Improving Student Learning and Participation:

A case study for subject "Air Pollution and its Control"

Jira Kongpran

Department of Environmental Health and Technology, School of Public Health
Walailak University, Nakhon Si Thammarat, Thailand

Overview

Not only knowledge but also laboratory and field measurement skills are important for learners in environmental health program. There are several subjects in the program which have both lecture and laboratory parts during second to fourth year. However, most of students are unable to apply previous knowledge and skill to higher level courses. Problems are:

- Big classroom and less participation
- Less practice of laboratory and field measurement skill
- Ineffective paper-based exam for laboratory part

Therefore, several teaching and learning techniques were applied in order to improve student learning and participation [1, 2]

Aims and objectives

- To improve students learning and participation in subject "Air Pollution and its Control"
- To evaluate learning outcomes and participation of learners

Activities

Planning
- Course specification
- Team teaching
- Teaching materials

Learning and teaching
- Traditional Lecture
- Group work/ discussion/ report/ presentation
- Peer tutoring
- Individual work
- Gaming and competition
- Project-based learning
- Field trip
- Lab. demonstration/ review and practice

Assessment and Feedback
- Pre-test/ post-test/ quiz
- Feedback
- Midterm exam
- Final exam
- Instrument using test
- Paper-based laboratory exam

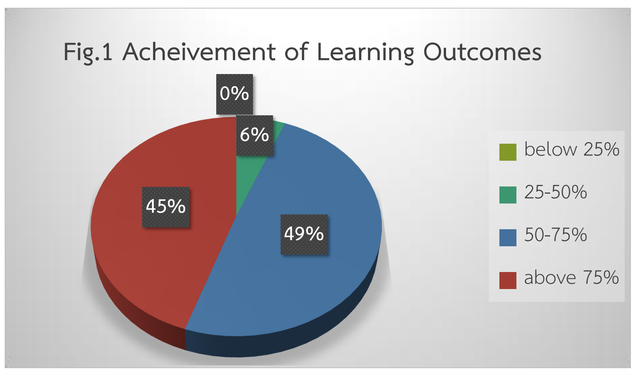
Learner Reflection by Questionnaire

Outcomes

Midterm exam score of 81 students were mainly in 65-75% of total score which represent C+ to B+ grade (Table 1). 67 Students in this subject (82.7%) reply questionnaire (Fig.1). Most of them (49%) reflected that their achievement of learning outcomes was between 50-75% (Fig.1).

Table 1 Midterm Exam Score

Score range	No. of student
16.0-20.0	17
13.0-15.9	37
10.0-12.9	20
0.0-9.9	7
Total	81



Impacts

To achieve learning outcomes in this subject, the most important factor was course specification and followed by teacher, while laboratory equipment and instrument was obstructed factor (Table 2). Top 3 satisfaction of learner to teaching and learning in this course were laboratory procedure review, laboratory demonstration and feedback, respectively (Table 3). Students were satisfied with The most important factor increasing learner participation was teacher characteristic (Table 4).

Table 2 Learner Perspective about Factors increasing Learning Outcome in the Subject

Factors	Score*
Student themselves	2.29
Teacher	2.82
Group members	2.59
Course specification	2.85
Teaching materials	2.79
Teaching supportive facilities	2.33
Lab equipment and instrument	2.08

Table 4 Learner Perspective about Factors increasing Learner Participation in the Subject

Factors	Score*
Characteristics of teachers	2.76
Characteristics of students	2.27
Learning environment	2.71
Engaging by teachers	2.62

*Each topic was specified by 1 = low, 2 = moderate and 3 = high after that the score was calculated by averaging value.

Table 3 Satisfaction of Teaching and Learning Techniques applied in the Subject

Teaching methods	Score*
Lecture by teacher	2.70
Group work/ group discussion	2.51
Student-group report	2.61
Group presentation	2.64
Peer tutoring by student	2.34
Individual homework	2.70
Gaming and competition	2.65
Project-based learning	2.67
Field trip	2.67
Feedback by teacher	2.75
Pre-test/ post-test/ quiz	2.63
Midterm and final exam	2.70
Laboratory demonstration	2.76
Laboratory procedures review	2.85
Instrument using practice	2.51
Instrument using test	2.70
Laboratory exam	2.57

Future development of project

The most significant feedback from students is insufficient number of laboratory equipment and instruments. Therefore, future development is

Short-term: To allocate additional time for practice

Medium-term: To improve teaching and learning techniques in the subject covering all learner with different performance

Long-term: To apply teaching and learning techniques in laboratory part for other subjects

References

[1] Starmer DJ, Duquette S, Howard L. Participation strategies and student performance: An undergraduate health science retrospective study. J Chiropr Educ. 2015;29(2): 134-138.

[1] Biggs & C. Tang (2011). Teaching for Quality Learning at University. What the Student Does, 4th Edition, SRHE & Open University Press, Berkshire.