Student perceptions of the hybrid learning practicum Qualitative Analysis Protein based Constructivism Needham's 5-phase

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Abstract: This study aims to determine student perceptions of hybrid learning practicum on the topic of qualitative analysis protein-based constructivism Needham's 5-phase. This study uses a quantitative descriptive method. Perception assessment is carried out by referring to 3 dimensions of perception consisting of 4 perception indicators, namely Perception of lecturers, perception of the teaching and learning process, perception of the social environment, and perception of assessment. Data was collected using online questionnaires via google form to students taking biochemistry practicum courses using purposive sampling technique. The results showed that the perception of lecturers obtained a perception level of 74%, the perception of the teaching and learning process was 79%, the perception of the social environment was 81%, and the perception of the assessment was 78%. The percentage of the average perception level was 78%, indicating the feasibility or success of the hybrid learning practicum of qualitative analysis protein based on Needham's five-phase constructivism. Overall, it can be concluded that students' perceptions of the hybrid learning practicum on the topic of qualitative analysis protein based on constructivism Needham's five-phase got the level of perception in the good category.

Keywords: Student perception; Qualitative analysis of protein; Constructivism needham's 5-phases

Introduction

The COVID-19 outbreak has changed the world of higher education. Higher education is forced to take advantage of technology quickly. Every lecture is conducted online (online), this is no exception for practical lectures. A virtual laboratory is one solution when practicum lectures are conducted online (Sari et al., 2022). Previously, Biochemistry practicum lectures had been designed on a project-based basis using local materials (PjBLLM) (Sari et al., 2018). Preliminary studies on Biochemistry practicum on the topic of quantitative analysis of PjBLLM proteins can improve creative thinking skills (Sari et al., 2017).

In the third year of the pandemic, higher education is required to adapt (Soetrisno & Yoku, 2019; Purwanto et al, 2020; Sadikin & Hamidah, 2020). Slowly the world of education has entered a new normal phase. Lectures can be done face-to-face with limited conditions and still integrated with online learning (hybrid learning). Hybrid learning can change the learning approach that has been centered on lecturers to become student-centered (Indarto et al., 2018; Aristika et al., 2021; Li et al., 2021; Dakir & Fauzi, 2022; Juwita & Purwoko, 2022). Hybrid learning has advantages in terms of learning time (Zitter & Hoeve, 2012); Fauzan, 2017; Gleason & Greenhow, 2017).

The implementation of hybrid learning in the practicum of qualitative protein analysis is still required

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to train high-level skills in this case creative thinking skills. The learning model that can facilitate this is the constructivism model, which is a learning process that is structured and built by the students themselves. Various approaches, strategies or learning models have developed by applying constructivist principles and/or values. Needham's Five-Phase Constructivism has been believed by pedagogical experts to be in line with the foundation and paradigm of constructivism learning. Learning the Needham Five Phases constructivism model consists of the following stages: Orientation, Idea Generation, Idea Structuring, Idea Application, and Reflection (Jasin & Shaari, 2012; Surif et al., 2018).

Several previous studies suggest Constructivism 5 phases of Needham in science learning can encourage students to have initial ideas related to phenomena in everyday life so that they can train students to think creatively (Syukri, 2016; Sukaryawan et al., 2018; Chear & Norb, 2020). From the description of the background above, there have been many studies promoting hybrid learning, but there have been no research reporting student perceptions of hybrid learning practicum activities that combine it with certain learning approaches. In this study, researchers will see how students perceive when the qualitative analysis of protein practicum is carried out using constructivism-based hybrid learning with 5 phases of Needham?

Method

This type of research uses descriptive research with a quantitative approach. Descriptive quantitative research because the data obtained in this study are in the form of numbers obtained from the survey method with a questionnaire technique to capture student perceptions. The results of descriptive quantitative research are expected to describe the characteristics of the object of research (Rukajat, 2018).

Questionnaire data collection techniques were used to measure students' perceptions of learning using a virtual laboratory. The type of questionnaire used is a closed questionnaire, where the questionnaire is presented in the form of a statement and several answer choices are provided using a Likert Scale. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena (Sugiyono, 2019). The questionnaire instrument used is the development of perceptions in learning whose validity has been analyzed. Questionnaires were given to students via google forms.

Questionnaire data is used to measure students' perceptions of learning using a virtual laboratory. The measurement scale model uses a Likert scale, which consists of five answer options, namely strongly agree (SA), agree (A), Less Agree (LA), disagree (D), and strongly disagree (SD). Data obtained from the results of

data collection are classified from the numbers calculated and measured, then percentage. The following are the steps for processing data from the questionnaire measuring instrument:

1. Calculating the score from the questionnaire

Table 1. Perception Answer Choices

Statement	SA	A	LA	D	SD
Score	5	4	3	2	1

(Sugiyono, 2019)

Description:
Strongly Agree (SA),
Agree (A),
Less Agree (LA),
Disagree (D), and
Strongly Disagree (SD)

2. Percentage the numbers calculated using equation 1:

$$\% = \frac{n}{N} \times 100\%$$

(1)

Description:
n = value obtained
N = sum of all values

3. Summarizing the percentage of answers of all students. Furthermore, student perceptions are grouped into categories based on:

Table 2. Category Student Perception

Category	Percentage (%)
Very good	86 – 100
Well	76 – 85
Enough	60 – 75
Not enough	55 – 59
Less once	≤ 54

(Purwanto, 2013)

Result and Discussion

The instrument consists of 50 statements which are divided into 3 dimensions of perception consisting of 4 indicators, namely Perception of lecturers 11 statements, Perception of PMB (Teaching and Learning Process) 13 statements, Perception of the social environment 7 statements, and Perception of assessment 19 statements. Based on survey data from the 19-statement questionnaire, information on the level of achievement of respondents regarding perceptions of the assessment was 78%. The results of the analysis of student perceptions based on perception indicators can be shown in the level of perception and category of perception in Table 3.

Table 3. Results of Perception Indicators

Perception Indicator	Score	Score Maximum	Perception Level
Perception of lecturers	3728	5060	74
Perception of PBM	4750	5980	79
Perception of the social environment	2621	3220	81
Perception of assessment	6803	8740	78
Average		5750	78

Based on the results of the study, the overall perception of students towards the hybrid learning practicum on the topic of qualitative analysis of protein-based constructivism 5 phases of Needham is in the good category with an average percentage of 78%. Students' perceptions in terms of 4 indicators, based on perceptions of lecturers obtained a percentage of 74%, namely 3728 from a maximum score of 5060 in this case students' perceptions of lecturers in the Enough category. Perceptions of teaching and learning process obtained a perception percentage of 79%, namely 4750 from a maximum score of 5980 in the good category. Perceptions of the social environment obtained a percentage of 81%, namely 2621 from a maximum score of 3220. Perceptions of assessments obtained a percentage of 78%, namely 6803 from a maximum score of 8740. The percentage level of student perceptions of learning using virtual laboratory courses based on indicators can be shown in Figure 1.
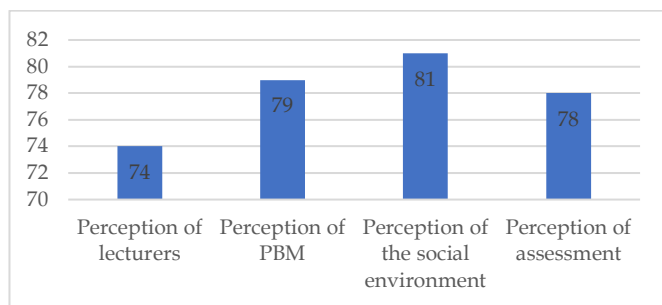

Figure 1. Percentage of Average Score of Student Perception Indicators

Calculation of each indicator, the value of students' perceptions of the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism got an average perception level of 78% in the good category.

Based on the results of the questionnaire regarding students' perceptions of lecturers, in the statement that lecturers guide and provide feedback to the group who did the exposure, they have the highest perception in this indicator, this is shown from the data obtained with a percentage of 88% in the very good category. The next indicator is the student's perception of the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism. Learning is a process of changing behavior in an individual or a person in the form of skills or abilities, behavior or attitudes, intelligence, and habits in a natural state through knowledge and life experience. The learning process takes place due to the interaction between individuals and their environment, which means that learning can take place anytime and anywhere.

The results of the questionnaire can be seen that the perception of students in the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism is in the good category. This indicates that the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism can facilitate students. This can also be seen from the statement of each perception, with the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism in the implementation of the practicum students can design, implement and report the results of the practicum properly in accordance with the Semester Learning Plan for biochemistry practicum.

The results of the questionnaire began in terms of practicum procedures that were observed by the lecturer directly, students were able to design, implement and report the results of the practicum well. This can also be seen from the results of student reports with good grades. In addition, students can also develop experimenting skills in a hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism in a good category, this can make students understand. With a hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism, students learn not only as a passive learning goal but also as an active learning goal with a well-organized learning flow (Nugraha, 2015).

Indicators of perceptions of the student's social environment in the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5 phases of constructivism are in good category. This can be seen from the questionnaire data which states that it is good, the hybrid learning practicum on the topic of qualitative analysis of protein based on the 5 phase of Needham constructivism helps students in interacting and communicating with friends. The peer environment is one of the external social factors that affect learning outcomes (Rahayu, 2017). Based on the survey results that the social environment as a whole has a perception in the good category, if seen from the results of questionnaire data analysis in students' perceptions of the learning environment the highest where students ask friends if they have difficulties in the hybrid learning practicum on the topic of qualitative analysis of protein based on constructivism 5 phases Needham has a good perception, this is also in line with

research from Zamista et al. (2021), the results show that the peer environment has a positive and significant effect on student achievement. So that when the peer environment is good, student learning achievement will also be good and vice versa.

The assessment indicators for the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5 phase constructivism are in the good category. This can be seen from the results of the questionnaire which stated that it was overall good. The results above indicate that the quality of the assessment process is indeed closely related to the quality of the learning process (Zamista et al., 2021). Based on the results of the research, it was found that the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism that the assessment obtained was good, students received assessment results or feedback in accordance with the learning they got. When students have good perceptions of learning, students also have good perceptions of the assessments made by lecturers (Zamista et al., 2021).

Overall, the students' perception of the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism was stated to be good. That is, the implementation of the hybrid learning practicum on the topic of qualitative analysis of protein based on Needham's 5-phase constructivism was carried out effectively and efficiently from the perspective of students of the chemical education study program.

Conclusion

A study has been conducted on hybrid learning practicum on the topic of qualitative protein analysis. Based on the findings and discussion, it can be concluded that for each indicator, the value of student perceptions of the hybrid learning practicum on the topic of qualitative analysis of protein-based constructivism in the 5 phases of Needham got an average perception level of 78% in the good category. The hybrid learning practicum on the topic of qualitative analysis protein based on constructivism Needham's 5-phase is feasible if applied to chemistry education students.

Acknowledgements

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