The impact of the use of the internet on the learning outcomes in physics for high school student

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Abstract. Research in this area has been carried out a lot, but the research this time has its own uniqueness, where the use of IT in high school learning in Aceh province varies greatly. There are schools that prohibit students from accessing the internet on the grounds that they will have a negative impact on student behavior, but there are also schools that encourage students to use the internet as an additional source of reading. However, their learning outcomes have no significant difference. Based on some of these studies, it needs to be studied more deeply about the impact of internet usage on the learning outcomes of high school students, especially on Physics subjects. Research uses a quantitative approach, survey methods and data collection through documentation techniques and questionnaires. The target population of all high school students is in the city of Banda Aceh, but with a variety of considerations a sample of 31 students was taken randomly. Data processing is done by using product moment correlation test and the value is 0.2646 with a positive low category or there is no significant relationship between the use of the internet as a learning resource and student learning outcomes in physics subjects. Inference from the results of research, teachers are encouraged to motivate students to use IT in learning while still controlling their use.

1. Introduction
The development of education is inseparable from the development of science and technology. The internet, as a product of science and technology, is becoming popular because it is the right media to get the latest information in various forms quickly and easily. Related to the use of the internet or the Web in education through multimedia has made it possible to create dynamic and interactive Web sites and can combine text, animation, sound and video display [1]. Besides that, through internet media information can also be accessed from various sources throughout the country very easily [2] and can help accelerate the learning process, adjust to the flow of information globalization, and can motivate students in learning activities [3].

Some of the results of previous studies found that there was an impact of internet use or technology on student learning outcomes and motivation [4-7], the formation of beliefs and teachers' perspectives on technology [8-10], and the use of time and place became more flexible [11]. Besides that, evaluation and assessment of learning activities have also been carried out using the internet [12-15]. However, not
all communities of educators accept the internet as a learning media that promises success, because among them there is a sense of concern that there will be intervention in western culture into the local culture. [16-19].

Based on the description of the results of the above research it can be understood that not all countries or communities accept the internet as one of the supporting media for the successful implementation of learning. On the one hand it cannot be denied that internet media has succeeded in motivating and improving student learning outcomes well, but on the other hand there are communities that are concerned that there will be outside cultural intervention into the local culture and will lose the transfer of value in the implementation of learning. Based on these two contradictory views, it is necessary to do more in-depth research on the impact of internet usage on physics learning outcomes in students in the Acehnese community as a society that is rich in local culture as well as a culture of religion.

There are several reasons why internet is chosen as the independent variable in this study, including through the internet media an interactive process occurs and this becomes a major factor in the learning process [20,21] and through internet media there will be changes in three cognitive domains, attitudes, knowledge and cognitive [22-24]. Besides that, internet media can be expected to (i) be better at capability and speed in communication; (ii) there is availability of up to date information, (iii) there are facilities to form and hold group discussions (News Group), (iv) there is an educational web, where the learning process can be done dynamically, regardless of time and meeting room, and (v) there is an e-mail facility, so that consultation can be carried out privately between students and educators or with other colleagues [23].

2. Methods

2.1 Approach and type of research
This study uses a quantitative approach with independent variables of internet media and dependent variables of student learning outcomes in physics lessons and uses documentation study methods and continued with interviews.

2.2 Population and sample
The target population is all high school students in the city of Banda Aceh both school and country. Sampling uses a gradual claster sampling technique, the first step that is randomized is school, then the second stage is class randomized. Finally, the chosen sample was students of class XI IPA1 and IPA2 in SMA Negeri 6 in the 2017/2018 school year. The number of respondents sampled in this study were 105 students and according to Arikunto if the sample number was more than 100 students, then the sample taken was 30% of the total population [25].

2.3 Data collection technique
The data collected in this study includes quantitative data in the form of learning outcomes of physics subjects and data in the form of a Likert scale. Data on learning outcomes is obtained through the study of documentation from original value archives stored by homeroom teacher. While the data in the form of a Likert scale were obtained using a 4 point Likert scale questionnaire. The questionnaire consisted of 5 indicators consisting of (i) understanding of learning resources from the internet, (ii) types of reference source domains, (iii) intensity of access to referral sources, (iv) benefits of access results as references, and (v) site categories which is widely accessed. The five indicators were developed into 20 items after going through the validation and trial process.

2.3.1 Documentation of learning outcomes. Documentation technique is a method of collecting data by recording data about the object of research. According to Arikunto the method of documentation is a technique of finding data about things or variables in the form of notes, transcripts, books, newspapers, magazines, inscriptions, minutes of meetings, briefs, agendas, etc. [25]. This method is carried out to
obtain data in the form of Physics report cards of grade XI IPA 1 and XI IPA 2 in semester 1 of the school year 2017/2018 Banda Aceh 6 High School.

2.3.2 Questionnaire. According to Sugiyono, the questionnaire is a technique of collecting data by giving a set of questions or written statements to the respondent to answer [26]. Questionnaires given to students in the form of statements to find out the use of the internet as a learning resource. The questionnaire used in this study is a closed questionnaire, which contains statements accompanied by a number of alternative answers chosen. Each answer item from the statement is given a score in the form of a 4-point Likert scale with its grids shown in table 1 [26].

| Variable                        | Indicator                                      | Item number | total |
|--------------------------------|-----------------------------------------------|-------------|-------|
| Use of the internet as a      | Understanding of learning resources from      | 1, 2, 3, 4, 5 | 5     |
| learning resource              | the internet                                  |             |       |
|                                | Types of referral source domains              | 1, 2, 3     | 3     |
|                                | Intensity of reference source access          | 1, 2, 3     | 3     |
|                                | Benefits of access results as a reference     | 1, 2, 3, 4, 5, 6 | 6     |
|                                | Many categories of sites that are accessed    | 1, 2, 3     | 3     |
|                                | Total                                         | 20          | 20    |

Sources: [26-28]

2.3.3 Testing of instrument validity. The instrument that needs to be tested for validity is a questionnaire using the internet as a Likert scale answer source with 5 points consisting of 25 items with 5 indicators. Because the instruments that need to be tested for validity are non-test, all that needs to be done is construction validity [26]. The questionnaire used in this study before use, first tested its validity. The researcher tested the validity of the questionnaire by consulting directly with 4 content experts and format experts. Two experts from universities and two experts from high schools. The experts were asked to give their views on the instruments that had been compiled [26]. Based on the explanation or input from the instrument experts it was revised repeatedly.

2.4 Data analysis technique

The data obtained in this study are the first two forms of ordinal data and ratios. In the first stage, both data were analyzed using descriptive statistics, then both were analyzed using inferential statistics to obtain information on the correlation between rapot value and frequency of internet usage.

Stages of data analysis include; Editing, namely checking the completeness and filling of the questionnaire that was successfully collected so as to avoid mistakes or errors. Scoring, which is giving a value to each questionnaire answer (X) using a Likert scale with five alternative answers and adjusted the reference scale with the report value / learning outcomes (Y). Inference, calculation of the correlation coefficient r product moment is carried out and interpreted by referring to the category of the product moment correlation coefficient value [26].

The description of each category is as follows; Category I: If the value of r > 0 means there is a positive linear relationship, in other words the greater the value of the variable X, the greater the value of the variable Y or the smaller the value of variable X, the smaller the value of variable Y. Category II: If the value r < 0 means that there has been a negative linear relationship, namely the smaller the value of the variable X, the greater the value of the variable Y or the greater the value of variable X, the smaller the value of variable Y. Category III: If the value r = 0 means there is no linear relationship between variable X and variable Y. Category IV: If the value of r = 1 or r = -1 has occurred a perfect linear relationship, that is in the form of a straight line, while for the value of r which increasingly leads to number 0, the line is increasingly not straight [26]. Significance Test, After the correlation coefficient is obtained, it is tested whether the correlation coefficient is significant or not at the level of 0.05 by using the two-way t test with reference to the t test equation used by Sugiono [26].
3. Result and discussion

3.1. Documentation and questionnaire studies
There are two data from two activities in this study. First, the documentation study carried out in this study is an activity to get students’ physics report card grades in the semester of school year 2017/2018 in public high schools 6 cities of Banda Aceh. Second, data from questionnaire answers in the form of a 5-point Likert scale were obtained from the results of the respondent's answers, then the data was changed to a score on a scale of 100 and adjusted to the report card value. To get information on the influence or association of report cards and the use of the internet as a learning resource, the correlation coefficient of the product moment and the t-test were calculated for each indicator of internet utilization. The correlation coefficient provides information about the relationship between report cards and the use of the internet as a source of learning, while the t-test value provides information about the level of significance of the relationship between the two variables. The results of the calculation of the two values are shown in table 2.

Table 2: The results of the analysis of the calculation of internet use with learning outcomes

| Indicator of the use of the internet as a learning resource | \( r_{xy} \) | \( T_{\text{account}} \) | \( t_{\text{table}} \) | score \( \alpha = 0.05 \) (Y) |
|----------------------------------------------------------|-----------|----------------|----------------|------------------|
| Understanding of learning resources from the internet    | 0.3346    | 1.9102         |                |                  |
| Types of referral source domains                         | 0.0425    | 0.2282         |                |                  |
| Intensity of reference source access                     | 0.2091    | 1.1503         | 1.699          | 2498             |
| Benefits of access results as a reference                | 0.0867    | 0.4681         |                |                  |
| Many categories of sites that are accessed               | 0.0509    | 0.2741         |                |                  |

3.2. Correlation of internet usage and learning outcomes
The correlation coefficient calculated using the product moment equation only provides information about the correlation between the two variables, but does not show the cause between the two [26]. The total correlation coefficient of \( r_{xy} = 0.2646 \) obtained in the study provides information that between the use of the internet as a learning resource and the value of student learning outcomes there is a relationship in the low category. Based on the \( r_{xy} \) value obtained the coefficient of determination \( r^2 \) of 0.0700 or 7%, meaning that the value of student physics learning outcomes is only 7% influenced by the use of the internet as a learning resource, while the remaining 93% is influenced by other factors outside the object of research this [27,28].

The low level of awareness between the use of the internet as a learning resource and learning outcomes was also found by previous researchers. As an example of the results of research conducted by Artati, where the use of the internet as a learning resource is not related to the index of student achievement in the Sutomo Surabaya midwifery diploma [29]. Furthermore, the research conducted by Firman and Mustafidah also found that the use of the internet on the achievement index of Informatics Engineering students at Muhamaddiyah University in Purwokerto was relatively low or around 0.282. According to Firman and Mustafidah, the use of the internet correctly will result in high learning achievement. But on the contrary, if the use of the internet is not properly utilized, the learning achievement achieved will be low [30]. If we refer to expert views, the factors that influence learning outcomes or achievement index at university level there are four factors that influence learning outcomes, namely: (1) environmental factors such as the natural environment and socio-cultural environment; (2) instrumental factors such as curriculum, programs, facilities and facilities, and teachers (3) physiological factors; and (4) psychological factors such as interest, intelligence, talent, motivation, and cognitive abilities [31-34].

3.3. Correlation per indicator
If studied more deeply, information will be obtained about the relationship between each indicator of the use of the internet as a learning resource with student learning outcomes. There are five indicators of the use of the internet as learning resources, namely (i) understanding of existing learning resources on the internet, (ii) types of learning source reference domains, (iii) intensity of access to referral sources on the internet, (iv) utilization of access results, and (v) categories of sites that are widely accessed.

3.3.1. Understanding of learning resources on the internet. Indicators of understanding learning resources are 5 questions, all of which describe the level of understanding of students towards learning resources on the internet. The results of the study found about 11.19% of indicators of understanding learning resources contributed to the measurement of the use of the internet as a learning resource. While the connection of understanding learning resources that exist on the internet with the use of the internet as a learning resource around 0.3346 with a low category.

3.3.2. Types of referral source domains. Indicators of the types of reference source domains are measured through 3 questions. The measurement results provide an overview of the types of reference source domains that are often used by students as learning resources. Based on the results of data analysis, it was found that the correlation coefficient between the types of referral source domains with student physics learning outcomes amounted to $r = 0.0425$ with a low category. In other words, the contribution of indicators of the types of reference source domains to the results of measuring the use of the internet as a learning resource of 0.18% is classified as low.

3.3.3. Intensity of reference source access. The indicator of intensity of reference source access is measured using 3 questions. The measurement results illustrate the number of students accessing certain reference sources in a given time. Based on the results of data analysis it was found that the correlation coefficient between the intensity of referral source access and student physics learning outcomes was equal to $r = 0.2091$ with a low category. In other words, this indicator contributes to the measurement of internet use as a learning resource of 4.37% with a low category.

3.3.4. Benefits of access results as a reference. The benefit indicator as a result of access is measured using 5 questions. The measurement results give an idea of the number of uses or uses of the access results to be used as references in learning. Based on the results of data analysis found the correlation coefficient between the benefits of access results as a reference with student physics learning outcomes is equal to $r = 0.0867$ with a low category. In other words, the contribution of the benefits indicator as a result of access to referral sources towards measuring the use of the internet as a learning resource is 0.75% with a low category.

3.3.5. Site categories that are widely accessed. The categories of sites that are widely accessed are measured using 3 questions. The measurement results give an overview of the category or type of site that is widely accessed by students when using the internet. Based on the results of data analysis found a correlation coefficient between the categories of sites that are widely accessed with student physics learning outcomes is equal to $r = 0.0509$ with a low category. In other words, the contribution of the site category indicators that are widely accessed towards measuring the use of the internet as a learning resource is 0.25% with a low category.

3.4. Outside cultural intervention on internet users
As we know the internet besides having a positive impact also has a negative impact so many students use the internet or social media applications or game applications. Now there are lots of social media, online games and entertainment media available on the internet. The reality found in a person's field can spend so long just to enjoy entertainment or gaming services. So that they cannot use the internet as well as a learning resource or as a source to access various information that can be used as additional knowledge. Therefore the use of the internet that is not wise will get a low achievement and vice versa
if the internet can be used wisely, the achievements will be high [35]. This may be one reason for the problem of the low correlation between the use of the internet as a source of learning and learning outcomes.

4. Conclusion
Based on the analysis of the discussion above, it can be said that students understand how to access data from the internet and students understand that the internet can be used as a source of learning, but students do not use the internet as the main thing to access information relating to subjects being studied, one of them is physics. The results of this study also found that the most important indicator or the highest contribution to the measurement of the use of the internet as a learning resource is the understanding of learning resources on the internet. Inference from the results of this study is addressed to every researcher who will measure the use of the internet for various purposes, the indicator that must be included is the user's knowledge of the sources to be accessed.

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