# ACTIVE AND EXPERIENTIAL LEARNING: THE IMPACT ON STUDENT OUTCOMES

Martin de Tours School of Management and Economics (MSME Business School) was established 50 years ago as the flagship unit of Assumption, the first international university of Thailand. With students from over 80 countries, MSME provides a rich, multi-cultural environment in which to develop the leaders of the future.

MSME strives to offer a range of diverse and practical undergraduate business curricula in an enriched international learning environment. They place great emphasis on nurturing their students to be business practitioners with an entrepreneurial spirit and solid English communication skills, as well as providing a strong network of alumni, entrepreneurs and industries.

Students at MSME are encouraged to develop a global mindset and they are supported to develop the well-rounded skills they will need to adapt and thrive in the ever-changing business environment.
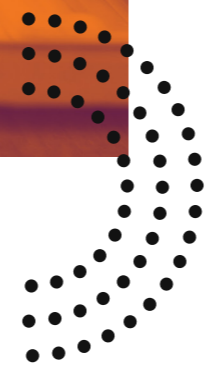
INTRODUCTION

Though 'active learning' is a well-established pedagogical approach, well supported by a body of research and more enthusiastically embraced at lower levels of education in many countries, the integration of active learning principles has been much slower in Higher Education globally. This may be explained by many factors both cultural and practical. It is difficult to enact large-scale change across institutions that are completely independent from one another and free from the imposition of prescribed direction by government. It is also risky to enact large-scale change when students' achievements in Higher Education – more accurately the perception of the standard of their education by employers – are linked so explicitly to their future career potential. Even more so in a global environment when a national

system of Higher Education must strive to be on the same footing as that from other countries if their citizens are to be competitive in the international market. This level of risk is not conducive to creative experimentation in the design of Higher Education courses. Traditional education methods are appealing because we know they work – well enough, at least.

Nevertheless, we are seeing a 'new education,' where active and experiential learning are emphasised, gain strength as universities around the world adapt to some of the big global trends that are shaping society in the 21st century, particularly the growth of technology and the changing 'skills' picture. In this paper we look at how faculty in the Management Information

Systems department at MSME have been innovating with the use of educational technology to enhance teaching and learning and how they set up the introduction of a new e-learning resource to formally evaluate its effectiveness and in doing so add to the national conversation in Thailand about educational reform.

But what is active learning? We see an early example of it in ancient Greece in the form of the Socratic method - learning through "cooperative argumentative dialogue between individuals, based on asking and answering questions to stimulate critical thinking…" Rather than the passing down of absolutes from one generation to the next, active learning sees education as something that allows students to evaluate, question and connect thoughts and ideas - to apply their own minds to learning rather than simply having learning imparted to their minds.

There is no doubt that traditional transmission teaching has its value too, after all, what is education if not the passing along of established knowledge, frameworks and rules from one generation to the next? In Experience and Education, 1938[1], renowned educational theorist John Dewey writes: "The history of educational theory is marked by opposition between the idea that education is development from within and that it is formation from without." Calling for less 'either-or' thinking, Dewey was nevertheless a leading proponent of active learning, seeking to answer the question: "How shall the young become acquainted with the past in such a way that the acquaintance is a potent agent in the appreciation of the living present?" **In other words, how can we nurture young minds so that they are not only able to take on board the learning of the past but also have the skills and abilities to build upon it for the future?**

Bonwell (1991)[2] offers a very simple definition of active learning: "In active learning, students participate in the process and students participate when they are doing something beyond passively listening." Beneath this simplicity of course lies a

more complex picture. What kinds of activities are best for active learning? What is most effective? What is the best balance between passive and active learning? While there is already a huge body of research into the theory of active learning by internationally renowned educational theorists and cognitive psychologists such as John Dewey, Jean Piaget and Lev Vygotsky, what is perhaps still needed, particularly within national contexts, is further investigation of the specifics in an attempt to answer those broad questions. The study conducted last year at MSME adds to the empirical and anecdotal picture specifically around the use of technology to create active learning opportunities both in and out of the classroom.

1. John Dewey, Experience & Education, 1938, First Touchstone Edition 1997 p17
2. Bonwell, Charles; Eison, James (1991). Active Learning: Creating Excitement in the Classroom. Information Analyses - ERIC Clearinghouse Products (071). pp. 3. ISBN 978-1-878380-08-1. ISSN 0884-0040.

Educational technology is a practical and cost-effective way to include more opportunities for experiential learning in the classroom. While we know that many universities are building relationships with local business and industry to build into their courses opportunities for real-life work experience, technology allows educational institutions to bring authentic 'virtual' learning experiences into the classroom instantly and on a massive scale, giving students frequent opportunities to turn theory into practice – to move from passive learning to active application.

Indeed, greater integration of technology in education is one of the central themes of the latest national plan for education in Thailand – the National Scheme of Education (2017-2036) – which aims to ensure that the educational system is fit for the 21st century and the challenges and opportunities presented by the mega global trends of rapid technological advancement, globalization and demographic change. This national plan for education, which is both outward looking and forward looking, is very much in keeping with the MSME's mission to: 'educate graduates with entrepreneurial spirit, global competency, and social responsibility.' Moreover, one of the four pillars of the school's strategic plan to 2023 is focused on the 'increased utilization of ICT in MSME's core functions by integrating digitalization into MSME operations and building an ICT innovative culture in MSME.'

INTRODUCING SIMNET
AT MSME

It is against this backdrop that Dr. Vasa Buraphadeja and his team in the Management Information Systems faculty at MSME have been working in recent years to build on traditional methods of teaching and learning to improve student outcomes and provide them with authentic workplace and business experiences that will set them up for success in their careers. A member of the Assumption faculty since 2001, Dr. Buraphadeja had already begun looking into how he could blend online and offline in a way that was beneficial for the setting, and had been experimenting with the use of technology to enhance students' learning. He and a colleague had started to build their own in-house web-based virtual learning environment. "But it wasn't very user friendly!" he says. "It took a lot of work to set up tasks for students. We wanted a way of being able to disseminate tasks more quickly. **When I found out about SIMnet it was like a light bulb moment. Here was a ready-made solution that did everything we needed it to, and which we could roll out straight away.**"

A curriculum change in 2018 offered the perfect opportunity to introduce something new, while the professor also realized that it presented a good opportunity to scientifically evaluate the impact of blended e-learning – a mixture of online and classroom learning – versus traditional face to face teaching and learning. He found that there had been very few in-depth studies evaluating the potential of blended e-learning in the context of Thailand, and none that he could find that offered a direct comparison of outcomes of students taught with and without a blended approach.

WHAT IS SIMNET?

SIMnet is an online learning system that provides learning and assessment solutions for Microsoft Office, Windows OS, Computer Concepts, File Management and Internet Browsers, which can be integrated with other Learning Management Systems. With a clear and intuitive user interface, students can easily navigate lessons, resources, projects, exams and SIMbooks. SIMbooks are electronic textbooks through which students receive interactive tutorials at a granular level on the functionality of the individual software programs.

Each interactive tutorial has three stages – 'show me', 'guide me' and 'let me try'. In the first stage, students watch a video demonstration of the operation; at the second stage they try it themselves, with supportive prompts; and finally, at the third stage they try the operation unaided. This learn, practice, and apply model is perfect for active learning, enabling students to learn by doing and allowing them to build procedural knowledge through experiential learning.

THE TRIAL

When it came to designing the research, great care and attention was given to ensuring that students in both the trial and control groups shared similar characteristics with no major discrepancies in prior attainment that could skew the final results. Eight of 12 freshmen classes, each containing 40 students, were randomly selected to take part in the trial. In phase one, the first part of the course was conducted using purely traditional teaching methods for all eight classes over four weeks for each of Microsoft Word and PowerPoint. All of the classes were taught by the same lecturer, and all received the same English language instruction, carried out the same class activities and received the same assessment. Results of the mid-term were then analyzed using T-tests to rule out any major differences between the different groups. The analysis revealed negligible differences between the mean distribution of scores across the groups.

For phase two, four of the eight classes were randomly selected to continue the second five-week part of the course, covering Microsoft Excel, with a mixture of traditional teaching and e-learning (blended e-learning, or BEL), while the other four classes, the control group, continued with purely traditional face-to-face learning (TDL). Both segments covered the same lesson content, and were given the same range of exercises, term project and final written exam. However, while the TDL group completed class activities following traditional class instruction, the BEL group was introduced to SIMnet.

In the TDL group, the lecturer directed the learning process in the usual way, providing content and instructing students to do step-by-step lessons before the class exercises were assigned. Students in this group followed a class schedule, working at a common pace through the learning and class activities.

In the BEL group, on the other hand, once the lecturer had introduced the lesson, Students had significantly more freedom to dictate their own pace of learning, either from the lab or elsewhere, practicing individual skills more, or less, depending on their individual needs before attempting exercises. The instant and detailed feedback they received through SIMnet enabled the students to learn from and correct mistakes in the moment, attempting each exercise up to a maximum of three attempts until the deadline set for the final attempt. They were able to complete the term project under the same conditions. (SIMnet recorded the results for all the attempts at assessment but used only the highest score for grade calculations). Finally, they completed the same final written examination at the same time and under the same traditional conditions as the TDL group, allowing the researchers to see whether blended e-learning would still have an impact one students were outside of the SIMnet system.

The final number of students in the BEL group was 152 and in the TDL group, 150. Although this total of 302 students taking part in the study is relatively small (due to the necessity of having the same lecturer for both groups to control variance), the rigour of the study, and the fact that the results reflect the findings of other literature on the subject, means that the results can be viewed as reliable, and are therefore interesting to other course directors who are thinking about introducing an element of e-learning in future.

Getting set up and running with SIMnet was a relatively simple task. The McGraw Hill consultant ran sessions with the team to show them how to use it, and the team appointed a manager for the project who was quickly able to set up the resources and exercises for the students. SIMnet was to be used with freshmen students studying a module on the use of productivity software applications – principally, in this case, Microsoft Word, PowerPoint and Excel. However, for the purposes of the research, SIMnet was not introduced to the course until the first half of the course, (covering Word and PowerPoint), had been completed, allowing Dr. Buraphadeja and his team to screen for any major differences between the 8 randomly selected classes involved in the trial in order to minimize any other variables that could significantly impact on results.

The professor was aware that there were risk factors involved in introducing e-learning. Traditional teaching methods are still largely the norm in most Thai universities and educational settings, so there was a bit of a cultural barrier to break down among the students. Dr. Buraphadeja says: "Students weren't used to taking control of their learning. It's not their fault, it's just the way they have been taught up until now. So, in terms of mixing independent active learning with guided, we've had to ease them into it; there's been a lot of hand holding. We're not just having to teach them the content but also the active learning skills. It has not been completely easy, but we've kept at it." He was also highly conscious that learners would have different levels of familiarity with technology, and different learning skills, characteristics and styles that could impact on their ability to use e-learning effectively. "The international students are often more at ease with the technology, but Thai students are eager to comply and to try new things as instructed," he says.

THE POSITIVE IMPACT OF SIMNET ON TEACHING AND LEARNING

The results of the study showed that overall, the students who had been taught using blended e-learning out-performed the group that had only received face-to-face teaching, with a higher mean score in each of the five separate assessments.

> **Taking an average of all of the assessments together, the mean for the BEL group was 80.84, against a mean for the TDL group of 76.26 – an uplift of 4.58 points.**

RESULTS OF ASSESSMENTS FOR BOTH GROUPS

| | GROUP (NO. OF STUDENTS) | | | | | Statistical significance (2-tail) |
| | BEL (152) | | TDL (150) | | | |
Assessments	Mean	SD	Mean	SD	T (Degrees of freedom)	
Exercise 1	83.5	16.9	80.8	19.2	1.3 (300)	0.197
Exercise 2	85.7	17.5	81.1	20.0	2.1 (300)	0.033*
Exercise 3	89.0	11.5	82.7	16.3	3.9 (267.5)**	0.000*
Project	86.3	13.2	81.3	20.1	2.6 (256.2)**	0.010*
Final written exam	59.7	13.4	55.4	13.1	2.8 (300)	0.005*

NOTES: (a) *indicates statistical significance at a level of 0.05 or less; (b) **indicates a statistically significant difference between the variances at a level of 0.05 or less

Mean results and standard deviance for the BRL and TDL groups across the five assessments that comprised the overall grade for the Microsoft part of the course.

So what accounts for this improved performance? Much of the research into e-learning and blended learning over the past decade has identified several features of educational technology that add value to the learning experience, and we see many of those at play here in the case of MSME and SIMnet.

A COMPARISON OF BLENDED E-LEARNING WITH TRADITIONAL LEARNING

BEL	TDL
Classroom instructions and activities often take advantage of appropriate technologies to enhance learning experience	Classroom instructions and activities do not often take advantage of technology
Learners have the ability to design their own schedule and able to access anytime	Learners must study one a fixed class schedule
Learners decide how long they prefer to study in each session	Each class schedule has a fixed range of time
Learners can choose the content they prefer to study most	Learners must follow fixed class content
Learners receive personalized feedback of their individual progress	Teachers often do not have time to provide personalized feedback to each individual student

Source: Data adapted from Bencheva (2010)

The question of how to use technology within the classroom to enhance instruction and activities was of course very much front of mind for Dr. Buraphadeja in his thinking about how to integrate SIMnet into the course pedagogy. "I asked myself – 'how can I blend online and offline in a way that is most beneficial for the setting?'" he says. "I realised we shouldn't be teaching in a traditional way in the computer lab. Why stand at the front of the room lecturing when you have the lab?" This element of the instructional design for the BEL students was a major differentiating factor between them and the TDL group. Following an introduction of each lesson by the lecturer, students were then allowed to discover and practice, using SIMnet, at their own pace. This active learning approach enables students to learn by doing, enhances both understanding and retention and is particularly good for visual and kinesthetic learning styles. The set-up of the laboratory class in this way also meant that students had the freedom to decide how much time to devote to each particular operation of Excel, spending more time on areas that they found challenging and less on areas that they quickly understood, without being constrained by the pace of the class as a whole. This makes the learning process much more learner-centered and efficient.

The professor and his co-authors also attribute the improved outcomes in large part to the
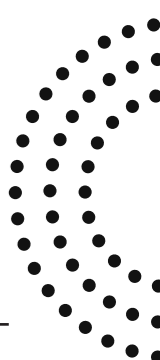
feature of the software that allows students to repeat exercises and assessments: "In particular, the BEL feature which allows students to retake assessments leads to improved learning performance equally for both males and females... it was clear that in the BEL environment, greater use of this feature enhanced final assessments."[3] While more investigation is needed to determine the exact extent to which this feature was responsible for the improved results (e.g., by splitting the e-learning group further and removing this feature for some), the education science behind

the retaking of assessments is well supported. Not only does the repetition of the assessments count as deliberate practice, leading to increased proficiency as per Bloom's taxonomy, but we also know that making mistakes, and learning from the feedback, is a fundamental part of the cognitive process.

Through SIMnet students receive detailed feedback on their mistakes instantly, allowing them to see where they went wrong, reflect on it, and correct it immediately while the learning is still ongoing. This also links into Bjork's concept of desirable difficulty, in which tests can be seen as learning events, helping students to understand the gaps in their knowledge and fluency allowing them to self-regulate. By giving students either confirmation or correction of their learning 'in the moment' it allows students to move forward quickly and reduces frustration and discouragement. Even in a scenario where the correct answer is not given, we know from the principles of gamification that errors encourage problem solving and increased effort at information retrieval.

The accessibility and flexibility of online learning are also highly conducive to active learning, allowing students to be proactive about their own learning. With the ability to access SIMnet from anywhere, at any time, and without time constraint, students in the BEL group had additional opportunities to access the material and to practise independently. This in itself, however, is a learned behaviour. As Dr. Buraphadeja reports: "Good students learn by themselves. We need to put our energy into the 'not so good students' and they needed a little more pushing to engage with the online system." To help mitigate this problem, the lecturer used the SIMnet dashboard as a motivating tool, demonstrating to students the correlation between good exercise scores and the higher levels of engagement among other students.

3. A case study of blended e-learning in Thailand, J. Wongwuttiwat, V. Buraphadeja and T. Tantontrakul. Journal of Interactive Technology and Smart Education, Vol. 17 No. 2, pp. 197-214: https://doi.org/10.1108/ITSE-10-2019-0068
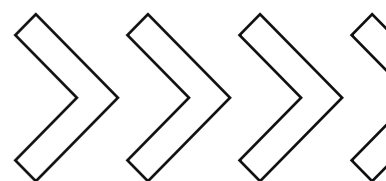
CONCLUSION

The research at MSME carried out by Dr. Buraphadeja and his team offers empirical evidence of the impact of blended e-learning generally, and the efficacy of the SIMnet online learning system specifically, in enabling students to learn more actively. The trial demonstrates a statistically significant improvement in mean results for students using blended e-learning for instruction over and above those using purely face to face instruction. While technology could never be a like-for-like replacement for a good teacher and human interaction, the study at MSME takes forward the national conversation about how educational technology can enhance teaching and learning. We have seen how SIMnet can help educators move from an emphasis on instruction to an emphasis on guiding and empowerment, while

(through the instantaneity and bandwidth of technology) students get personalized learning to a degree that would otherwise be impracticable even for the most committed of teachers.

Dr. Buraphadeja now hopes that his experiences will encourage other university faculty across Thailand to investigate what is possible and to embrace technology with more confidence as they work towards the achievement of the new National Scheme of Education.