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Enhancing Learning Interest in the Collaborative Learning Practitioner Lecture: Training on Determining the Viscosity of Palm Kernel Oil (PKO)

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ABSTRACT: This study aims to determine the effects in physical chemistry class with the workshop sessions on measuring PKO viscosity by CV. Bina Agro Mandiri. The effects are evaluated through the enhancing of student's learning interest in the Physical Chemistry II class in Chemistry Program of the Islamic University of Indonesia, which presents a good avenue for this investigation. The study was conducted by classroom, practical and online action. The data were analyzed using a pie chart. Findings showed that the implementation of the practical was able to increase the student's learning interests. Through case analysis tasks, students participate significantly in the teaching-learning process.

Keywords: class participation, learning achievement, Physical Chemistry II class

INTRODUCTION

The Chemistry Study Program (Faculty of Mathematics and Natural Sciences) of the Islamic University of Indonesia is one of the study programs that *continuously improves the quality of learning through several programs which in general consist of strengthening the curriculum and strengthening local genius* study programs with the *theme of* developing essential oils, energy and environment as well as organic synthesis for health and food. Development of an academic atmosphere that is in line with increasing curriculum capacity is directed at conformity based on the Indonesian national qualification framework (KKNI) and the Merdeka Learning Campus Merdeka (MBKM) education program as well as the direction of increasing the status of study programs namely international accreditation through *the Royal Society of Chemistry* (RSC) and Accreditation in Engineering Computer Sciences Natural Sciences Mathematics (ASIIN). The Chemistry Study Program has designed a new 2022 curriculum that comprehensively supports the achievement of graduate competencies and mastery of content according to RSC and ASIIN standards and refers to the MBKM program. However, several technical and conceptual obstacles in learning several courses are still visible, considering the wide range of basic competencies to be achieved by each course in the basic science of chemistry. According to RSC, the core chemistry curriculum is broadly classified into 3 (three) fields of science, namely organic chemistry, inorganic chemistry and physical chemistry. Physical chemistry is a scientific field of chemistry that can be explained in detail as a study that includes atoms, macroscopic, atomic particles and sub - topics in chemistry. The subject physical an applied on concepts, priciples and practices in energy, time, motion, thermodynamics, dynamics, forces, statistical mechanics and quantum chemistry. In the Chemistry Study Program Curriculum, the scientific field of physical chemistry is studied in 4 (four) mandatory courses consisting of: physical chemistry I (2 credits), physical chemistry II (2 credits), chemical bonding (2 credits), and chemical kinetics (2 credits).

The physical chemistry II course is a compulsory subject taught in the even semester for second year students. The learning objective or basic competency to be achieved is that students are expected to be able to explain changes in entropy, the Gibbs function and changes in enthalpy and colligative properties of solutions. Because the content is full of theories and concepts, the physical chemistry learning process is often trapped in a mathematical approach and does not provide chemical descriptions. Moreover, these basic concepts are not clearly seen and felt by students when carrying out independent assignments, theses or practical field work. Based on this background, *the American Chemical Society* and *the Journal of Chemical Education* placed the development of physical chemistry learning as the focus of the need for more comprehensive chemistry learning [1, 2, 3, 4] . Mastering of the material, generally exercises mastery of concepts and practices for students have been carried out. However, the visualization of concepts is very limited because the scientific content of physical chemistry is rarely conveyed through practicum methods. Meanwhile, mastery of the basic concepts of bonding and mastery of information related to scientific developments in that field is a requirement in RSC. Referring to several studies and exploration of classroom actions for physical chemistry material, one of the techniques that can be developed within this framework is the conceptual and practical teaching methods. Basically, the conceptual method emphasizes the enrichment of basic material by involving several actors in curriculum development. As an example is the material visualization approach to students [5, 6, 7, 8]. Visualization will have a wider scope, not only at the stage of proving theory which in turn, depends on students' interests. For example, the basic meaning of colligative properties of solutions and energy changes in bond formation, as well as several applications of spectroscopic techniques, are easily developed by lecturers. Based on increasing the expertise of lecturers (through training/workshops from practitioners working in industry as a visualization and learning medium that can be adopted and to support this) is essential, increasing the expertise of lecturers is very necessary. On the other hand, study programs must be able to foster an academic atmosphere that encourages students' self-confidence. With a combination of visualization as part of a conceptual approach through instilling training methods from industry and increasing lecturer expertise, this research proposes a training/workshop model from industry partner practitioners.

Visualization and collaborative approaches and the involvement of practitioners in teaching and learning activities provide lecturers to explore aspects of students' cognition. The combination of presenting material through online lectures [9, 10, 11, 12] and training methods is important for student evaluation abilities and it also supports MBKM-based learning activities by involving partners.

RESEARCH METHODS

Literature review

The theoretical and mathematical characteristics of physics and chemistry material are seen as far from applicative aspects, and the first step in preparing for lectures is therefore to attract students' interest. In the early stages, an initial assessment (benchmarking) was carried out by utilizing the evaluation system that had been developed by the curriculum team of the Chemistry Study Program. Along with the development of technology, learning will attract interest if it is carried out not only by introducing changes in study styles but also by using modern teaching methods. The presence of practitioners in the new design of teaching and learning activities focusing on planting concepts in an interesting way and related to the direction of the study program's goals will be very useful for improving the quality of teaching [13, 14, 15]. In an effort to support students' cognitive achievements, tutors are also provided in the learning structure. In this program key steps aimed at improvement are:

a. Initial evaluation of students. Evaluation is linked to prior knowledge *related* to the Basic Chemistry course that was obtained in the previous semester.
b. Development of learning substance: presents a visualization section through training in determining material viscosity, and colligative properties of solutions.
c. Increasing the capacity of lecturers by collaborating with practitioners .

Tutorial involvement to facilitate the achievement of students' cognitive and numerical skills.

Methods of developing interest in learning systems and their implementation through Class evaluation

Class evaluations required in the Chemistry Physics II learning design include:

Basic material: basic concepts of reaction rates, reaction orders, mathematical equations of reaction orders.

1. Further material: Gibbs function, entropy, enthalpy and its applications .
2. The extent to which training can improve students' understanding of the material .
3. How to design assignments for students to accelerate the achievement of learning targets [16].

Evaluation of students is needed to group students according to cognitive abilities.

How to Research

The data collection technique used in this study is by using documentation, questionnaires and observation. This research process was carried out cyclically as suggested by Ellison et al [16] with attention to plan, implementation, monitoring, and reflection. With this cycle model, the stages above will be developed continuously until the most effective learning model is obtained and the most guaranteed success. Data analysis used in this classroom action research is descriptive analysis. Descriptive analysis is an activity to describe the process and results of research implementation. Qualitative data is analyzed and described in the form of phrases and sentences to describe the phenomena that arise during the research process, especially in the implementation of actions [17,18]. Meanwhile, quantitative data is analyzed using descriptive statistics which includes presenting data in the form of tables and figures, as well as descriptive statistical measures such as average, minimum, maximum and standard deviation. In order to improve the action in the next cycle, the researcher also carried out reflective analysis activities. Reflective analysis is an attempt to remember and reflect on an action that has been taken.

RESULT AND DISCUSSION

The effects of practitioner lectures on interest

The results of lectures with online training and enriching exercises have had quite an impact on increasing students' interest in paying attention to lectures. This happens because there are a lot of exercises and question and answer discussions that make active involvement by the students in every lecture activity obligatory. The large number of exercises and questions and answers and the fact that completion of these exercises is not only carried out by the lecturer but also by the students compel the latter to be active participants. This strategy is indeed effective in increasing student interest and attention, however, there are still students who still do not respond to the many exercises. For example, if asked to come forward to complete the practice questions, the student didn't respond on Zoom and left the meeting and rejoined at a later time. As a next step, the lecturer tries to approach them by asking them to study in groups and have a discussion with their friends. This method also turns out to be quite effective in increasing student involvement in lecture activities. To increase students' interest in learning through online modality, lecturers give individual assignments. The results are quite effective in increasing student interest in learning and independence. The following are the results of observations before and after the practitioner lecture.

1. The results of the questionnaire before the practitioner lecture can be shown in the following pie chart:

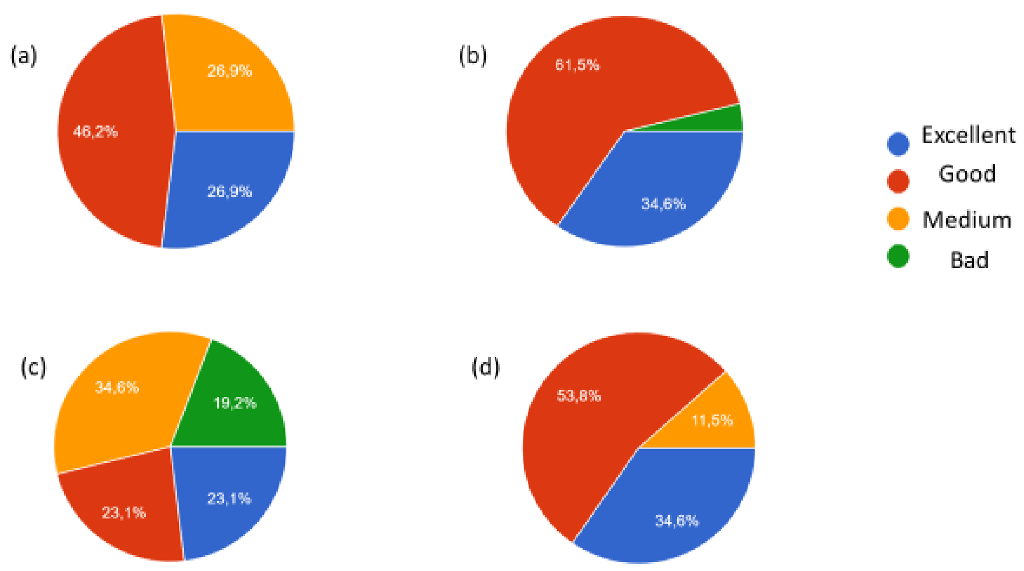

FIGURE 1. Pie chart of the feeling on (a) The inclusion of practitioners lecture in the course (b) adding workshop in lecture (c) conducting lecture by online media (d)adding viscosity practical in laboratory

a) The feeling of present in practioners lecture

About 46% and 26% of the 26 students are happy and very happy with the practitioner lectures that will be held after the Mid Semester Exams (UTS), but around 27% respond moderately.

b) The practitioners lecture

About 61.5% and 34.6% of the 26 students stated that it was very necessary to have workshop and necessary for a practitioner's lecture to be held after UTS, but around 4% disagreed.

c) Conducting lecture by online media

Around 34.5% and 19.2% of the 26 students said they were okay and not good with the online practitioner lecture which would be held after UTS, however around 23.1% responded good and very good. This shows that students prefer offline rather than online according to the suggestions in the questionnaire

d) Adding viscosity practical in laboratory

Around 53.8% and 34.6% of the 26 students stated that they were interested and very interested in the viscosity measurement material training which would be held after the UTS, but around 11.5% responded indifferent.

2. The results of the questionnaire after the practitioner lecture can be shown in the following pie chart:

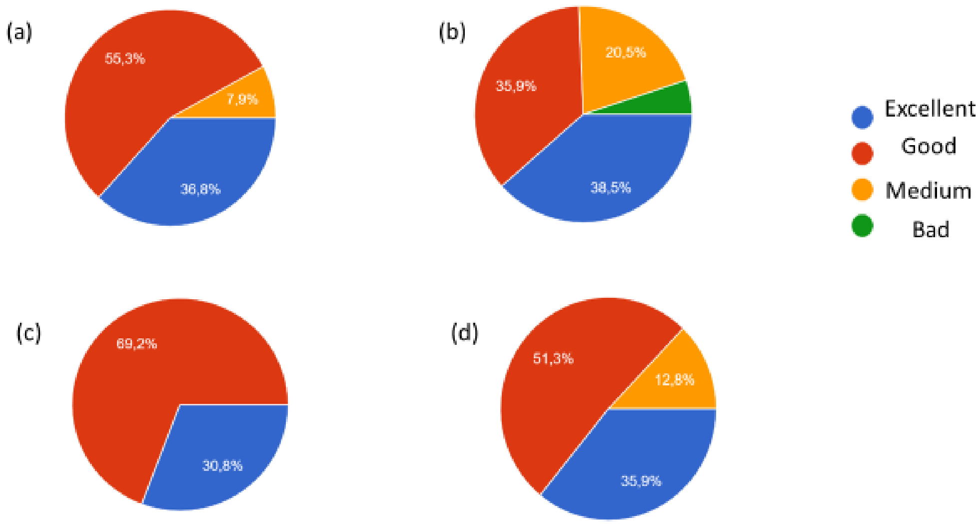

Figure 2. Pie chart of the feeling on (a) The inclusion of practitioners lecture in the course (b) adding workshop in lecture (c) conducting lecture by online media (d)adding viscosity practical in laboratory

a) The practitioners lecture
   About 37% and 55% of the 26 students were satisfied and very satisfied with the practitioners' lectures, but about 8% responded moderately.
b) Adding workshop in lecture
   About 38% and 36% of the 26 students were very happy with the workshop from practitioners' lectures, but about 20.5% responded moderately.
c) Conducting lecture by online media
   69.2% and 36 % of the 26 students were very interested and interested in practical lectures, videos and presentations
d) Adding viscosity practical in laboratory
   About 51% and 36% of the 26 students were happy and very happy with the practitioners' lectures, but about 12% responded moderately.

The effect of practitioner lectures on the level of student understanding

Table 1 shows that students' understanding of the material on colligative properties of solution is in the satisfactory category in practical lectures and moderate in theoretical courses without practitioners. However, the situation in the practitioner class shows that it is better than the theory class without practitioners from the achievement level of scores above 80 and the average score in Table 2.

TABLE 1. Comparison of college exam scores with practitioners and non-practitioners

Category test scores	%(percentage)	
	Lectures with Practitioners	**Theory lectures without practitioners**
80-100	44	34
60-79	15	48
<60	41	18

On the other hand, the practitioner’s group also has a higher percentage of students with a score of less than 60, which shows that exam scores are inherently based on the student's level of understanding. Nevertheless, majority of the students admit that a learning process with more practice can really improve their understanding. This indicates that the existing learning process has a significant contribution to increasing student understanding. The results of the evaluation of assignments and exercises can be seen in Table 4.2, which shows that the students' scores are still moderate. The class average score is only 72 in practitioner lectures and 67.8 in non-practitioner lectures. Although the average value cannot be considered optimal, it has shown an increase when compared with the assignment value in the first cycle.

TABLE 2. Comparison of statistical data from lecturers with practitioners and non-practitioners

Test score categories	Lecture with Practitioners	Theory lectures without practitioners
Average	72	68
Standard deviation	25.3	20.1
Minimum	0	0
Maximum	95	90

CONCLUSION

The application of practitioner lectures in collaborative learning in the physical chemistry II course is able to increase students' interest in learning. This occurs because the learning process involves more assignments, questions and answers, both individually and in groups, thus requiring the participation of all students in the learning process. The application of practitioner lectures in physical chemistry 2 learning is able to increase students' understanding because the learning process places more emphasis on practical application, question and answer training and discussions, making it easier for students to understand concepts and their application.

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