the sample was grouped by the generations and complete bootstrapping procedure with 500 bootstrap subsamples performed using SmartPLS 3 and followed all the relevant statistical protocols (see Hair, 2014). From the path estimates of the model in Table 2, we analyse the path relationships. From the results of the full sample (All) model estimates, the results suggest a positive influence of Course Development factors on Results Demonstrability factors (γ = 0.144, p = 0.004). Thus, in the E-Learning environment, the utility of Course Development Factors leads to positive Results Demonstrability for students. Hence, hypothesis **H1** is supported. This relationship is seen in Generation Y (γ = 0.144, p = 0.004) making them a distinct group in the cohort. Whereas, the relationship did not reach the level of significance in Generation X (γ = 0.122, p = 0.228) and Generation Z ((γ = 0.051, p = 0.260). Therefore, Generation Y is the most influenced group by the utility of Course Development Factors since they are highly digitally connected and but above all are highly concerned for quality education to be seen in achievements.

INSERT TABLE 2

Also, Learner Support Factors have a positive influence on Results Demonstrability (γ = 0.071, p = 0.046). Meaning in E-Learning environment utility of Learner Support Factors leads to positive Results Demonstrability for students. Hence, hypothesis **H2** is supported. This relationship is more prominent in Generation Z (γ = 0.136, p = 0.016) but failed to reach the level of significance in Generation X ((γ = -0.078, p = 0.186) and Generation Y (γ = 0.062, p = 0.141). Gen Z has a short attention span and focused on value for relevant education they can apply. Thus, their requirement for relevant learner support is very important and they make an instant judgement on learner support factors usually in technology application which leads to results demonstrability.

In addition, User Characteristics have a positive influence on Results Demonstrability (γ = 0.723, p < 0.001). Suggesting in an E-learning environment utility of User Characteristics leads to positive Results Demonstrability. Hence, hypothesis **H5** is supported. This is collaborated with the high effect in the form of the positive significant coefficients in Generation X (γ = 0.899, p < 0.001), Generation Z (γ = 0.748, p < 0.001) and Generation Y (γ = 0.678, p < 0.001).

Furthermore, Results Demonstrability have a positive influence on Overall Satisfaction (γ = 0.558, p < 0.001). Suggesting in an E-Learning environment utility of Results Demonstrability influence positive Overall Satisfaction of students. Hence, hypothesis **H6** is supported. This is also shown by positive significant coefficients in Generation Y (γ = 0.561, p < 0.001), Generation Z (γ = 0.544, p < 0.001) and Generation X (γ = 0.430, p = 0.001). However, relationships of Assessment Factors to Results Demonstrability (**H3**) and Institutional Factors to Results Demonstrability (**H4**) were found to be statistically non-significant. In assessing the predictive accuracy of the model, the R^2 values of 0.311 (Overall Satisfaction) and 0.863 (Results Demonstrability) signifies moderate to high levels of accuracy respectively (Hair et al., 2014). They also indicate that the utility of the E-Learning components examined in this study explained reasonable variance in results demonstrability and overall student satisfaction. Also, the cross-validated redundancy (Q^2) values of

the endogenous constructs shown in Table 3, are larger than zero and determines the predictive relevance of the inner model (Hair et al., 2014).

INSERT TABLE 3

Results of the Multi-Group Analysis

Multi-Group Analysis was employed to test hypothesis H8. The results are shown in Tables 4-5 in the appendix. Table 4 shows for the relationship Learn Support and Results Demonstrability (H2) there is a statistically significant difference in the path coefficients difference for Generation Z and Generation X (t-value = 1.608, p = 0.055) which was significant at 0.10 (confidence interval) (See Table 4 in Appendix). Therefore, in a multi-generational student cohort utility of Learner Support Factors for Generation Z and Generation X are significantly different. Hence, we partially accept hypothesis H8 (Statistically significant differences between the three generations exist in the relationships between the variables of the utility of the E-Learning system leading to differences in overall satisfaction). It is important to note differences between Generations X and Y, and Y and Z did not reach statistical significance as shown in Tables 5 and 6 in the appendix.

Discussion

The study reveals statistically significant differences between the three generations for the utility of all the variables of the E-Learning systems components with varying differences in statistical significance in the relationships between Generation X, Y and Z. Making it important to contextualise birth generations of students in E-Learning delivery and deployment programmes. On relationships, the study reveals Course Development, Learner Support and User Characteristics positively influence Results Demonstrability which also influence Overall Satisfaction of students in an E-Learning course for a multi-generational undergraduate programme. Course Development and Learner Support factors have a relative moderate effect on Results Demonstrability in an E-Learning course. However, User Characteristics measured as "Your belief in your ability to achieve goals (Self-efficacy)", "Your training on the internet," "Your personal motivation," "Incentives to take the sessions at your own time," and "Your experience with the course content" has a high positive influence on Results Demonstrability in the utility of E-Learning courses. Therefore, in designing E-Learning course engagement or deployment users will need to be given introductory workshops to improve their training and improve confidence and self-efficacy in the use of the learning management systems. These workshops should be categorised into generational cohorts and not by the traditional level of the programme since this obfuscates the underlying nuances. Likewise, Results Demonstrability has a moderately high influence on Overall Satisfaction. Therefore, in designing and delivering an E-Learning course, Course Development, learner Support and User Characteristics should be contextualised for undergraduate multi-generational cohorts. Large classes could be made into carefully selected tutorial groups contextualised base on generations. Besides, in a multi-generational cohort of undergraduate programme studies using E-Learning platforms, there is evidence of intergenerational learning giving a cohort unique characteristic from the generational characteristics. Therefore, the general performance or utility of the multi-generational cohort should not be seen as the general engagement of the cohort, since there are underlying nuances, which when considered will improve course engagement and utility, More importantly, there are generational differences in the utility of the components of the E-Learning platform utility especially for Learner Support and should be contextualised especially for Generation Z and X students.

Also, in a utility-satisfaction linked model for evaluating E-Learning environment, the model exhibits a moderate to high levels of accuracy with a reasonable explanatory and predictive power. Thus, contributing to the solution of modelling with fewer items in this area of research as stated by Al-Fraihat et al., (2020) and also taking into consideration the unique idiosyncrasies of developing countries as in emerging literature (Hadullo et al., 2018; Hadullo et al., 2017). This contribution also provides an alternative and contributes to Noel-Levitz (2004) recommendation, as he posited that the key to measuring satisfaction is in determining what is important to the learner.

Contributions to Practice

We highlight the study's four main contributions. Firstly, a model on utility- satisfaction have been developed and employed to successfully explain student utility essentials in an E-Learning course for an undergraduate business school programme. This provides an alternative model to evaluate student utility of E-Learning courses which has a fewer number of items and connects utility to student satisfaction to enable E-Learning system evaluation and ease for identifying areas for improvement in E-Learning course delivery.

Secondly, the study elucidates on the nuances of the learning utility essentials in E-Learning courses for the multi-generational cohorts found currently in Business School undergraduate programmes. This shows that all the students in the multi-generational cohort have user characteristics that situate them in their generational cohort but also engage in intergenerational learning which is generally perceived. Thus, different generations need contextualised E-Learning experiences to ensure positive results demonstrability and user satisfaction. Thirdly, learner support can be a key differentiator for student generations in achieving results demonstrability and ensuring student satisfaction of E-Learning courses. Fourthly, the deployment of the model takes into account and test the imperatives of developing countries who are currently been driven by the acceleration of adoption and deployment of E-Learning systems in higher education. This makes the model relevant to the current prevailing conditions of increasing and accelerated deployment of E-Learning management systems in undergraduate programmes.

Implications for Research

Firstly, the study proposed and tested a utility-satisfaction model for evaluating E-Learning systems in an undergraduate programme. Thus, extending the knowledge on E-Learning systems evaluations. Secondly, the study contributes by extending research on the emerging multi-generational cohorts currently found in the traditional degree-awarding programmes and the nuisances of the phenomenon of deployment of E-Learning systems in courses delivery. Thirdly, the study employs the new Multi-Group Partial Least Squares Analysis technique to compare differences in utility variable relationships which hitherto has been sparse on the literature of E-Learning systems evaluation.

Limitations and Boundary Conditions

This study is not without limitations. First, the validation of the results was from one unique tertiary institution that enables multi-generational cohort research to be undertaken, and this limits generalisability. Therefore, extending the sample to include higher education institutions with such profile may be important for future research. Second, the study is cross-sectional and a longitudinal study would be advisable to compare the different stages of the utility of e-learning throughout the undergraduate programme. Third, the period of the study was characterised by the accelerated drive to engage in E-Learning due to the global COVID 19 pandemic.

Conclusion

The main implications for this study are that in the current phenomenon of emerging multi-generational students in the degree awarding programmes, the generation of the student is an important nuance factor required for contextualisation to achieve student results demonstrability and overall satisfaction.

Declaration of Conflicting Interests

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TABLES

Table 1 Descriptive Statistics of Sample

Descriptive Statistics		Generations			Total
		Generation Z (IGeneration) (16-23 yrs)	Generation Y (Millennials) (24-39 yrs)	Generation X (40-54 yrs)	
Gender	Female	129 (35.1%)	214 (58.2%)	25 (6.8%)	368
	Male	72 (29.6%)	148 (60.9%)	23 (9.5%)	243
Total		201(32.9%)	362 (59.2%)	48 (7.9%)	611

Table 2 Path Estimates for the Model

PATH	GROUPS	Original Sample (γ)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)
Assessment Factors -> Results Demonstrability Factors *(H3)*	**All**	0.060(n.s)	0.060	0.041	1.461
	Generation X	-0.050(n.s)	-0.024	0.083	0.599
	Generation Y	0.087(n.s)	0.089	0.059	1.483
	Generation Z	0.090 (n.s)	0.090	0.064	1.413
Course Development factors -> Results Demonstrability Factors *(H1)*	**All**	0.144**	0.138	0.053	2.706
	Generation X	0.122(n.s)	0.185	0.164	0.745
	Generation Y	0.175**	0.173	0.065	2.679
	Generation Z	0.051(n.s)	0.055	0.079	0.643
Institutional Factors -> Results Demonstrability Factors *(H4)*	**All**	-0.013(n.s)	-0.012	0.027	0.478
	Generation X	0.070(n.s)	0.044	0.097	0.719
	Generation Y	-0.009(n.s)	-0.010	0.034	0.254
	Generation Z	-0.049(n.s)	-0.048	0.040	1.213
Learner Support Factors -> Results Demonstrability Factors *(H2)*	**All**	0.071*	0.071	0.042	1.684
	Generation X	-0.078(n.s)	-0.076	0.087	0.893
	Generation Y	0.062(n.s)	0.068	0.058	1.076
	Generation Z	0.136*	0.149	0.063	2.151
Results Demonstrability Factors -> Overall Satisfaction *(H6)*	**All**	0.558***	0.558	0.042	13.280
	Generation X	0.430***	0.443	0.136	3.166
	Generation Y	0.561***	0.565	0.056	10.001
	Generation Z	0.544***	0.548	0.064	8.556
User Characteristics Factors -> Results Demonstrability Factors *(H5)*	**All**	0.723***	0.728	0.044	16.469
	Generation X	0.899***	0.837	0.141	6.385
	Generation Y	0.678***	0.675	0.060	11.359
	Generation Z	0.748***	0.729	0.073	10.231

Note: Standardized path coefficient; *p < 0.05, **p < 0.01, ***p < 0.001, n.s – non significant

Table 3 Predictive Power Estimation of Model

		R^2 VALUES	Q^2 (=1-SSE/SSO)
Overall Satisfaction	**All**	0.311***	0.305
	Generation X	0.185(n.s)	0.141
	Generation Y	0.315***	0.312
	Generation Z	0.296***	0.288
Results Demonstrability Factors	**All**	0.863***	0.729
	Generation X	0.912***	0.686
	Generation Y	0.859***	0.712
	Generation Z	0.875***	0.749

Note: p-values; *p < 0.05, **p < 0.01, ***p < 0.001. n.s – non significant

FIGURE

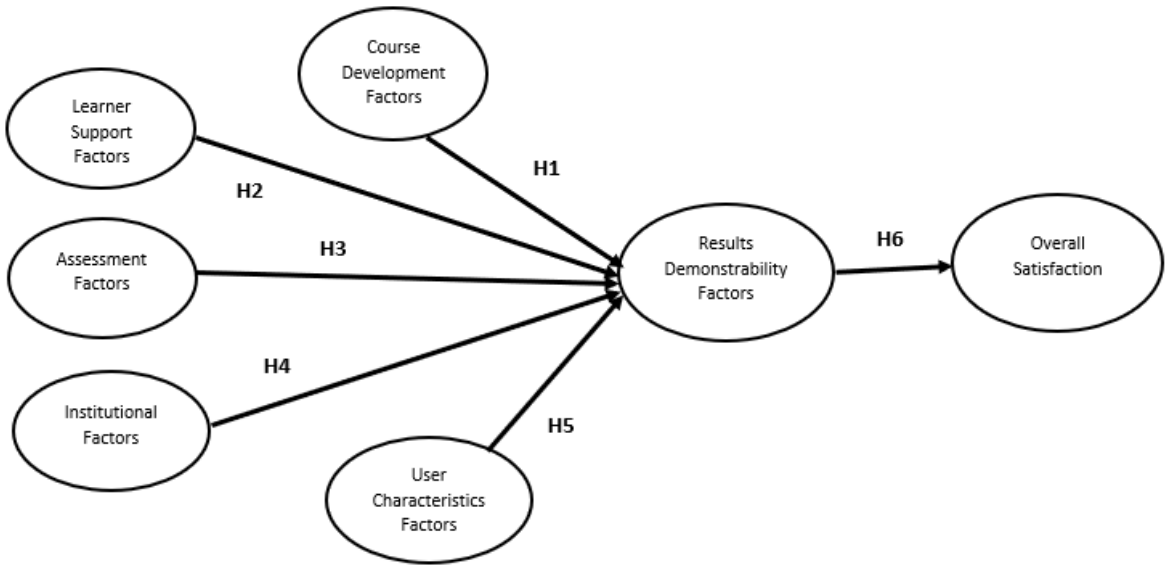

Figure 1 Proposed Research Model

1. Appendix

Table 4 PLS-MGA Path Coefficients for Generation Z and Generation X

PLS-MGA PATH COEFFICIENTS			Parametric Test	
PATH	**Path Coefficients-diff (Generations Z - Generations X)**	**p-Value new (Generations Z vs Generations X)**	**T-Value (Generations Z vs Generations X)**	**p-Value (Generations Z vs Generations X)**
Assessment Factors -> Results Demonstrability Factors (H3)	0.140	**0.085 (n.s)**	1.054	**0.146 (n.s)**
Course Development factors -> Results Demonstrability Factors (H1)	-0.071	**0.391 (n.s)**	0.387	**0.350 (n.s)**
Institutional Factors -> Results Demonstrability Factors (H4)	-0.119	**0.109 (n.s)**	1.285	**0.100 (n.s)**
Learner Support Factors -> Results Demonstrability Factors (H2)	0.213	**0.019 (*)**	1.608	**0.055 (n.s)**
Results Demonstrability Factors -> Overall Satisfaction (H6)	0.114	**0.236 (n.s)**	0.758	**0.225 (n.s)**
User Characteristics Factors -> Results Demonstrability Factors (H5)	-0.151	**0.206 (n.s)**	0.918	**0.180 (n.s)**

Note: p-values; *p < 0.05, **p < 0.01, ***p < 0.001, n.s – non significant

Table 5 PLS-MGA Path Coefficients Generation Y and Generation X

PLS-MGA PATH COEFFICIENTS			Parametric Test	
PATH	**Path Coefficients-diff (Generation Y - Generation X)**	**p-Value new (Generation Y vs Generation X)**	**T-Value (Generation Y vs Generation X)**	**p-Value (Generation Y vs Generation X)**
Assessment Factors -> Results Demonstrability Factors (H3)	0.137	**0.086 (n.s)**	0.844	**0.200 (n.s)**
Course Development factors -> Results Demonstrability Factors (H1)	0.053	**0.348 (n.s)**	0.263	**0.396 (n.s)**
Institutional Factors -> Results Demonstrability Factors (H4)	-0.079	**0.197 (n.s)**	0.789	**0.215 (n.s)**
Learner Support Factors -> Results Demonstrability Factors (H2)	0.140	**0.083 (n.s)**	0.856	**0.196 (n.s)**
Results Demonstrability Factors -> Overall Satisfaction (H6)	0.131	**0.204 (n.s)**	0.823	**0.205 (n.s)**
User Characteristics Factors -> Results Demonstrability Factors (H5)	-0.222	**0.112 (n.s)**	1.287	**0.099 (n.s)**

Note: p-values; *p < 0.05, **p < 0.01, ***p < 0.001, n.s – non significant

Table 6 PLS-MGA Path Coefficients for Generation Z and Generation Y

PLS-MGA PATH COEFFICIENTS			Parametric Test	
PATH	**Path Coefficients-diff (Generations Z - Generations Y)**	**p-Value new (Generations Z vs Generations Y)**	**T-Value (Generations Z vs Generations Y)**	**p-Value (Generations Z vs Generations Y)**
Assessment Factors -> Results Demonstrability Factors (H3)	0.003	**0.489 (n.s)**	0.037	**0.485 (n.s)**
Course Development factors -> Results Demonstrability Factors (H1)	-0.125	**0.124 (n.s)**	1.109	**0.134 (n.s)**
Institutional Factors -> Results Demonstrability Factors (H4)	-0.040	**0.218 (n.s)**	0.743	**0.229 (n.s)**
Learner Support Factors -> Results Demonstrability Factors (H2)	0.073	**0.191 (n.s)**	0.818	**0.207 (n.s)**
Results Demonstrability Factors -> Overall Satisfaction (H6)	-0.017	**0.424 (n.s)**	0.187	**0.426 (n.s)**
User Characteristics Factors -> Results Demonstrability Factors (H5)	0.070	**0.228 (n.s)**	0.722	**0.235 (n.s)**

Note: p-values; *p < 0.05, **p < 0.01, ***p < 0.001, n.s – non significant