# Evaluation of the Active Learning Approach on Students' Quality of Learning in Singapore

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## Background

- This study is conducted to evaluate the effect of encouraging the active learning approach on the students' quality of learning, so as to develop effective learning environments and approaches in teaching for Singapore.
- This is an area on the UK Professional Standards Framework (UKPSF) for teaching and supporting learning in higher education that the Singapore-based lecturer would like to develop.
- This evaluation is conducted on a an undergraduate fourth year module with a class size of hundred and fifty students from both the Mechatronics (MT) and Mechanical Design Engineering (MDE) Programmes.

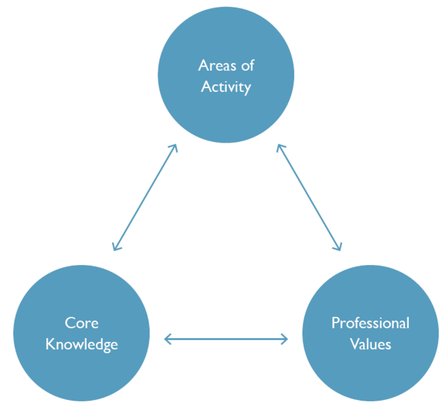


Figure 1: UK Professional Standards Framework for teaching and learning in higher education.

## Motivation

- In O'Neill & McMahon (2005), it is reported that the paradigm shift away from pure teaching to an emphasis on learning has encouraged power to be moved from the teacher to the student.
- This is further supported in Ditcher (2001) that teachers can never ensure a deep approach to learning for their students but the teaching conditions can be arranged to encourage deep learning.
- On top of it all, some elements which make a lecture "unmissable" by Revell and Wainwright (2005), are a high level of participation and interaction, a clear structure of the materials enabling integrative links to be made and the passion and enthusiasm of the lecturer.

## Activities to Encourage Active Learning

**Sparks For Learning**

1. MATLAB /Simulink simulations and videos are used in the lectures to illustrate the applicability of the subject matter in real life. It is also supported by Wright (2005) and Browns and Atkins (1988) that lecturing should not only involve the transmission of information. Social responsibility is also instilled in the students whom are training to be future engineers. An article "Respect the Unstable" written by the Bode Lecture Prize Award Winner is also covered in the lecture, which illustrates the negative implications of improper control system design on the society.

**Resilient Learners**

2. Mini classroom exercises are also designed for the students to practice what they have been taught and be exposed to real life engineering problems. Prior to releasing the solutions, the students are given time to discuss with their peers on their approach. Dweck (2006) has discussed that students grow to be resilient learners when they adopt the growth mindset and believe that their abilities can change with practice. This is very much in line with the Asian culture that "practice makes perfect" and hard work is required for success.

**Deep Learning**

3. Pre-readings are also uploaded online for the students to read before they come to lectures. It has been recognized by authors such as Williams (1997) that students find reading in advance for discussion in the next lecture a good way of active learning. This is further supported in Entwistle et al. (2000) that active learning is critical to deep and high quality learning versus the surface approach to learning and teaching.

## Evaluation Results

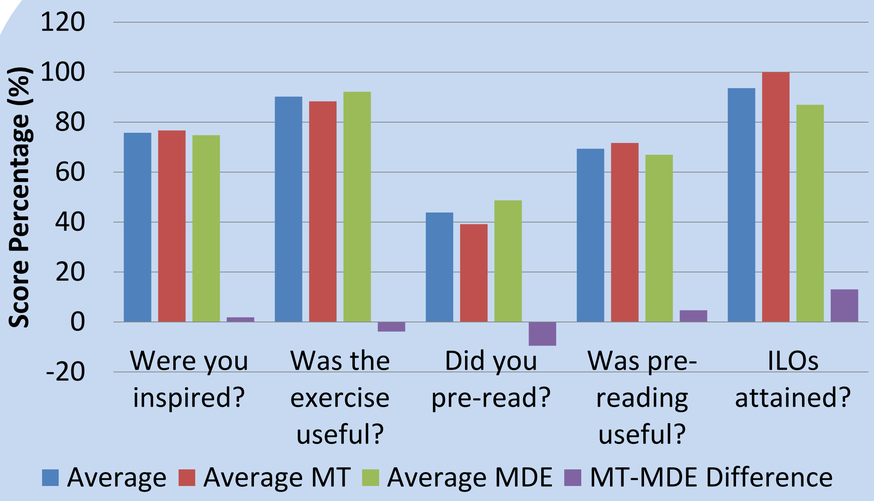


**Figure 2: Evaluation Results on Learning Activities**

We observe that once the classroom activity starts, the students are very active and it was difficult to pull their attention back towards the end of the activity.

- It is discussed in Hyde (1993) that the students who feel obligated to engage in the peer exercises, tend to be remain quiet, either as a reflection of them not knowing what and how to do the exercise or as a resistance to the teaching method.
- Some students felt that the certain parts of the pre-reading notes are hard to understand without guidance. It is supported in the electronic resource on "How people learn: brain, mind, experience and school" that learning is enhanced when teachers draw out and work with the learners' pre-existing knowledge and link this knowledge to new materials.

## Key Takeaways

- Browns and Atkins (1988) and Revell and Wainright (2005) reported that instilling sparks in learning is important. Some students has requested for more explanation on the videos and simulations. This is supported in Bennett (2010) that simply viewing how things work on the screen is not sufficient for learning.
- Cheng (2000) has discussed that Asian learners of English are generally perceived as passive and challenged that such passitivity is observed due to the teaching methodology or language proficiency, rather than cultural differences.

## Good Practices

- A good recap on previous material to provide a link to the present material
- Constant feedback throughout session through queries.
- A good summary after each section to consolidate the points covered.
- Delivery through writing was particularly effective.
- The lecturer shows passion in her teaching.
- Difficult concepts were repeated.

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