The influence of communication platform on the students’ engagement in the magnetic electricity e-learning class

N S Liani¹, S Nur² and I Huda³
¹Department of Science Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia
²Department of Physics Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia
³Department of Biology Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia

E-mail: ismulhuda@fkip.unsyiah.ac.id

Abstract. This study aims to determine the effect of the communication platform on student involvement in learning electronic magnetic electricity. This study uses a quasi-experimental method with experiment, control group, and use only posttest control group design. Random sampling techniques used on 72 students of class 2017/2018 Physics Education courses who studied magnet electricity subject and all divided into three classes. One is the experimental class, and two are the control group classes. The results indicate that the t-score was 0.76 therefore, the table in the significant level of α = 0.05 which is 1.99 so that 0.76 < 1.99. As a result, H₀ is accepted, and Hₐ rejected. As a conclusion, the communication platform does not have a significant effect on the students’ involvement.

1. Introduction
Magnetic electricity is one of the subjects which requires the ability of scientific thinking and reasoning because it contains abstract concepts therefore difficult to understand. Understanding magnetic electricity concept requires scientific thinking ability [1]. The 2015 TIMSS results indicated that Indonesian scientific literacy is ranked 45th out of 50 countries surveyed. It is due to the lack of college students’ active role in the teaching-learning process. Students’ active role or involvement in the learning process can profoundly influence the achievement [2]. However, based on research conducted by Hans Jellen [3], Indonesian students’ learning engagement is very low compared to other countries. Students’ involvement in the learning process is important for student development since it has a tremendous impact on an individual’s personality in term of the totality.

The lack of student engagement in the learning process is caused by several factors, one of which is the less innovative and creative use of learning methods and media. The use of media as a learning tool may accelerate and facilitate the understanding of learning materials [4]. One of the objectives of using the media is to accelerate the learning process and to help students comprehend the materials presented by teachers in the classroom [5]. Nowadays, the use of media in the learning process has involved sophisticated information technology or the internet. The use of technology has a direct positive relationship with student engagement [6]. With computer/online-based learning, students will be more involved in the PBM [7]. The term online learning is used to demonstrate all forms of electronically
supported teaching and learning, and this has become increasingly important in higher education [8]. This type of learning is better known in Indonesia as the network learning. E-learning is one of the online-based learning methods [9]. The e-learning involves the use of electronic or internet networks to convey learning materials, interactions between educators and students, or guidance [10]. E-learning or electronic learning is learning performed through the utilization of internet function in learning activities by having electronic facilities as the learning media [11].

These views support the significant importance of e-learning role in the teaching and learning process. Several research findings show that online learning can save time, reduce costs, offers a variety of multimedia suitable for distinct learning styles [12]. It also induces a more active involvement of students in the PBM [13-15]. Online learning also improves the students’ learning motivation and participation [16], students’ learning effectiveness [17], and their learning quality [18].

As technology and online learning continue to develop, more and more online learning platforms offered to the public. Many universities or colleges set up an e-learning platform to promote the effectiveness of teaching. This platform gives students access to a variety of courses and discussion forums resources from the simple to the complex, free to paid, and various social media platforms give people more access to information at their fingertips. Messages exchanged instantaneously, in bulk, in a matter of seconds. The more affordable and accessible social media by the public has made it a new mean of communication. Learning platforms is an essential aspect of communication strategy because of its ability to convey information [19]. Each platform brings its advantages and disadvantages but, of course, has the same goals. It is a place that fulfills the needs of the teachers and students in the learning process, a place to share teaching materials, discussions, tests, chats, and many others. Another impressive result is the smartphone and laptop, the technology tools that often used by pre-service teachers [20].

Some communication platforms used in education include email, SMS, Facebook groups, Twitter, and WhatsApp. Each of the tools has different characteristics that affect its suitability for the learning purpose [21]. WhatsApp is the 3rd most used communication platform, some research results show that WhatsApp can improve the students’ writing skills [22], build and share knowledge [23], as well as increase the homogeneity of students’ success [24].

2. Research and method
This research was conducted at the Physics Education study program of Universitas Syiah Kuala, Darussalam, Banda Aceh City, in the even semester of 2017/2018 academic year, on magnetic electricity subject. The sample includes 72 individuals consisting of 10 males and 62 females. The study used a quasi-experimental method with the experimental and control group. The Posttest-only Control Group Design was employed, one being the experimental group and one control group, without any pretest. The research design is present in table 1 as follows:

| Table 1. Research design. |
|---------------------------------
| Group | Dependent variable | Posttest |
|-----------------|-----------------|---------|
| Experiment | X₁ | Y₂ |
| Control | X₂ | Y₂ |

In which:
X₁ = Learning via platform WhatsApp communication platform
X₂ = Learning via e-learning discussion communication
Y₂ = final evaluation (posttest)

Each of the experimental and control group received the same instructions through the student learning site. The discussion of the learning materials take place every week, and the learning instructions were provided in the module, what distinguishes them is in the communication in the control group via WhatsApp.
The instrument of student involvement developed from the SES-4DS. It consists of four indicators of student engagement [25], which are (1) cognitive engagement; (2) effective engagement; (3) behavior involvement and (4) agency engagement. The six levels of scale provided as the responses or answers, which are strongly disagree, disagree, slightly disagree, slightly agree, agree, and strongly agree. Twenty test items were prepared in the forms of statements.

| Table 2. Validation results of questionnaire SES-4DS. |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|
| Subscale                        | N = 120        | N = 565        | T_{683}         | D              |
| Cognitive                       | M | SD  | M | SD  | 2.92 | 0.29 |
| Affective                       | 23.04 | 5.13 | 25.14 | 4.50 | 4.16 | 0.46 |
| Behavior                        | 24.78 | 4.77 | 27.27 | 2.77 | 5.51 | 0.78 |
| Agency                          | 17.58 | 6.77 | 18.88 | 5.67 | 2.24 | 0.23 |
| Total                           | 82.89 | 12.20 | 90.22 | 11.94 | 6.08 | 0.61 |

Based on table 2 above, each subscale of the students’ involvement exhibits that the SES-4DS is valid. Meanwhile, for the reliability values based on the Cronbach’s α estimates which were obtained for the overall sample, the internal consistency of the subscales was based on the four factors, which are 0.76 (cognitive dimension), 0.82 (affective dimension), 0.70 (behavior dimension), and 0.85 (agency). For the total scale, α = .82. Therefore, it concluded that the reliability level of SES-4DS is very high.

3. Result and discussion
The hypothesis to examine in the present study is as follows:

\( H_0 \): Communication platform in the magnetic electricity e-learning has a significant influence on student engagement.

The hypothesis testing based on the data obtained from the questionnaire responses of the two classes in the form of 20 items of a statement. The following data are the hypothesis testing results by calculating the t-test of two independent samples:

| Group          | Mean | Standard deviation | Std. Error mean | Sig. (2-tailed) | T_{score} | T_{table} (n=72) |
|----------------|------|--------------------|-----------------|-----------------|-----------|-----------------|
| Experiment     | 4.31 | 0.14               | 0.02            | 0.62            | 0.50      | 1.99            |
| Control        | 4.28 | 0.20               | 0.03            |                 |           |                 |

The t_{score} obtained is 0.76 with the df (degrees of freedom) = (n_1 + n_2 - 2 = 70) and, therefore, the t_{table} at significant level α = 0.05 is 1.99 so that 0.50 < 1.99, this means that \( H_0 \) is accepted and \( H_a \) is rejected. In conclusion, the communication platform does not have a significant effect on the students’ engagement.

The reason is that the students are accustomed to using WhatsApp as a learning medium. According to the research findings of Abraham et al. either lecturers or students have cellphones with internet facilities, but they do not use the WhatsApp instant messages for effective academic activities, it is inseparable from the technical effect of the WhatsApp [26]. The research findings studies show that message flooding, consumed time, and continuous focus on the cellphone’s screen cause fatigue to the eye muscle [27]. Moreover, some of the other studies found that the communication platform could increase student motivation [28], as well as student engagement in learning [29]. According to Jang [30], the type of asynchronous learning does not affect student engagement [31].
4. Conclusion
The communication platform in online magnetism learning does not significantly influence student involvement. It happens because the communication platform integrated with asynchronous e-learning type. In this format, lecturers and students do not meet during content delivery, and there is no presence, both physical and virtual. Syiah Kuala University still uses online learning with the blended learning category, which is a combination of face-to-face learning and distance learning.

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