

# **Case-based learning (CBL) in Clinical Chemistry 1** (MTH60-311) in the 3<sup>rd</sup> year Medical Technology Students

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## Abstract

Background: Clinical Chemistry 1 is usually taught by traditional lectures. The students may have less attention and concentrate while they're learning and may result in the low ability in learning outcomes

Aim: To enhance the ability of learning outcomes in the Medical Technology students in the Clinical Chemistry 1 course, this study used several UKPSF methods including Think Pair Share, awards, case-base learning (CBL), formative assessment (Kahoot), VDO presentation in corporation with lecture-based learning (LBL) in the teaching.

Methods: A total of 97 students have attended in the Clinical Chemistry 1 (MTH60-311) class in year 2019. The course was taught by lectures for 2 hours and have case based learning (CBL) for 1 hour in each topic. After finish the lecture, the students had a formative assessment or quizzes by Kahoot. The student who got the top score received an award. Think pair share activity was also done at the beginning of the lecture hour for ice-breaking. Finally, the case studies were posted on WU e-learning by each lecturer one week before the student worked as a group (8 students/group) and gave a presentation. Finally, the students also sent mind-mapping and report for the case studies. The presentations and reports were evaluated by lecturers. The quiz score and Mid-term score were compared between the LBL in year 2017, and CBL+LBL in year 2019. Results: In this study, the students preferred the lecturers to lecture them directly, and they required the Thai hand-outs. Moreover, the students do not prefer the VDO presentation. The mean score of mid-term and quizzes in CBL+LBL was significantly higher than LBL in the clinical chemistry course (p-value < 0.0001). Conclusions: CBL+LBL showed a better of learning outcomes when compared with LBL only. Moreover, CBL+LBL may promote the critical thinking, self-directed learning, and lifelong learning that are important for enhance the capability of the students in the 21<sup>st</sup> century skills.

## Introduction

...CLINICAL CHEMISTRY 1 (MTH60-311) have taught by traditional lectures for Medical Technology students for a decade. This course is learn about the important biochemical substances in normal conditions and diseases such as metabolic disorders of carbohydrate, disorder of protein and lipid metabolism, diseases of the heart, kidney, liver, pancreas, bone, prostate and endocrine glands as well as, abnormalities of vitamins, minerals, electrolytes and acid-base balance.

After the end of the course, the students should understand the pathophysiology and known the markers of such diseases. The students have loss of concentrate and less attention while they are learning by the traditional lecture for 3 hours continuously.

To improve the attention, enhance ability the learning outcomes, as well as, provide the self-direct learning, and lifelong learning of the students, the course was improve and used several UKPSF methods; think pair share activity, awards, Kahoot, VDO, case-based learning (CBL), Thai Textbook, as well as, lecture based learning (LBL).

The learning outcomes of this course which used CBL+LBL in the year 2019 was compared with the course which used only LBL in the year 2017.

# Learning activities

#### Lecture-based learning (LBL)

## Feedback

- Feedback from the students
- They like;
- The lecturer to teach them by using ppt. and need to read a Thai hand-out
- KAHOOT
- Think pair share activity

### **Evaluation; Formative assessment,** Summative assessment

Mid-1 (Total sco	「erm ore = 90)	Quiz (Total sco		
Year 2017	Year 2019	Year 2017	Year 2019	



- They <u>DO NOT</u> like;
- VDO presentation
- Too Much of Case studies



- After Feedback/ The Teacher DO:
- Use THAI textbook: Basic Clinical Chemistry
- Use KAHOOT in after the lecture hour
- Use Think pair share activity
- Remove the VDO presentation from the PPT. But shown it as a link in the references
- Reduce the number of Case studies (from 12 to 6 cases per course)

Mean	45.44 ± 9.07	54.51 ± 10.07	0.000	1.40 ± 0.49	6.53 ± 1.76	0.000
Max	65	75	NA	10	9.50	NA
Min	31	29	NA	1.5	3.50	NA
Ν	55	97	NA	55	97	NA
	LBL	CBL+LBL	P-value	LBL	CBL+LBL	P-value

## Conclusion

- Only some UKPSF methods are preferable by the students
- CBL + LBL showed a higher scores of quizzes and Mid-term when compared with LBL alone
- The students are happy and enthusiastic when they were assessed by Kahoot and have more in critical thinking and self directed learning when they worked as the team in CBL.
- It could be expected that CBL+LBL could enhance the Learning outcomes and promote a lifelong learning in the students



### **Acknowledgement**

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#### References

1. Bonney KM. 2015. Case study teaching method improves student performance and perceptions of learning gains. J Microbiol Biol Educ. 16:21–28.