The Role of Technology Innovation in Shaping Student Learning Experience in Higher Education

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Abstract

The role of technology innovation as the driving force in today's learning environment cannot be under-emphasized. It is now changing the way in which learning and teaching occur in higher education. Over the years, preparing students for the world of work from higher education has been a difficult task. With the majority of students venturing into the world of work without work experience to help them understand and develop the skills to succeed in business is perturbing. Hence, for academic institutions charged with the responsibility to equip and develop students in the knowledge economy, technological innovations holds the key to several possibilities such as distance learning and sophisticated learning management tools and systems. Amongst the sophisticated learning management systems and tools is the use of business simulation which assists students to grasp, understand and apply theories in the real business world. Furthermore, these tools help them to develop the soft skills that are difficult to nurture during lectures. This paper, therefore, examines the role of technology in shaping the development of business and practical skills of the student's transition from the university into the world of work. This study adopted a mixed method approach. Primary data were collected from MBA and MSc students who participated in the use of the business simulation tool on their perception over ten semesters. This was aimed at explaining the development of business skills using the business simulation technology. The preliminary results show a positive relationship between business simulation game participation and improvement of both hard and soft business skills of students such as; high quality learning, development of critical thinking, decision making, teamwork and analytical skills.

Keywords: Student Learning Experience, educational software, business simulation, hard and soft business skills

Introduction

This paper aims to explore the role of technology innovation in shaping the student learning experience in Higher Education. Technology offers universities a varied array of possibilities for learning and presently, changing the way in which universities teach and how students learn through distance and sophisticated integrated learning systems. The student learning experiences involve the encounters of a student in higher education from pre entry to graduation (HEA, n.d.). The learning spans both formal and informal domains of learning: one on one support, workshops, development opportunities, student interactions such as events, networking, forums and discussion, development projects and using teaching and learning technologies to enhance the interactivity in the lectures, seminars and workshops and at the individual level, enhance assessment (HEA, n.d.). Research shows that technology will continue to have significant impact on higher education with 63% of a survey of both private and public institutions acknowledging that technological innovation will have major influences on teaching methodology over the next five years and will serve as a differentiating factor for attracting and maintaining students and corporate partners (The Economist intelligence unit, 2008).

The business education, especially the postgraduate business education globally is defined by well-equipped students who are well informed both theoretically and practically to fit into the global business environment and also lifelong careers; hence the varied business programmes tailored to fit into this dynamic environment and contemporary business practice. As such, business education, especially at the postgraduate level needs to develop sustainable educational teaching content that will impact and change the business demographics and culture in the ways skills are developed and applied (Clarke, 2009). Extant literature posits the new approach of designing courses and learning outcomes that emphasizes the development of essential leadership skills for the future, such as, problem solving skills, managing flexible environments, utilizing technology effectively with the capacity for innovation in new market and technological contexts and critical analysis (Clarke, 2009).

Technology has an impact on all facets of higher education with the most impact on the teaching and learning process and experience (Beer et al, 2010). Technology plays numerous roles in the teaching and learning experience as compared to the traditional lecture and tutorials or discussions which are less engaging and passive, the computer assisted educational instructional processes are more engaging and efficient. Students can present their work online and engage in discussions both online and at seminars, access course materials at their convenience and as many times as required. These are very beneficial in terms of time, cost (Farrington, 1999) active engagement in the learning process helps to motivate students and enhance their learning outcomes. Innovative technologies, therefore, can facilitate active engagement in learning by reducing the amount of class time where students sit passively listening to lectures (Zerihun, et al. 2012). It assists with a collaborative and interactive approach to learning through facilitating communication and team work approach. From the literature, it can foster collaborative learning approaches such as brainstorming, design teams, peer writing groups, which aids understanding and problem solving leading to the development generic business skills. Not only does technology engage student collaboratively, but it also helps to personalise and shape the individual student learning experience. Academics are able to devote time and interact with student at the individual level and adapt teaching topics to technology based assignment and discussions to can incorporate all the four different learning approaches: theoretical, practical, pragmatic and reflective to assist individual students adopt to their learning style (Matthews, 1998; Raines, 2003; Silvia, 2014).

Educational innovative technologies are now acknowledged as empowering students to take control of their learning and improving the learning experience. Although, the educational innovative technologies are beneficial, the research into the student's perception of how the technology impacts on their learning engagement and experience is still in the infancy stage in higher education. In recent times as technology is transforming the landscape of the educational marketplace, so is power shifting from the higher education providers to the consumers. As such, higher education consumers will now select the learning opportunities that meet their educational, personal, professional and career goals (Roth, 2016).

Research Aim and Objectives

The main research question of this study is: what is the role of technology innovation in enhancing the student learning experience? This research therefore aims to investigate the impact of business simulation workshops on student learning experience. The following objectives below were delineated to assist with answering the research question and aim of the study.

1. To explore the literature on student engagement, and strategies to develop a framework for the study
2. Collect and analyse interview data on the student learning experience of MBA managing strategy students and MSc using business simulation technology in strategy seminars.

Statement of the Problem

The requirements of essential business and leadership skills in the contemporary business environment pose a challenge to educational practitioners on how to meet these. Also, in today's dynamic technology enabled knowledge economy, universities face their biggest challenge of how to integrate theoretical academic content to equip students with practical skills and knowledge required to function effectively in this environment. Research has shown that universities brands may slip (Hanna, 2000). Not only are these requirements necessary, but also, demographics of generations Y, millennials *(*individuals born between 1982 and 2001) who are open to collaboration, have the facility for multi-tasking, and are at ease with new technologies plays a role in the need for integrating technology into the student learning experience. This is due to the fact that though the Millennials are at ease with technology, they lack the experience in independent decision making and critical analysis than previous generations and assist the development of these soft skills, educational content should be integrated with technology in a collaborative way to impart these experiences. Within this generation are the majority of university students learn when they are more engaged with programmes and content that linked with technology and more practical. The Brown report in 2010 in the UK also, stipulated the importance of improving the whole student learning experience.

From extant literature, business simulation games have been very effective in the integrative learning experience of students who seek to understand management concepts, techniques and practices. Many universities employ the integrated business simulations to develop the soft and hard skills to enhance their student's business acumen, financial literacy and develop competencies (Clarke, 2009: Raines, 2003; Silvia, 2014), hence, the motivation to study how technology simulation helps to improve MBA managing strategy students learning experience.

From the above, therefore, this study is very timely and significant since it is investigating the impact of technology based simulation assessed workshop's impact on student learning experience in higher education. It will assist students to improve upon their skills learning in the application of theory into practice and improve upon the student centred and active learning approaches in teaching.

Literature Review

The development and introduction of simulation educational technologies for teaching is a teaching tool that helps the student to contextualise and apply theories and case studies knowledge learned to resolve simulated real life business cases through practical application and decision-making and problem-solving. The simulation game assists the students to deepen their understanding and exploration of concepts and to directly see the impact of their decisions and the consequences of these decisions on performance. The model gives the students the flexibility of applying different ideas and the game can be repeated and restarted when required (Gilgeous and D'Cruz, 1996).

The learning process and experience using business game simulation occur on many levels. First, learning occurs at the contextual level where students learn contextual information in the game and application of theory; learn the process of playing the game, risk analysis and taking risk, decision making and problem solving, benefits, costs, outcomes and reward resulting from the decision making process (Doyle and Brown, 2000; Clarke, 2009), It also gives the opportunity for experimentation during the learning process and students experiment their ideas and decisions and learn from the outcome to improve future decision making. Extant literature posits that the efficiency of the business simulation depends on the integration of lectures, case studies with the simulation to provide opportunities to develop and enhance the skill development and competencies of students with more robust and relevant experiences (Cadotte, 1995).

Technological innovation and the student learning experience Literature

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The Role of Educational Software and its effect on the student learning Experience

The literature shows that new technology plays a significant role in the shaping the higher education learning experience. Learning using the business simulation education could lead to experiential, active and reflective learning. This learning occurs when students actively engage with the business simulation where they take decisions and bear the consequences of their action and using team approach means shared experiences amongst the students (Raines, 2003; Silvia, 2014). In this instance, learning occurs through the dialogue and interaction amongst the team of students who share their observations, feelings and thoughts for team solutions to business operations of learnt behaviours (Kolb et al., 1984). Students engage in thinking process during the interactions and decision making to develop high order level thinking skills. Reflective learning occurs when the student participants reflect on their decisions and performance and make changes to improve on them.

The literature review shows a clear pattern of strategies for student learning experience ranging from interaction, exploration, technology, instruction and authentic assessment that encourage student engagement (Taylor and Parsons, 2011; Willims et al., 2009; Claxton, 2007; Barnes et al, 2007). These strategies are mostly based on active learning approach that goes beyond just a teacher centred approach of impacting knowledge to students but, rather a student centred approach where students take responsibility for learning to occur (Gove, 2012). Within these settings, learning is achieved through activities in which the learner takes responsibility for their learning through finding solutions to problems and projects either as individuals or in a group. This approach is particularly important in the managing strategy module where students learn theories, and knowledge is readily applied to current issues. The facilitation of engagement has been noted as a desirable activity which leads to achievement and performance.

This research focuses on technology and assessment as a strategy to improve engagement of managing strategy MBA and MSc students of a University in the Northern Region in the UK. Simulations are classified as synthetic learning environments which correspond directly to the context or topic that one wishes to learn about (Gove, 2012). The main aim of using business simulation games are for application but, it also embodies an enjoyment aspect which captures student's attention and creates a competitive environment within which they operate. The literature (Gove, 2012) clearly indicates that the use of

business simulation to enhance learning has increased in recent times with the majority of universities and business schools adopting the technology. About 50% active users of the simulation software are within strategic management faculties using whole –enterprise simulations which focus at the strategic level of businesses with the integration of operations giving the students the opportunity to engage in a high level business activity. The use of whole– enterprise simulations is effective and valid pedagogical techniques which result in high-level engagement on the part of students and; hence, a positive learning experience (Gove, 2012:102). This is beneficial as students learn about the entire business operations rather than just an aspect which fosters learning during this activity.

The role of Business Simulation Educational Software Technology in shaping the student learning experience

There are varied roles of the business simulation noted in literature such as it provides an interesting and enjoyable learning activity for all stakeholders within a particular institution (Kuh et al. 2008); improves retention (Tinto, 2006) and high quality learning and opportunity for the application of knowledge, critical thinking and capabilities leading to the development of skills required in the business world (Krauses and Coate, 2008; Pike and Kuh, 2005). The impact on the student learning experience is also documented in the literature; it embodies group dynamics and diversity that facilitates learning (Beer et al, 2010). Whole-enterprise simulations such as the Pro-sim advanced simulation used by the managing strategy students involves student taking up the role of management, analysis the business environment, development and implementation of overall competitive and growth strategies for their virtual companies. Due to the integration and interrelationship of analysis and decision making students spend a lot of time and energy both in the workshop and independently to prepare for their business simulation. This leads to high-level activity and participation in learning (Gove, 2012). It also aids with engagement in terms of interest and motivation to achieve due to the competitive nature of the simulation tasks. The interests to engage is heightened since students engage in similar tasks to their world of work to develop some level of technical, business, social and interpersonal skills. Research also shows that students are likely to engage more in learning if it is related to their career aspiration (Allen, 2010).

Though there is a linkage of student experience in the literature it is often very difficult to determine the level of impact on the student learning experience (Kuh et al.2008). One key aspect of using active learning tools like the simulation to improve engagement is the level of students participation. Using the business simulation assist with every student performing a particular task and engaged in the discussion and decision-making process. Although this helps, there is a problem of the level of engagement.

Methodology

This study adopted the interpretive philosophy and the phenomenological paradigm. This study adopted an exploratory qualitative study to gain insight and understanding into the role of technology in shaping the student learning experience in higher education since, the practical knowledge sought in this study is embedded in the context of the student's interactions and meanings during participation in the business simulation game (Bryman, 2012; Crotty, 1998). Thus, the qualitative phenomenological strategy assisted the researcher to generate new understanding of the student learning experience in their unique ways. This was dependent on their experiences and frames of reference of the world they tried to interpret (Crotty, 1998; Silverman, 2013). Further, using the semi-structured interview approach, data were collected from 123 students (strategy students) at a University in the Northern region. The findings of the research will be value-bound and significant to the stakeholders of higher education environment due to the socially constructed process of interaction, co-generation, and interpretation.

A purposive sampling was adopted to collect data engage 123 strategy students were selected for the study. The criterion for inclusion in the data set is international MBA and MSc students studying managing strategy and strategic management module from May 2011 to December 2016, there are no other inclusion or exclusion criteria for the study. The student cohorts were used because it gives a trend of participation over a period of the semester. This gives evidence of engagement and learning experience, and a richer data to draw inferences of students' overtime (Yin, 2009). Data was collected using both face to face and online contact.

The data were transcribed and refined for the thematic analysis. First, the data were read thoroughly a line by line coding based on the initial themes identified from the literature review and 'invivo' codes derived directly from the data (Braun and Clarke, 2006). The themes developed from the line by line coding were matched with all data extracts from the interview scripts that explain the themes coded and collated within each code through tagging and naming the selections of text within each data item. The data were then coded to develop a relationship between the themes to sort out the different themes into main overarching and sub-themes to explain the relationship between the themes (Braun and Clarke, 2006). The themes were then reviewed through visiting the data many times to verify and confirm the themes identified (Miles and Huberman, 1994) to ensure that they work in relation to the data set and also all themes are coded. The themes were then refined, defined and organised into a set of categories to explain the relationship between innovative technology and how it shapes the student learning experience in higher education.

This study was carried out in accordance with the ethical procedures of the Liverpool John Moore University guidelines that apply to this study. Documentation for ethical approval was appropriately submitted to the ethics committee to be approved to ensure that this study will not have any adverse risk or hazard to anyone. This research study does not involve primary participants and hence will not harm any participant in any way. The findings from this research will be published, however, for confidentiality reasons, no results will be linked to any individual student within the cohorts used. The data being used is already confidential and stored safely and only available to those who work directly or indirectly with the module.

Findings and Discussion

Three main themes emerged from the qualitative data on the role of technology in shaping the student learning experience in higher education which are; (a) Effective tool for theoretical, active, experiential and reflective learning (b) motivation and engagement to learn (c) the development of hard and soft business skills (d) Improvement in the overall student learning experience and performance.

Effective tool for theoretical, active, experiential and reflective learning

The analysis from the interviews revealed a unanimous agreement by the students using innovative technology educational software such as the business simulation played a significant role in their student learning experience. The findings show that there were many benefits that the student derived from their formal learning. It impacted on all the four different learning styles of students in the learning process which made their learning more interesting using a combination of theory, practice experiment and reflection. Theoretically, to select and make decisions for their simulated businesses, the students had to first learn the theories through studying their lecture notes, which was not enough to be highly competitive so, they had to engage in further reading and research to understand theories before they can be applied. With all these reading and research, during the simulated workshops, they refer to both academic and industry resources to select the appropriate strategies and decisions for their businesses. Further, it aids active learning as students work under simulated business environment to apply the

different processes of strategy development and implementation, the understandings of the different types of strategies and the functional decisions that apply to each which gives them an opportunity for practical application of theory into practice which leads to the development of critical thinking, capabilities and career skills. Furthermore, it provided an opportunity for experiential learning due to the ability to experiment with different strategies and the ability to learn from past mistakes and feedback and improve upon them without irreversible consequences to the business. Finally, the students also identified the reflective learning as a good opportunity to learn through using formative feedback from the practical workshops to improve on past performance week on week and the overall reflective summative assessment on the whole strategic management plan and implementation to identify successes and failures and to recommend appropriate sustainable strategies for the future a key part of the formal learning experience. Below are some excerpts from the interview:

It offers a realistic business environment and allows you to test your business acumen highly

It allows for engaging and practical approach to learning. Practical learning is my favourite form of learning and helps to understand things and learn.

It creates and build teamwork, self-development, hunger for success

Motivation and engagement to learn

The students explained that in relation to the traditional approach to the learning the innovative technology educational software motivates them to learn. Several examples were cited to the support this view. The different learning styles embedded in the business simulations enables the different learners to improve on their learning styles. Secondly, it is rewarding based on the competitive environment created and the summative assessment embedded which motivates students to invest time and energy to learn in order to achieve competitive advantage and higher marks. The whole-enterprise simulations such as the Pro-sim advanced simulation engenders skill development as it involves students taking the up role of management, analysis of the business environment, development and implementation of overall competitive and growth strategies for their virtual companies competing with their colleagues. The integration and interrelationship of analysis and decision making provides the opportunity for the students to spend a lot of time and energy both the in workshop and independently to prepare for their business simulation. This leads to high level activity, learning and participation. It also aids with engagement in terms of interest and motivation to achieve due to the competitive nature of the simulation tasks. The interests to engage is heightened since students engage in similar tasks in their world of work to develop some level of technical, business, social and interpersonal skills. It creates a teamwork approach and each person contributed towards the team's performance. Finally, retention of students is encouraged due to the linkage between attendance and participation to achieve summative marks. Here are a few excerpts on this role:

Yes, trying to achieve the best score with my group and competing was a real joy

The process provides a sense of achievement

What is the point of engaging time and effort if it was not assessed?

The pressure to get higher marks kept the team going

It created an atmosphere of competition and also made us work harder.

It enabled us to work as a team and also do extra study so as to do my bit for the team.

Assessment of the group's performance, and the opportunity to improve upon performance each week keep us going.

Improvement in overall student learning experience, engagement and performance

The analysis of data showed that the overall learning experience with regards to learning with technology is improved because it stimulates their interest to learn to achieve and working with others instead of to learning alone. The analysis showed that majority of the students were engaged in the participation and students centred learning which impacts on their performance. The students worked hard investing time, energy and participation in their learning, working as a team, attending group meetings and contributing equally to ensure the success of their team which led to week on week opportunity and determination to improve upon previous performance. A key area for further motivation to engage was the competitive reward and the incorporated summative assessment. The findings further highlight that the reward part of the business simulation game also led to the motivation to participate and hence the retention of students during the simulation workshop sessions since the award of individual marks is linked to the participation. Below are some excerpts from the interview data that support this impact:

It enabled us to work as a team and also do extra study so as to do my bit for the team.

We wanted to be a leader in the market and were successful for a few weeks

It allows us to do more research on industry and the factors affecting the business environment.

It created an environment to interact with my team and competitors and I learnt a bit from everyone and collectively it provided me with positive changes to learning.

To a greater extent, because it took us to group meetings to review decisions we have made.

To a greater extent because it provides a clear aim and direction because students feel like they are involved in an interesting project.

The development of hard and soft business skills

From the analysis, the business simulation assists the students to develop both academic and employability skills. With students engaging in the simulation, they are empowered to learn and to act in a rational manner as managers and leaders. The analysis shows that it enables them to develop hard business skills such as critical thinking and problem-solving skills due to the structured risk-free environment to resolve business issues and problems in a logical approach. The business simulation game assisted the students with the understanding and skill development in strategic issues, planning and implementation for sustainable business operations. This was emphasised with a reflective assessment of the planning and implementation process. It also led to the understanding and development of skills in the functional areas of business through the application of previously acquired skills in functional strategies such as marketing, finance, human resources and operations in challenging and motivating way. This led to the acquisition of strategic business competences. Not only did the students develop hard business skills but also, the soft business skill such as team work, capacity building and social skills. The following excerpt from the students underpins this role:

It made us work harder to develop business skills.

It allows us to do more research on industry and the factors affecting the business environment.

It created an environment to interact with my team and competitors and I learnt a bit from everyone and collectively it provided me with positive changes to learning.

To a greater extent, because it took us to group meetings to review decisions we have made.

To a greater extent because it provides a clear aim and direction because students feel like they are involved in an interesting project.

It shows real life business situations and the need to develop the skills to manage such problems

Despite the numerous benefits of the business simulation game software, a few of the students stated that they preferred the traditional lecture approach to using the simulation due to the level of preparation, engagement and participation required to achieve good results. Furthermore, limited information in the system, and sometimes decisions were taken are not saved appropriately were also cited but, the benefits of the student learning experience outweighed the limitations identified.

Conclusion and Recommendations

The findings from the interview data revealed several roles played by innovative educational technology software in the formal learning experience of students in higher education. It illustrated a positive relationship between participating in the simulation and the development of theoretical, active, experiential and reflective learning (Clarke, 2009). In addition to the difference enhancing the different student learning styles, it also provided fun, enjoyable and interesting learning approach for diverse students in a dynamic group environment (Kuh et al. 2008). Furthermore, the findings showed that it provided an opportunity for practical learning with the students engaging in practical analytical and decision making to improve their capabilities to assist them to develop the essential skills required in the business world (Krause and Coates, 2008; Pike and Kuh, 2005). Further, the findings show that it motivates to engage which improves the overall learning experience. This is evidenced through the integration and interrelationship of analysis and decision making where students spend a lot of time and energy both in the workshop and independently to prepare for their business simulation which leads to high-level learning and participation (Gove, 2012).

Further, the findings from the perception of the students showed a positive impact on student motivation to learn, participation, retention and engagement which confirms extant literature on student learning experience (Beer et al, 2010; Krauses and Coate, 2008; Pike and Kuh, 2005; Tinto, 2006). It also aids with engagement in terms of interest and motivation to achieve due to the competitive nature of the simulation tasks and its relation to some of their career aspirations (Allen, 2010).

Overall, the findings from the interviews confirms prior findings in the literature in relation to participation, retention, high quality learning, development of critical thinking, application of theory, decision making, teamwork and analytical skills, the development of deeper approaches to learning including a sense of ownership and high performance (Pike and Kuh, 2005; Zimitat and Horstmanshof, 2007; Hand and Bryson, 2008; Krause and Coates, 2008; McCulloach, 2009). However, the present study extends this literature through the identification of the reward aspect which further motivates students to engage in their formal learning experience through the use of both formative and summative assessments. The marks awarded for both the practical and the reflective report served as a motivating factor for students to participate and learn to achieve high performance.

Suggestions for future Research

There were a number of limitations which provided new avenues for further research. The data collected for this study focused on one university and the strategic management; hence, further should conduct comparative studies using different universities context and subjects using. In addition, such studies must also use the findings to conduct a quantitative study on a large scale to aid generalisation of the findings. The study focused on the formal domain of innovative educational technologies for shaping the student learning experience; however, this spans both the formal and informal domains in higher education. Further studies, therefore, must extend research into the informal domain, examining the role that innovative technologies play in informal events, networking, forums and discussion, development projects in shaping the student learning experience.

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