



Fostering Student's Engagement in the Digital World: Technology - A Boon or a Barrier?

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Abstract

School education is stepping into a new phase worldwide, with the more use of technology within the classroom. It's a theme of debate between instructors and technology fostering student's engagement in active learning. This paper presents a comparative study of student's engagement versus the instructors' experience of using technology, especially within Science education. Science education promotes more on hands-on experience for better engagement but interesting to work out how technology overcome these barriers and supply similar results. In Science lessons, students are introduced to different tools to maximise participation. These tools not only help them to gain real-life experience but also make them more confident learners. Alongside scientific skills, it also helps them to develop IT skills, necessary in this digital era for lifelong learning. The results of each lesson are evaluated based on how confident instructors and students are with technology, student's involvement, clearing misconceptions at an early stage, and opportunities to develop real-life skills.

Keywords: *technology, digital world, student engagement, secondary science education*

1. Introduction: Learning environment/Student engagement and technology

Fostering student's engagement through technology is a crucial area of interest, within the secondary educational community in person and remotely [7]. Engagement does not occur in a vacuum, thus impacted and influenced by various factors when using technology. Students' and instructors' access to technology is the biggest issue due to its nature and complexity. Recognising the role technology plays now in education and forever, and the potential it has to involve students, this paper shares experiences of instructors, and the overall impact of technology on their professional development. A survey was conducted among Science teachers to share their real-life experience, confidence level, how they are using technology to clear misconceptions, students' involvement, and any possible ways to develop life-long skills. The aim of every instructor is to make students' successful global learners. This should have an accountability outcome unto itself.

Technology is not simply using computers, it is much more beyond that includes learning tools, audio-visual resources, and diverse forms of communication necessary in all disciplines. Technology provides network connections between subjects, allows learning from and with each other, within the school community and globally. In the past few years, the Science curriculum has focused on the mastery of individual disciplines. This has now changed to an interdisciplinary approach, which could be achievable with the enhanced use of technology. In the real-world, student engagement is not only limited to core knowledge and understanding, it is more directed towards engaging ways of learning through quality instruction. Intrinsic motivation is at its best when students are fully engaged and actively participating. A need for a change in pedagogy is clear, but the ways to implement the technology are still in the early stages of development.

Various authors have suggested that this change is uncomfortable at first glance, due to the challenges involved in controlling process and content. Further, it is also suggested that this new change allows ambiguity, arises many unfold stories and questions instructor's freedom of speech and expertise. However, on the positive front, this change opens doors for instructors and students to success and prosperity. A deeper transformation is required within secondary schools across the globe to foster student's engagement in this digital world.

2. Research findings

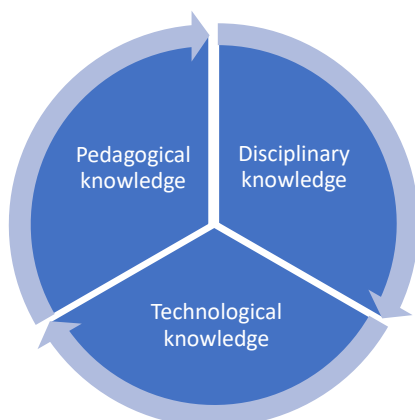
Research shows that various measures have been implemented to see how many students are involved in active learning. But these measures mainly focused on quantitative data such as assessment scores, attendance, behavioural points, pass rate and opting for higher education [14]. The outcome of these measures has been analysed at a later stage. In real sense, instructors are unable to meet the expectation of the students in this fast pace changing world, thus results in



reducing higher education and future opportunities [3]. In lieu of that, researchers start focused on another way of measuring engagement quantitatively and qualitatively that can be analysed instantly, which helps to turn disengaged learners to engage learners in no time. Present century needs collaborative critical thinkers, creative and courageous innovators, and true lifelong learners [10]. Today's learners consistently looking for opportunities that allow them to explore and to find solutions and answers for themselves [15]. Embedding interactive technology could bring significant change in teaching and learning [11]. A culture of learning is a need of an hour when teachers and students are learning simultaneously, focussing on teaching, learning and engagement before achievement. Dunleavy and Milton, 2009 [4] added that, exposure to digital technologies help to bridge student's learning experience in and outside. In contrary to that, (Oblinger and Oblinger, 2005) [15] and (Barnes, Marateo and Ferris, 2007a) [1] stated that the generation may lack information literacy skills and have weak critical thinking skills due to more dependency and frequent use of such electronic tools. OECD (2008) [9] also suggested that many researchers still believe that technology causes more harmed to learners than its positives, however, this view is a minority.

3. Experience

Quite interestingly, after reading interviews and surveys from various science researchers', and educators it is found that everyone is using technology in one form or another while delivering the course content, without actually measuring it quantitatively and qualitatively to know how it is affecting their practice and students' learning. Surprisingly, it is evident that nearly 90% of students are engaged in active learning when using technology at the school level. It makes learning accessible for all students, but for instructors it's use is limited to the following:



- To explain different concepts and make explanations more explicit and visually
- To automatically collect data
- To access student's understanding
- To allow differentiation at a broader level
- To allow deeper questioning that further helps to embed concepts more effectively
- To increase confidence and confidentiality
- To strengthen retrieval practice
- To enhance digital literacy, creativity, and IT skills

Fig 1. PTD Model for an Interdisciplinary Approach

Figure 1, shows a continuous revolving model of Pedagogical, Technological, and Disciplinary knowledge, considering these as three strong pillars in an education industry now and forever. If one pillar fails it affects the others, and in turn student's engagement and progress. This further impacts on their future job opportunities. An ever advancing technological world can be impaired. My survey suggested that students and instructors have an awareness of the technology but a lack understanding of its effective use. Technology does help to clarify misconceptions if proper training is given to students and instructors to make best use of it. To implement this, most important step is to proper use of allocated budget in the education industry considering its lifelong benefits.

4. Final reflections

It is interesting that everyone favours the technology as a boon over the barrier, even without having a real sense of its impact on progress. The impact of the technology is yet to be measured quantitatively and qualitatively, other than the student engagement. Thus, there is a need to measure the impact of it at every level starting from a kindergarten to the university, by students and instructors. A need to introduce continuous development programmes primarily focused on IT skills in this era of the digital generation. It is rightly said that the key to the student success is directly proportional to how schools respond to their needs and expectations. Apprenticeships and jobs directly linked to STEM developing these skills across subjects at a secondary level, now-a-days become a necessity. The self-directed learning opportunities also help to develop the skills required to become successful global citizens.



5 References

- [1]. Barnes, K., Marateo, R. & Ferris, S. P. (2007a). Teaching and Learning with the Net Generation. *Innovate Journal of Online Education*, 3(4). Reprinted in The Fischler School of Education and Human Services at Nova Southeastern University; Pennsylvania. Retrieved December 2010 from: http://www.innovateonline.info/pdf/vol3_issue4/Teaching_and_Learning_with_the_Net_Generation.pdf
- [2]. How Technology Can Boost Student Engagement, 2014, Pearson
- [3]. Carlson, S. (2005). The Net Generation goes to college. *The Chronicle of Higher Education*, Section: Information Technology, 52(7), A34. Retrieved October 30, 2010 from [http://www.msmc.la.edu/include/learning_resources/todays_learner/The_Net_Generation .pdf](http://www.msmc.la.edu/include/learning_resources/todays_learner/The_Net_Generation.pdf)
- [4]. Dunleavy, J. & Milton, P. (2009). What did you do in school today? Exploring the concept of Student Engagement and its implications for Teaching and Learning in Canada. Toronto: Canadian Education Association (CEA), 1-22.
- [5]. Gayle A. Buck, Nicole Beeman-Cadwallader and Amy Trauth-Nare (2016). Improving K-12 STEM Education Outcomes through Technological Integration Series: Advances in Early Childhood and K-12 Education, Page 86
- [6]. Guzman, A., & Nussbaum, M. (2009). Teaching competencies for technology integration in the classroom. *Journal of computer Assisted learning*, 25(5), 453-469.
- [7]. Henderson, M., Selwyn, N., & Aston, R. (2017). What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. *Studies in Higher Education*, 42(8), 1567-1579. <https://doi.org/10.1080/03075079.2015.1007946>
- [8]. J. Voogt, G. Knezek, M. Cox, D. Knezek and A. Ten Brummelhuis (2013). Under which conditions does ICT have a positive effect on teaching and learning? *A Call to Action Journal: Journal of Computer Assisted Learning*, Volume 29, Number 1, Page 4
- [9]. Organization for Economic Co-operation and Development (OECD) (2008). *New Millennium Learners. Initial findings on the effects of digital technologies on school-age learners.* OECD/CERI International Conference "Learning in the 21st Century: Research, Innovation and Policy," May 15-16 2008. Paris: Center for Educational Research and Innovation. <http://www.oecd.org/dataoecd/39/51/40554230.pdf>
- [10]. Prensky, M. (2005). Engage me or enrage me. *EDUCASE Review*, 40(5), 61–64.
- [11]. Ramaley, J., & Zia, L. (2005). The Real Versus the Possible: Closing the Gaps in Engagement and Learning. In D. Oblinger & J. Oblinger (Eds), *Educating the Net generation*, pp. 8.1- 8.21). Boulder, CO: EDUCAUSE. Retrieved October 30, 2010, from <http://www.educause.edu/educatingthenetgen>
- [12]. Robinson, K. (2009). *The Element: how finding your passion changes everything.* Toronto, Ontario: Penguin Group.
- [13]. Tapscott, D. (1998). *Growing up digital: the rise of the Net generation.* New York: McGrawHill.
- [14]. Taylor , L. & Parsons, J. (2011). Improving Student Engagement. *Current Issues in Education*, 14(1). Retrieved from <http://cie.asu.edu/>
- [15]. Windham, C. (2005). The Student's Perspective. In D. Oblinger & J. Oblinger (Eds), *Educating the Net generation* (pp. 5.1-5.16). Boulder, CO: EDUCAUSE. Retrieved December 2010, from <http://www.educause.edu/educatingthenetgen>