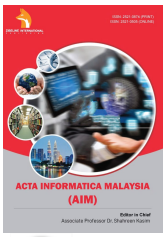
ZIBELINE INTERNATIONAL PUBLISHING

ISSN: 2521-0874 (Print)
ISSN: 2521-0505(Online)
CODEN: AIMCCO

Acta Informatica Malaysia (AIM)

DOI: http://doi.org/10.26480/aim.02.2020.07.09



RESEARCH ARTICLE

VISUAL COMMUNICATION TECHNIQUE TO ENHANCE TEACHING AND LEARNING PROCESSES IN QUANTITATIVE ANALYSIS AND INSTRUMENTATION COURSE

Mardiana-Jansar K.*, Marlia Mohd Hanafiah

Centre for Earth Sciences and Environment, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia.
**Corresponding author email: mardiana@ukm.edu.my*

ARTICLE DETAILS

Article History:

Received 11 December 2019
Accepted 18 January 2020
Available online 18 February 2020

ABSTRACT

Visual communication has become an important technique for the 21st century's education. Images and videos are essential tools for better understanding in science and technology subjects. The science and technology subjects can be better understood through a combination of visual communication and application of the theory can be practiced. 40 students from quantitative analysis and instrumentation course were given an assignment using the separation concept. Only two students were unable to perform the task well and these students were also among the students who failed to answer the examination questions involving the application of separation techniques. Correlation tests between assignment and examination scores (involving separation concept questions) showed a positive correlation (r= 61.1). Despite the small number of respondents, the results showed a relatively strong correlation. To address this issue, students were encouraged to share their video among them, so that they can understand the separation techniques excellently.

KEYWORDS

across disciplines, visual techniques, separation techniques, science, visual communication

1. INTRODUCTION

The rapid changes of the modern world have caused the higher education system to face a lot of challenges. Teaching in conventional way in a classroom is no longer appropriate when universities want to produce competitive, innovative and creative graduates. Therefore, research and exploration of beneficial and effective teaching and learning methods is one of the most important needs of the current student education system, known as Z generation students. The Z generation students are less focused in the classroom when teaching and learning techniques are incorporated into one-way communication which is in lecture form. Other approaches such as visual communication need to be emphasized more broadly in order to make the learning and teaching process more effective. Visual communication is the dissemination of ideas and information in a tangible form. There are two obstacles to science communication using appropriate visuals; (1) visual materials are often treated as supplements not as a major part of teaching techniques and (2) there is a lack of recognizing Z generation characteristics as target listeners so that visual materials can be tailored to them (Fadzilah et al., 2010). In order to make the learning and teaching process more effective, courses and assistance from experienced lecturers in the field of visual communication are crucial.

In order to ensure the quality of education, attention should be given to the students as the main product. Emphasis at university level is usually given to the quality of teaching and learning, as well as research works, however studies showed that more attention is focused on research than to the quality of university education (Shirani et al., 2016). This resulted in the graduates being less competitive to meet their job requirements. In a conventional teaching and learning system, teaching is teacher-centered while the student needs and interests are not taken into consideration. Therefore changes need to be made, the lecturer must pay attention to the students and the teaching and learning approach; to achieve a new and quality teaching approach.

Teaching and learning in higher education is a shared process; which is the responsibility of students and lecturers in contributing to the success of the graduates. In this process, higher education needs to engage students in drawing on ideas from what they have learned and applying them to achieve higher levels of understanding. However, students do not care to face this challenge, and they only care about how to survive a subject, to get good grades and move on to the next subject. Whereas the lecturers are more concerned with the knowledge they have been delivered without regard to whether or not the students understand what is being taught. The best teaching and learning is a combination of teacher-centered and student-centered methods by effectively communicating knowledge while helping students to question their prejudices, and motivating them to learn (Shirani et al., 2016; Elen et al., 2007).

2. RESEARCH METHODOLOGY

40 first year undergraduate students in environmental science programs

Quick Response Code	Access this article online	
	Website: www.actainformaticamalaysia.com	**DOI:** 10.26480/aim.01.2020.07.09

Cite the Article: Mardiana-Jansar K., Marlia Mohd Hanafiah (2020). Visual Communication Technique To Enhance Teaching And Learning Processes In Quantitative Analysis And Instrumentation Course. *Acta Informatica Malaysia, 4(1): 07-09.*

were used as respondents of the study. Assignment title was the application of separation techniques in everyday life. Students were required to consider the appropriate studies and chemicals for the application of separation techniques using chromatographic paper (Figure 1). The materials and chemicals required to produce the assignment were provided by the lecturers. After that, students had to record the process and upload the video to the padlet website. Subsequent scores were assigned to each video produced. The study was conducted using a quantitative analysis method to find the relationship between student test result scores and the assignment score.

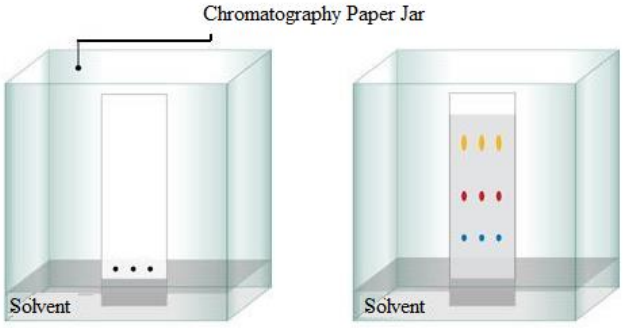


Figure 1: Paper Chromatography Method

3. Results and Discussion

3.1 Video produced by students

A variety of student-created videos were produced to meet the assigned tasks. Students have used various sources of materials to see the application of separation techniques that can be made to them (Ratnasari et al., 2017). The materials used are pen and markers, flowers, food coloring and lipstick. The following is a screenshot of some of the videos produced by students during this assignment (Figure 2-7). All of these videos can be viewed on the STAE1423 Young Detective Assignment website (the separation technique) in https://padlet.com/mardiana_jansar/STAE14232018.

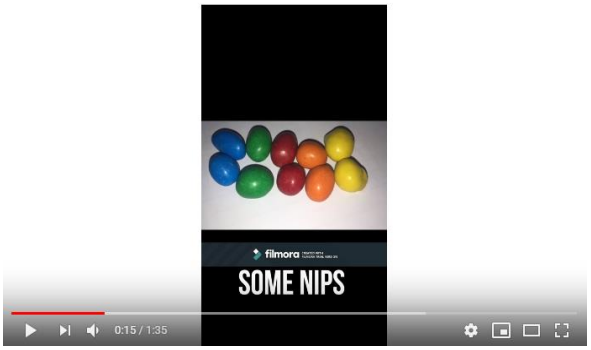


Figure 2: Food coloring as the study materials

Figure 3: Flowers as study materials

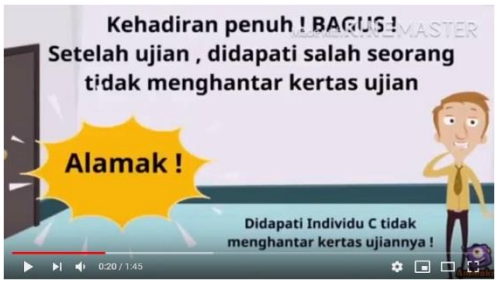


Figure 4: Examination answer script losing case

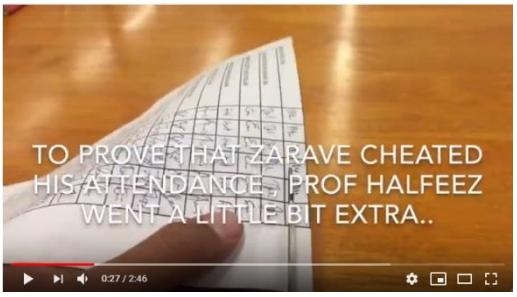


Figure 5: Attendance class cheating case

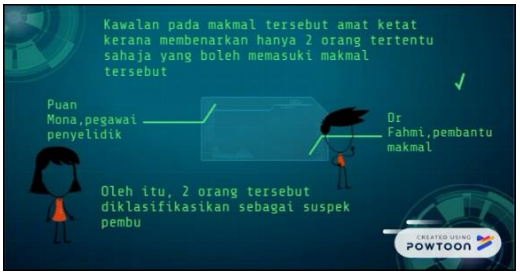


Figure 6: Professor Kassim murder case

Figure 7: A doctor cheating case

From the videos produced by students, it can be seen that students can apply this concept of separation in their daily lives. Students are very creative in figuring out which cases were best created with the materials used. This is a student-centered visual communication technique because students act as the creators of ideas from what they have learned in the classroom (lecturer-centered teaching) and students are able to apply that knowledge so that they can reach a higher level of understanding. This statement was also supported by a group researchers that most students have conceptual understanding at the partial level, so that the students can solve mathematical problems from teachers, however they do not understand the concept [2]. Hence, if the concept is fully understood, then the student's understanding level will be deeper.

3.2 Relationship between assignment marks and student exam scores

The relationship between assignment marks and student test scores was obtained using correlation analysis involving questions about the concept of separation. The rubric of scoring for the assignments were given in Table 1. The examination questions used in the correlation analysis were only the questions involving separation techniques.

Table 1: Rubric Marks for Video Assignment

Criteria	Excellent	Good	Intermediate	Weak
Concept	**15-20 marks** Very clear concept to achieve excellent video production. Adequate descriptions in the video.	**10-14 marks** Clear concept to achieve good video production. Adequate descriptions in the video but aim of the video concept nearly achieved.	**5-9 marks** Uncertain concept to achieve video production. Unclear focus. Video concept not achieved.	**0-4 marks** Very little effort on thinking of the video concept. Unclear video concept and can't be achieved.
Content and Story line structure	**15-20 marks** The video content enclosed a clear statement of the video's objectives and themes. The video was creative. There was also additional information that allows viewers to get better understand the idea of making the video. The message to convey was logical and video sources were stated	**10-14 marks** The video content enclosed a good statement of the video's objectives and themes. There was also additional information that allows viewers to get better understand of the idea in making the video. The message to convey was logical and video sources were stated	**5-9 marks** The video content enclosed a weak statement of the video's objectives and themes. There was also additional information that allows viewers to get little understand of the idea in making the video. The message to convey was having a little logic and some of the video sources were stated.	**0-4 marks** The video content did not enclosed a statement of the video's objectives and themes. There was also additional information given but did not allows viewers to understand of the idea in making the video. The message to convey was not logic and video sources were not stated.
Quality	**15-20 marks** The video was perfect and took all the elements needed. The video was excellently edited and runs smoothly from scene to scene. Audio was clear too.	**10-14 marks** The video was good and took all the elements needed. The video was well edited and runs fairly smooth from scene to scene. Audio was clear too, but not given a maximum effect.	**5-9 marks** The video was made and but did not take all the elements needed. The video was little edited and runs fairly smooth but had unneeded scene. No audio was used.	**0-4 marks** No video was made or the video was downloaded from the internet. No audio was used.
Collaboration in group	**15-20 marks** Students had excellent discussion to produce a video. Both students provided good cooperation in video production.	**10-14 marks** Students had good discussion to produce a video. Both students provided fairly good cooperation in video production.	**5-9 marks** Students had little discussion to produce a video. Both students provided little cooperation in video production.	**0-4 marks** Students did not discussion to produce a video. Only one student did the video.
Time punctuality	**15-20 marks** Projects are submitted at the appointed time.	**10-14 marks** Project submitted after two days from the appointed time.	**5-9 marks** Project submitted after one week from the appointed time.	**0-4 marks** Project submitted after two weeks from the appointed time.

From the student assignment marks and the student test scores, the relationship showed in Figure 8. The correlation test between the assignment marks and the test scores (involving the concept of separation) (Figure 8) showed a positive correlation with the strength of the relationship was 61.1%. This indicates that as students understood and applied the concepts learned, their ability to answer questions related to the concept of separation also increased. Despite the small number of respondents, the results still provided a relatively strong correlation.

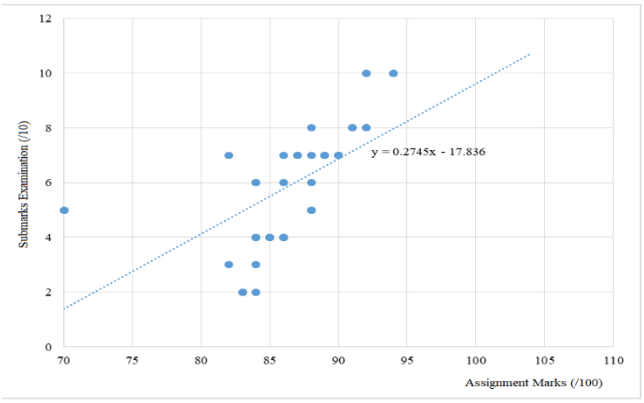


Figure 8: Correlation test between assignment marks and examination scores

4. Conclusions

A strong understanding of basic concepts was very important for the students. This can be achieved through application of concepts learned through visual communication methods.

Acknowledgments

The authors wish to express thanks to the Center for Earth Sciences and Environment and the Faculty of Science and Technology, Universiti Kebangsaan Malaysia for providing a good teaching and learning facilities.

References

Elen, J., Clarebout, G., Léonard, R., Lowyck, J., 2007. Student-centred and teacher-centred learning environments: What students think? Teaching in Higher Education, 12, 1, 105-117.

Fadzilah, A.R., Scaife, J., Yahya, N.A., Habibah A.J., 2010. Knowledge of Diverse Learners: Implications for The Practice of Teaching. International Journal of Instruction, 3 (2), 1308-1470.

Ratnasari, D., Sukarmin, S., Suparmi, S., 2017. Effect of problem type toward students' conceptual understanding level on heat and temperature. Journal of Physics: IOP Conference Series, 909, 012054.

Shirani, B.N., Nasr, I.A., Rouhollahi, A., Khalili, R., 2016. Effective Teaching Methods in Higher Education: Requirements and Barriers. Journal of advances in medical education and professionalism, 4 (4), 170-178.