

The effect of using e-learning material on hydrocarbon chapter to improve students' achievement motivation in learning chemistry

Sri Novita Yanda¹, Yulia Safitri²

¹² UIN Sultan Syarif Kasim Riau, Riau - Indonesia, (yanda.sn@gmail.com)

Abstract

In the recent years, electronic-based learning has become an option in chemistry learning. Hydrocarbon has one of the subjects that involved microscopic matter, so it could be understood by animation in computer or internet. The purpose of this research is to know the effect of using e-learning material on hydrocarbon chapter to improve students' achievement motivation. The quantitative method was applied. The study used a survey approach by using questionnaires were developed. Grade XI students' was a sample research survey-based in two government high school in Tembilahan, Riau Indonesia. The pilot test involved 30 students' and the results of the test showed that the Cronbach's Alpha value was 0.796 and 0.773, shows that the instrument has a high reliability. The validity of the instrument also was analyzed based on Pearson correlation. The findings showed that the instrument has valid. The data were collected was analyzed using inferential statistics. The finding showed that there is a significant relationship between using e-learning material and students' achievement motivation.

Keywords: e-learning, learning chemistry, achievement motivation.



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Introduction

Technology in everyday life is essentially a tool that serves to help, facilitate or speeded up the work. The current technology has been developing so rapidly, the development as a revolution that took place in three waves of change that is the first wave of the emergence of agricultural technology, the second wave of the emergence of industrial technology and the third wave of emergence of information technology that encourages the growth of telecommunications (Noor Hudallah, 2012: 72). Technology has existed in every human life, so it has almost all sides of life in touch with technology (RusiRestiyani, *et al*, 2014: 50). In the Department of National Education (Depdiknas), the use of Information and Communication Technologies (ICT) was defined as a means of learning; the system of learning in formal education has been prioritized by the rostra for development, non-formal education and in schools to support the expansion and equity of education in Indonesia (SyadPatmanthara, 2012: 29). Implementation of ICT in the development of education in the future was not just following the global trend but also a strategic step in efforts to improve access and quality of services to the community (Munir, 2009: 1). ICT is a collection of tools and technology resources used to communicate, create, disseminate, store and process information or technology.

This has been able to reduce the space and time constraints for retrieving, moving, analyzing, presenting, storing and transmitting data information into information (Sujoko, 2013: 72). The opportunities offered by the use of ICT in education are so numerous, so this can lead to a better and more exciting learning experience (HerryFitriyadi, 2009: 217). ICT utilization has led to the growth and development of Virtual Learning, Multimedia Learning, E-learning, Online Learning and Distance Learning (SyaadPatmanthara, 2012: 29). E-learning has been chosen to be one of the solutions related to improving the quality of learning in chemistry subjects because it could facilitate the interaction between learners by subject matter as well as the interaction between learners with teachers and among learners both in terms of situation, condition, time and place (Epinur, *et al*, 2013: 24).

Hydrocarbons known as subjects of chemistry lessons characterized as abstracts, for example the subject of reactions occurring in alkanes, alkenes, and alkalis, as well as other microscopic concepts that could not be observed directly so that many of the students find it difficult to understand the concepts (IvatuLailiKurniawati, 2011: 292). The research has been done by RizkyAuliaKhumairo, *et al*, (2017) one of the goals of learning was to stimulate students' thoughts, feelings, attention and willingness to learn by engaging their emotions through visual, audio-visual, humor, games, multimedia devices, and so on. This involved an interactive and thorough teaching based on the principle that learning should be fun. Displayed animation on the subject of chemical concepts would concretize the abstract chemistry; it could also increase reinforcement and add interest of students' attention throughout the learning process (Christina Purnamasari, 2016: 3). Achieving learning objectives has known as a measure of learning's success. These achievements include learning processes and outcomes, measurable learning outcomes that were student achievement (Tri Murtiningrum, *et al*, 2013: 1).

The research has been done by Muhammad Adri (2008) entitled multimedia development strategy Instructional Design shown that the use of multimedia technology as one of learning media in learning can be used as an alternative to help overcome student learning problems, one of them by using multimedia-based computer. Solfarina (2012) was found that an increase in chemical bonding concept understanding of pure e-learning and e-learning as supporting but in e-learning as supporting class was better. Improving student learning outcomes by applying methods project based e-learning was done by NurJannatuNa'imah *et al* (2015). The results of the analysis concluded that the application of project based learning assisted e-learning was able to improve student learning outcomes in chemistry.

Achievement motivation known as an incentive to compete either with themselves or with others referring to a standard of skill or a standard of skill in which a person tends to strive for success or to choose an activity oriented for the purpose of success or failure (Sapto Widodo, 2012: 18). McClelland has presented six characteristics of people who have high achievement motivation, namely: 1) Someone have a high level of personal responsibility; 2) Dare to take and shoulder the risk; 3) Realistic goals; 4) Comprehensive work plan and strive to realize the goal; 5) Utilizing concrete feedback in all activities undertaken; 6) Seeking opportunities to realize the programmed plans. This achievement motivation can be seen in individual activities in the field of school achievement, occupation, or in sports competitions. Individual behavior basically leads to goals related to the fulfillment of their own needs and driven by certain motives (NetaSepfitri, 2011: 23).

This research aimed to know the effect of using e-learning material in hydrocarbon chapter to improve student achievement motivation. This research was conducted to provide solutions to students in understanding the hydrocarbon material.

The paper provided the main hypothesis: "there is a relationship between using e-learning on hydrocarbon chapter and students' achievement motivation in learning chemistry."

Method

Grade XI students' was a sample research survey-based in two government high school (SMAN 1, and SMAN 2) at Tembilahan, Riau Indonesia. The sample amount has been calculated using Slovin formula as 164 students. The random sampling method has been used. 20 questionnaires of using e-learning has been developed from Setyana (2017), and 20 questionnaires of students' motivation achievement has been developed from MannikAji (2013) which adopted contextual achievement motivation scale (CAMS) based on McClelland theory. The Likert Scale (from 1 to 5) has been applied. In this research pilot test was conducted to measure the appropriateness of instrument. 30 Sample was selected randomly at Pekanbaru, Riau for this case. The reliability of questionnaire was examined through Cronbach's Alpha of using e-learning and students' achievement motivation as 0.796 and 0.773 respectively that is presented in *Result* (Table 1 & 2). Collected data was analyzed based on inferential statistics; Pearson Correlation Coefficient to calculate the correlation between variables, using a SPSS 24.

Results and Discussion

The result showed that there is a significant relationship between using e-learning on hydrocarbon chapter and students' achievement motivation in learning chemistry. The collected data has been analyzed for reliability tests presented in tables 1 and 2.

Table1. Reliability Statistics (e-learning on hydrocarbon chapter)

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .796 | 20 |

Table2. Reliability Statistics (students' achievement motivation)

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .773 | 20 |

The reliability test is accepted if the value of Cronbach's Alpha > 0.6. In this study the results shown are both large from the specified level. Therefore, the instrument is considered very reliable. After the instrument testing phase, the study has continued by looking at the Pearson correlation results presented in Table 3.

Table 3. Correlation matrix between e-learning and achievement motivation

| | | e-learning | achievement motivation |
|------------------------|---------------------|------------|------------------------|
| e-learning | Pearson Correlation | 1 | .681** |
| | Sig.(2-tailed) | 164 | .000 |
| | N | | 164 |
| achievement motivation | Pearson Correlation | .681** | 140 |
| | Sig.(2-tailed) | .000 | 1 |
| | N | 164 | |

**Correlation is significant at the 0.01 level (2-tailed).

Table 4. Group Statistics

| | Name of High School | N | Mean | Std. Deviation | Std. Error Mean |
|------------------------|---------------------|----|-------|----------------|-----------------|
| e-learning | SMAN 1 Tembilahan | 93 | 77.43 | 4.941 | 1.321 |
| | SMAN 2 Tembilahan | 71 | 68.09 | 9.360 | 1.582 |
| achievement motivation | SMAN 1 Tembilahan | 93 | 78.75 | 2.958 | .854 |
| | SMAN 2 Tembilahan | 71 | 68.16 | 9.215 | 1.515 |

Pearson correlation value showed a very significant level of significance with the value of $\alpha = 0.01$ is 0.681. Thus, it suggested a very strong correlation between using e-learning on hydrocarbon chapter with student achievement motivation.

Conclusions

This research emphasized the significant relationship between using e-learning on hydrocarbon chapter and students' achievement motivation. Furthermore, learning using e-learning can be an alternative for teachers. The positive side of the using e-learning is the interaction between students and teachers that can be done anytime and easy to use so that achievement motivation can be improved by the use of e-learning in learning chemistry.

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