

## Rethinking Learning

Applying and comparing the learning outcome of new teaching and learning strategies at both a university and a business (University of Alexandria, Egypt and Telecom Egypt).

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### **Abstract**

*We will be carrying out a comparative study of learning outcome between students enrolled in the University of Alexandria, Egypt and staff working at Telecom Egypt. Changes in technology over the past few years have removed a number of physical and economic barriers for those living in Egypt and wishing to pursue a university education or improve the workplace skills. However, the advancements in technology are not what stimulated this project. The challenge to improving learning isn't with technology; it's the learning strategies that are being applied. Business has typically adopted the teaching and learning strategies of educational institutions.*

*For the study we will be using a new teaching and learning strategy D4LP (Design for Learner Performance), developed in Canada (RethinkingLearning.com) and first piloted in two major universities in Thailand in 2008 (Ubon Ratchathani University and Sukhothai Thammathirat Open University). D4LP is designed to go well beyond conventional teaching and training methods with the potential to directly influence change in learners and impact business. D4LP has an innovative 'learning environment' designed to challenge and motivate a learner to engage in constructing their own understanding of new knowledge. This result in higher levels of learner participation, learner confidence and learning outcome, plus, promotes the development of critical thinking, interpersonal and knowledge comprehension skills. D4LP allows us to design our teaching and training strategies, implement these strategies, and assess the learning outcome of these strategies. In addition, D4LP allows us to diagnose the flaws in project design and learner effort towards mastering a specific skill.*

*The challenge we face is not the learners' ability to embrace D4LP strategy; the challenge will be in restructuring the role of program committees, course instructors and training designers. In order for learner engagement to have a direct impact on learning outcome, teaching and learning strategies need to go well beyond conventional methods. We have to throw off the belief that the only way for a learner to learn new information is to present it to them in the form of a lecture.*

*The guiding factors that inhibit change for the University of Alexandria and Telecom Egypt:*

- The teaching success of any university in Egypt is measured by the **quantity** of students they accept and not the **quality** of students they graduate.*
- An instructor is assessed on the **quality** of their lecture and not the **quality** of students' learning.*
- Business training is influenced by academic teaching strategies.*
- Both institutions are still applying traditional teaching and training strategies that mainly promote the memorization of facts and procedures.*

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Leslie Richards Ph.D. and Cherine Sallam (Ph.D. candidate)

### 1. Introduction: “the challenge”

The rethinking learning project is to encourage instructors and university administrators to re-think their teaching strategies. The thinking that individuals are unable to advance beyond their ‘predicted’ academic abilities is being questioned. As lecturing is central to the teaching philosophy of the majority of instructors, asking them to re-assess their applied teaching philosophy and carry out an in-depth appraisal on the impact their lectures have on changing learning outcome is not an easy task. For some instructors to appreciate the benefits of change, they need to experience it for themselves.

“When I was first exposed to the T5model [basis of Rethinking Learning], I felt that I was being led along a path that was quite different from my initial goal. I was forced to examine my teaching at a very fundamental level, essentially dealing with the philosophy of teaching and the underlying principles of learning. This led to some initial irritation and resistance on my part as I felt my established classroom teaching methods (which until now had been moderately successful) were being threatened. After the first learning design session, I began to overcome my own resistance and initial aversion. I was able to look at the creative potential of adopting the T5 methodology to core engineering courses. I expect these insights to lead to better learning opportunities for my future students.” Rob MacDonnell, Faculty of Engineering, University of Waterloo, Canada (2000).

The challenge we will face is not learners' ability to embrace change; the challenge will be in restructuring the role of program committees, course instructors and training designers. For learner engagement to directly impact learning outcome, teaching and learning strategies need to go well beyond conventional methods. You have to throw off the belief that the only way for a learner to learn new information is to present it to them in the form of a lecture. Transforming how institutions implement their teaching and learning strategies is difficult but not an unattainable task however, it will require the community to engage in the process of re-thinking how learning happens. The challenge then is for teaching to focus on student learning rather than on content delivery

### 2. C- in C- out

*“It is no surprise when an A+ student walks out the doors as an A+ graduate. But what about a B student who finishes with an A, his or her programs would have a higher added value than the programs at the top university.” OECD (2010)*

Traditionally, students’ university entrance GPA (Grade Point Average) reflects their learning outcome potential as university students. This argument is based on the assumption that a learner’s entire educational experience is founded on a teaching strategy of content delivery rather than student learning and; that learners more suited to memorization of facts and concepts are more likely to succeed and keep on succeeding. “The GPA (Grade Point Average) is a

testament of what you [students who are applying to a university] are capable of” (Jeanette Leach, 2009).

Most universities don’t enjoy the same advantage as universities that are able to set a high GPA entrance requirement (B+ to A) to their programs. Universities with a high (GPA) entrance requirement are virtually assured that their students will have the ability to succeed in mastering a university lecture-centred teaching and learning system and will graduate with the same (B+ to A).

## **2. 1 No change**

To verify the anticipated outcome of this statement, ideally, universities would need to monitor students’ input and output GPA averages, to ensure that no discrepancies exist between the ability of the entrance students and the quality of the university’s academic programs. The registrar of a leading Canadian university stated that, “Universities do not create and maintain data that would allow one to analyze students’ entrance averages versus their graduation averages. Some universities do however, implement a ‘predicted GPA’, derived from students’ entrance GPA that although traditionally lower, ultimately equates to their graduation GPA. Therefore, we can only assume that maintaining a student’s entrance GPA is the standard that most universities aim for, or are capable of, and no more.

Ubon Ratchathani University (UBU), located in the North-East of Thailand maintains a database (by program) of all students’ entrance and graduation GPA. The combined average for all programs over a four year period (2005-2008), shows no significant difference between students’ entrance and graduation GPA (with a standard deviation of -0.0036 GPA on a four point scale).

At UBU, instructors have successfully navigated their lecture-centered education. Therefore, it may appear reasonable for these instructors to assume that if they were able to learn within the traditional lecture-centered method, their students should also be able to learn by this method as well. However, the entrance GPA of UBU students is considerably lower than that of their instructors’ undergraduate university entrance GPA, therefore, unlike their instructors, the majority of UBU undergraduate students are not absorbing, remembering and recalling the large volume of information being transmitted to them via lectures. Subsequently, if learning does not happen, instructors tend to fault the lack of positive learning outcome on the students.

## **3. Creating teaching and learning alternatives**

“People and organizations everywhere can see that current systems of education are failing to meet the challenges we now all face and they're working furiously to create alternatives” Sir Ken Robinson (2006)

In an attempt to rectify poor learning outcome, University of Alexandria, as well as other universities internationally, will replicate lecture-centred instruction in a variety of media to provide students with additional access to lecture content outside the classroom. Although this generates little or no change in actual learning outcome, it does support traditional teaching and learning methodology. Barr and Tagg (1995) point out that “An instructor is typically evaluated by her peers or dean on the basis of whether her lectures are organized, whether she covers the appropriate material and, whether she shows interest in and understanding of her subject

matter....They do not raise the issue of whether students are learning, let alone demand evidence of learning...Many institutions construe teaching almost entirely in terms of lecturing.”

Over the years, instructors have viewed the problem of poor learning outcome as learning challenges. The ‘T5’ Model, Salter, Richards & Carey (2004) talks about instructional challenges: “Students do not prepare for class time; No time to cover topics in depth; No time for discussion in class; Difficulty providing feedback to individual students in large classes; Students do poorly on tests/assignments...”. When we focus on instructional challenges rather than learning challenges it provides a totally different perspective on the root of the problems associated with students’ learning. Learning problems no longer point to the learner but to the teaching and learning strategies, the primary strategy being the lecture. Continuing to lecture or replicate the lecture in various forms of media only masks the learning problem and interferes with students’ ability to advance beyond their university entrance GPA. By moving away from the lecture-centred method and all its inherent instructional challenges, to a process that allows students to develop their own learning strategies, students are more motivated and build confidence in their ability to learn.

University of Alexandria offers excellent academic programs with highly qualified instructors who are dedicated to the improvement of learning and the quality and abilities of the students who graduate from their programs. However, improving or matching the graduation GPA of universities that pre-select students based on their high entrance GPA appears to be impossible within the established teaching and learning strategies at UA. Like other universities, UA has held the position that the lecture-centred method is central to learning. If the lecture-centred method of teaching impedes the possibility of improving students’ learning outcome, the challenge for UA is to make a radical change in their teaching and learning methodology.

#### 4. Rethinking learning

“Contemporary learning theory is based upon the notion that learning is an active process of constructing knowledge rather than acquiring knowledge....rather than a process of knowledge transmission.” Duffy & Cunningham (1996).

In order to begin to move away from their traditional teaching and learning strategies, that promote the memorization of facts, the University of Alexandria and Telecom Egypt (TE) were presented with a new learning design model. Design for Learner Performance (D4LP), was introduced to their program committees and training directors. The D4LP model emphasizes “*Tasks* (learning tasks with deliverables and feedback), *Tools* (for students to produce the deliverables associated with the tasks), *Tutorials* (online support/feedback for the tasks integrated with the tasks), *Topics* (content resources to support the activities) and *Teamwork* (role definitions and online support for collaborative work)”, (Salter, Richards & Carey, 2004).

Collaboration as well as learners taking responsibility for their own learning is central to the D4LP method of transferring the responsibility for the learner gaining knowledge and skills *from* the instructor directly *to* the learner. The D4LP learning and training strategy is designed to go well beyond conventional training methods. D4LP incorporates tasks, tools, tutorials, topics and teamwork to achieve ongoing student engagement, ongoing constructive feedback, ongoing collaboration and ongoing measurement of learning outcome. Supportive learning environments motivate students by engaging them in higher level applications where they are asked to apply, analyze, evaluate or create, relative to defined course learning outcomes. The additional

foundational knowledge (required in order to master the primary application) is acquired by the student on a need-to-know basis, or introduced by the instructor through feedback.

### **5. Learning environments to guide mastery of learning outcomes:**

A learning task is an activity that requires students to engage with course materials. “Learning tasks pose an open question; students respond by engaging with course material. The single most important factor shaping learning outcomes is the way in which students approach a learning task ...” (Jackson & Anagnostopoulou, 2001). At the core of D4LP is an innovative ‘learning environment’ that consists of a single open question that requires the learner to solve a practical problem. This open question challenges and motivates learners to engage in learning that builds their confidence and enables them to independently and collaboratively construct meaning in their learning. This results in higher levels of student participation and learning outcome.

### **6. Flipping Bloom's Taxonomy:**

According to Bloom’s Taxonomy (1956), “The traditional learning paradigm implies a fixed order; before a learner can advance to higher order thinking, like applying, analyzing, evaluating or creating; they first need a solid understanding of fundamentals or a solid foundational knowledge.” In comparison to this traditional learning paradigm, with the D4LP method, foundational knowledge is specified by the instructor as part of the criteria or conditions required in order for students to master a task. The instructor designs tasks that challenge the students in applying, analyzing, evaluating or creating. This introduces entry level students to higher order thinking at an early stage and helps them to maintain their understanding and memory of foundational knowledge. As students move into advanced courses, they are better prepared to move directly into advanced applications. As Brownstein (2001) indicates, “Learners should constantly be challenged with tasks that refer to skills and knowledge just beyond their current level of mastery. This will capture their motivation and build on previous successes in order to enhance the confidence of the learner.”

### **7. The new instructor:**

The most important responsibilities for the instructor are: to monitor students’ progress towards mastering the required knowledge and skills and; to guide students towards understanding and correctness through constructive feedback, culminating in a weekly one hour class-time (face-to-face or online). Class-time is an opportunity for the instructor to focus on guiding the quality of learning outcome rather than knowledge transmission. Class-time for the students is an opportunity to engage in learning outcome discussions. Assignments are replaced with weekly tasks that represent 20-40% of the students’ marks. Formative assessment, as opposed to summative assessment, is based on ‘*effort towards correctness*’ and is carried out by the student’s peers - not the instructor.

A number of University of Alexandria instructors indicate that in order for students to learn, especially new information, the instructor needs to “give” this information to their students in the form of a lecture. According to Alan Guskin (1997), “students retain less than 20 percent of what they were taught one week after the lecture.” When you include the percentage of

students who are absent or have their own ‘agenda’ during a lecture, the actual value gained during a lecture is questionable. An instructor spends a considerable amount of time preparing and giving lectures designed to transmit knowledge to their students. Class-time should be a time for the instructor to: give feedback that reinforces understanding and; receive feedback from students regarding any miss-understandings. This cannot happen unless the learner has made an attempt to understand the course concepts by independently and collaboratively engaging in learning tasks prior to class-time with the instructor.

## 8. Stages of learning:

D4LP has an innovative ‘learning environment’ designed to challenge and motivate a learner to engage in constructing their own understanding of new knowledge. This results in higher levels of learner participation, learner confidence and learning outcome.

Within each learning environment, there are five stages in which students, individually and collaboratively, engage in mastering each task. Throughout the five stages, students are challenged and motivated to engage in learning. The process builds confidence and enables students to independently discover and collaboratively construct meaning. With participation in weekly learning activities, higher levels of learning outcome are achieved. Students provide and receive ongoing feedback; develop and improve their listening and communication skills and; with a higher understanding of the problem, students can engage in class-time discussion for deeper understanding. Class size and the providing/receiving of ongoing constructive feedback is no longer a concern for instructor or students.

**Stage 1:** The learner is given a task, an open-ended question, requiring her to state what she believes is the correct solution to the problem. Working independently, the student needs to make an effort to master the learning task.

**Stage 1 Design part 1:** The design of the task should pose an open question and requires the learner to solve a practical problem.

For example the learner is to:

- Carry out procedure x and identify challenges encountered
- Assemble x and identify challenges encountered
- Determine why x is happening and recommend changes to its process
- Evaluate the merging of x with y and identify challenges
- Devise a procedure to improve x and identify challenges
- Evaluate difficulties to growth
- Plan a new direction and identify challenges
- Produce a plan for implementing change and identifies challenges

**Stage 1 Design part 2:** Next, define the criteria that determine the knowledge comprehension skills needed to successfully solve the problem (knowledge comprehension is achieved as learner references resources i.e. technical manuals, textbooks, etc).

Criteria examples:

- Your solution must show where x principles are being applied
- Compare the difference between x and y
- Summarize your results and indicate how x was defined.
- Explain in detail what would happen if x **wasn’t** implemented
- In your solution compare the difference between x and y
- Describe the procedures used to determine x

**Stage 1 Design part 3:** Define the resources that will assist the learner in the mastery of the required skills. The design of task 1 determines the level of a learner’s motivation and the quality of their learning outcome. For learners to actively discover knowledge, the assigned resources (technical manuals, textbook, learning object, hand-on experience or mini presentation) are *only* of value if the learner is motivated to reference the resources (that is the job of the problem based task). The best resources are those that can be quickly referenced. Also, (if appropriate) provide resources with varying points of view.

**Note:** Avoid including lectures or PowerPoint presentations:

**Stage 2:** After submission of task1, the learner will receive three submissions from her peers (classmates). She will not only see the solutions of her peers, she can re-think the problem by comparing her own submitted solution to that of three peers. The student must: review the three submissions and provide constructive feedback to each of the three peers and; rate the effort each peer made to produce the solution (5 point scale).

**Note:** *The identity of the peers is not disclosed to the learner.*

**Stage 3:** In turn, the student receives anonymous feedback from three of her peers on the task she submitted. The student must: review each feedback provided and; rate the effort each peer made in giving her feedback (5 point scale).

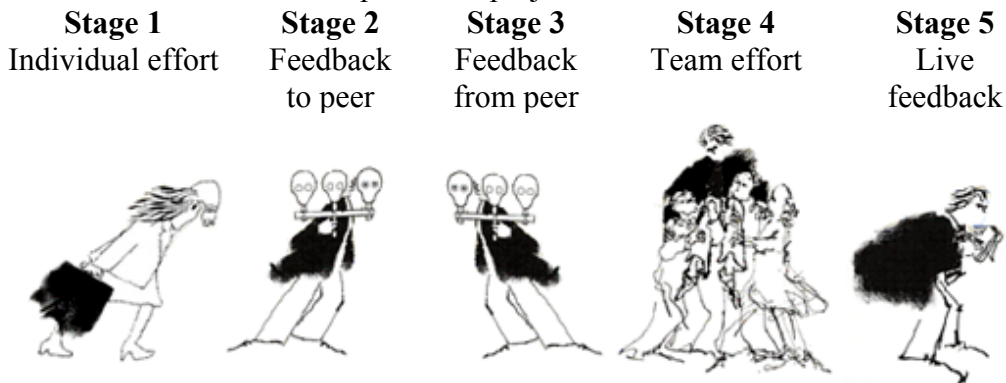
**Note:** *The identity of the peers who gave the feedback is not disclosed to the learner.*

**Stage 4:** The student is then placed within a team of four and will know the identity of her team members. The team is assigned either the same task or one that is more challenging to work on collaboratively. Students must: engage with their team members to complete the team task and; rate the effort each team member contributed to the completion of the team task (5 point scale).

**Note:** *Although the identity of team members is known to students, they do not know how they were assessed by individual team members.*

**Stage 5:** The instructor and learner engage in either face-to-face or online discussion of the week’s learning task. The learning environment shifts the role of an instructor away from introducing new information to students in the form of a lecture to: guiding and responding to the students based on their independent and collaborative effort towards mastering a problem (stages 1-4). The instructor: reviews either all or some of the team submissions. The instructor then guides students through any misunderstandings/problems and discusses the challenges that individuals and teams encountered in preparing their tasks.

**The 5 Stages of learning:** Each stage is an important step towards learners gaining their own understanding of the problem and; their development of the confidence to constructively challenge and collaborate with their peers and project leader.



## 9. Timeline:

Typically, if an instructor lectures three hours per week, then two of these hours would be transferred to the students to work on Task 4 as a team, and the third hour would be for students' class-time with the instructor. With the D4LP learning environment, an instructor is expected to spend three to four hours per week monitoring and one hour per week facilitating class-time for the duration of the course. The student is expected to spend three to six hours a week engaged in solving an application and one hour engaged with the instructor in class-time. "The theory [that]...learners learn by becoming involved...seems to explain most of the empirical knowledge gained over the years about environmental influences on the learner's development." (Astin, 1985).

## 10. Measurable outcomes

Each program needs to define measurable learning outcomes, describing what the learner will achieve upon graduation from the program. These measurable learning outcomes form the foundation for the type of courses offered within each program. Based on the program learning outcomes, each course must have specific, relevant, measurable learning outcomes defining what the students will achieve upon successful completion of their course. Authenticating learning outcomes at the program level is derived from the success of student learning across the courses related to each of the programs' learning outcomes. This generates evidence of the correctness of each of the programs' learning outcomes, and the quality of learning within the program. Within D4LP, there are two forms of assessment of learning outcome:

- Formative assessment: Marking for effort towards correctness / weekly tasks / providing and receiving constructive feedback (see D4LP learning environment, Stages 1-5);
- Summative assessment: Marking for correctness / mid-term and final exam.

## 11. Formative Assessment:

Encouraging the students to make an effort for which they are subsequently provided feedback is the key to their mastery of learning. Within each learning environment, students are assessed by their peers on the effort they made towards mastering a particular competency. For each learning environment, the student will be assessed nine times. Two-thirds of the assessment is provided by peers who are anonymous to the student, and one-third provided by known team members. Peer assessment is based on effort towards correctness. This assessment by one's peers represents the student's learning outcome (effort=learning). Knowing their peers will be reviewing and providing assessment motivates and stimulates students to make their best effort. The criteria for peer assessment are defined by the instructor. "Experiences revealed that peer-assessment, as a formative assessment method and as a part of the learning process, can be valuable because students are more involved both in learning and in the assessment process and because they find it fair and accurate." (Sluijsman, Docky and Moerkerke, 1996).



## 12. Engagement

- Learner Engagement (50% of course time): Students engaging in challenging activities towards mastering the required knowledge and skills (for which they are required to make an effort).
- Constructive Feedback (50% of course time): Students giving and receiving constructive feedback to each other and; the instructor giving constructive feedback to students in class-time.
- Learner Collaboration with Peers (2/3 of all learning activity): “Collaboration is a process by which individuals negotiate and share meanings relevant to the problem-solving task at hand.” (Roschelle &Teasley,1993).
- Resources: formal lectures are eliminated and replaced with resources (textbook, etc.) to assist the students in mastering challenging activities.

## 13. Pilot Study

In 2008, UBU completed an extensive pilot study on ‘Rethinking Learning’ and the effect on students’ learning outcome (‘Mobile Learning Project, Richards, Inprasit, and Sophakan, 2010).

The student survey results showed a substantial shift in their attitude towards learning and taking responsibility for their own learning. Without this change, we could not anticipate a change in students’ learning outcome. The results of the survey completed by thirteen out of the twenty-two instructors showed a marked change in their teaching philosophies and increased confidence in their ability to contribute to their students’ learning. Twelve of the thirteen instructors who completed the online survey indicated that, although the D4LP method initially required a lot of rethinking on the design and delivery methods of their course, they were looking forward to teaching with this method for the next offering of their course.

Of the students surveyed, 78.09% indicated that they would enroll in other courses taught by the D4LP method and 85.69% indicated that this method of learning was more rewarding than attending lectures.

For 10 of the twenty-two courses involved in the Pilot Study, we were able to compare the final exam marks between the D4LP method of teaching and learning and these same courses when they were previously offered with the traditional lecture-centred method of teaching and learning. The results showed that for 741 students enrolled in courses using the D4LP method, their final exam average was 17.31% higher than the 515 students enrolled in the traditional lecture-centred courses.

## 14. Rethinking Learning Project:

“Educational research offers compelling evidence that students learn mathematics well only when they construct their own mathematical understanding.” (Tusgate, 1996, p. 4) This applies to any subject, but it is especially true when mastering a skill.

For any learner to obtain a quality education the conditions for both learning and training strategies needs to go well beyond conventional teaching and learning methods.

**University of Alexandria** pilot project will focus on instructional challenges and will allow us to:

- Design courses that will engage students in critical thinking and interpersonal skills.

- Monitor learning behaviour and authenticate mastery of critical thinking and interpersonal skills.
- Link academic program's learning objectives directly to students' mastery of learning outcomes.

**Telecom Egypt** pilot project will focus on workplace performance (behaviour) challenges and allow us to:

- Design training projects that will engage staff in critical thinking and interpersonal skills.
- Monitor behaviour of staff as they engage in skills change.
- Authenticate change in workplace behaviour.
- Link Telecom Egypt's criteria for success directly to staff performance.

## Conclusion

Transforming how institutions implement their teaching and learning strategies is a difficult but not an unattainable task; it will require the community to engage in the process of re-thinking how learning happens. The challenge then is for teaching to focus on student learning rather than on content delivery.

Factors affecting improvement in learning is a shift in a learner's attitude and behaviour towards learning. Any student willing to make the effort to be responsible for their own learning can excel academically and professionally. However, first we need to change the mindset of educators; none of this will change unless institutions have the strength and resolve to change from the traditional lecture-centred method. Without educational leaders' responsibility for the outcome of their product (change in learning) improvement in learning outcome will not occur.

By focusing on learning, the University of Alexandria and Telecom Egypt have the potential to offer programs that are academically more successful than similar programs offered at top universities or businesses.

Once considered a constant, the focus on content rather than learning is now being viewed as an obstacle to learning outcome; a flaw in methodology within university teaching and learning. The University of Alexandria and Telecom Egypt will continue to monitor learners as they engage in future courses designed with a focus on learning. This direction does not require funding for new structures, technology, additional learning resources or more classrooms. Rethinking learning does require commitment from administrators, program directors, and individual instructors to re-visit how learning happens; it requires them to support broad changes across entire programs, not just specific courses. Both the University of Alexandria and Telecom Egypt recognize the need for real change and are rethinking their teaching and learning strategies. If, as Barr and Tagg (1995) suggest, "universities are about producing learning and not delivering instruction...", then University of Alexandria and Telecom Egypt are heading in the right direction.

## Testimonials

*D4LP has opened up a totally new and flexible teaching and learning strategy for Ubon Ratchathani University (UBU). D4L has made available the potential for UBU to change from its current lecture-centred model and all its inherent instructional challenges, to a process that allows students an opportunity to fully develop their critical thinking and interpersonal skills (rather than become rote learners).*

**Dr. Utith Inprasit, Vice-President Academic, Ubon Ratchathani University, Thailand**

*All senior executives should be forced to participate in a D4LP workshop in-order to gain a better understanding of:*

- *Why traditional staff training methods are passive and offer little if any change in learning*
- *Why learning centred training is an active process and far more productive in developing advanced change in a staff member's critical thinking and interpersonal skills.*

**National Broadcasting and Telecommunications Commission of Thailand**

*Thailand's Office of National Educational Standards and Quality Assessment has issued a directed to improve the quality of learning in Thailand. In order to improve learning outcome all universities need to change their current teaching and learning strategies. Transforming a university into a "Learner Centred" university is a difficult but not an unattainable task; but, it will require the entire academic community to engage in the process of re-thinking how learning happens. A universities most difficult challenge is focusing their academic programs on student learning rather than on faculty teaching. D4L's learning outcome teaching and learning strategy is the model that will assist us towards achieving this goal. And unlike the majority of universities that are recognized for the quality of student they accept, we will be recognized for the quality of student we graduate.*

**Dr. Suchin Visavateeranon, Vice-President Academic, Sukhothai Thammathirat Open University, Thailand**

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