The Future of Accessibility in International Higher Education

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Chapter 14

Knowledge Transfer Openness Matrix Facilitating Accessibility in UK Management Education Teaching

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ABSTRACT

This is an empirical investigation considering how the Knowledge Transfer Openness Matrix (KTOM) could facilitate accessibility and Knowledge Transfer (KT) for the UK Higher Education (HE) Management Education Teaching when utilising learning technologies. Its focus is where learning technologies applications currently assist the KT process and support accessibility for the HE teacher and learner. It considers the philosophy of openness, focusing on its usefulness to support accessibility within UK HE Management Education Teaching. It discusses how the openness philosophy may assist the KT process for the HE teacher and learners using learning technologies. In particular, the potential to support accessibility within HE Management Education Teaching environments is appraised. There appear several implications for both teachers and learners. These are characterized in the proposed KTOM. The matrix organises KT events based on the principles of the openness philosophy. The role of learning technologies in events is illustrated with regard to teaching and learning accessibility.

INTRODUCTION

If we try and forget the last eight hundred years or so of university tradition of transferring knowledge between teacher and learner, and imagine starting anew with the problem of how best to enable a large percentage of the population to understand and access discussions on difficult and complex ideas. Do you think putting two or three hundred people into a large room for a couple of hours would immediately spring to mind as the obvious solution? (adapted from Laurillard, 2005)

Technological advances over the past century have greatly enhanced our reach beyond our immediate human senses. We are on a technological curve the progression of which signals the increasing availability of systems that store and aid manipulation of data for human learning and Knowledge Transfer (KT) in organisations. With the emergence of the internet the landscape of Higher Education (HE) has changed. Teachers and Learners in UK HE benefit from aided KT because it enhances their ability to experiment with ideas and share them in productive ways (Goh, 2002). Accessibility to HE has been greatly facilitated through the advance of the internet, learning technologies and e-learning environments (Xiong and Winckler, 2008). Accessibility of university websites, virtual learning environment (VLE's) etc. has a critical role in the activities of currently enrolled and prospective HE students (Cook-Sather, 2014).

In HE learning environments, the interactions between users and technology can represent critical points of breakdown and potentially end achievement. However, sometimes these interactions can provide poor accessibility because of human error and limited availability of information (Nonanka and Takeuchi, 1995; Goh, 2002; Paiva *et al*, 2016). Breakdown at this point can mean that both learners and teachers stand unable to benefit and can suffer low levels of KT (Bates, 2001; Jerrard *et al*, 2013).

In this chapter we discuss the KT and the Openness philosophy, which has the potential to facilitate a current generation of teachers and learners in UK HE by sharing the utility and accessibility of knowledge through a Knowledge Transfer Openness Matrix (KTOM). In the HE sector this approach can represent Higher Education Institutions (HEI's) as environments that mediate generatively the transfer of knowledge and accessibility. This involves systems that are open and can enable accessibility of effective KT for both teacher and learner. A particular focus is developed around the issue of accessibility of knowledge in HE. Therefore, this research considers how the development of a KTOM could potentially assist the reduction of KT barriers to accessibility within the organisation.

Understanding Knowledge Transfer

Over the years various researchers (Stewart, 1977; Ratcliffe, 1997; Jackson; 2002; Mougin *et al*, 2015) have the common view that Knowledge Management is often used to describe the management of knowledge within an organisation and this includes KT within the organisation.

Bates (2001) and latterly Mougin *et al* (2015) claim that the value of KT relates directly to the effectiveness with which the transferred knowledge enables educators within the establishment to deal with the current situations and effectively envision and create their future. People; in the case of this research, the teacher and learner; and the connection between these are considered the most critical factor in KT (Denning, 2011). People create knowledge, share knowledge, learn, and use knowledge to complete tasks (Ratcliffe, 1997). Accessibility to knowledge through a structured KT process can increases the ability of individuals to deal with new situations, events, information, and context (Kunmari and Ilomkai, 2016). Research suggests (Nonanka and Takeuchi, 1995;Goh, 2002; Hanna, 2016) there are potentially many barriers to effective KT that could emerge because the process relies heavily on human interactions and relationships that are not designed into the organisation's culture.

Understanding E-Learning

In simple terms, E-Learning is the use of telecommunication technology to deliver information for education and training (Lin, 2001). Perhaps predominantly due to continuing progress of information and

communication technology development, e-Learning is rapidly emerging as the paradigm of modern higher education. The key advantages of e-Learning can include the advantageous interactions between learners and instructors, or learners and learners, free from limitations of time and space through the asynchronous and synchronous learning network model (Paiva *et al*, 2016; Turban et al, 2000). More so that ever E-learning's characteristics can fulfil the requirements for learning in a modern society and have created great demand for e-Learning from both businesses and institutes of higher education (Hasanzadeh *et al*, 2012).

Understanding the Openness Philosophy

The openness philosophy is an attempt to orient research efforts towards the principle that effective knowledge transfer between learning systems is crucial, particularly in the context of fast and lasting penetration of e-learning technology. However, there remains lack of clarity about openness in education (Peter and Deimann, 2013). There is increasing awareness that openness is essential and best practice in education, which should fertile terrain for sharing knowledge as a common good (D'Antoni and Savage, 2009: 138). Three areas of openness have been proposed as social characteristics, technical and the nature of the resources (Hylen, 2006). In the education sector open education has been aided with the development and widespread use of digital technologies (Weller, 2011: 21). Through the openness principle it is argued that greater sharing of knowledge in the scientific community can enhance and refresh perspectives in individual disciplinary spheres. We propose the KTOM taxonomy as an evaluation of the types of systems found in higher education. This is predicated on an exploration of scenarios that signal indeterminacy, transparency and accessibility in e-learning environments.

E-Learning as a Knowledge Transfer Enabler

E-Learning can be perceived as a key enabler to KT within HE sector (Owens & Floyd, 2007; Deejring & Chaijaroen, 2012).The successful introduction and implementation of e-Learning into existing and new units, modules, programmes etc. at an HEI can be heavily influenced by its ability and accessibility effectiveness, in delivering knowledge based products and managing any number of strategic issues that may need to be addressed as part of the successful development of KT though e-Learning products (Conaway *et* al, 2005; Hanna, 2016; Owens and Price 2010).

Laurillard (2008) suggests the strategic issues of significance when considering e-Learning as a tool for KT through traditional and independent study within the HE sector are:

- Identifying the customer service imperative for each stakeholder or institute involved in an e-Learning initiative;
- Appreciating the advantages and disadvantages of incremental KT through e-Learning in HE;
- Understanding the value of national, integrated approaches to e-Learning and KT in HE;
- Understanding the need to develop user support systems, to underpin e-Learning and KT developments;
- Working within technological and financial limitations associated with HEI's;
- Successful internationalisation of HE.

Accessibility to Teaching and Learning in HE

Research (Gladstone, 2000; Reeder *et al, 2004;* Weller, 2004; Kandiko & Mawer, 2012) suggests that academics (teachers) and learners have accepted the idea that e-learning environments (i.e. Virtual Learning Environments, Blackboard, Discussion Boards) can be effectively used for accessibility to teaching and learning. Research suggests a common theme in that both traditional and non-traditional students increasingly expect this presence and use HE (Roberts, 2004; Hannon & D'Netto, 2007; Paiva *et* al, 2016). In some HE teaching and learning environments the high penetration of these teaching and learning tools has become the norm, or at least one of the indicators of accessibility to a HEI (Lanham & Zhou, 2003; Dobozy, 2012). Alexander (2002) and Kandiko and Mawer (2012) claim new students expect the institutions to offer up-to-date web based teaching and learning tools. Further studies (Goodfellow, 2004; Goodfellow & Lea, 2007) suggest that some HEI's are using the tools as a competitive advantage for accessibility in order to attract more students in an increasingly competitive HE market. More and more, students expect lecturers (teachers) to use these tools to support their provision and accessibility to teaching and learning (Goodyear & Jones, 2003; Owens and Price, 2010). This is perhaps nothing new though, as mature and distance learning students in UK HEI's, who are often in full-time employment and from a working environment, adopt e-learning environments predominantly due to accessibility necessity for their teaching and learning agendas (Lanham & Zhou, 2003).

Understanding Learning Technologies

Learning technologies can effectively assist teaching when it is seen as one of a set of activities aimed at supporting students' learning (Akgun *et al*, 2003; Kunnari, 2016). This approach corresponds to the level three of Biggs' student-centred theory about teaching (Biggs &Tang, 2011). They discuss how student learning depends on the following:

- The learner's ability and capability;
- The learner's prior knowledge of the subject/field which they are about to be taught;
- The learner's accessibility to new knowledge on the academic subject/field, including:
  - The teacher's responsibility;
  - The learner's decision-making ability and capability;
  - Good KT process management skills of predominately the learner, but consideration should be given to the teachers KT ability and capability in this area also.

Therefore, good teacher and learner interaction, including the use of learning technologies, involves an awareness of contextual dependency of learning and teaching (Borstorff & Lowe, 2007; Falconer, 2006; Goodfellow, 2005; Gosper *et al*, 2008).

The evaluation of learning technologies includes examining the intentions, implementation process and the outcomes of technology use (Hannon & D'Netto, 2007). Sims and Jones (2002) the purpose of evaluating learning technologies is to provide the designer (teacher) or user (learner) with enough evidence on which to make confident judgements regarding the effectiveness of the innovation. They also claim that the match between the intentions and outcomes determines the success; therefore it is important that the intentions add value to student learning.

Existing research suggests (Jackson, 1998; Gladstone, 2000; Falconer, 2006, Goodfellow, 2007; Gosper *et al*, 2008) learning technologies can be evaluated against intended outcomes such as ease of use, accessibility, efficiency, student preferences, technology attractiveness, and cost effectiveness. Subsequently, there is a reasonable assumption that accessibility to an effective KT process within the HE learning environment is relatively important requirement for both parties, thereby supporting the need to investigate KTOM as vehicle to support this feasibility.

Using Learning Technologies for Teaching and Learning

Both Borstorff and Lowe (2006) and Kandiko and Mawer (2012) suggest the introduction of e-learning environments represents an additional burden on lecturers' timetables, as it requires co-ordination and integration of the activities in the teaching programme. In order to be effective, these learning technologies should reflect the current constructivist-learning model that over the last few decades evolved from behaviourist and objectivist models (Fry *et al,* 1999; Borstorff and Lowe, 2007; Deejring and Chaijaroen, 2012). Above all, e-learning should foster interaction and dialogue between the learner(s) and the teacher (Goodfellow, 2005). Research (Institute of Teaching and Learning Seminar, 2003; Roberts, 2004; Goodfellow and Lea, 2007) suggests that learning though this environment can be enhanced in all sorts of ways, including hearing, seeing, as well as participating in activities such as a game, quiz, and podcasting.

Hannon and D'Netto (2007) argue that the potential of learning technologies to improve learning depends on the context of learning and assessment. The context is defined by the combination of its elements that include the students, lecturers, institution, teaching material, style and method. Research by Ashraf (2009), Goodfellow (2007) and Gosper *et al* (2008) claim the majority of studies in this area fail to provide solid evidence of increased effectiveness of the e-learning for teaching and learning. As discussed earlier (Student Expectations Study, 2007), when considering technology, there should perhaps be a manner of caution in adoption and utilisation. This is because HEI's cannot assume that presenting new technologies automatically makes their institutions "*youth friendly*", this new generation would like to see some concrete benefits of technology. Additionally, Gosper *et al* (2008) report that adaption of these technologies for teaching and learning contributes to a "*blurring*" of the boundaries between traditional (full-time) and non-traditional (part time, distance learning) students. This is primarily because its introduction is more than solely a teaching issue as it can affect the design of the unit and programme, as well as having professional and organisational development implications.

The literature has predominantly indicated that students are enthusiastic (Jackson, 1998; Roberts, 2004; Gamlanglert & Chaijaroen, 2011) about the e-learning environment, and they take the medium more seriously when their work is assessed (Fry *et al*, 1999; Borstorff & Lowe, 2004). However, both Hannon and D'Netto (2007) and Goodfellow (2007) state an e-learning environment fails to enable the achievement of significantly different learning outcomes. They also suggest that organisational, operational and logistical problems combined with technical difficulties mean that the learning technology cannot always be used to its full potential. Further research (Falconer, 2006; Owens & Price, 2010; Turban *et al*, 2000) suggests that in order for this to perform more effectively, learning technologies need to be fully embedded in a programme/unit/ module etc., and importantly both the teacher and learner should be provided with the adequate skills and support.

Knowledge Transfer Using Learning Technologies in an E-Learning Environment

Research suggests (Hannon and D'Netto, 2007; Hanna, 2016; Owens, 2002, 2006; Macfayden, 2005) and is relatively consistent in that E-Learning is perceived as a key enabler for effective and efficient KT within the HE sector. E-learning can be used to facilitate KT in a number of ways, as set out in Figure 1. The successful introduction and implementation of e-Learning into existing and new units/ programmes/modules etc. at HEI's is heavily influenced by the institution's ability to deliver knowledge based products and services.

In addition, as discussed earlier in this chapter by Laurillard (2008), it is perhaps useful to consider the strategic issues of significance of e-Learning as a tool for KT through traditional and independent

Figure 1. Model of knowledge transfer education to business (Owens & McManus, 2004)

Industry e-Business

Education Knowledge Transfer

Source	Recipient
• On-line	• Self-Discovery
• Internet	• Action Learning
• Intranet	• Lecture
• CD-ROM	• Seminars
• DVD	• Job Shadow
• TV & Video	• Role Play
• Books etc…	• Discussion Groups etc…

Support Structure
  • **Teacher, Mentor, On-Line Learning Network, Trainer etc.**
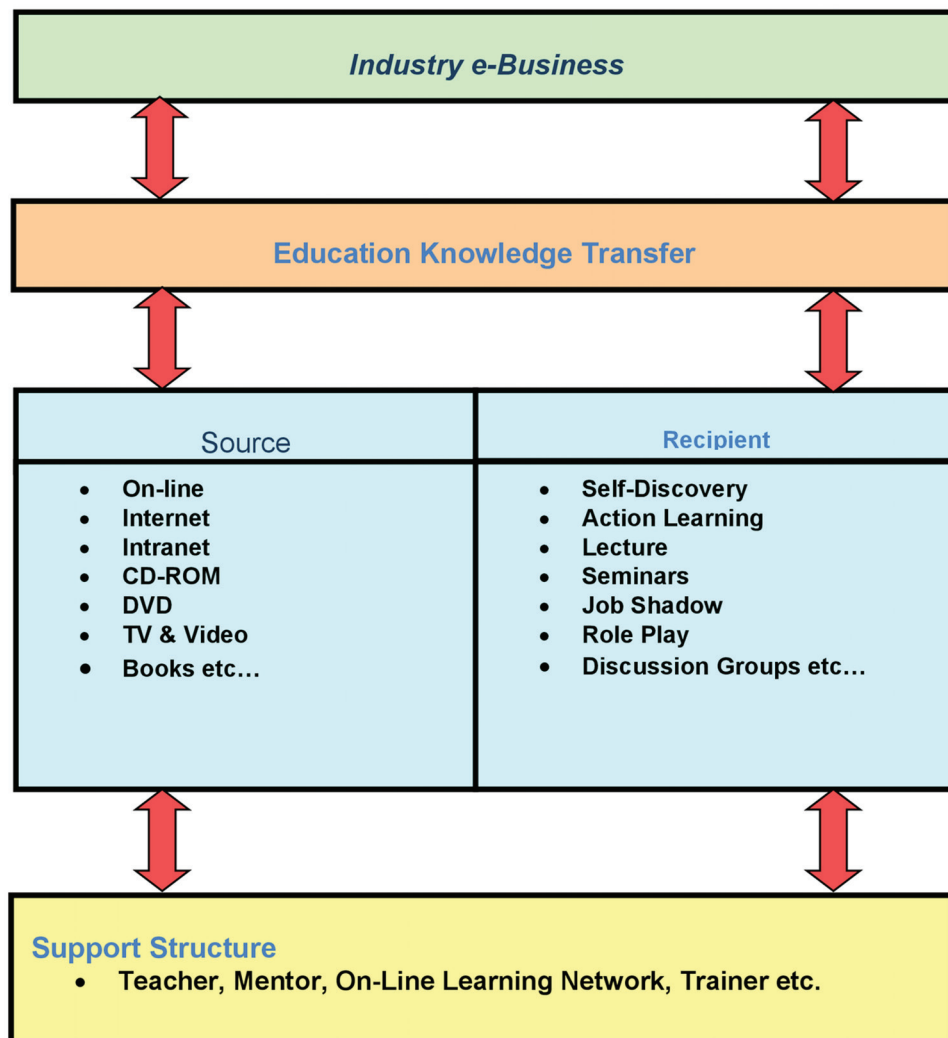
study. This is particularly pertinent, if the HEI needs to be effective at managing any number of strategic issues that may arise as part of the development of KT though the utilisation and operationalisation of learning technologies within an e-Learning environment. As such, designing and developing KT processes within e-learning environments and with the utilising learning technologies can be both costly in time and money (Owens & McManus, 2004). Consequently, before making the investment, HEI's may prefer to establish if it is worthwhile (Goodfellow, 2005). It may therefore be beneficial to have a strategy in place for sustaining and embedding the institutes proposed KT and e-Learning developments.

Owens and McManus (2004) suggest there are two schools of thought when considering the integration of KT and e-Learning to support HE accessibility:

1. The exploration of learning technologies currently known and understood to produce sound learning and teaching KT through the model (see Figure 2). Where the current technologies available in the HEI do not allow this, then both internal and external developers should be encouraged to assess if new technologies are necessary, in order to provide a feasible solution for the teacher(s) and learner(s) involved in the KT process;
2. To examine the current learning technologies within the HEI and explore the possibilities for innovation that can lead to the development of new pedagogies and enhance the KT process in the model. This school of thought considers that the potential of the technology that currently exists has not yet been fully investigated and realised by the HEI. Thus, it focuses on the premise of embedding new teaching and where applicable learning practices utilising the existing learning technologies, before moving onto new learning technologies to assist the KT process.

Internet Utilisation in the UK

The 2009 Oxford Internet survey reports that the top four reasons people in the UK accessed the Internet to go on-line were:

1. Check emails;
2. Product information search;
3. Browse to Buy on-line;
4. Fact finding, through search engines such as Google, Wikipedia etc.

Therefore, with the rapid advance of on-line learning technologies (Kunnari and Ilomaki, 2016) it is perhaps interesting that there is no clear correlation to on-line learning at 19th place at just over twenty percent. Unfortunately; from an e-learning perspective; even use of the internet to download to watch videos and listen to the radio achieved an almost ten percent better score than distance learning. Another disappointing finding for learning purposes is that twenty percent read less due to the advent of the Internet. This suggests that perhaps internet is not a perfect substitute for knowledge, and that lecturers need to encourage both means to foster both more creativity and utilisation. Subsequently, as the Openness philosophy is a novel concept that has been underexplored in UK HE, later this chapter will start to consider if the development of a KTOM could help foster this creativity and utilisation.

A summary of the twenty main reasons people access the internet is illustrated in Table 1.

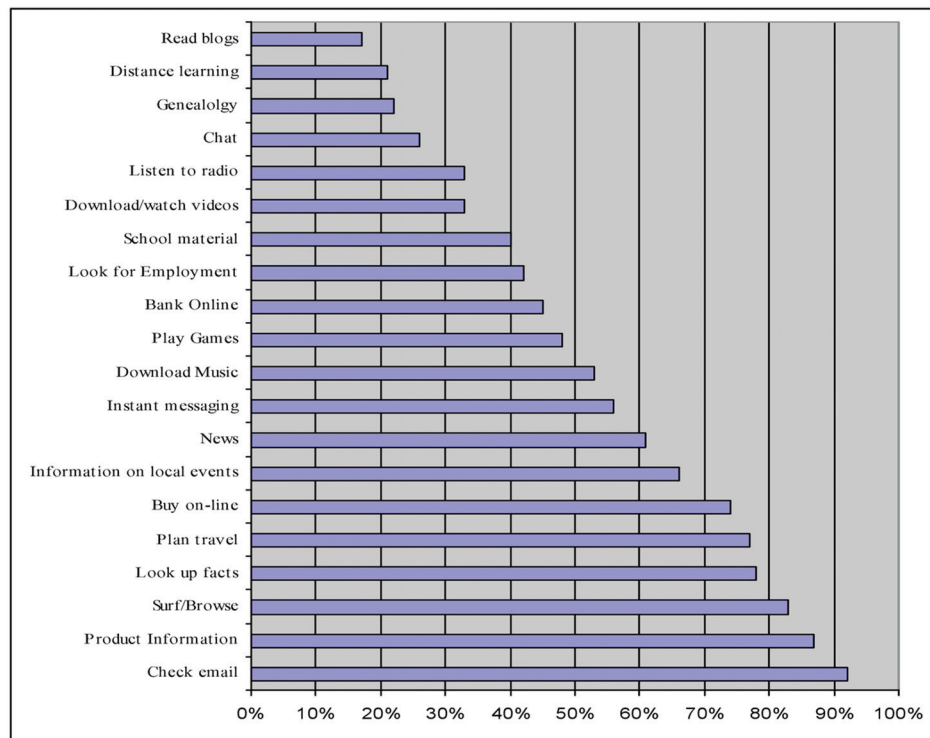*Table 1. Top twenty reasons why we go online in the UK*

Table 1.Top twenty reasons why we go online in the UK. (Oxford Internet Survey, 2009)

(Oxford Internet Survey, 2009)

Teaching and Learning Through Internet Based Technology

Various authors (Kalkota and Whinston, 1996; Turban et al, 2000; Owens and Price, 2010) have identified that the Internet offers unique opportunities in both teaching and learning applications. A common theme that appears to have changed little (Ackoff, 1989; Dearing, 1997; Conaway *et al*, 2005; Hasanzadeh *et al*, 2012) is that students are very keen on using the Internet for entertainment, peer communication, and for secondary sources of data. Researchers (Lissenburgh, 1999; Dobozy, 2012) claim that, in some cases, students assume the information does not exist if it is not available on the Internet.

Although students are familiar with Internet technology, some researchers (Gladstone, 2000; Hannon and D'Netto, 2007) argue that students often lack the specific skills that would enable them to use it more effectively. It could be that students are not clear about the benefits from the outset (Ashraf, 2009). A Student Expectations and Perceptions survey carried out in 2012 reported that, whilst many current and prospective students are comfortable with the learning technologies both used and available, this new generation of students like to see the concrete benefits of technology usage and implementation; for example that work is recognised and contributes to final grade assessment (Kandiko & Mawer, 2012).

In summary, it becomes apparent that as internet usage continues to gain momentum with increased dependency amongst both teacher and learner. This perhaps supports the increasing need for accessibility to internet technology to facilitate KT in e-Learning Environments with the UK Higher Education Management Education Teaching.

Preliminary Investigation of Teaching and Learning Through Internet Based Technology at Two UK HEI Business Schools

Introductory research investigating teaching and learning through Internet Based Technology was undertaken at two UK HEI's Business Schools. A number of units that included IT-based learning were identified at both HEI's.

Three teaching modules that offered similar content and level were reviewed and each had a dedicated web site aimed at supporting students' learning. The site gives the lecturer some degree of flexibility in terms of inclusion of teaching material, and setting up the discussions despite being fairly standardised. The cohort for this study included both undergraduate and postgraduate students studying fulltime at both HEI's.

The data collection approach included an unstructured discussion (interview) with the lecturer for each cohort and a questionnaire for the students. The discussion with the lecturer aimed to identify the main issues related to use of the web site that emerged during the semester. The breakdown of respondents for each module and HEI is illustrated in Table 2.

Interview Findings

It emerged that the teaching team for each module provided a web site that aimed to offer additional support for the students. Although standardised to suit institutional requirements, the web site offers a

Table 2. Respondents breakdown from both HEIs

UK HEI Business School One			UK HEI Business School Two		
Module	**Level**	**Number of Respondents**	**Module**	**Level**	**Number of Respondents**
Operations Management	7	17	Operations Management	7	12
Strategic Management	6	14	Strategic Management	6	17
Management of Operations	5	19	Management of Operations	5	13
	Total	**50**		**Total**	**42**
Combined Total	**92**				

Table 2   Respondents breakdown from both HEI's.

certain degree of flexibility. The lecturer was able to publish the lecture notes, the syllabus, the module outline, the assessment brief and any other text material. The related web links could be edited at the discretion of the lecturer who has the control over the content of the web site. Additionally, the lecturer could set up a discussion area by proposing a topic and encouraging student participation. Typically, the lecturer posted a question related to the lecture on a weekly basis. The students could respond or comment on the topic and get the lecturer's feedback. The students could see the contributions of their fellow students but could not address the comment to one particular student. Similar to research by Chou (2003), the communication channel corresponded to the interactive of one-to-many model. Each participant was identified through a username and a password.

The discussion with the lecturer allowed for identification of main themes and items that were then included in the questionnaire. For example, ascertaining how often the student accessed the discussion area, if they found it helpful, and if they contributed. The feedback helped to build a picture of the level of interaction between the student and the lecturer using internet-based learning. Once the questionnaire had been drafted, it was reviewed by the lecturer, and the final version administered to students towards the end of the semester. This is similar to Goodfellow and Lea's (2007) thoughts on encouraging links between the two parties involved in the learning process.

Level 7 Operations Management Module Questionnaire Findings at Both HEI's

These students scored the lowest usage rate of the three groups involved in this research. Only twenty one percent and nineteen percent of respondents respectively logged on to the web site at least once a week. Approximately two thirds of the students at the two institutes visit the web site once per month or less, or not more than five times in a semester.

When the students log on they mostly look at the lecturer's questions but only one in four contributes to the discussion. Across both institutes approximately two thirds look at the contributions of other students and use the web links. Less than half use the web based lecture notes and less than a third use other material related to the assessment. This finding is not surprising as it supports the common view (Fry et al, 1999; Borstorff and Lowe, 2007), that the student will only take this medium of study more seriously if it is assessed. Hannon and D'Netto (2007) comment that the real potential of learning technologies to improve the student's learning experience depends upon the context of learning and assessment.

At both HEI's, the majority of students feel the web site helps their learning, makes it easier to keep up to date with the lectures, offers the opportunity to discuss questions with the lecturer, and ask for clarifications. The use of the website therefore promotes efficiency, effectiveness, ease of use and attractiveness as a mode of learning (Gladstone, 2000; Falconer, 2006; Kunnari & Ilomaki, 2016).

However, a large majority of students at both HEI's do not think the web site gives the lecturer a tool to monitor their learning, nor themselves the opportunity to show how much they study. This is supported by Goodfellow (2005), Ashraf (2009) and Randy Garrison (2011), who identified this to be a particular constraint as HEI's appear to predominantly use this as an attendance and retention tool. They suggest more development needs to be undertaken with this mode of learning in order to achieve its full potential for both lecturers and students. The implications for students who are technically competent are that the use of web-based interaction may deliver 'concrete' benefits which involve measuring their level of understanding and improvement.

Level 6 Strategic Management Module Questionnaire Findings at Both HEI's

Almost two thirds of the students at each institute visit the web site at least every other week. They predominantly use the lecture notes, look at the lecturer's questions, and at the contributions from other students. However, only seventeen percent and fourteen percent respectively have ever contributed to the discussion on the web site.

Similar to earlier findings with the L7 findings, the students at both HEI's felt that the web site helps their learning; makes it easier to keep up to date with the lectures, offers the opportunity to discuss questions with the lecturer, and to ask for clarifications. Approximately one in four and one in three respectively agree that it should be part of the portfolio of activities. However, an interesting finding was that the majority of students studying this module at both HEI's agreed that web-based work should not be formally assessed for this module at this level of study. This did not follow earlier trends in this research, nor the literature (Hannon and D'Netto, 2007), where students would prefer to see it as part of their assessment. A possible explanation for this could be that, as this group comprised level six students, they were more aware of the significance of grade at this stage of their degree programme. They perhaps preferred the familiarity and 'concrete benefits' (Student Expectations Study, 2007) of the traditional assessment methods.

Level 5 Operations Management Module Questionnaire Findings at Both HEI's

It was both an interesting and common finding at both HEI's that almost half (forty nine percent and forty seven percent) of the students used the web site on a weekly basis. This was perhaps an expected finding at level six undergraduate, rather than level five undergraduate because of the maturity of the student towards learning and, the weighting of the degree programme at level six in UK higher education.

Similar to the previous two cohorts, these students mostly use the lecture notes; they look at the lecturer's questions and use the web links. Across both HEI's, approximately half the respondents think the web site helps their learning and that it makes it easier to keep up to date with the lectures. This is a finding supported by Goodyear and Jones (2003) and latterly Dobozy (2012), who identify that there is a clear expectation by students to use IT for teaching and learning. One in three and one in four respectively were of the opinion that it offered them the opportunity to have discussions with the lecturer, ask questions, to show how much they study, and that it should be part of the portfolio. However, only one in four at both HEI's thought it should be assessed.

The students at both HEI's were of the opinion they would use the web site more often if it counted towards the final mark, if there was additional learning material and if there was more material related to the assessment. Another common finding was that the lecturer should promote the web site more convincingly during the lectures and seminars. It should also be easier to use and it should be part of the portfolio of activities.

Key Finding From Preliminary Investigation of Teaching and Learning Through Internet Based Technology at Two UK HEI Business Schools

The key findings summarised in Table 3. The ticks indicate where more than half the cohort had used the particular function of the website, or had expressed a preference for how the website had been used.

Table 3. Summary of responses for each cohort

	UK HEI Business School One			UK HEI Business School Two		
Use of Module Web Site:	**CMS**	**BA3**	**BA2**	**CMS**	**BA3**	**BA 2**
To log on/visit regularly	X	✓	✓	X	✓	✓
To look at the lecturer's questions	✓	✓	✓	✓	✓	✓
To contribute to the discussion	X	X	✓	X	X	✓
To look at lecture notes	X	✓	✓	X	✓	✓
To look at web links	✓	✓	✓	✓	✓	✓
To interact with the lecturer	✓	X	✓	✓	X	✓
To interact with other students	✓	X	✓	✓	X	✓
To look at material related to assessment	✓	✓	✓	✓	✓	✓
How effective is the Web Site for						
Monitoring learning?	X	✓	✓	X	✓	✓
Demonstrating how much students study?	X			X		
Should the Web-based activities:						
Form part of a portfolio of work?	✓	X	✓	✓	X	✓
Form part of formal assessment?	X	X	X	X	X	X

Table 3 Summary of Responses for each Cohort.

The majority of respondents across both institutes would like to see more teaching material and more material related to their assessment presented on the module web site. A common theme similar to Hannon and D'Netto's (2007) findings is that they would use the web site more often if it counted towards their final mark. Assessment could consist of a small component of the unit's total marks. For example, there were positive aspects for including the web-based work in the portfolio of activities, and a small minority of students supported making it count toward their final mark. However, students said they would be more likely to undertake work that they would be rewarded for, which suggests that some kind of assessment of web-based activity could promote use of e-learning. Research (Kandiko and Mawer, 2012; Laurillard 2005; Owens and Floyd, 2007) all suggest that this is a common finding in that the students will not do anything unless they clearly benefit through a contribution to their grade.

The Openness Philosophy and its Application to UK HE Management Education

In HE management education environments across the UK, the concept of openness remains somewhat indistinct and not clearly defined (Baker, 2012). At present, there is limited application of this concept in the field. Overall, openness in science means that data should be shared with the wider scientific community (McComas, 2014). In the context of this ethos, accessibility to platforms and technologies becomes a prime focus for HE distributors. In this regard, we suggest that the openness of a pedagogical system can be understood by recognizing its degree of indeterminacy, transparency and accessibility.

Indeterminacy in UK HE Management Education Environments

Indeterminacy suggests that a system does not have sufficiently rigid boundaries and discrete variables such that its development is wholly determined in advance (Stein, 1991). This characterizes most systems that are used by humans, which are open systems consisting variables not wholly determined in advance. For example, if a student uses the software Microsoft Excel then he or she engages with a system that provides tools through an integrated environment. The behaviour of this system is partly determined through its states, features and rules, and in part through the user's behaviour. The system is open in the sense that its behaviour depends to some extent on the unpredictable behaviour of the user, but also serves idiosyncratic learning needs (Cziko, 1989). In such systems that are characterised by human use of information communication technology, a boundary of the tool in question might be sufficiently rigid, however human behaviour remains relatively less rigid and less predictable, whilst at the same time necessary for adaptation. Such learning systems build through trial and error loops that provide feedback based learning for human users with varying demands for knowledge exchange over e-learning platforms. Such a system cannot become accessible in its authentic form. Thus, indeterminacy means that MS Excel is not accessible in its rule governed forms alone, but rather, it is accessible as *n* number of iterations in relation to user subjectivity, interactions, errors, and learning outputs.

Openness in this sense offers a principle for guiding numerous tasks for learning and developing solutions. To the extent that indeterminacy is a condition for e-learning, improvements in accessibility through higher education systems might aim to manage the inherent indeterminacy of pedagogical processes and outcomes.

Transparency in UK HE Management Education Environments

Transparency of a system is the degree to which its components are visible in their workings. Increased transparency can help align perspectives of users (Benkler, 2006). A transparent system, might increase visibility of indeterminacy in systems, and provide users with options to manipulate components for pedagogical ends. In this instance, research (Peters and Roberts, 2012: 45) suggests the degree of transparency of a learning system such as MS excel is based on two points:

1. Its functions;
2. What the user brings to the social environment in terms of experience, knowledge, expertise, interest, task, goals, and time.

They discuss that openness of technology must be coupled with open-mindedness of users and collaborators. Philip (1987) notes that measuring human learner behaviour accurately is extremely difficult due to the indeterminate nature of education systems, which are inherently complex and open to varying change. To this proposition, transparency adds the likelihood of effective access to content, based largely on the increased ease of managing system components. However, transparency is a condition that is specific to the e-learner engaged in gaining access. A system that is open and visible in its workings remains as such by virtue of learner knowledge and expectations in relation to attributed system features/functions. However, it remains the case that openness as a practice through conduits like Massive open online courses (MOOCS) can be effectively seen as transparency of activity (Cormier and Siemens, 2010: 32).

Accessibility in UK HE Management Education Environments

In contemporary organisations the accessibility of a system is the ease with which users can obtain intended and satisfying outcomes with regard to learning. Enhancement in accessibility signals a relatively open system. In general, accessibility is enhanced with virtual environments that provide storage, processing, representation and transmission of data facilities. This has leveraged the accessibility of ideas over computerised platforms, which can often talk to each other, without compromising content quality (Altbach *et al*, 2009). However, in relation to how humans learn with tools that enable access, openness is not a new idea. In the early part of the 20th century the philosopher Martin Heidegger proposed openness as a non-intentional or pre-intentional state of being in the world (Fuenmayor, 1991). The term non-intentional is the antithesis of the term intentionality; the latter is a central feature of human consciousness whereby we walk about in the world always holding beliefs, emotions, imaginations, and feelings that are directed towards things we play with and learn from. Intentionality structures provide access through experience, and represent the analytical experience of idiosyncratically reaching out and carving meanings in experiences, using tools systematically. In Heidegger's sense, openness is about taking a step back from intentionality. For example, openness of a learner in an HE environment is the deliberate letting go of pre-conceptions and starting with a tabula rasa type psychology. Through conversations teachers and learners attempt to improve access by co-constructing what is learnt. They might attempt to linguistically represent each other's narratives (Dahlberg *et al*, 2003) or store, process, and share content, which can be manipulated and become accessible through transparency and interconnectivity of technical frameworks. In this sense, openness applies more easily to electronic technology then to human users, whilst both co-operate to produce educational output in HE systems. When applied to technology openness primarily means ease of use because syntax, rules, goals and processing in technological systems is often easier to delete or modify (i.e. accessibility). Conversely, the application of openness in terms of accessibility of the cognate user-as-learner's behaviour appears riddled with indeterminacy (Cziko, 1989). Conclusively, the application of openness might address accessibility of systems whereby technology, users, and their cooperation can improve or decline in that system. We contend that accessibility sits in tandem and in co-operation with transparency and the in determinacy inherent in human learning spaces that characterize e-learning systems. In such learning spaces, the behaviour of technology and the user represents an integrated process - a continuous system - which can be evaluated for openness through its indeterminacy, transparency, and accessibility.

Openness in UK HE Management Education Environments

In regard to the above picture of openness, in an HE context, we propose that in so far as indeterminacy, transparency and accessibility are applied, this represents behaviour of systems between concentric levels at which they operate and cooperate in learning spaces. In HE learning environments a system can be (Baker, 2012) discernible at the component and sub-component levels. From a higher abstract viewpoint, a system is also discernible at the actor, group, organizational, and the society wide level. These concentrically coupled levels where systems behave can themselves display openness at the intralevel, that is, systems constituting a level (e.g. at the group level classroom learning or blackboard blogs) and at the inter-level, that is, across systems behaving within and between levels (e.g. individual access to content also shared with other learners over social mediums for communication). Applied to the UK

HE in management education environment this provides a diagnostic matrix to illustrate the degree of openness of a system, expounded below.

THE KNOWLEDGE TRANSFER OPENNESS MATRIX (KTOM)

The Knowledge Transfer Openness Matrix (KTOM) illustrated in Figure 2 provides six openness scenarios for teachers and learners in UK HE management education environments. Each one of these can be characterised in different scenarios (i.e. perspectives) when facing the same system. Each scenario's evaluation is based on degrees of indeterminacy, transparency, and accessibility – indicating openness of the system.

Scenario 1: Chaos

The first scenario occurs in learning interactions whereby indeterminacy is increasingly present as the system components (user, technology and content) develops and thus indicates learning that is not predictable, but somehow functional (i.e. it meets minimum user needs to retain its use). Such a system is chaotic in the sense that it is not predictable and only reflects a probable developmental trajectory. This involves the use of most human learning tools. For example, the behaviour of the whole World Wide Web is indeterminate for a human user (Carr, 2012:205). Over the period of its use, such a system increases in complexity with two parallels. First, as more components and relationships are added, the indeterminacy of the system emerges over a time period conceivable as probability distributions. This involves system interactions that add layers of complexity conditioned by the subjective choices of users (Cziko, 1989). Second, the learning system behaves to increase or decrease in indeterminacy. This can impact accessibility of knowledge in so far as the knowledge is searchable throughout learner-teacher-technology structures of the system, in intended ways. Such structures and channels involve mapping of subjective data on other relatively homogenous mediums of communication. We find indeterminacy in complex knowledge acquisition in so far as learner-teacher relations fuse human tacit knowledge with more objective encoding platforms. This process can modify and qualify shared knowledge as indeterminate. The degree of this also depends on the environmental noise that interferes in preserving the intended meaning of types of knowledge shared, processed and stored in a learning environments system.

Figure 2. The knowledge transfer openness matrix

Openness Scenarios for Teachers and Learners in UK HE management education environments	Indeterminacy	Transparency	Accessibility
Scenario 1: Chaos	●		
Scenario 2: Interpretable Chaos	●	●	
Scenario 3: Platonic Openness	●	●	●
Scenario 4: Randomness	●		●
Scenario 5: Closed Environment		●	●
Scenario 6: Rote system			●

Scenario 2: Interpretable Chaos

Learning Systems that exhibit indeterminacy and transparency are independent of user accessibility but remain observable in their ultimately non-deterministic and probable behaviour. That is, the user (i.e. student) can observe but cannot modify the system towards a determinate state. These exhibit interpretable chaos for the learner. For example, this might be the use of online software that displays information and can be visually seen such as an algorithm based blackboard learning environment. However, it is not amenable to modification and thus affords partial accessibility whereby the learner is on the receiving end.

The limit of an event that is in interpretable chaos is its non-feedback based behaviour.

Scenario 3: Platonic Openness

The third scenario involves complete openness, which we term *platonic openness* whereby indeterminacy, transparency and accessibility are all featured in the learning system. This is an idealistic state (Stein, 1991; McComas, 2014), albeit one that any system can aim towards. Because the human-technology system is indeterminate, it is an open system in continuous flux. The transparency of the system is indicated through workings of non-human components in the learning system (i.e. system features, relations, functions, and data) with heterogeneous human perspectives (i.e. intelligence, background experiences). Cziko (1989) and Sagan (1977) contend that students in this kind of human-technology learning system are components that are impossible to predict and measure because they are more complex then learning technologies. The difficulty of measurement means that transparency of human-technology pedagogical interactions represents a spectrum of events, such as those identified earlier in Figure 1. One end represents knowledge transfer that indicates machine to machine acquisition with complete openness. This contrasts with human to human learning that is less transparent in its workings due to immeasurable differences between people, as illustrated in Figure 3.

In this instance, accessibility is bounded by user capacity to learn (Peters and Roberts, 2012). Systems close to the Platonic openness scenario would be machine to machine learning systems, used extensively outside pedagogical environments and in the finance and energy markets (Fadullah *et al*, 2011). Applying this to machine-human interaction is a fertile prospect for further research and use that should strike a balance on our spectrum of learning interaction/events.

Figure 3. Transparency of human-technology pedagogical interactions
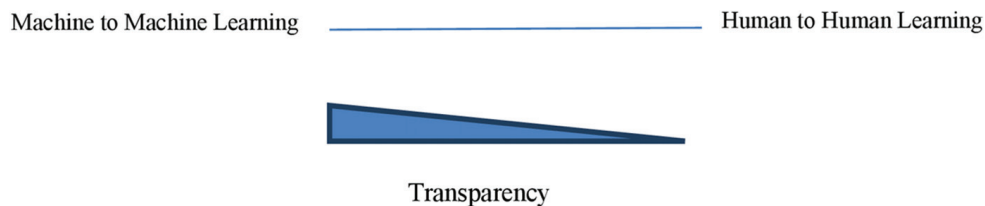
Scenario 4: Randomness

This is a system with indeterminacy and accessibility, which displays randomness because it is not observable by virtue of lack of patterns. However, it is tacitly received by the learner who has access to partly determine its behaviour through rules or functions of the system available through end-use interfaces. An example is a time series analysis conducted by a computer science student whereby the system/software rules and functions are accessible, the results of input equations are non-deterministic, and after some iteration's transparency is lost in terms of system behaviour (Fuenmayor, 1991; McComas, 2104). A more social example is a one to one conversation between a teacher and student. The conversation is not determinable despite availability of the topic of the conversation and rules of the language. The conversation can lack transparency by virtue of access to how differing perspectives deliver confusing conceptions throughout the conversation (Peters and Roberts, 2012).

Scenario 5: Closed Environment

We propose a transparent and accessible learning system that is not indeterminate. This is a closed system found in e-learning games with definite rules, syntax and a set of discernible patterns for the learner to engage with and utilise. We call such systems or sets of systems closed learning environments. Examples are found in Game Theory studied by learners in a host of fields including Economics, Finance, and Strategy that deals with non-cooperative games. Essentially, environments that provide zero-sum games (Mendelson, 2004:9) are examples found across e-learning platforms like Wolfram Mathematica and Gambit. The determinate nature of such platforms to some extent arises from the complete visibility of component workings (transparency) and access to a finite number of interactions by each learner (accessibility), whereby processes are discretely as well as jointly traceable. Whilst this kind of system is highly amenable to determinate outcomes, the indeterminacy of human error still remains a variable that represents imperfect transfer of knowledge and replication of learning strategy. In large part this is due to the bounded capacity of learners in HE environments aided by communication technologies (Morton, 2012: 147). The openness of a closed environment in so far as this is the ability to share knowledge at individual, group and organization wide levels is high because the platform in question demonstrates predictable, transparent, and accessible behaviour. Given formal axiomatized systems used in disciplines like economics and social sciences, the replication of content for learning is easier to study due to homogeneity of the content.

Scenario 6: Rote System

Finally, there is the scenario where a system is open to the extent that it is accessible, but neither is it indeterminate nor transparent. This type of user-technology e-learning system involves humans memorizing iterative content and replicating it. We recognize this as a single-loop learning system based on Argyris (1976). In this type of system learning takes place with content; however, the methods of learning (human mental models and technological functions) are not transparent for the user. Thus, what is determinate in relation to our indeterminate condition is at the content level rather than a methodological level. For example, a user constructing a pivot table is able to engage in rote learning by memorizing steps needed for using MS Excel functions. This is a matter of memorizing and replicating procedural steps that are determinate in their cause-effect relations (i.e. rote systems stand opposite to chaos systems of

learning proposed earlier). The transparency of user subjectivity as well as backend workings of the MS Excel software (i.e. Visual Basic scripts) is absent. In these types of e-learning systems and platforms, learning is severely limited, not innovative and tedious for HE students due to monotonous interactions. We propose that openness in a rote learning system is limited to educational subject specific content, without recourse to methodological or psychological operations. Tan (2011) argues that in UK HE education -within management and other disciplines - international students from the East often engage in rote learning, which is ineffective, and remains poorly recognised by most education providers. Rote learning is not an open system to the extent that content can be replicated without an understanding of 'context' (the connected texts and conditions of learners), that are continuously changing, indeterminate, and not transparent.

DISCUSSION AND EARLY CONSIDERATIONS

Higher Education is on the threshold of being transformed through the application, integration and utilisation of e-learning technologies in UK HEI's. However, it has been on the threshold for some time now (Goodfellow and Lea, 2007; Paiva *et al*, 2016; Turban *et al*, 2000). Personalisation, flexibility of delivery and inclusion of a wider participation are cited (Laurillard, 2008) as being key ambitions for learning e-technologies in education. However, perhaps we should not fully enter the route of making HE "techno friendly" institutes, because as discussed the current generation want to see the concrete benefits of "click and mortar" (Ashraf, 2009) learning before they sign up. The contributions of Internet learning should therefore count towards the completion of only part of the module (Goodfellow, 2005). An e-learning system that exhibits the proposed features of openness should recognize the excessive attribution of techno friendly cultures that cannot condition sustainable and deep long terms knowledge acquisition.

As previously discussed Openness is a novel concept that has limited research and application available in UK Higher Education (HE) management education. This paper has offered an preliminary investigation that considers the philosophy of Openness in a UK HE management education teaching and learning environment. It has discussed the philosophy of openness as a KT tool that might aid UK HE management education teaching and learning technology applications. The early focus being to investigate if the feasibility of developing a Knowledge Transfer Openness Matrix (KTOM) could assist and support the learning process and utilisation.

The KTOM appears to assist with the identification of systems that might facilitate or inhibit knowledge transfer across UK HE management education teaching and learning environments. This could be because KT predominantly depends on co-operation and collaboration between users (Goh, 2002:25), which varies across the types of systems (i.e. scenarios) identified in the KTOM. There exists scope for conceptual ambiguity in learning tasks involving KTOM systems. A closed environment (scenario 5) presents determinate conditions such those involved in solving a mathematical equation through graphical iterations. The homogenous character of such system variables coupled with rules and intended meanings, increases predictability as well as complexity of the learning system (Bauersfeld, 1980; Pea, 1987: 91). The error in learning may occur on the human side of the interaction when a closed environment interacts with user demands (Monetti *et al*, 2005: 5-6). Interaction between a closed environment and a chaotic system (scenario 1) for instance fuses objective encoding platforms with subjective tacit knowledge, whereby multiple meanings are attributed at innate tacit levels of psychological processing,

compared with the more explicit and shared meanings intended for the platform. Hence, in so far as face to face human learning must compliment the more basic learning needs of e-learning users, conceptual ambiguity is a hazard in e-learning environments by virtue of human error, intended or otherwise. Whilst growing numbers in research endorse the idea that e-learning environments can be effectively used to enhance accessibility (Gladstone, 2000; Reeder *et al,* 2004*;* Weller, 2004; Kandiko and Mawer, 2012) our proposed system type categories (i.e. scenarios of KTOM) provide conceptualizations of e-learning environments. Coupled with the high penetration of learning technology in HE and positive outcomes for accessibility (Lanham and Zhou, 2003; Dobozy, 2012), the KTOM recognises that certain technologies through integration with human behaviour vary in terms of access to intended knowledge transfer and acquisition. KTOM characterizes systems that will recurrently arise through the progressive adoption of e-learning environments based on both accessibility and desire for greater access in education (Lanham and Zhou, 2003).

This is very early stage investigation offering an alternative approach that considers the real issue as whether a KTOM could help new generation of students see the concrete benefits of technology usage and implementation. The current and future challenge is to recognise the complexities and nuances of the modern context, and seek to create a UK HE teaching and learning environment that recognises the need to ensure academic relationships are as equal as possible. No academic system can exist by itself in the 21ˢᵗ century of HE.

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