Key Success Factors Affecting National Licensing, Step 1, Passing Results of the Endocrinology Block: Lessons Learned From the Faculty of Medicine, Thammasat University

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Background: *Following initiation of the three-step national licensing (NL) examination, NL step 1 is the most difficult step of all. As our curriculum has been based on problem-based learning since its establishment, the block committee of each block system is responsible for planning the learning process to secure educational outcomes, student-learning promotion and a satisfactory rate of NL passing results.*
Objective: *The present study aims to identify key success factors that have been implemented each year to achieve successful NL passing results.*
Material and Method: *Three parts with nine new ideas were implemented each year. These parts included the three ideas of extra-materials preparation for effective tutorial sessions, three ideas of student-learning process motivation and three ideas of the reliable assessment preparation.*
Results: *Mean scores on block satisfaction were above 4 (from a total of 5) annually. NL passing-rate in each category during the last-two-year is above the country's average score.*
Conclusion: *This review demonstrated a key factor which contributes to student success in the endocrinology block.*

Keywords: *Key success factors, National license passing results, Part 1, Endocrinology block*

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In order to ensure that medical students in Thailand have the skills and knowledge to perform standard practice, the national license examination regulations from the Thai Medical Council was launched in 2002[1]. This new situation affects all Thai medical students in that they all need to pass the three parts of the Licensing Examination conducted by Center for Medical Competency Assessment and Accreditation. The examination schedule has been set up so that steps 1, 2 and 3 will occur at the end of the students' third year, fifth year and sixth year, respectively. Among these three steps, the step 1 national license exam, comprising mainly two subjects, general principles and organ system, is the most difficult part. The reason is that this step is the comprehensive part, since it integrates the entire two-year pre-clinical curriculum. This pre-clinical curriculum encompasses anatomy, physiology, biochemistry, pharmacology, microbiology, immunology, pathology and bio-statistics, among still other subjects. The integration involved emphasizes the principles and mechanisms of underlying health and disease, therapeutic usage and bio-psycho-social considerations.

Our curriculum has been based on problem-

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based learning since its establishment. The block committee is responsible for creating an interdisciplinary approach for integrating learning objectives from two or more academic fields of study. Being in charge of Endocrinology committees, we are all accountable to our students for setting up a block module that will successfully provide them a relevant learning experience within the curriculum. Additionally, our responsibility also includes planning and implementing the learning process to secure, not only educational outcomes and student-learning promotion, but also a satisfactory rate of NL passing results.

Hence, this study aims to review key success factors that have been implemented each year for a successful study plan based on the guidelines of the Medical Competency Assessment Criteria for National License.

Material and Method

Settings

All of the activities set up in Endocrinology block were conducted by committees whose members were under no compulsion, but were willing to join on their own initiative. Preclinical committees were formed from various departments, including anatomy, physiology, biochemistry, pharmacology and pathology. Members of clinical committees were from the Endocrinology Unit, Department of Medicine. After a detailed review from feedback results, annual framework developments were prepared. The entire process was under the guidance of the Vice Dean of Academic Affairs.

The processes

To achieve a better result, three parts with nine new ideas for the encouragement of both facilitator and students were implemented each year as shown in the Fig. 1. The first part consisted in the preparation of supplementary materials and activities for effective tutorial sessions, namely, (A) a newly designed scenario, (B) a novel written tutorial note (also called Scenemulator[2]) and (C) setting up the "S-O-A-P" approach in the tutorial-group section for early clinical application[3]. The second part consisted in the preparation of the student-learning process, itself, namely, (D) creation of a specification table indicating SDL connections, (E) origination of a multi-self-test on a Moodle platform[4] and (F) establishment of an individual feedback system correlated with a specification table[5]. Lastly, to achieve maximum performance, attention was directed to the assessment, i.e., the preparation of a reliable assessment by (G) formulation of an MEQ examination, (H) the twice organizing of an NL-based formative MCQ with a clear, expertly given explanation and (I) initiation of a formative MEQ[6,7].

Frameworks

An objectivity framework for each design was organized on consideration by the committee to serve as the guidelines for block rearrangement, as shown in the Table 1.

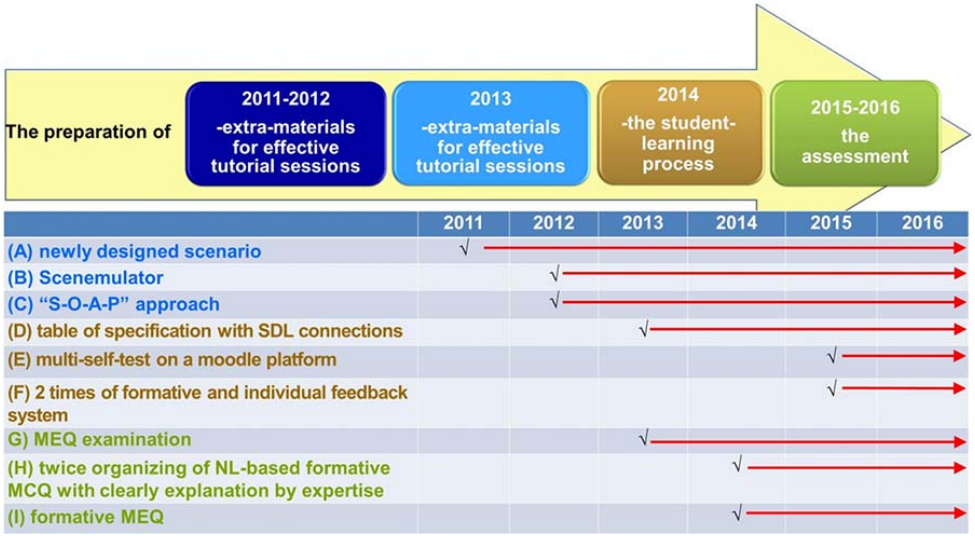

Fig. 1 The nine new ideas for encouragement both facilitator and students that was implemented year by year.

Results

After three years' preparation of supplementary materials for effective tutorial sessions (A-C) from 2011 to 2013, the preparation of the student-learning process motivational program (D-F) and the preparation of reliable assessments (G-I) began sequentially year by year as shown in the Fig. 1. The four-year NL passing rates of the endocrinology block based on each category are represented in Fig. 2. When compared with the mean country results, mean TU results gradually increased with better than mean country's results during the last two years.

From A-C, the effectiveness of, and satisfaction with, the scenemulator tutor note were studied[2]. The result showed that, comparable with typical tutor notes, a more powerful efficacy on the process during tutorial sessions, including clarification of terms, problem definitions, brainstorming and hypothesis formation, was detected when using scenemulator ($p<0.05$), as shown in the Fig. 3. In addition, this study also confirmed that the clearly preferred tutor notes lay within the scenemulator

Table 1. Objectivity framework of nine ideas generated by the endocrinology block committees

Activities	Objective
1. the preparation of extra-materials for effective tutorial sessions	
(A) newly designed scenario	1) to motivate and stimulate good discussion in order to develop hypothesis with critical thinking skill as well as integrate basic science knowledge to clinical sciences 2) to generate similar contexts learning as it will face in their real-life situations 3) to engage student learning with the common cases as similar to real-world situations 4) to provoke students' brainstorming based on the most common endocrinology case in Thailand
(B) Scenemulator	1) to facilitate non-specialist PBL tutors to have more confidence in facilitating tutorial session, 2) to diminish the diversity of outcomes in tutorial sessions 3) to have the more thorough and quality tutor notes.
(C) "S-O-A-P" approach	1) to obtain essential history ,report pertinent physical findings and generate reasonable differential diagnoses for further investigations 2) to perform better clinical thinking skills
2. the preparation of the student-learning process motivation	
D) table of specification with SDL connections	1) to help the students for identifying their learning needs 2) to enhance students' engagement in learning activities
(E) multi-self-test on a Moodle platform	1) to enable students to do more self-assessment and self-reflection 2) to prepare and review students' understanding after studying in the classes
(F) 2 times of formative and individual feedback system	1) to assist the 15 last-learner students 2) to self-monitoring progress according to the learning goals
3. the preparation of reliable assessment	
G) MEQ examination	1) to assess the level III cognitive domain or problem solving skills
(H) twice organizing of NL-based formative MCQ with clearly explanation by expertise	1) to prepare and review students' understanding after studying in the classes 2) to prepare the students to familiar with case-based question as utilizing in NL examination 3) to reassure students' understanding after their self-directed learning process
(I) formative MEQ	1) to stimulate self-directed learning 2) to motivate critical thinking skill 3) to monitor what contents should be learned more by themselves

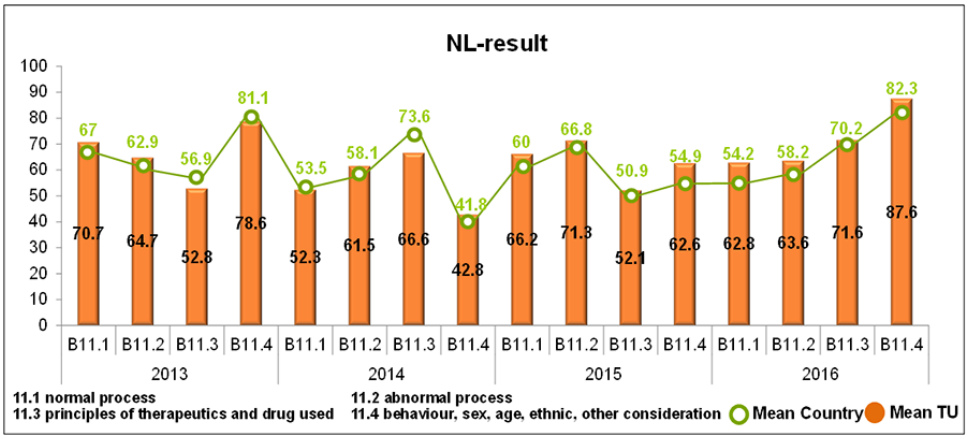

Fig. 2 The 4-year National license examination mean result of the endocrinology block based on each category. When compare with the mean country result, mean TU results were gradually increased and better than mean country result in the last two years.

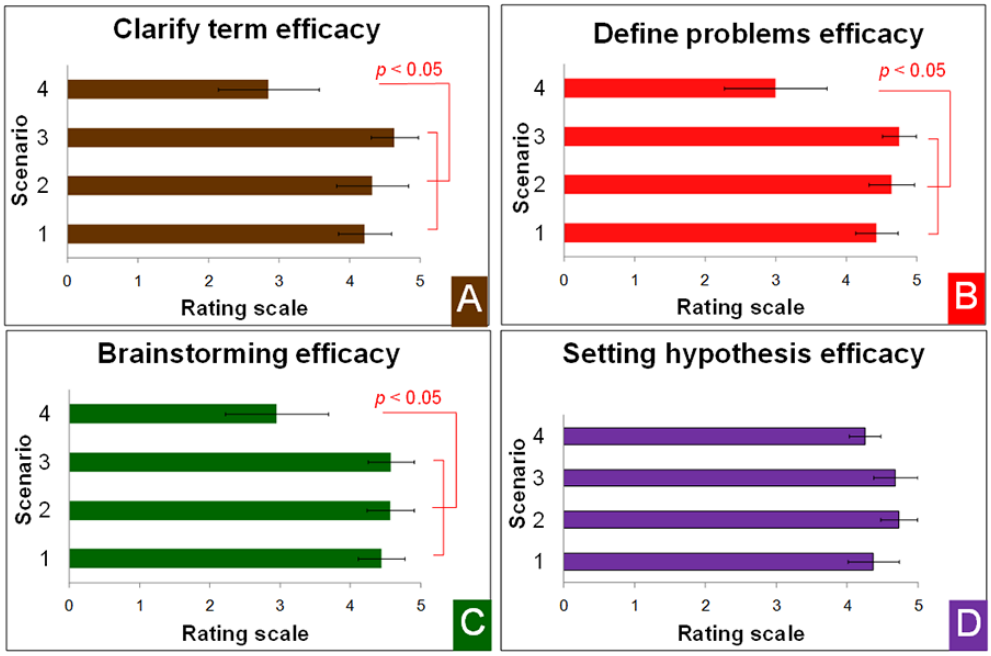

Fig. 3 (As the permission of Rojpibulstit P, et al[1]) Mean score of the efficiency of scenemulator (scenario 1-3) and the regular tutor note (scenario 4). A) Step 1 (Clarify term efficacy: mean average from sceneraio 1-3 = 4.3±0.81, mean average from sceneraio 4 = 2.85±1.42). B) Step 2 (Define problems efficacy: mean average from sceneraio 1-3 = 4.6±0.6, mean average from sceneraio 4 = 3.0±1.45). C) Step 3 (Brainstorming efficacy: mean average from sceneraio 1-3 = 4.53±0.66, mean average from sceneraio 4 = 2.95±1.47). D) Step 4 (Setting hypothesis efficacy: mean average from sceneraio 1-3 = 4.59±0.64, mean average from sceneraio 4 = 4.25±0.44).

group (p<.001), as shown in the Fig. 4. This report demonstrated the potential of scenemulators to standardize non-expertise PBL tutor as a means of handling tutorial sessions with more confidence. Finally, an absolute outcome that resulted from Scenemulator tutor notes was an ability to promote the learning environment in tutorial sessions.

From D-F, (E) the multi-self-test on a moodle platform and (F) the individual feedback system reveal striking evidence based on outcomes of the preparation activities involved in the student-learning process, as shown in Fig. 5, 6, respectively. For an outcome of (E),

the relationship between number of completed moodle tests and final exam scores has been shown in Fig. 5. It was found that the greater the number completing the multi-self-test on a Moodle platform, the higher the final examination scores that were achieved. By focusing attention on (F), the information was compared from two implementations of the formative and individual feedback system in 2015 and block management in 2014, which had only one formative and a group-feedback only at the 3rd week. It was shown that the average test scores of the 15 lowest-achieving learners from Formative-1 and 2 from block management in 2015 were 42.24 and 33.3%, respectively (Fig. 6A). A comparison with block management in 2014, which had only one formative and group-feedback at the 3rd week, showed that this approach could not help these 15 lowest-level students to identify the areas where they needed to improve (Fig. 6B). Conversely, after framework modification by adding two individual instances of formative and feedback after Formative-2 in 2015, the average summative MCQ of these 15 lowest-level students was 54%, a significant improvement ($p<$ 0.001), as shown in the Fig. 6, right. Moreover, the satisfaction level received from individual feedback from students who received assistance in becoming better prepared for final examinations was above 4.00. For the last part, consisting of G-I "the preparation of reliable assessment" it has been demonstrated that (I) the formative MEQ did improve students' scores in the endocrinology block, as shown in the Fig. 7. It demonstrated the potential of formative MEQ in improving students' ability for both the "top-thirty"

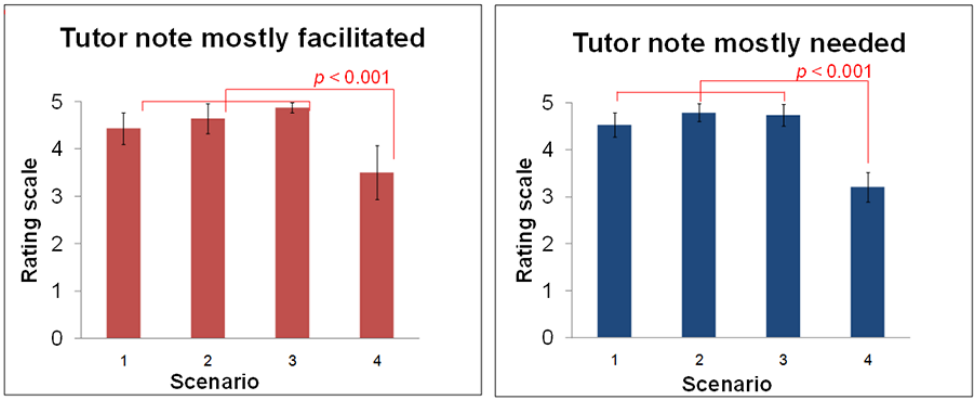

Fig. 4 (Left) Mean score of the tutor note mostly facilitated (mean average from sceneraio 1-3 = 4.64±0.60, mean average from sceneraio 4 = 3.50±1.15). (Right) Mean score of the tutor note mostly needed (mean average from sceneraio 1-3 = 4.64±0.46, Mean average from sceneraio 4 = 3.20±0.62). Scenario 1-3 is scenemulator, scenario 4 is regular tutor note.

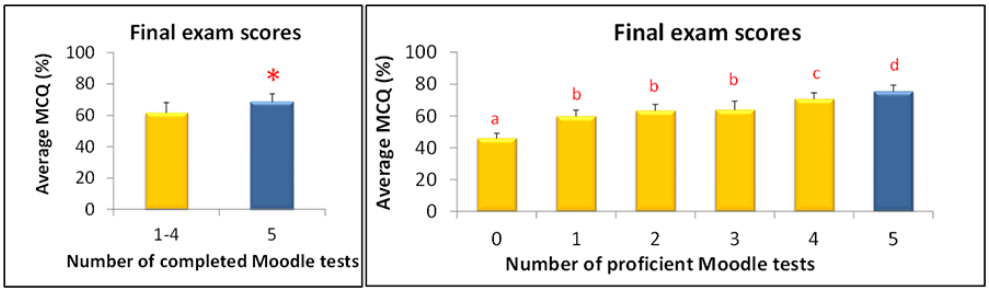

Fig. 5 Outcome of the relationship between number of completed moodle tests and final exam scores. (Left) Relationship of completed Moodle tests and final exam scores (MCQ) of 3rd year medical students at Thammasat University. [The data represent the mean ± SD. Asterisk indicates a significant difference at $p<0.05$ (Mann-Whitney test)]. (Right) Relationship of proficient moodle tests and final exam scores (MCQ) of 3rd year medical students at Thammasat University. [The data represent the mean ± SD. Different letters on each bar are significantly different at $p<0.05$ (Mann-Whitney test)].

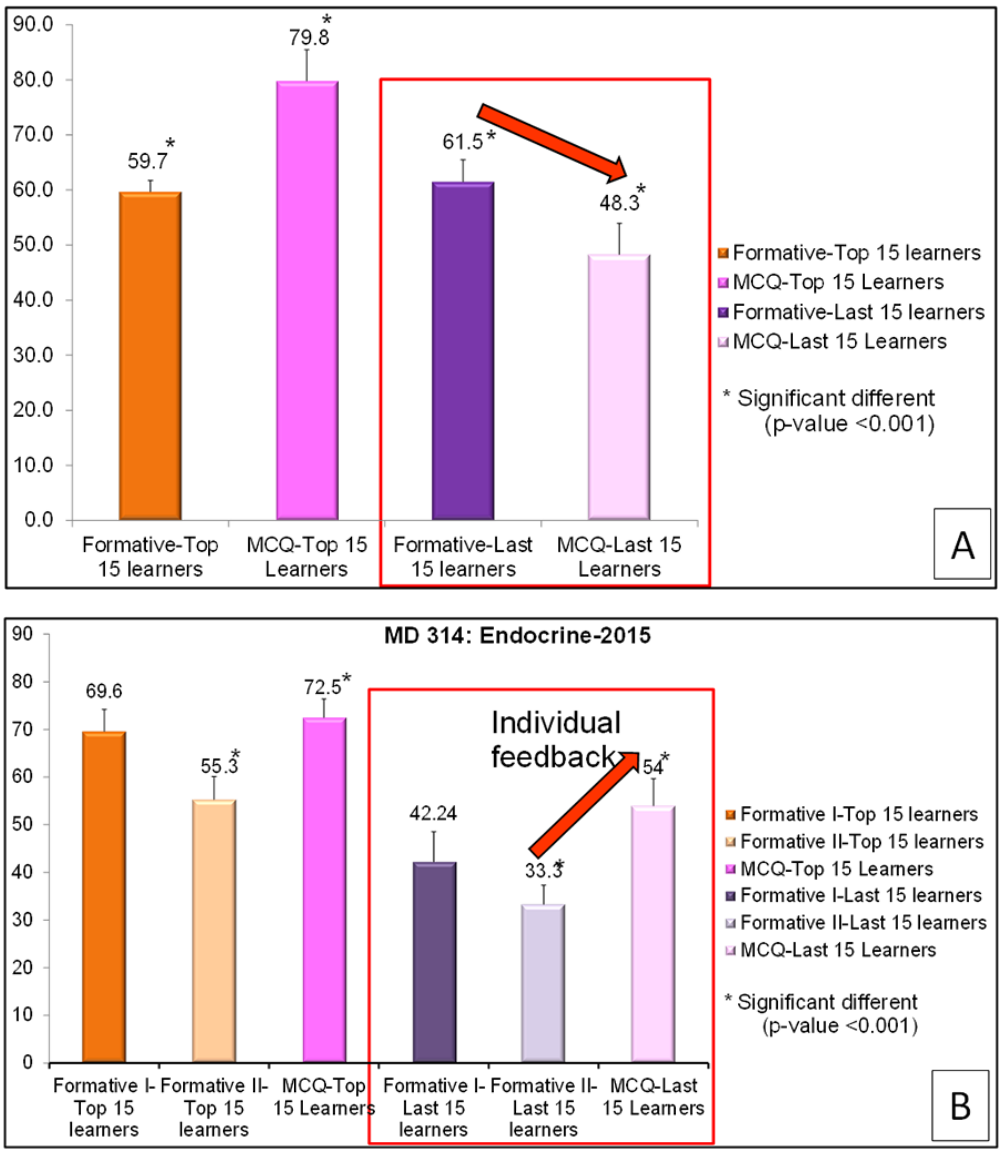

Fig. 6 Outcome of 2 times of formative and individual feedback system. A) Result from block management by only 1 formative (Formative-I) and group-feedback only). [The data represent the mean ± SD. Asterisk indicates a significant difference at $p<0.001$ (Mann-Whitney test)]. B) Result from block management by 2 times of formative (Formative-I , -II) together with both group- and individual-feedback. [The data represent the mean ± SD. Asterisk indicates a significant difference at $p<0.001$ (Mann-Whitney test)].

and "bottom-thirty" learners (Fig. 7 right). Additionally, it also stimulated those preclinical students to do more seeking to determine "what symptoms and signs are there that can help them, what mechanism was involved, on what tests they should rely to determine why they did not do well, how they may interpret the test results, what medications should be prescribed and why they should be prescribed" through their own self-learning (satisfaction rates shown in the Fig. 7 left).

Additionally, the satisfaction-rating scores on scenarios, formative, MCQ test on Moodle and overall satisfaction for the learning strategies endorsed during the endocrine block from 2013-2016 were analyzed as shown in Fig. 8. It has been found that the satisfaction rate was above 4 in each category. Moreover, the regulations launched from the academic-affairs department stipulate that the block committee must scrutinize the examination questions before they have

been used. This requirement encouraged us to screen and pick up the exam items in a more reliable form with more discrimination power each year, as shown in the Fig. 9. In conclusion, all of these positive outcomes confirmed that our learning strategy and management in setting up the endocrinology block each year could support the students, not only to have the sufficient content they'll need to pass the final exam of the block, but also to back them up so they'll have adequate knowledge to pass NL in their third-year medical-student exams.

Discussion

After exploring the learning activities from the setting up of A-I in each year of the endocrinology block, it was revealed that all of these activities enabled the students to have a relevant learning experience and, importantly, proved to be useful in enabling them to pass their final exams and NL part 1. This outcome might be well explained, item by item, in terms of the following:

From activities A-C, the study of (B) Scenemulator, it was demonstrated that scenemulators have the potential of supporting a non-specialist PBL tutor with much more confidence in facilitating a tutorial session. This outcome was well corroborated, as mentioned by Wood[8] and Groves et al[9], who showed that it might be a great advantage to have adequate and quality tutor notes together with the tutor training course before the course begins. This analysis, in turn, reflects back to the tutorial sessions and the students; in these sessions, case objectives and clinical problem

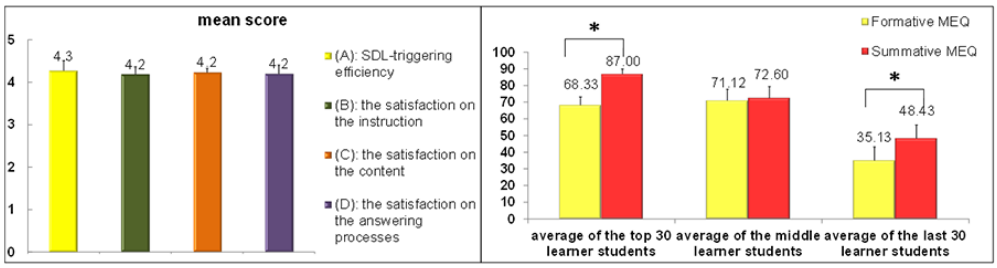

Fig. 7 Outcome of the formative MEQ that help the top and the last learner. (Left) Mean score of the satisfaction on (A) SDL-triggering efficiency, (B) the satisfaction on the instruction, (C) on the content and (D) on the answering processes. (Right) The top and the last thirty learner students showed significant improvement scores from formative to summative MEQ (p-value <0.01) while insignificant difference were detected in the middle score students.

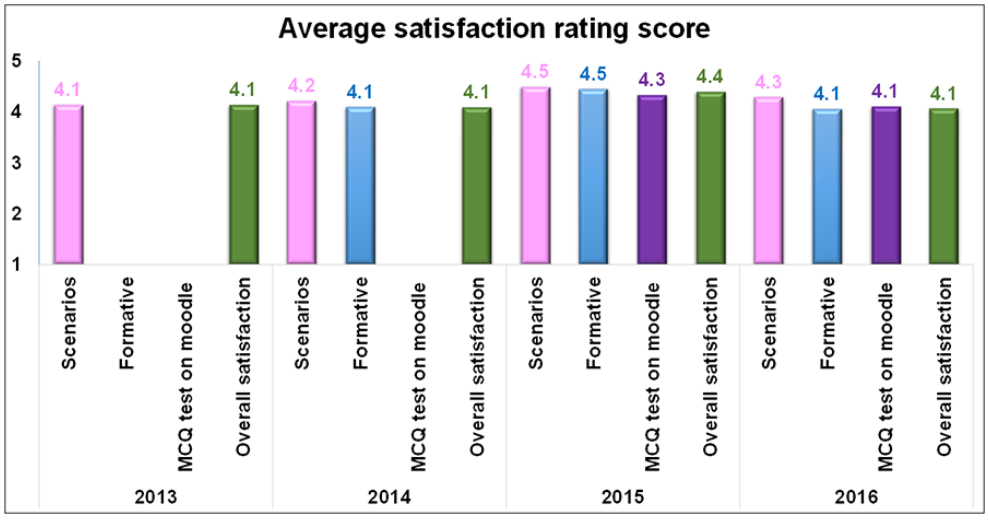

Fig. 8 Satisfaction rating score on scenarios, formative, MCQ test on Moodle and overall satisfaction for the learning strategies endorsed during the endocrine block from 2013 to 2016.

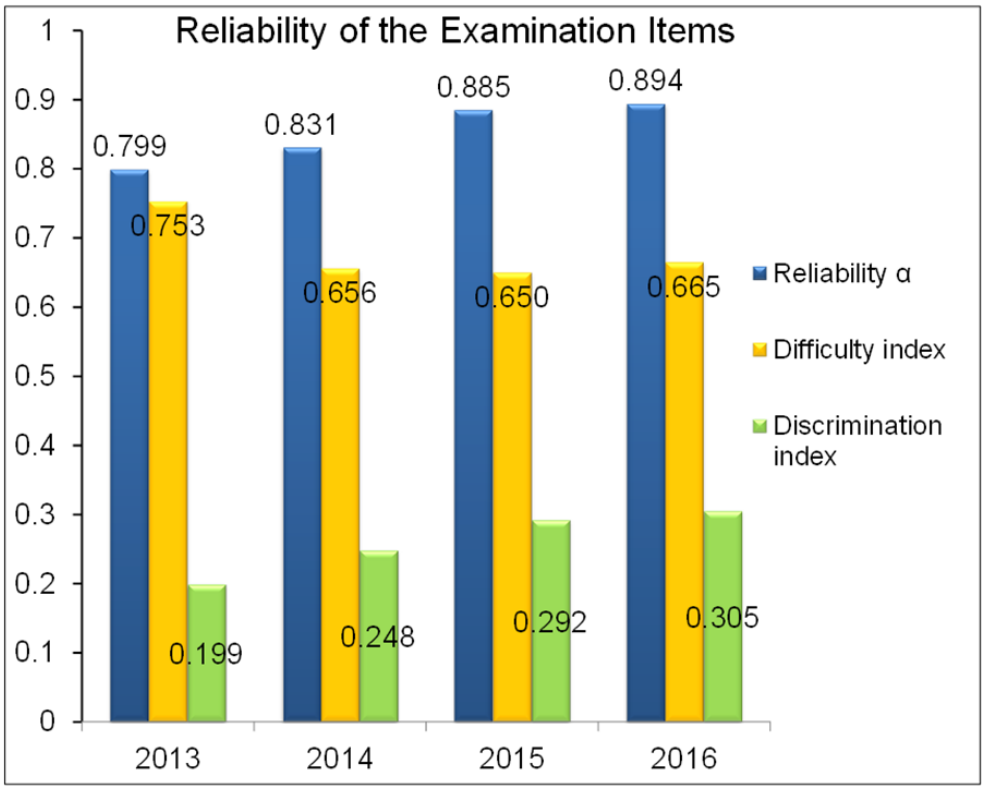

Fig. 9 Reliability of the examination items from the year 2013 to 2014. It did show an increasing of reliability and discrimination index annually.

identification were discussed in the same standard in every tutorial group, and were of the same standard as that of the experts.

From D-F activities, it has been found that the students who had performed five Moodle tests (activity E) had significantly higher MCQ final exam scores than those who had performed fewer than five tests (Fig. 5 left). Among the students who had completed five Moodle tests, 31.45% students (39/124 students) achieved Moodle-test scores of more than 50% in each test (Table 2); furthermore, they significantly achieved the highest MCQ final scores (Fig. 5 right). Our results correlated well with the previous findings that the medical students who used moodle obtained significantly higher scores in the final examination as compared with those who did not use moodle[10]. In addition, the final exam score was positively predicted by the total number of quiz attempts[11]. There were similar results with the activity (F) individual feedback system, which normally has one formative test at the middle of the course. Such was not the case for MD 314, an Endocrinology course in the year 2015, in which two of the interim formative as well as group- and individual- feedback were assessed. Fig. 6 shows the effectiveness of this model. This pattern is corroborated well as stated by Fleischer C et al[12] that one of the goals of formative assessment is to encourage students toward self-monitoring progress according to the learning goals. The most effective strategic to-do list consists in providing immediately useful feedback to

Table 2. Proficient moodle tests of 3rd year medical students at Thammasat University

Number of proficient moodle tests+	Number of students (%)
0	3 (2.42)
1	8 (6.45)
2	17 (13.71)
3	28 (22.58)
4	29 (23.39)
5	39 (31.45)
Total	124 (100.00)

+ Number of moodle tests that the student achieved more than 50% in test scores

students. This study hence demonstrates the potential of individual feedback, after an interim formative test, showing it to be an important factor in assisting the most slow-learning students. To maintain continuous support, the implementation of individual feedback after interim formative in other blocks should be seriously considered.

Last but not least, when taking into account G-I activities, both H and I, the twice organizing of an NL-based formative MCQ with clear explanation by experts and formative MEQ also supported students' outcome. While the students always voiced how they may acquire adequate and necessary knowledge from the PBL curriculum that would be sufficient to pass the NL test, the twice organizing of an NL-based formative MCQ with clear explanation by experts was set up in the endocrinology block. This arrangement had the effect of both reinforcing the students' understanding, through their self-directed learning, and reducing their anxiety arising from the complexities of their subjects. For (I) formative MEQ, its powerful capacity to stimulate self-directed learning (SDL) and problem-solving skills was demonstrated. This process supported the level III domains of skills from Modified Bloom's taxonomy[13] as effectively as MEQ did. Yet, even beyond the MEQ, formative MEQ can also help students identify their strengths and weaknesses in targeted learning areas.

Conclusion

It is difficult to identify among A-I activities which one is the most effective and most beneficial factor for medical students to gain the appropriated knowledge and pass NL examination step 1. All of the activities implemented within the six-year management period did work well together. They are all mutually promoting each other to link together as a jigsaw of multidisciplinary learning experiences into one effective platform.

What is already known on this topic?

This study aims to review key success factors that have been implemented each year for a successful study plan during 6 years in Endocrinology block at Thammasat University based on the guideline of Medical Competency Assessment Criteria for National License. No strong relevant manuscript has been found. However, mostly of the relative contents are from one experience for example Sara B demonstrates a creative, collaborative teaching strategy from her active learning in Endocrinology Pathophysiology class room. Silverthorn DU discusses 5-way to create a successful class from his observation of students. From this fact, implementation of these promising tools in other blocks should be considered.

What this study adds?

This study demonstrates key success factors that can group into three parts with nine new ideas (A-I activities) for encouragement both facilitator and students during 6 years in Endocrinology block, Faculty of Medicine, Thammasat University. Any way, it is difficult to say that from A-I activities which one is the most effective and most benefit for medical students to gain the appropriated knowledge and pass NL examination step 1 in final. All of the activities that performed along 6 years management did work together. An accomplish outcome actually came from the synergistic of these activities.

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Potential conflicts of interest

None.

References

1. Center for Medical Competency Assessment and Accreditation. The Medical Council of Thailand. Medical competency assessment criteria for national license 2012 [Internet]. 2017 [cited 2017 Jan 30]. Available from: https://www.tmc.or.th/file_08062012.pdf.
2. Rojpibulstit P, Suealek N, Srisawat U, Kongkham S, Pornthisarn S, Krudpathum W. Scenemulator: an innovative tutor note to facilitate non-specialist tutor in PBL tutorial session. J Med Assoc Thai 2014; 97 (Suppl 8): S175-81.
3. Ngodngamthaweesuk N, Rojpibulstit P. The challenge of clinical approach by SOAP notes in small group discussion at preclinical level. The continuum of education in the healthcare professions; August 25-29, 2012; Lyon, France: AMEE: An International Association for Medical Education; 2012.
4. Suealek N, Vannasiri S, Rabintossaporn P, Pankao V, Rojpibulstit P. Does moodle tests completion predict final exam scores? Experience from MD314,

The 3rd year Thai Medical students at Thammasat University. Poster presentation at The 48th annual meeting of the JSME (Japan Society for Medical Education); July 29-30, 2016; Takatsuki City, Japan: Osaka Medical College; 2016.
5. Rojpibulstit P, Suealek N, Vannasiri S, Rabintossaporn P, Pankao V. Individual feedback after interim formative test: How it should be important for the improvement? Experience from MD314, The 3rd year Thai Medical students at Thammasat University. Poster presentation at The 48th annual meeting of the JSME (Japan Society for Medical Education); July 29-30, 2016; Takatsuki City, Japan: Osaka Medical College; 2016.
6. Rojpibulstit P, Suealek N. Formative MEQ, Can it be the challenging tool for preclinical medical students in encouraging their own self-directed learning and improving their own scores? Poster presentation at 16th Ottawa Conference, 12th Canadian Conference on medical education; April 26-29; Ottawa, Canada: Ottawa Convention Center; 2014.
7. Ngodngamthaweesuk N, Rojpibulstit P. Is MEQ better than MCQ to assess cognitive domain in preclinical medical students? Poster presentation at 16th Ottawa Conference, 12th Canadian Conference on medical education; April 26-29; Ottawa, Canada: Ottawa Convention Center; 2014.
8. Wood DF. Problem based learning. BMJ 2003; 326: 328-30.
9. Groves M, Rego P, O'Rourke P. Tutoring in problem-based learning medical curricula: the influence of tutor background and style on effectiveness. BMC Med Educ 2005; 5: 20.
10. Seluakumaran K, Jusof FF, Ismail R, Husain R. Integrating an open-source course management system (Moodle) into the teaching of a first-year medical physiology course: a case study. Adv Physiol Educ 2011; 35: 369-77.
11. Kleitman S, Costa DSJ. The role of a novel formative assessment tool (Stats-mIQ) and individual differences in real-life academic performance. Learn Indiv Differ 2014; 29: 150-61.
12. NCTE National Council of Teachers of English. Formative assessment that truly informs instruction [Internet]. 2013 [cited 2016 Jun 28]. Available from: http://www.ncte.org/library/NCTEFiles/Resources/Positions/formative-assessment_single.pdf.
13. Khan MU, Aljarallah BM. Evaluation of Modified Essay Questions (MEQ) and Multiple Choice Questions (MCQ) as a tool for Assessing the Cognitive Skills of Undergraduate Medical Students. Int J Health Sci (Qassim) 2011; 5: 39-43.

ปัจจัยแห่งความสำเร็จต่อผลการสอบผ่านการสอบเพื่อรับการประเมินและรับรองความรู้ความสามารถในการประกอบวิชาชีพเวชกรรมขั้นตอนที่ 1 ของรายวิชาต่อมไร้ท่อ: บทเรียนจากคณะแพทยศาสตร์ มหาวิทยาลัยธรรมศาสตร์

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ภูมิหลัง: สืบเนื่องจากการเริ่มมีการสอบเพื่อรับการประเมินและรับรองความรู้ความสามารถในการประกอบวิชาชีพเวชกรรม 3 ขั้นตอน ซึ่งการสอบในขั้นตอนที่ 1 จัดว่าเป็นขั้นตอนที่ยากที่สุดนั้นและด้วยหลักสูตรของคณะที่ใช้หลักการเรียนการสอนโดยใช้ปัญหาเป็นหลักนับตั้งแต่ตั้งคณะ จึงเป็นความรับผิดชอบของกรรมการรายวิชาที่ต้องดำเนินการวางแผนกระบวนการจัดการเรียนการสอน เพื่อให้ได้ผลทั้งในส่วนของผลลัพธ์ทางการศึกษาของรายวิชา, การกระตุ้นให้นักศึกษาได้เรียนรู้และมีผลการสอบผ่านในขั้นตอนที่ 1 อย่างน่าพึงพอใจ

วัตถุประสงค์: เพื่อรวบรวมปัจจัยแห่งความสำเร็จที่ได้ดำเนินการในแต่ละปีเพื่อให้ผลการสอบผ่านในขั้นตอนที่ 1 ประสบความสำเร็จ

วัสดุและวิธีการ: กิจกรรมที่ได้ดำเนินการแบ่งได้เป็นส่วนใหญ่ ๆ 3 ส่วน ซึ่งประกอบด้วยกิจกรรมย่อย 9 กิจกรรม ได้แก่ การเตรียมข้อมูลเพิ่มเติมพิเศษ 3 แบบสำหรับการใช้ในห้องกลุ่มย่อย, การดำเนินการกระตุ้นการเรียนรู้ของนักศึกษา 3 แบบ และการเตรียมเพื่อให้ได้มาซึ่งการประเมินผลที่น่าเชื่อถือ 3 แบบ

ผลการศึกษา: ค่าเฉลี่ยของความพึงพอใจต่อการจัดการเรียนการสอนในรายวิชาต่อมไร้ท่อ มีค่ามากกว่า 4 (จากคะแนนเต็ม 5) รวมทั้งผลการสอบผ่านในขั้นตอนที่ 1 ในช่วง 2 ปีย้อนหลังมีค่าสูงกว่าค่าเฉลี่ยของประเทศในทุกเนื้อหาที่แยกตามแต่ละอวัยวะ

สรุป: การรวบรวมข้อมูลในครั้งนี้แสดงให้เห็นถึงปัจจัยแห่งความสำเร็จที่มีส่วนช่วยให้นักศึกษาประสบความสำเร็จในการเรียนรู้เนื้อหาในรายวิชาต่อมไร้ท่อ