



Facilitating the Paradigm Shift: Encouraging Student Engagement through ICT

Robert Craig¹, Asli Hassan²

Abstract

The last two decades or so have seen a noticeable paradigm shift in education from traditional teaching methodologies towards a more active, inquiry-based and technology driven practices. In many cases, higher education has been slow to respond to such changes for various reasons but developments in technology and a generation of students expecting its use, has had a positive impact on the way courses are delivered, and more importantly, the way learners learn.

This paper describes initiatives taken recently at an EMI engineering institute in Abu Dhabi to promote student engagement through the use of IT, and focuses on gains across a range of learning outcomes related to language development, research, critical thinking, and teamwork skills.

Keywords: Engagement, ICT, inquiry-based learning, learner autonomy, real-world activity

Introduction

The Organization for Economic Cooperation and Development [1] and the Partnership for 21st Century Skills [2] have highlighted the need for change in our approaches to teaching and learning if we are to meet the needs of twenty-first century professionals. In order to fully participate in an ever changing knowledge society, today's graduates need to demonstrate a far greater range of personal skills and competencies than traditional a curriculum prepares them for. [3] suggests that there a sizeable gap between the skills required in the workplace and those taught in secondary and higher education. According to [4], our education systems are not conducive to promoting motivation, engagement and learning for the present generation of 'digital natives' [5] believe that today's students have a growing intolerance for pedagogies that are non-engaging, and that their familiarity with technology. [6] says this impacts their "view of authority, especially traditional scholastic authority".

Engaging students in their learning is the key to success and will more likely result in better performance [7] particularly in improved cognition and skills [8] Engagement is more likely to occur when students develop knowledge and understanding by working, learning and sharing together, particularly in situations that attempt to replicate real-world, professional activity [9]. Today, such activity inevitably involves interaction with information and communication technology (ICT) and enables learners to develop from being consumers of knowledge to producers. This shift to a learner-centered paradigm creates an environment where students are actively involved, learn by doing and through social interaction while taking responsibility for their learning.

Context

The Petroleum Institute (PI) in Abu Dhabi is an English-medium university that offers undergraduate degrees in Chemical Engineering, Mechanical Engineering, Materials Science and Engineering, Petroleum Engineering and Petroleum Geosciences. The vast majority of its students are studying in English as an additional language.

The first year of the undergraduate curriculum includes many of the commonly required courses to engineering programmes - Chemistry, Calculus, Physics, an Engineering Seminar, and English courses. The two English courses, Communication101 and Communication 151 have four main student learning outcomes, (1) effective written, spoken and graphic communication, (2) ability to develop and use data gathering instrument(s) in research, analysis and discussion of results, (3) an ability to work effectively and professionally in a team, and (4) awareness of, and engagement in, independent study and life-long

¹ Khalifa University of Science and technology, Petroleum Institute (UAE)

² Khalifa University of Science and technology, Petroleum Institute (UAE)

learning. The first course (COMM 101) is designed to introduce students to the language and communication skills that are required for undergraduate engineering study. Critical reading, critical writing and oral presentation skills are developed through a context of involvement in team-based research projects, which also aim to raise student awareness of quality time-management skills, teamwork and meta-cognition. The following course (COMM 151) builds on these skills and focuses on developing critical thinking. Students are required to undertake a second “real-world” academic, educational or technical research project. The research approach of these two courses provides a framework for a GOAL protocol (Gathering information, Organizing a process, Analyzing a problem and Learning from their efforts), and, as such, an opportunity to develop life-long learning skills.

Impetus

The initiatives described in this paper are the results of the PI's strategic goals to improve students' engagement and academic performance through the development of enhanced learning environments. In doing so, it would also fulfill accreditation requirements of providing best teaching practices, and continuous improvement, thereby meeting its stated mission and vision objectives. The specific aim of the project was to create optimal learning environments that would include state-of-the-art technology and facilities along with the adoption of laptops so students use ICT both in and out of class, to support enhanced curricula. Encouraging the use of ICT supports the facilitating role of teachers in assisting learners to move beyond consumers of knowledge to co-creators of knowledge. The new learning spaces also signal a move from the traditional classroom; no longer are they designed to focus on the teacher but now accommodate new learning styles and technologies.

Design

One of the initiatives was facilitated through the Active Learning Programs (ALPS) that called for redesigned, student-centered, active learning spaces with fully integrated state-of-the-art educational technology. To facilitate the initiative, the design of the ALPs rooms was informed by findings from digital native research [10, 11] which provided the our learners' traits, the learning theory principles that support, the appropriate spaces and the suitable IT. For instance, multitasking is one the traits that coincides with the active learning theory along with the spaces with various tools and the availability of wireless internet. Another trait of digital natives is that they are goal and achievement oriented which goes with metacognition/formative assessment learning theory (Dewey) supported with access to facilitators/tutors and online assessment. Group activity was the one trait that fit well the curricula of the two English courses based on collaborative, cooperative learning theory principles. Students work in teams throughout the semester and the setting of the learning spaces befitted along with the screen sharing tools used.

ICT and Language Learning

The shift over the last two decades to a learner environment where students are actively involved and learn by doing, and through social interaction has been significantly influenced by theories of constructionism, social constructivism and situated learning. Within such a framework, knowledge is constructed by adding new information, ideas and experiences to what we already know.

Language acquisition uses the same mechanisms; language is used for interaction and target language input and output is maximized in group situations. Following Vygotskian principles in which what has been learned from one task provides the impetus for the next, language acquisition is unconscious, and allows learners to engage in the kind of natural discourse that traditional pedagogies do not. That language learning is a social activity means that interaction will be optimized and promoted through group work. [12] suggests that intensive interaction in the group results in internalization of the language produced. The team and inquiry-based approach described provides an environment for language learning to flourish due to participants' involvement and efforts to communicate with each other, in and out of the classroom. Control of, and responsibility for, their learning develops as team-members work towards a common goal. The process demands reflection and negotiation of meaning, and resolution and compromise of direction, and in doing so promotes the learner autonomy essential for real language use.

The technology available today provides opportunity for constructivist principles to be applied to learning. Interactive, multi-modal learning environments promote learner autonomy and language proficiency that “are mutually supporting and fully integrated with each other” [13 p. #].



Students can address real world, 21st century tasks, using the latest organization and planning tools, and engage in the multi-tasking, instant retrieval and on-line discussion behaviors they favour. Learning to work and communicate in a team is an integral part of the language learning process and team-members can make use of technology to perform a range of tasks independent of the instructor, in and out of the classroom. **Table X** below lists the main uses of IT over the last year.

Table X: *Technology-based teaching/learning activities in Communication courses*

Online assessment/homework	Drawing/CADD
Online feedback	File sharing
Blog/Website creation	Electronic note-taking/Annotation
Brainstorming/Mind-mapping	Spreadsheets
CLICKSHARE	Presentations
Data analysis	Project management tools
Discussion forums	Social networking sites
Document creation & editing	Storyboarding
Student use of whiteboard walls	Video

Impact

Findings from a range of instruments used to collect evidence of the impact of the approach on the development of targeted skills suggest that significant gains are made; between two-thirds and three quarters of students report their reading, writing, listening, presentation, critical thinking, organizational, and reflection skills have improved either 'a lot' or 'quite a lot'. This is confirmed by evidence of student learning outcome (SLO) success. The most recent findings show that 90% of students on the 101 course were rated as 'Effective' in terms of being able to combine reading and writing skills effectively, in order to describe and summarize observations, arguments and ideas. Somewhat fewer students (71.6%) on the following 151 course achieved the same rating. Such development is perhaps due to the interest students have in working together and of their developing autonomy. By the end of the second course, almost all students demonstrate a high degree of awareness and application of the basic requirements for a team to function in an effective manner, increasing from just over 90% on COMM 101. Similarly, almost all students (96% and 100%, respectively) were rated as being able to give effective presentations, in which they described and summarized the research process, academic observations, arguments and conclusions related to their team project.

Conclusion

ICT infused curricula when is properly designed, it encourages students to take control of their learning processes. It also promotes collaboration, increases engagement and provides opportunities for teachers and learners to co-create knowledge. Although the initiatives were well received by majority of the students and faculty, some resistance came from the content (science, mathematics) instructors mainly rejecting as technology was the driving force and not pedagogy. Further study that examines the opposing views through the use of focus group is recommended. This will allow everyone to have a say in the project before it is fully implemented.

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