Information Technology in Higher Education Teaching
Much Ado about Nothing?

Gali Naveh
Department of Industrial Engineering and Management, Shamoon College of Engineering, Bialik St., Beer-Sheva, Israel

Keywords: Information and Communication Technology, Higher Education, Pedagogy, Stakeholders' Perspective, Garbage Can Model.

Abstract: Unlike nearly every aspect of our lives that has changed enormously in the past decades, academic teaching has changed very little, and a professor walking into a classroom populated with dozens of students who are trying to grasp the material presented to them, is relevant today as it was a century ago. To discern this phenomenon, this paper discusses some of the most promising technologies which have emerged during the last quarter of a century (accessibility to the internet, smartphones and Massive Open Online Courses) while indicating their failure to facilitate a large-scale pedagogical change in academia, in contradiction to high expectations and predictions. A perspective is suggested on the perception and motivation of the three major stakeholders of academic teaching – instructors, students and institutes, signifying the lack of incentives on their part for large-scale change. Finally the gap between the volume of research in the field of information technology integration in higher education pedagogy and the little change in academic teaching reality is discussed, and a course of action that may change this state of affair is offered.

1 INTRODUCTION

Finance, agriculture, commerce, manufacturing and art, as almost all other areas in our lives, have changed enormously in the past decades. Current life in western countries does not resemble the life of those who lived in the same places a hundred years ago. Yet, teaching in higher education seems to be almost frozen, compared to its ever changing surrounding. The scene of a professor walking into a classroom, populated with dozens of students who make an effort to grasp the material presented to them, is relevant today almost as it was a century ago. The disciplines taught are broader and more diverse, the material is much more scientifically grounded, the accessibility has improved tremendously and the magnitude of student numbers has grown, but the mainstream of pedagogy practiced has failed to change. Instructors present facts, ideas, processes and methodologies, students submit papers and take exams in a classroom, and pass (or fail) the course with a grade, as they did decades ago. This is especially surprising since the technology that has transformed so many aspects of our life beyond recognition, is relevant to higher education teaching as it is to other domains. Moreover, this technology is integrated in administrative processes in higher education (such as registration and payment) and has greatly changed the way student administrative services are offered. To discern this phenomenon, this paper discusses some of the most promising technologies that were expected to change the face of higher education, and proposes some explanations to their failure to do so. The paper concludes with a discussion of the implications of this conjecture, and offers a path that may change this state of affairs.

2 EMERGING TECHNOLOGY AND THEIR IMPACT ON ACADEMIC TEACHING

Perhaps the most significant technological change in the past decades is the internet. The accessibility to the internet in practically every house in western countries (not to mention internet cafes, free Wi-Fi in public places and later via smartphones), hyped the hopes and dreams of many educators (e.g. Woods, Baker and Hopper, 2004; Mason, 2000, Benett and Bennett, 2003; Lynch, 2002; Harasim 1999). At the turn of the 21st century, predictions were made as to the upcoming transformation of

Naveh G..
Information Technology in Higher Education Teaching - Much Ado About Nothing?.
DOI: 10.5220/0005486904500454
In *Proceedings of the 7th International Conference on Computer Supported Education* (CSEDU-2015), pages 450-454
ISBN: 978-989-758-108-3

higher education, suggesting that the accessibility to information will change the role of the instructor from teacher to facilitator, that the technology will provides opportunity to enhance students' involvement in their study, generate students' centred teaching/ learning, improve students' achievements, enable a more active and personalized learning process, etc. (Harasim, 2000; Norton et al., 2005; Phipps and Merisotis, 2000; Wegner, Holloway and Garton, 1999). But the numerous projects materializing the potential of the technology and making revolutionary integration of Information and Communication Technology (ICT) into academic courses failed to conclusively prove the positive effect of the change, and remained in the margin of academic teaching (Russell, 1999; Phipps and Merisotis, 1999; OECD, 2005). Ten years after more than 90% of academic institutes surveyed by the OECD (2005) declared they have an online learning strategy and over 70% adopted a Learning Management System (LMS), these information systems are used mainly as administrative tools (e.g. the dissemination of learning materials and grades), and meaningful pedagogical changes facilitated by them are rarely found.

A few years later, as smartphone adoption entered Rogers' (2003) late majority phase in western countries (Nielsen, 2013), as well as some third world countries (Deloitte and GSMA, 2012), a new hope for change in academic teaching has emerged – mobile-learning or m-learning – learning using personal electronic devices. Educators talked about learning any time and any place, consuming small pieces of information, making good use of available small chunks of time by learning on the train on the way to work or to the campus, or while waiting in line at the bank. Others talked about situated learning or using phones in the classroom to increase students' involvement (e.g. Corbeil and Valdes-Corbeil, 2007; Liu and Carlsson, 2009; Naismith et al., 2004; Cruz, Boughzala and Assar, 2014). Experiments were made, projects were funded (e.g. Savill-Smith, 2002; Paletta et al., 2012), but half a decade into the hype, once again the results do not meet the expectations (Liu and Han, 2010), and the use of smartphones in academic courses is very rare, to say the least.

The latest significant promising development is Massive Open Online Courses (MOOCs). Courses offered by the best institutes of higher education, free of charge and available online were expected to make real change by making education available as never before. However, this year, as it was in the past few centuries, most of the graduating students took the majority of their classes in a face-to-face format, with a professor in a physical classroom, while the majority of students taking a MOOC already holds a degree (Emanuel, 2013), and usually more than 90% of them drop the class before it reaches its ending point (Jordan, 2014). A few years into well-organized blossoming activity of MOOCs with hundreds of courses offered and millions of course enrolments, the results indicate that this wonderful idea will not change the face of higher education. Contrary to high hopes, taking a MOOC requires much more than an internet connection. Students need to be fluent in English (only a fraction of the courses are offered in other languages), and have to hold distance learner skills, on top of basic learning skills (Mackness, Mak and Williams, 2010). All of these are not trivial for a large portion of the population MOOCs were hoping to reach. It seems that MOOCs, as many other resources, are much more available to those who already hold resources.

The fountain of technological innovations with a potential to shift higher education pedagogy gushes with many more opportunities. Online virtual worlds, social networks, wikis, podcasts, gamification, augmented reality and many more, kindled the imagination and dreams of devoted educators, but none of them materialized the potential to a degree of meaningful changes in the mainstream of teaching pedagogy in academia. Even when examining the accumulating impact of all these technologies, the effect is not significant. With all these technologies at instructors' disposal, they walk into classrooms with their notes and PowerPoint presentations (which are merely a technical upgrade, with no pedagogical impact from the projector slides used two decades ago).

This raises the question what is unique in academic teaching to cause the shift generated by technology to skip pedagogy in higher education while transforming almost every other aspect of our lives.

The answer to the this question should be three-fold, as the number of major stakeholders in academic teaching – instructors, students and institutes (Wagner, Hassanein and Head, 2008), as discussed next.

3 STAKEHOLDERS' PERSPECTIVE

Most instructors, like most workers in every profession, would like to do the best work possible

with minimum resources. However, the experiments made with pedagogically meaningful integration of technology into academic course has shown benefits only at an anecdotal level, and meta-analysis shows no obvious or outstanding value (e.g. Russell, 1999; Phipps and Merisotis, 1999), while adopting technology and making changes to hundreds of years old practices requires tremendous effort. Moreover, many experiences with technology facilitating shifts in teaching pedagogy demonstrated that the resources required do not level back to what they were before the change, even after acquiring know-how with the new methodologies, and remain higher than in traditional teaching (Wallace, 2003; Hara and Kling, 1999; Doughty, Spector and Yonai, 2003). With no consensus on the upside (better learning) and obvious downside (higher effort) it is only natural that instructor will not hurry to integrate technology and make large-scale changes in their teaching. This is even more probable when considering that teaching is only one aspect of the roles of higher education instructors, alongside administrative tasks, and more importantly - research.

The second, and maybe most important, stakeholder in this issue, the students, support the standstill as well. Students' perception and expectation of the role of technology in academic teaching is not often examined in research, and when it does, it presents somewhat surprising views. Putting aside anecdotal revolutionary implementation of ICT in academic courses, students don't expect nor wish for changes in traditional face-to-face teaching. They would like the technology to support the administrative process accompanying studying, but show no desire for it to function as an enabler of changes in traditional pedagogy (Naveh, Tubin and Pliskin, 2012). For students, the best use of technology would be an easily accessed, well organized websites, abundant with learning material (Naveh, Tubin and Pliskin, 2010). A more revolutionary pedagogy usually requires more effort on the part of the students as well (Hara and Kling, 1999; Doughty, Spector and Yonai, 2003), an effort perceived by students as superfluous since their objectives (learning and acquiring an academic degree) are currently achieved without it. This is not to say that students are not enthusiastic about unique ICT-enabled pedagogy, but they don't expect or want it to be the mainstream of their study.

Last, but not least, of the dominating stakeholders of technology integration into academic teaching, are higher education institutes. They wish to be cost effective on one hand, as budget cuts are a constant threat (Green, 2009; Wagner, Hassanein and Head, 2008), and on the other hand, be perceived by potential students as leaders of innovation in order to remain attractive in the competitive environment of higher education. These potentially contradicting objectives may explain the current state of academic institutes, which purchase the technology that could support a shift in pedagogy, but deploy it only to a degree of supporting administrative teaching processes (such as posting learning material) (OECD, 2005). This way, the institutes both save resources (e.g. homework assignments do not have to be distributed by the instructor but posted on the course website, transferring the cost of printing and photocopying to the students), and are perceived as innovative due the use of emerging technology. This organizational behaviour is in line with the institutional theory which suggests that an organization might make symbolic changes with no significant impact on the organizational core activities in order to meet the expectations of its surrounding environment (Mayer and Rowan, 1977). Academic institutes have no incentive to invest more resources in making true changes in their pedagogy which is not guaranteed to promote the effectiveness of the teaching process on one hand, while already perceived as doing what is best for their customers (the students) on the other.

The combination of the perceptions and motivations of all three major stakeholders of academic teaching, as outlined here, generates a unique outcome, as discussed next.

4 DISCUSSION

It seems then, that from the point of view all major stakeholders, the current situation where academic teaching pedagogy changed very little in the past decades, as opposed to almost all other practices inside and outside academia, is not an issue at all. The majority of instructors are satisfied with the current situation and do not wish to invest resources in a process whose outcome is uncertain; students would like the technology to be used as a supporting administrative tool as it currently is; and institution administrators are satisfied with the technical efficiency LMS provides them and the image it promotes of technology adopters. In other words, the perceived usefulness of further integrating technology into academic teaching and transforming it, is rather low for all major stakeholders of the

process, thus hindering the adoption, as suggested by the Technology Acceptance Model (TAM) (Davis, 1989), which identified Perceived Ease of Use and Perceived Usefulness as influencing factors on the adoption of technology.

Thus, all key stakeholders are comfortable with the current state and have no urging incentive to change it. Perhaps even the contrary is true, since making changes require more resources which are always scarce. In this state of affairs, the rise of a new technology is unlikely to generate a wide and large-scale change, as past decades have demonstrated. An ICT could facilitate a meaningful shift in academic teaching only if it presents an easily observed and proven benefit, i.e. clearly perceived usefulness of adopting the technology, such as apparent decrease in resource consumption for one (or more) of the major stakeholders of the process.

Alongside the relative standstill of the mainstream of academic pedagogy in the past decades, tremendous amount of research was, and still is, conducted on the potential of pedagogy shifts in academic teaching facilitated by ICT adoption, as each novel technology ignites the imagination and enthusiasm of educators as to new possibilities and opportunities. Papers detailing researches focusing on what can and should be done with technology in academic courses and examining motivators and inhibitors, facilitators and barriers, populate scientific journals as they did ten and twenty years ago.

With the continuous profusion of ideas, thoughts, researches and discussions, with little real-world change in the last quarter of a century, one might wonder if this engagement with technology integration into higher education teaching has been Much Ado About Nothing.

One possible path that perhaps should be explored in order to produce different results is the decision making process in which integration of ICT into academic teaching is being conducted. Higher education institutes have been identified as organized anarchies, suggesting that the decision making in these organizations often follow the garbage can model (Cohen, March and Olsen, 1972), i.e., education institutes may be viewed as a collection of choices looking for problems, rather than a tool for resolving clearly defined problems. In this perspective, technologies may function as solutions looking for problems to solve. This approach is present in countless studies, as their starting point is the technology, not the pedagogical problems faced by higher education institutes (e.g. Liu, Li and Carlsson, 2009; Woods, Baker and Hopper 2004). A more rational, well established decision process, where the integration of a specific technology, in a certain way, in defined settings, is the outcome of a decision made after analysing a problem, exploring potential solutions, examining their impact on the problem and the environment, and choosing the one that is most cost-effective, may produce better results.

REFERENCES

Bennett, J and Bennett, L 2003, 'A review of factors that influence the diffusion of innovation when structuring a faculty training program', *The Internet and Higher Education*, vol. 6, pp. 53-63.

Cohen, MD, March, JG and Olsen, JP 1972, 'A Garbage Can Model of Organizational Choice', *Administrative Science Quarterly*, Vol. 17, No. 1, pp. 1-25.

Corbeil, JR and Valdes-Corbeil, ME 2007, 'Are you ready for mobile learning?', *Educause Quarterly*, vol. 30, no. 2, pp. 51–58.

Cruz, Y, Boughzala, I and Assar, S 2014, 'Technology acceptance and actual use with mobile learning: First stage for studying the influence of learning styles on the behavioural intention', Paper presented at the *22nd European Conference on Information Systems,* Tel-Aviv, Israel.

Davis, FD 1989, 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, vol. 13, pp. 319–340.

Deloitte and GSMA 2012, *Sub-Saharan Africa Mobile Observatory*, Available from: <http://www.gsma.com/publicpolicy/wp-content/uploads/2013/01/gsma_ssamo_full_web_11_12-1.pdf> [February 4, 2015]

Doughty, PL, Spector, M and Yonai, BA 2003, 'Time, Efficacy and Cost Considerations of e-Collaboration in Online University Courses', *Brazilian Review of Open and Distance Learning*, Available from: <http://www.abed.org.br/revistacientifica/Revista_PDF_Doc/2003_Time_Efficacy_Cost_Considerations_Philip_Doughty_Michael_Spector_Barbara_Yonai.pdf >. [February 4, 2015]

Emanuel, EJ 2013, 'Online education: MOOCs taken by educated few', *Nature* 21 November. Available from: <http://www.nature.com/nature/journal/v503/n7476/full/503342a.html> [February 4, 2015].

Green, KC 2009, 'The 2009 National Survey of Information Technology in U.S. Higher Education', *The Campus Computing Project*, Encino, CA, USA.

Hara, N and Kling, R 1999, 'Students' frustrations with a Web-based distance education course', *First Monday*, vol. 4, no. 12.

Harasim, L 1999, 'A Framework for Online Learning: The Virtual- U', *Computer*, vol. 32, no. 9, pp 44-49.

Harasim, L 2000, 'Shift happens: Online Education as a

New Paradigm in Learning', *The Internet and Higher Education*, vol. 3, no. 1, pp. 41-61.

Jordan, K 2014, 'Initial Trends in Enrolment and Completion of Massive Open Online Courses', *The International Review of Research in Open and Distributed Learning*, vol. 15, no. 1, pp. 133-159.

Liu, Y and Han, S 2010, 'Understanding the factors driving m-learning adoption: a literature review', *Campus-Wide Information Systems*, vol. 27, pp. 210-226.

Liu, Y, Li, H and Carlsson, C 2009, 'Exploring the factors driving M-learning adoption', *AIS Symposium conducted at the meeting of the AMCIS 2009*, San Francisco.

Lynch, D 2002, 'Professors should embrace technology in courses', *Chronicle of Higher Education,* B15.

Mackness, J, Mak, SFJ and Willims, R 2010, 'The Ideals and Reality of Participating in a MOOC', *Proceedings of the 7th International Conference on Networked Learning*. Aalborg, Denmark.

Mayer, JW and Rowan B 1977, 'Institutional Organizations, Formal Structure as Myth and Ceremony', *American Journal of Sociology*, vol. 83, p. 340-363.

Msson, R 2000, 'From Distance Education to Online Education', *The Internet and Higher Education*, vol. 3, no. 1, pp. 63-74.

Naismith, L, Peter, L, Giasemi, V and Shaples, M 2004, 'Literature Review in Mobile Technologies and Learning', *Futurelab*, Bristol.

Naveh, G, Tubin, D and Pliskin, N 2010, 'Student LMS use and satisfaction in academic institutions: The organizational perspective', *Internet and Higher Education*, vol. 13, no.3, pp. 127–133.

Naveh, G, Tubin, D and Pliskin, N 2012, 'Student Satisfaction with Learning Management Systems: A lens of critical success factors', *Technology, Pedagogy and Education*, vol. 21, pp. 337-350.

Nielsen 2013, *Ring the Bells: More Smartphones in Students' Hands Ahead Of Back-To-School Season*, Available from: <http://www.nielsen.com/us/en/insights/news/2013/ring-the-bells-more-smartphones-in-students-hands-ahead-of-back.html> [February 4, 2015].

Norton, L, Richardson, JTE, Hartley, J, Newstead, S and Mayers, J 2005, 'Teachers' beliefs and intentions concerning teaching in higher education', *Higher Education*, vol. 50. pp. 537-571.

Organization for Economic Co-operation and Development (OECD) Observer, 2005, '*E-learning in Tertiary Education, Policy Brief*', from: <http://www.oecd.org/edu/ceri/35991871.pdf > [February 4, 2015].

Paletta, L, Kluzer, S, Ros, A, Bobeth, J and Kukulsa-Hulme, A 2012, 'MASELTOV – Mobile assistance for social inclusion and empowerment of immigrants with persuasive learning technologies and social network services', *Proceedings of the Conference on Digital Crossroads: Media, Migration and Diaspora in a Transnational Perspective*. Utrecht, Netherlands.

Phipps, R and Merisotis, J 2000, 'Quality on the line: benchmarks for success in internet based distance education', *Institute for Higher Education Policy*, from: <http://www.nea.org/assets/docs/HE/QualityOnTheLine.pdf > [February 4, 2015]

Rogers, EM 2003, *Diffusion of Innovation*, 5th edn, Free Press, New York.

Russell, TL 1999, *No Significant Difference Phenomenon*, North Carolina State University, Raleigh, NC, USA.

Savill-Smith, C 2002, 'The m-Learning Project and its investigation into young adults use of mobile phones', *The Annual Conference of the British Educational Research Association*, University of Exeter, England.

Wagner, N, Hassanein, K and Head, M 2008, 'Who is responsible for E-Learning Success in Higher Education? A Stakeholders' Analysis', *Educational Technology and Society*, vol. 11, no. 3, pp. 26-36.

Wallace, RM 2003, 'Online Learning in Higher Education: a review of research on interactions among teachers and students', *Education, Communication and Information*, vol. 3, pp. 241-280.

Wegner, SB, Holloway, KC, and Garton, EM 1999, 'The effects of Internet-based instruction on student learning', *Journal of Asynchronous Learning Network*, vo. 3, pp. 98 – 106.

Woods, R, Baker, J and Hopper, D 2004, 'Hybrid Structures: Faculty Use and Perception of Web-Based Courseware as a Supplement to Face- To – Face Instruction', *The Internet and Higher Education*, vol. 7, pp. 281-297.