

The Development of Massive Open Online Networked Learning for Thai Education

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Abstract

The research study's purpose is to implement our SEED of WISDOM Agile Project Management model (SEED stands for Scheme, Execute, Evaluate, and Develop) to develop the project named Massive Open Online Networked Learning (MOO-NL) for Thai Education. We want to prove whether our model is effective enough to use as a guideline to manage any kind of projects in response to the fast changing technology. The MOO-NL system was developed according to six main SEED of WISDOM procedures. 1) what are the concepts and definitions of the project? (W), 2) iterative cycle planning (I), 3) scrum project by self-control. (S), 4) deliver final products for acceptance and rollout project. (D), 5) operate retrospectively (O), and 6) manage guidelines for continuous improvement. The MOO-NL project is the networked learning platform for all Thai teachers and students to learn, share and reflect knowledge. Its platform is easy for donors to consider the sponsorship of the project for sustainability. Key performance indicators were set up to measure the success of the MOO-NL project output and outcomes which could reflect the success of the SEED of WISDOM model. The MOO-NL output is to finish the project within the planned constraints. The MOO-NL outcomes are the 3 values for interested parties: 1) improving project development team performances 2) intrinsic quality for users 3) extrinsic quality for users. We hope that the MOO-NL system will be a successful story for Thai education in the near future.

Keywords: Massive Open Online Networked Learning, Agile Project Management, intrinsic and extrinsic quality

Introduction

According to The National Institute of Educational Testing Service (NIETS) announcement in fiscal year 2012, the Ordinary National Education Testing (ONET) score in eight subjects for 3 levels of education, Pratom 6 (Grade 6), Matthayom 3 (Grade 9) and Matthayom 6 (Grade 12), were lower than 50% for all the eight subjects in every level. The students' average scores in five of eight subjects were lower than last year. Out of full scores of 100, the average score for five subjects which were lower than last year were: Thai language, our mother tongue, from 42.61 to 41.88; social studies, religions and culture from 46.51 to 33.39; science from 30.90 to 27.90; health and physical education from 62.86 to 54.61; and art from 32.62 to 28.54. Meanwhile, the average score for occupation and technology was up from 43.69 to 48.72; English language from 19.22 to 21.80; and mathematics from 14.99 to 22.73. Even for the 3 subjects which the scores were higher than the previous year, the average score were quite low especially for English. Figure 1 shows the ONET score in 2012.

Thai student Ordinary National Education Testing (ONET) Average Score (%) in year 2012

Item	Pratom 6 (Grade 6)	Matthayom 3 (Grade 9)	Matthayom 6 (Grade 12)
Thai language	50.04	48.11	41.88 (42.61)*
Social Studies, Religions and Culture	52.22	42.73	33.39 (46.51)*
English	38.37	30.49	21.80 (19.22)*
Mathematics	52.40	32.08	22.73 (14.99)*
Science	40.82	32.19	27.90 (30.90)*
Health and Physical Education	58.87	50.87	54.61 (62.86)*
Art	46.75	43.50	28.54
Occupation and Technology	55.38	47.29	48.72
Number of Schools	31,617	11,817	3,577
Total students	805,099	804,895	351,633

Source: Ministry of Education (--) * Previous year score

Figure 1 the ONET score in 2012

English is one of the keys of success for competitiveness of Thailand when ASEAN turns to be ASEAN 10 in 2015. The Thai government is introducing the holistic development approach to solve the problems in teachers, curriculum, ICT infrastructure and even the networking between government and private sectors. The government implemented a much-publicized One Tablet Per Child (OTPC) scheme by distributing nearly one million tablets to all Grade 1 students at the start of the 2012 semester. For the first semester in 2013, new tablet models were released, with much more capability but cheaper, so the government must review the tablets specification and costing again. The tablet is only one of many elements in a mobile learning environment which is changing fast. The tablet is a powerful “last mile” link in the m-Learning system and the m-Learning system itself is changing because of the emergence of the smart mobile environment which includes tablets, mobile phones and 3G, 4G or even 5G speed broadband internet. For success with the OTPC project, it is not enough to select a quality tablet and deliver it on time to all students in grades 1-12. The tablet does not teach by itself. We also need to prepare for students and teachers, digital content, schools’ internet and wireless environments in order for the tablets to deliver education content effectively and provide connectivity between students and teachers and online knowledge. The number of teachers in primary and secondary school should be 484,777 (Education Council, 2008), but there were actually only 426,363 teachers and as a result we lacked 58,414 teachers, especially for English, science and mathematics teachers. According to this data the main reasons for those poor ONET scores was the lack of enough quality and quantity of teachers. This problem is the main cause for the quality of education in all levels and also wider gap in education between urban and rural areas, and the rich and the poor’s opportunity to have an equally chance for education. To solve this problem is not so easy, it takes time. So we should try to introduce the quick and low investment as a supplementary tool to solve the problem. Nowadays disruptive of internet social networks technology plays an important role in our society. Why not implement this disruptive technology to education?

Research Objective

The goal of our research is to develop a web based system named **Massive Open Online Networked Learning (MOO-NL)** for Thai Education, which will be implement for high school students, by SEED of WISDOM Agile Project Management (APM) model, (Annop & Namon, 2013).

Research Hypothesis

“MOO-NL” could be finished and met the key performance indicators, which are one output and one outcome, according to the monitoring system of SEED of WISDOM APM model. We hope that the system could be one of the problem solvers for the lack of English, science and mathematics teachers to improve the quality of education in Thailand.

Theoretical Framework

Three generations of education

Because of the disruptive technology of social media like YouTube, Facebook, Wikipedia, SlideShare, Flickr, and Line together with the high speed broadband internet technology, people all around the world can connect seamlessly. Academia is

mentioned on education 1.0, 2.0 and 3.0. Education 3.0 is characterized by rich, cross-institutional, cross-cultural educational opportunities within which the learners themselves play a key role as creators of knowledge artifacts that are shared, and where social networking and social benefits outside the immediate scope of activities play a strong role (Keats & Schmidt, 2007). Figure 2 shows the distinguishing differences between learning 1.0, 2.0, and 3.0 (Chang, 2012)

Topics	Education 1.0	Education 2.0	Education 3.0
Meaning is...	Dictated	Socially constructed	Socially constructed and contextually reinvented
Technology is...	Confiscated at the classroom door (digital refugees)	Cautiously adopted (digital immigrants)	Everywhere (ambient, digital universe)
Teaching is done...	Teacher to student	Teacher to student and student to student (progressivism)	Teacher to student, student to student, student to teacher, people-technology-people (co-constructivism)
Schools are located...	In a building (brick)	In a building or online (brick & click)	Everywhere (thoroughly infused into society, cafes, bowling, alleys, bars, workplaces, etc.)
Parents view schools as...	Daycare	Daycare	A place for them to learn too.
Teachers are...	Licensed professionals	Licensed professionals	Everybody, everywhere
Hardware and software in schools...	Are purchased at great cost and ignored	Are open source and available at lower cost	Are available at low cost and are used purposively
Industry views graduates as...	Assembly line workers	Ill-prepared assembly line workers in a knowledge economy	Co-workers or entrepreneurs

Figure 2. Comparison between learning 1.0, 2.0, and 3.0 (Chang, 2012)

Massive Open Online Courses (MOOCs)

In 2008 the Canadian National Research Council set up the first research project for Massive Open Online Courses under the cooperation between Athabasca and Prince Edwards Island Universities in Canada under the project named “Personal Learning Environments Networks and Knowledge (PLENK)”. The project was supported by George Siemens & Stephen Downes who proposed the connectivism learning theory (Kob, 2011). They started with only 25 students who paid to enroll for the course and at the same time the course was also opened for students all around the world for free enrollment. There were almost 2,300 students enrolled for the free course at that time. Dave Cormier named this course **Massive Open Online Course, MOOC** in the same year (Wiley, 2012). In 2011 Sebastian Thrun and colleagues at Stanford University opened the Massive Open Online Course named “Introduction to Artificial Intelligence”. There were more than 160,000 students from 190 countries registered to the system. From that point MOOCs were recognized and expanded very fast all around the world (Yuan & Powell, 2013). “Massive Open Online Networked Learning” has 3 key flexible features (Kob, 2011). First, it is open for any learners to join the course (open content). Second, course participants use the social network as collaborative learning tools (networked learning). Third, the system is unlimited for the number of learners (massive).

The way that MOOCs offer massive courses has magnetized significant interest from governments, institutions and commercial organizations. MOOC platforms have been developed and offer courses independent of or in collaboration with universities for the purpose of expanding access, marketing and branding, as well as the potential of developing new revenue streams. MOOCs have now deviated from the original concept, and some universities offer a certification fee or even fee for the extra assessment result. Figure 3 shows the names and detail of their activities to date. (Yuan & Powell, 2013)

Name	URL	Institutions	Commercial Organization	Investment (Million \$)	Profit	No profit	Certification fee	Credit consideration
eDX	http://www.edX.org/	MIT, Harvard	X	60	X	<input type="checkbox"/>	<input type="checkbox"/>	X
Coursera	http://www.coursera.org/	Stanford, Princeton, Michigan, Pennsylvania	New Enterprise Associates & Kleiner, Perkins, Caufield & Byers Education	22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X <input type="checkbox"/>
Udacity	http://www.udacity.com/	Open for some universities	Sebastian Thrun & Mike Sokolsky, Charles Pearson center, Charles River Ventures & Andressen Horowitz	21.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X <input type="checkbox"/>
Udemy 2010	http://www.udemy.com/	Also open for teachers	Insight Venture Partners, Lightbank, MHS Capital	16	<input type="checkbox"/>	X <input type="checkbox"/>	<input type="checkbox"/>	X <input type="checkbox"/>
P2PU 2009	http://www.p2pu.org/en/	Open for learner and subject matter experts in the community	Hewlett Foundation & Shuttleworth Foundation	-	X	<input type="checkbox"/>	<input type="checkbox"/>	X
Khan Academy 2008	http://www.p2pu.org/en/	Salman Khan	Bill & Melinda Gates Foundation & Google	-	X	X	X	X

Figure 3. Table of names of MOOCs providers and their activities.

SEED of WISDOM Agile Project Management (APM)

There are two types of project differentiated by their output. The first one, the project output could be described or depicted clearly at the starting period such as the construction project. The second one, the output itself is technology products or is using technology, software or high-tech tools, to develop the project such as a software development project like the MOO-NL system. For the former, after the scope is settled, a step by step activity is created as a task break down structure (TBS). When the first step is completed and approved then the next step will be followed. It is quite difficult to go backwards to the former step for improvements. The activity is traditionally one way and will go to the next step one by one the same way as with a waterfall. We named it as waterfall project management. The famous reference procedures for this style of management is the nine bodies of knowledge developed by the US project management Institute (PMI, 2004). For projects in which changing technology and environment have the potential to adversely affect the outcome of the project. We need a much more flexible methodology to manage the project. Agile Project Management (APM) has some distinguishing differences and underlying assumptions from waterfall project management. It is appropriate for the project that might be affected by the rapidly changing environment but still conforms to customer value (CCPACE, 2011). The author developed the Agile Project Management model named SEED of WISDOM APM (Annop & Namon, 2013). The model consisted of four foundations: **S**cheme, **E**xecute, **E**valuate, and **D**evelop (SEED) and six main procedures, WISDOM: 1) what are the concepts and definitions of the project? (**W**), 2) iterative cycle planning (**I**), 3) scrum project by self-control. (**S**), 4) deliver final products for acceptance & rollout project (**D**), 5) operate retrospectively (**O**), and 6) manage guidelines for continuous improvement (**M**). The MOO-NL system project, in which ICT plays a big role in the success of the system, needed an appropriate project management methodology so we implemented our SEED of WISDOM APM model as a tool to develop the MOO-NL system. SEED of WISDOM APM also has much more flexibility to maintain synchronization with the changing smart mobile learning environment.

MOO-Networked Learning for Thai Education

Most of the MOOCs implemented nowadays are for higher education in a massive way. Can MOOCs apply for other levels of education? Can massive mean massive locally for Thai students in school not university? The authors realized that English is a key to success for the word massive in MOOCs today. As we mentioned before, the English literacy of Thai students is quite poor. Actually we don't want to lose an opportunity to implement MOOCs for our Thai education in English, but we try to think globally but act locally. By reviewing the feature and platform of MOOCs, our conceptual idea was developed to implement the MOO-NL system for Thai high schools. We hope that the MOO-NL system will be one way to solve the problems of our Thai Educational system. Thai students will have an opportunity to develop self-practiced learning for lifelong learning through their local MOO-NL system without the burden of English language. It should be challenging for the authors to do the research from different points of view from the global trend. Our conceptual model and feature diagram are shown in figures 4 & 5.

MOO-Networked Learning for Thai Education (Conceptual Diagram)

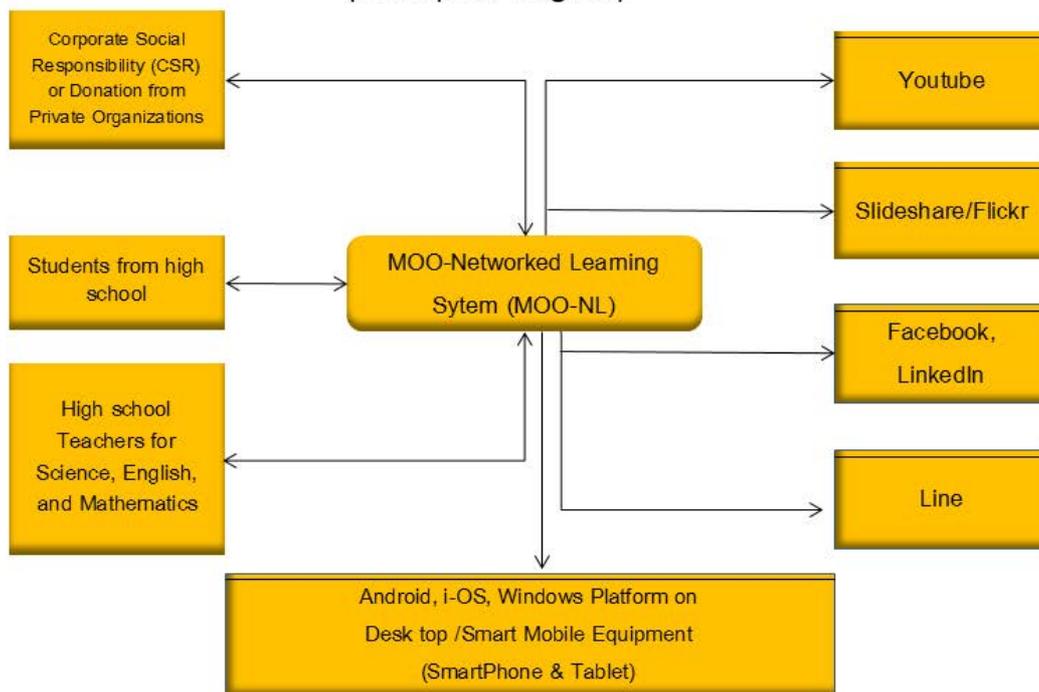


Figure 4. MOO-NL for Thai Education Conceptual Diagram

Massive Open Online Networked Learning for Thai Education System Feature

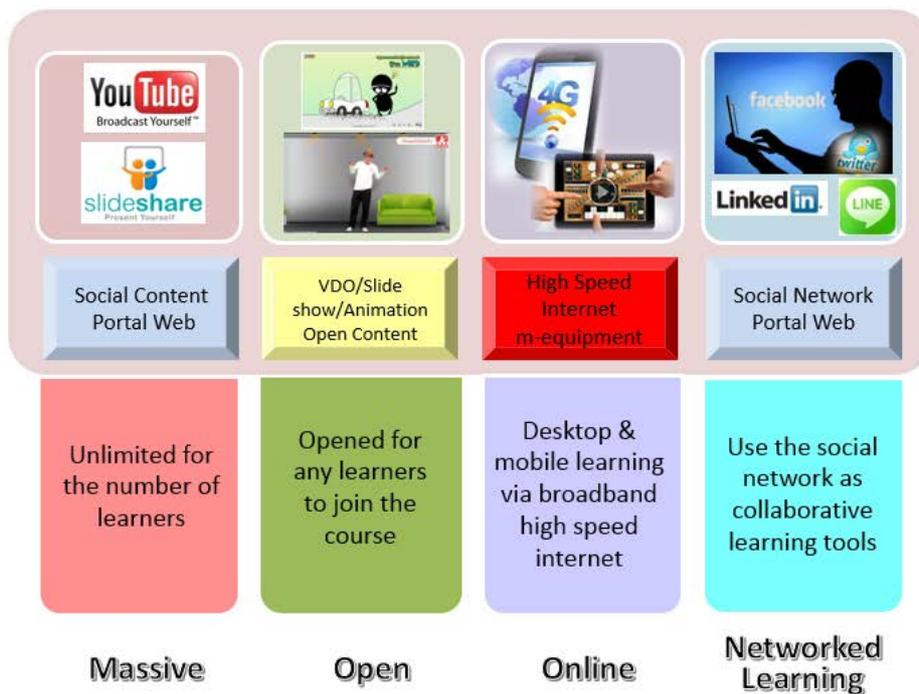


Figure 5. MOO-NL for Thai Education Feature Diagram

Research Methodology

Population and Representative Sample

Population (Interested parties)

- (1) Commercial organization (project owner / project sponsor)
- (2) Project management team leader (scrum master) who have at least five years of experience in managing the project
- (3) Web based application developers who have at least five years of experience in web based development (development team)

We selected the representative sample by purposive sampling method

One private company as a project owner and project sponsor

One quality management system manager from a private company as a scrum master

Three commercial web based developers

Research tool

SEED of WISDOM APM Model concept
(<http://www.youtube.com/watch?v=uydaYaeYvgI>)

SEED of WISDOM APM Model training media and document for MOO-NL system development (<http://www.youtube.com/user/annoppiyasinchart>)

SEED of WISDOM Model Close-ended questionnaire (Five-level Likert scale) to evaluate the MOO-NL, system constraints (system output)

System scope

System schedule

System cost

Close-ended questionnaire (Five-level Likert scale) to evaluate project team performance (system outcome)

Self-control during development

Team building

Communication among team members and other interested parties

Strictly to the project objective

Research procedure

Training MOO-NL system interested parties by uploading the SEED of WISDOM APM content to YouTube then asking them to look through it. (<http://www.youtube.com/user/annoppiyasinchart>)

Developing the MOO-NL system step by step according to the SEED of WISDOM APM model

Evaluating step (2) one output: system constraint, and one outcomes: improving project development team performances.

Research Output and Outcomes

SEED of WISDOM APM training

All of the interested parties saw the SEED of WISDOM AMP training content on YouTube (<http://www.youtube.com/watch?v=uydaYaeYvgl>) and used it as a guide line to develop the MOO-NL system.

Developing the MOO-NL system

The MOO-NL system was finished and tested by the users on time. The total cost was only 40,000 baht which is 10,000 baht lower than the target budget. This budget was subsidized by ASAHI Thai Alloy Company Limited, a Thai water meter manufacturer as a pioneer donor for the MOO-NL system. The MOO-NL interphase flow diagram and homepage are shown in figures 6 & 7.

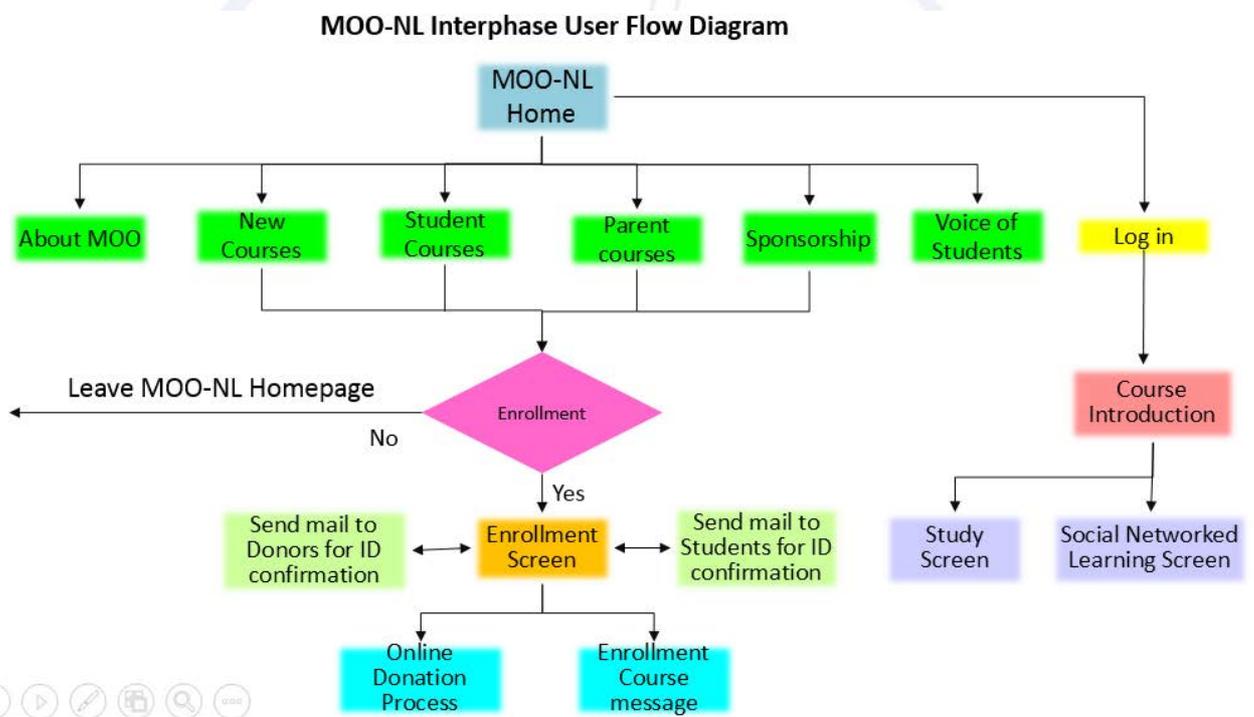


Figure 6. MOO-NL Interphase user flow diagram



Figure 7. MOO-NL system home page (<http://www.moo-education.com>)

Output and outcome of the MOO-NL system evaluation are shown in figure 8, and 9.

- The MOO-NL system output, scope constraint, was evaluated by donator and scrum master and the results are shown in figure 8.

System constraints Key Performance Indicators, Output (Highsmith 2010)	Sponsors	Scrum master
1. Scope of work	<input type="checkbox"/>	<input type="checkbox"/>
2. MOO-NL system is Finished within 2 months	<input type="checkbox"/>	<input type="checkbox"/>
3. Budget is not more than 50,000 Baht	<input type="checkbox"/>	<input type="checkbox"/>

Figure 8. The MOO-NL system output evaluation

- The development team, web base and courseware developers totally agreed that SEED of WISDOM APM model was quite flexible and made them feel free to manage to create the system with happiness. The output for team performance evaluation has been shown in figure 9.

Team Developer Key Performance Indicators, Outcomes 1 (Highsmith, 2010).	3 Developers for web based development		
	1	2	3
1. Self-control during developing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Team building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Communication among team members and other interested parties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Strictly to the project objective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 9. The MOO-NL system first outcome evaluation

Suggestions from the Research

Even though the output and outcome of the MOO-NL system were quite positive for all interested parties during the development period, the next step of the research is to verify the MOO-NL system. The authors plan to implement the MOO-NL system to be used by three government and one private high schools in Bangkok. The population size selected from each school will be 40 students, so totally students will be 160 students. After that we will evaluate the two outcomes, the MOO-NL system intrinsic and extrinsic quality for users. Hopefully after the verification phase, the MOO-NL system will be good enough to be one of many engines to push up the ONET score in the near future.

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