Intersection of Pedagogy and Emerging Technologies to Enhance Student-Centred Learning in Higher Education

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Abstract:
This paper examines the importance of intersection of pedagogy and emerging technologies to enhance student-centred learning. By following reflective and self-explanatory approach, the paper discusses the influence of emerging technologies on higher education environment as well as analyse the challenges that it brought for modern day educational institutions. The higher education institutions are facing a growing demand to use cutting-edge technologies in order to provide learners an environment where the knowledge is conveniently accessible at a low cost. The fast developments in technology, however, presents outburst of various tools that can be used in teaching and learning. This presents a challenge for the education institutions, however, it does create exhilaration within academics who are thrilled to be the part of this transformation from traditional to modern style academia. The existing evidence suggests that institutions are responding positively and academics are collaborating with technology and the intersection of pedagogy and emerging technologies is generating a virtuous effect to enhance student-centred learning in higher education.

Keywords: Emerging Technologies, Pedagogy, Student Learning, Universities

I. Introduction
The 21st century has seen universities facing a growing demand to use cutting-edge technologies in order to provide learners an environment where the knowledge is conveniently accessible at a low cost. The revolution in information technology has resulted in an outburst of new tools of information and communication technology, which are of great interest to academia. Some of the emerging technologies are very well received and have in fact created exhilaration among academics. The result is transformation from traditional academic environment to the modern academic styles and practices. The intersection of pedagogy and emerging technologies is generating a virtuous effect and academics are collaborating to use this to enhance student-centred learning.
This particular paper aims to highlight the importance of the intersection of pedagogy and emerging technologies to enhance student centred learning. Following reflective and self-explanatory approach, this paper analyses the challenges of using emerging technologies in higher education and also contributes to the debate of how well emerging technologies intersects with pedagogy to enhance student-centred learning in higher education. The paper also highlights some obstacles preventing the essential growth of emerging technologies within higher education sector and also attempts to describe how the adequate combination will provide students a better environment to absorb knowledge and engage in learning activities within higher education. The authors combine their respective experiences of (a) over eight years of IT support to various schools and participating in projects on deploying emerging technologies and higher education, and (b) over 15 years of experience of pedagogy and using emerging technologies to support teaching, learning and assessment in higher education.

The article is organised as follows: section 2.0 discusses the concept of pedagogy in higher education, section 3.0 discusses the intersection of emerging technologies and pedagogy with focus on enhancing student learning, section 4.0 discusses the framework of Technological Pedagogical Content Knowledge (TPACK), finally section 5.0 concludes.

II. Pedagogy in Higher Education

Pedagogy can be simply described as ‘the science and art of teaching’ (Stevenson 2010). The Oxford Dictionary of English defines pedagogy as ‘pedagogy is the method and practice of teaching especially as an academic subject or theoretical concept: the relationship between applied linguistics and language’. Alexander (1997) classifies teaching method and student as the two sides of pedagogy and presents a conceptual framework for educational practice. He establishes pedagogy as one of his seven interrelated aspects of educational practice. He also highlights that pedagogy and information technology should be explained within a broad framework of educational practice. In our personal observations and the argument Alexander tries to develop in his framework (see Figure 1) it stems that students learn what the lecturers and teachers develop as good educational practices. Student learning is directly determined by lectures’ own concepts, principles, knowledge, and the attitude towards the emerging technologies.
Figure 1: Educational Practice; a conceptual framework (source: Alexander, 1997)

However, Shulman (1987) developed a model of pedagogical reasoning that focuses on the procedures involved in education including the transformation of
knowledge so that it can be communicated to learners. Shulman puts more emphasis on a lecturer’s knowledge and understanding of technology and relatively less importance on his/her concepts and beliefs. The review of relevant research and personal observations indicate that there is evidence of strong links between academics own concepts and beliefs towards emerging technologies and their denial for training and using emerging technologies (Fang, 1996). Fang also argues that lecturers’ own ideas, beliefs and values may also influence practice.

Webb and Cox (2004) highlight the issue affordability in adoption of emerging technologies (see Figure 2). This is relevant as the technology is growing at a very fast pace and inventions are emerging so rapidly. The newly develop technologies are expensive at times and raises financial constraint with regards of their usage. The educational institutions have to properly budget themselves to take adequate advantage of emerging technologies.

The Figure 2 explicitly advocates that the lecturer/ teacher’s knowledge, beliefs and values along with their pedagogical reasoning for lesson plans are directly affected by affordance and on the right side of the figure students/ learners are also affected by affordance of the technology. This will have a direct impact on learning activates and students’ understanding and skills.
After the recent changes in legislations within United Kingdom the educational institutions have to utilize their financial resources intelligently than ever before. Now all Universities are focused on developing student-centred learning environment to attract more and more students. Students on the other hand are more interested in the proper and comprehensive utilization of cutting edge technologies as they are paying higher than ever fees.

The universities in United Kingdom are facing a situation similar to that of financial crisis after the recent government legislation resulting in either withdrawal or a significant decline in government funding. In this situation, the utmost concern within higher education bodies is how to appropriately utilize their available financial resources to overcome the dilemma of emerging technologies and to enhance utilization of emerging technologies to attract more students. The ever growing demand for excellence in higher education has made information technology an essential tool in higher
education institutions (Dawson et al., 2010). Dawson et al. (2010) also argue that ‘the adoption of ICTs … is no longer a luxury, but a necessity for all institutions’ (p. 120). Farhan (2014) further explains that the information technology utilization as a tool has been seen as a significant approach for academics to enhance student learning experience and also to address the competition among education institutions.

III. Emerging technologies intersection with pedagogy:

The emerging technologies come in all shapes and forms. Let us first discuss some of the basic class/lecture room equipment. It’s a common knowledge that the use of blackboard and chalk is an ancient method used by academics in lecture theatres, which later replaced by whiteboard and marker. However, the technology has changed ethos and environment of a classroom. The Table 1 contains a list of essential equipment, which are available to use in lecture room of authors’ institution.

Table 1: List of equipment available in a modern day lecture theatre.

<table>
<thead>
<tr>
<th>Overhead Projector</th>
<th>Multimedia Projector</th>
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</thead>
<tbody>
<tr>
<td>Computer with high speed internet</td>
<td>Connecting ports for laptops with availability of wireless technology</td>
</tr>
<tr>
<td>DVD player</td>
<td>Blu-ray player</td>
</tr>
<tr>
<td>Whiteboard and Markers</td>
<td>Interactive whiteboard</td>
</tr>
<tr>
<td>Sound system</td>
<td>Audio visual equipment</td>
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</tbody>
</table>

The term ‘emerging technologies’ is frequently used, however, it still lacks a clear sense of meaning. The most literature on emerging technologies discusses the concept in the context of its impacts and implications for overall society as well as for pedagogy. In authors’ point of view, emerging technology should be seen as an instrument that assists us to achieve our objectives. Whereas, from an educational institution’s point of view, the clear objective is to provide a learning environment where learners can engage themselves with teaching and learning in a comfortable way. Veletsianos (2010) proposes that the emerging technologies are tools, concepts, innovations and advancements utilized in diverse educational setting to serve varied education-related purposes.

Pollock and Cornford (2002) discuss digital technology as a reformer that had restructured higher education institutions’ ethos, norms, and also their learning and teaching methods. Bouwma-Gearhart and Bess (2012) propose that the changes in academic norms reflect changes in society and technology. The increase in the use of emerging technologies has developed a momentum for electronic learning as well as towards online and blended learning (So and Bonk 2010).

What makes it challenging is the fact that Information technology is rapidly changing and emerging technologies made amendments in the perception of used technologies in a modern higher education environment and lecture theatres. Academics have also responded to this change and educational organizations are also reacting and
encouraging the use of information technologies in institutions (Edmunds et al. 2012). Alam (2013) highlights some of the emerging technologies used within higher education and it’s depicted in Table 2.

**Table 2: Emerging technologies used within higher education (source: Alam, 2013)**

<table>
<thead>
<tr>
<th>Learning with the Internet</th>
<th>Mobile wireless Technologies</th>
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</thead>
<tbody>
<tr>
<td>Learning by Design</td>
<td>Wireless Computers</td>
</tr>
<tr>
<td>Knowledge Webs</td>
<td>Personal Digital Assistants (PDAs)</td>
</tr>
<tr>
<td>Virtual Communities</td>
<td>PDAs and mobile wireless Phones</td>
</tr>
<tr>
<td>Mobile wireless Phones</td>
<td>Short Message Services (SMS) and Multi Media Services (MMS)</td>
</tr>
</tbody>
</table>

It is observed that the enthusiasm in adoption of emerging technologies has a great impact on educational institutions productivity and learning quality. Educational institutions gain more power and control over student learning through technology. According to Hricko and Howell (2006) ‘the most extensive developments during the 1990s may have taken place in the area of teaching on the Internet, with electronic access to course materials’. Information technology is used as a low cost substitute in some academic institutes as more and more courses are taught through internet and intranet. Moreover, modules are designed and structured by utilizing technology in a way that learners achieve their goals through online study. The transformation of knowledge with less consumption of financial and academic resources will effect education institutions and could give a rise to the efficiency of academic institutions (Mansell 2010).

The implementation of the appropriate technology provides learners a platform where they can achieve their learning goal at a low cost solution and student productivity also increases. A notable study by Edmunds et al. (2012) stresses that student learning by deploying various information technology tools is significantly improved. They record one of the respondents saying that ‘ICT allows me to produce more in the time I have (at work or for study) … I can learn and cover material more quickly through the use of ICT... at work’ (Edmunds et al. 2012, p. 82).

The use of social media technologies like twitter, face book and LinkedIn within higher education bridges the gap between academics and students and also encourages students to discuss their ideas more extensively. It’s a general common understanding that information and communication technology has changed the canvas of learning environment within higher education. Information technology has created an environment where academics and learners can have discussion on their ideas and have debate on their research in a non-traditional face-to-face method and this communication and the exchange of ideas between academic stakeholders can facilitate to create socially constructed knowledge (Bouwma-Gearhart, 2012). This intersection of knowledge between stockholders through technology can provide an alternative viewpoints which is called “Co-constructed knowledge” (Hill and Nelson 2011).
Herrington and Parker (2013) convincingly advocate that the emerging technologies have not yet been extensively incorporated within higher education provisions and also add that the disappointment of non-presence of optimal utilizing of emerging technologies in higher education courses can proceed pedagogies in a way which poses the potential danger of isolating a cohort of learners which may have little or no knowledge of emerging technologies. At present we are living in an overanxiousera of technology and internet is emerged as an ideal source of information and if internet is an information superhighway, then teachers just might be the road-kill on the asphalt of the information superhighway. Kirschner and Selinger (2003) suggest that, possibly for the first time in history, students are more adept at using the tools necessary for acquiring and transmitting knowledge than are their teachers. While the over use of technology raise concern among the traditional educationist, there is still a prodigious inspiration information technology brings into higher education in terms of communication, availability of online learning and resource sharing.

One can argue that the emergence of information technology within education has transformed the techniques of teaching within academics and also enhanced the learning methods. Information technology has also encouraged internet-based education (Aragon, 2003). This emerged approach of electronic based learning can be confronted by social presence theory, which according to Aragan is ‘the ability of the learners to socially and affectively project themselves in communities of inquiry’. Some researchers proposed that in internet based learning the main emphasis is on learners’ own time management and self-regulation and have warned that any lacking in these two important pillars can lead to low student performance academically as well as socially (Kilgusieck et al. 2012).This issue can be addressed by a well-managed lesson plan and designing activities throughout the course to keep student engaged within module. However, Arinto (2013) recognised that in internet based learning the activities might enhance student participations and reduce the classical lecture behaviour(with no or little communication with students), but it can also isolate some students as ‘they are constrained to follow group schedules instead of their own pace’.

IV. The Framework of Technological Pedagogical Content Knowledge (TPACK):

There exists consensus among academics that the fact the emerging technologies provides a new canvas for pedagogy and researchers are experimenting different combinations of emerging technologies and teaching styles to develop an educational environment which can satisfy the ever challenging demands of students. The research to identify the accurate combination of emerging technologies and pedagogy goes back to 1995 when Cornu suggested that information technology can deliver a variety of learning styles and also emphasised the need to design a new ‘integrated pedagogy’ (Cornu 1995).

Pierson (2001) came up with an initial idea of technological pedagogy and investigated how teachers with various levels of technological knowhow can use technology in relations to general teaching practice. This idea led the way for other researchers and there emerged in a framework of Technological Pedagogical Content Knowledge (TPACK). The TPACK was established to identifies the knowledge teachers need to teach effectively with technology(http://www.tpack.org/). The Figure 3 explains that at the heart of the TPACK framework is the complex interplay of three primary
forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). The TPACK approach goes beyond seeing these three knowledge bases in isolation. TPACK also emphasizes the new kinds of knowledge that lie at the intersections between them, representing four more knowledge bases applicable to teaching with technology: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK), and the intersection of all three circles, Technological Pedagogical Content Knowledge (TPACK). Please refer to TPACK website www.tpack.org for detail information. Graham asserts that:

'A strong TPACK framework can provide theoretical guidance for how teacher education programs might approach training candidates who can use technology in content-specific as well as general ways. However, in order for that potential to be realized, researchers must work together to shore up weaknesses in the clarity of TPACK construct definitions and in articulating ways that the constructs are related to each other'.

Figure 3: The TPACK Image (source: www.tpack.org)

V. Conclusion

Ours is a technology phobic generation. The modern students have every right to use technology as a mode of learning and demands for the use of latest technological tools to be used in learning environment and academics thus become bound to develop their teaching in collaboration with technology. The increasing demand from students for
adoption of latest technology also forced educational institutions to invest in emerging technology. Where this implementation of technology is very essential to meet the challenges, the education institutions also have to address other issues attached with the flourishing desire. The issues like financial constraints in adopting technology and resilience from some academics favouring traditional methods needs consideration. The appropriate intersection of pedagogy and emerging technologies can provide an environment for students where they have more opportunities and accomplish their desire of learning at a low cost solution. The universities now days are committed to provide a student-centred learning environment and realize that by implementing information technology in higher education the overall efficiency can be increased. Information technology can also be used to reduce operational cost and at the same time can influence the quality and standards of teaching and learning in a positive manner. Acknowledging that the information technology plays a very important part in academic institutions, the universities need to develop formal strategies to address this issue. The existing research shows that more and more education institutes are welcoming the emerging technologies and have already established a link between pedagogy and emerging technology. The better the blend of pedagogy and technology, the better institutes will be able to enhance student learning.

References


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