Think-pair-share discussions: an active learning in the topic of heavy metal toxicity

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Overview

In toxicology course for second-year student, I was responsible for toxic effect of heavy metal and pesticides. There were a lot of materials for them to cover including biochemistry, anatomy, molecular biology and physiology. In the previous of time this topic was only lecture-base learning and the students receive the information resulting in they could not make a linkage between theory and real world situation. It is thus this topic was redesigned by addition of active leaning. Think-pare-share discussion is one of the teaching methods that help students process information rather than passive receive the information. Therefore, lectures play role as the facilitator to hold a discussion, or talk to one student at a time.

Aims and Objectives

The Objective of this study was based on learning outcome of the program

1. Describe some of the sources of heavy metal pollution in water and give examples of effects of environmental exposure to heavy metals on human health and/or ecological function.

2. The goal of a discussion is to get students to practice thinking about the course material

Think-pair-share activity

Title	Assessment	Score (%)
Toxic metals in occupational health Biomarker and assessment Diseases Law	Post-Test Team base Learning (1 pt) Mid-term Exam (4 pts) Open Book Exam	7 TEACHER

I. Preparing for discussions

In order to help students reach that learning objective and learning outcome in toxicology course, we started planning a instruction of activities, and decide what students be able to interpret at the end of hour. The students worked in small groups for brainstorming, making new connections, and sharing a response to the theme in question.

II. Developing a clear goal for the discussion

Before the class begin, the concepts of the topics and the updated publication in related field were included in the class activity. Learning materials and PowerPoint chapter were posted on e-learning for the students to prepare themselves before class. The concepts and topics we want students to know were list as the questions using Socrative application

III. Class activities, assessment and give feedback

The students were arranged into the smaller groups (two-three) by randomly assigning which were more likely to speak in smaller groups and generate lots of ideas. On the screen, graphs & pictures (visual learning), video clips (audio learning) and texts (reading/writing learning) were posted on WU e-learning. During the class we allowed the students to access and responsible for the questions we asked. In this class, Socrative application was used to enter their answers. We could monitor their answers real time and prompt us to give them the feedback. If all answers were correct, we would move on the new topics. However, if we found the incorrect answer, we would give them more information and guild them to find the correct answer.

IV. Finally

We wrap up and summarize the discussion for the students (or have students summarize it), or to debrief after activities

V. Assessments

In the case of formative assessment, concept test e.g., quizzes and post-test were applied; however, long term memory was assessed by essay to interpret their understand in final exam.

Outcome

Name	Score (%)	1	2	3	4	5	6	7
*****	83%	B, C	B	A	A	A	25	1
*****	83%	B, C	B	A	A	A	25	2
*****	100%	B, C	B	A	A	B	25	3
*****	83%	B, C	B	A	A	B	25 ml	4
*****	100%	B, C	B	A	A	B	25	5
*****	83%	B, C	B	A	A	D	25	6
*****	50%		B	A	A	D		7
*****	100%	B, C	B	A	A	B	25	8

95% of students obtained the scores higher than 50 %
Mean=72.4 SD = 13.3

Impact

- The students will explain their unterstand to people who have high risk of heavy mental and insecticide exprosure in order to prevent the harmfull health effect
- The students will improve employability skills including communication skill, time management skill, technology skill, and problem-solving skills
- The students will apply the basic concept of toxicology to project-based learning in next year
- Long-term groups allow students to practice collaborative skills and make stronger bonds.

Future development of project

The developed technique will be moving teaching online and will apply through other class during COVID-19 pandemic

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