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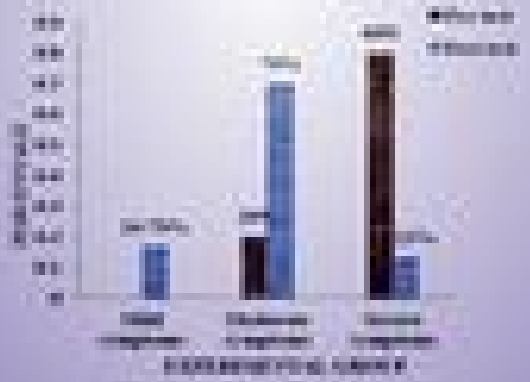

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Original Research Article

Learning Motivation of Students During the Implementation of Lecturing Based in Silico Approach

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ABSTRACT

The silico-based learning is one of the new curriculum programs for prospective teachers at UN PGRI Kediri. Because of motivation plays an important role, this study aims to reveal the dimension of students' learning motivation to that program.This research is a case study at Biology Education Department. Respondents of this research were Biology Education students in Biochemistry class (52 students). The data were collected by a standard questionnaire of learning motivation of science and analyzed by correlation analysis. This study shows that all aspects of the motivational dimension are increasing. The dimension of career motivation experienced the highest increase compared to other dimensions in the medium category (0.36). There was a strong and positive correlation between the dimensions of self-efficacy and assessment anxiety with career motivation (0.669) and between self-determination and grade motivation (0.768).

Key words: motivation, in silico, Biology, Biochemistry class.

INTRODUCTION

Motivation has an important role to encourage someone to actively do something. Motivation also serves as a basis for someone to get involved and take part in a program. Teachers can organize learning so that students continue to be motivated in learning (Sutrisno *et al*., 2012) through a creative program in the classroom. Motivation becomes the driving force within students to carry out learning activities to achieve their goals (Palupi *et al*., 2014). This shows that motivation is an important aspect in improving the quality of learning.

Motivation can increase learning outcomes (Yokhebed *et al*., 2012; Widodo & Utami, 2012), affect students' cognitive learning outcomes (Palupi *et al*., 2014), can determine student achievement (Sutrisno *et al*., 2012). Therefore, in the science class the teacher must be creative in creating the learning style so as to foster student learning autonomy (Sutrisno *et al*., 2012).

The deep survey was conducted at one of teacher universities in East Java Indonesia. Surveys shown that students' cognitive learning outcomes were low and there were misconceptions in biochemistry class. This problem needs to be overcome. Biochemistry course is the basic course that must be taken by prospective teacher Biology student. This course is the basis for students to take further courses. Examples include human physiology, animal

physiology, biotechnology, basic genetics, advanced genetics, and evolution.

Based on the respondents to students and lecturers, there are factors that lead to the learning of Biochemistry is not optimal. Biochemical Learning has not provided good instructional media that is visualization of dynamic three-dimensional structure of biomolecule. Generally students have visual kinetic learning style. It has a serious impact on students' understanding of some concepts. For example the structure of the enzyme and its mechanism of action. Understanding that is less than optimal also affects the results of student learning is less than the maximum as well. Therefore, learning that provides visualization of the three-dimensional structure of biomolecules is necessary.

The in silico approach utilized a number of available organism databases for further processing by computational methods. One of these analyzes in silico is the exploration of metabolic path data bases and the modeling of three-dimensional biomolecular structures. Therefore, this study aimed to reveal the motivation of student learning during the implementation of the program on lectures.

MATERIALS AND METHODS

This study included a case study and was conducted at one of the universities in East Java in Biochemistry class (52 students) in academic year 2016/2017. Student motivation data was collected by using a standard questionnaire of learning motivation in science refers to Glyn et al. (2008). Motivational data is recorded at the start of the program and after it has been implemented. Data were analyzed descriptively. Each dimension of motivation was analyzed by simple correlation with *SPSS for Windws 2007*.

RESULT

Based on Table 1, learning using in silico approoach can improve the mean of students' science learning motivation up to 0.23. In the career motivation dimension (F4), there is an increase of 0.36. The increase is categorized as a moderate rise. The increase in this dimension is higher when compared with other motivational dimensions, namely intrinsic motivation and personal relevance, self-efficacy and assessment anxiety, self-determination, and grade motivation. While on the dimensions of self-efficacy and assessment anxiety, intrinsic motivation and personal relevance, grade motivation, and career motivation is of 0.25; 0.23; 0.19; and 0.18 respectively and all included in the low category.

Table 1. Motivation Improvement Profile on Each Aspect of Dimension

Motivation dimentions	Score		N-Gain	Category
	Before	After		
intrinsic motivation and personal relevance (F1)	3,83	4,10	0,23	low increase
self-efficacy and assessment anxiety (F2)	3,57	3,94	0,25	low increase
self-determination (F3)	3,87	4,07	0,18	low increase
career motivation (F4)	4,08	4,42	0,36	medium increase
grade motivation (F5)	3,77	4,00	0,19	low increase
All (*average*)	3,82	4,11	0,29	low increase

Table 2 shown that there is a correlation in the dimensions of motivation. There is a positive and strong correlation between the motivational dimension of self-efficacy and assessment anxiety with career motivation that is 0.669. On the other hand, also occurs between self-determination with grade motivation of 0.768. While the demension of self-efficacy and assessment anxiety with self-determination and between self-efficacy and assessment anxiety with grade motivation is quite low, respectively 0.313 and 0.542. It shows there is some relevance to some dimension of motivation. Examples include self-efficacy and assessment anxiety with career motivation as well as between self-determination and grade motivation.

Table 2. Correlation between Dimensions of Learning Motivation

Motivation dimentions	F1	F2	F3	F4	F5
intrinsic motivation and personalrelevance (F1)	1				
self-efficacy and assessment anxiety (F2)	-0,073	1			
self-determination (F3)	-0,056	0,313	1		
career motivation (F4)	-0,406	0,669*	0,068	1	
grade motivation (F5)	-0,152	0,542	0,768*	0,321	1

*) = significant, *P value < 0,05* .

DISCUSSION

This research indicates that the learning program based on silico study can be accepted by the students. This is supported by data of student motivation during the activity or program. Student motivation increases on average as well as in every dimension of motivation, namely intrinsic motivation and personal relevance, self-efficacy and assessment anxiety, self-determination, career motivation, and grade motivation.

The findings are in line with previous research findings that reveal simple and directed science inquiry tasks can increase students' learning motivation in science classes (Ahn et al., 2016; Abdullah et al., 2012; Mooss & Honkomp, 2011; Talib et al., 2009; Glyn et al., 2008; Anderman & Young, 1994).

In this study, Biochemical learning provides a number of activities that can increase motivation. Students are assigned to explore the data base of metabolic pathways and enzyme sequences and visualize them in 3D according to their own learning needs. This is confirmed by the questionnaire motivation to learn science that students are motivated to learn Biochemistry because there are assignments given by lecturers. This is confirmed by Phillip and Burbules (2000) and Abdullah et al. (2012) that investigation activities in science can provide experience in the form of evidence of empirical investigation (measurable) to motivate learners to build knowledge.

In addition, other opinions suggest that learners who clearly know their learning needs have good self-regulation (Chow & Yong, 2013; Pintrich, 2000) in meeting their learning needs (Glyn et al., 2008; Mubeen & Reid, 2007). Self-regulation in learning is one of the domains in behavioral psychology: self efficacy (Pintrich, 2003 and Ames, 1990) Pintrich (2003) and Pintrich et al. (1993) reported that learners' motivation is closely related to (1) what are the needs of learners? and (2) how learners get what they need?

In the context of this study, Biochemistry learning can help students to reaffirm what the goals of biochemistry are and how to achieve them. This is supported by the results of the questionnaire that the motivation to learn, especially on aspects of self efficacy (F2) and self-determination of respondents is quite high (F3). It means that the learning of Biochemistry can increase belief in students' self-efficacy and self-confidence in self-determination management in completing the assignment

Conflict of Interest Statement

The author states no conflict of interest on this publication.

CONCLUTION

This study can be concluded that the silico-based learning program in Biochemistry course can improve students' learning motivation. There is an increase in all aspects of the motivational dimension. The dimension of career motivation has the highest increase with the moderate category (0.36). There is a strong and positive correlation between the dimensions of self-efficacy and assessment anxiety with career motivation (0.669) and between self-determination and grade motivation (0.768).

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