Development device learning online use model inquiry learning on theory the balance of tough things

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Abstract. Covid-19 pandemic has changed the world of education where the learning process is done remotely by using an online learning system (online) which is done at home. The need for a device learning is designed to be able to support the distance learning process and achieve 21st century competence, which is directly involved in the learning process using internet facilities. This study aims to develop online learning tools using Inquiry Learning model for physics subjects on equilibrium of rigid bodies. The syntax of the Inquiry Learning model 1) orientation to the problem, 2) making a hypothesis, 3) collecting data, 4) processing the results of the data, and 5) formulating conclusions. The researcher used research and development method (Research & Development), using the ADDIE models (Analysis, Design, Development, Implementation, Evaluation). The validation results of the three experts and the overall average teacher showed a percentage of 81.89%, it can be categorized in a very good category. This online learning tool can be declared very good or feasible to use in physics lessons on rigid equilibrium material. So, the development of online learning tools using inquiry learning model on rigid equilibrium material is effective and suitable for the physics learning process of class XI senior high school.

1. Introduction
At present the world is facing an outbreak of the Covid-19 pandemic that has changed the world, especially in terms of education. Teaching and learning activities carried out by utilizing internet facilities online. This requires adaptation so that teaching and learning activities run effectively. The impact of covid-19 has changed the learning device directly transferred to the learning device by using an online system. The development of increasingly rapid times in the 21st Century, requires learning devices designed to be able to achieve competence in the 21st Century, where in the learning process that utilizes internet facilities. According to Trilling and Fadel namely 21st Century Skill which includes three things including: 1) life and career skills, 2) learning and innovation skills, and 3) Information media and technology skills[18].

According to the needs analysis survey, the use of information media and technology as learning literacy used by students in learning physics is the Ruangguru application, Zenius, Youtube and Quipper via internet. To carry out online learning the need for supporting applications namely learning management system (LMS). There are several types of LMS that can be utilized in the learning process including Schoology, Learnboos, Edmodo, Moodle and the others. In using the LMS application, learning tools can be accessed anytime and anywhere effectively and efficiently.
In addition to learning management systems (LMS), learning models are indispensable for the learning process. Curriculum of 2013 which is centered on students, where students are required to be more active, think scientifically and have the ability to be creative. Teachers are required to encourage students to learn actively and can improve their ability to understand a concept in physics learning by using the curriculum of 2013 including the Inquiry Learning model. The inquiry learning model was developed by Suchman [5]. Inquiry-based learning is an educational strategy in which students follow methods and practices similar to those of professional scientists to build knowledge [6]. It can be defined as the process of discovering a new causal relationship, by formulating a hypothesis and testing it by conducting experiments or making observations [10] [11]. Guided inquiry is a way of teaching and learning that transforms the school culture into a collaborative community of inquiry [7]. Inquiry learning is student-centered, which means that students have ownership in the process rather than pursuing a project that has been assigned by the teacher [9]. Inquiry is considered as an education-centered learning approach in which the instructor acts as a facilitator [1]. Inquiry learning generally emphasizes questions and ideas that motivate students to want to learn more and create ways to share what they have learned [7]. The dynamics of inquiry learning shift in four ways [13]:

- Student-centered learning,
- Changing passive learning to active learning,
- Deep understanding
- Isolation to interactions

The results of the research that are relevant to this research are the research conducted by Gwo Jen Hwang et al (2013) with the title of the research Effects of the inquiry-based mobile learning model on cognitive load and learning achievement of students published by the journal Interactive Learning Environments Vol. 21, No. 4. It was found that students who study with inquiry-based mobile learning approaches have better learning achievement compared to traditional approaches. Therefore, it can be concluded that the inquiry-based mobile learning model has a positive effect on students [4]. Research results that are relevant to this research are research conducted by Binar Kurnia Prahani et al (2016) with the title research effectiveness of physics learning material through guided inquiry models to improve student's problem solving skills based on multiple representations published by the International Journal of Education and Research Vol.4, No. 2. The results show that the learning material through the guided inquiry model is effective for improving students' problem solving skills in high school [12]. Research conducted by Parno S Mahulue et al, with the research title The Effect of Inquiry Training in Learning Models Using PhET Media and Scientific Attitude on Students' Science Process Skills published by IOSR Journal of Research & Method in Education (IOSR-JRME) Vol. 7, Issue 5 Ver. I, the results of the study show that the science process skills of students using inquiry learning models are better than conventional learning [14].

The concept of rigid body balance is a very important basic knowledge and has many applications in daily life, especially. In this discussion, we still regard objects as rigid objects. An object is called a rigid body if the distance between each part of the object is always the same. In this case, we can think of each object as being composed of particles or points, where the distance between each point scattered in all parts of the object is always the same. In fact, every object can change shape (become not rigid), if the object is subjected to force or torque. For example the concrete used to build bridges...
can be bent, even broken if subjected to great gravity, the crane can be broken if the load being lifted exceeds its capacity. The car can bend if the gravity of the passenger exceeds its capacity. In this case the objects have changed shape. If the shape of the object changes, then the distance between each part of the object, of course, changes or the object becomes no longer rigid[3][17].

Based on the description above, it is necessary to have an online-based learning tool that can be used as an alternative learning for students for physics subjects on rigid equilibrium material that can be accessed anytime and anywhere, according to the curriculum. Learning devices are everything that is used by teachers and students to facilitate learning [8]. This study aims to develop online learning tools using Inquiry Learning model for physics subjects on equilibrium of rigid bodies.

2. Research Method
Research had done included the type of Research and Development (R & D). The stages of the ADDIE models are Analysis, Design, Develop, Implementation and Evaluation. ADDIE models is the simplest model but has included overall development. The following is the ADDIE models scheme [2].

![ADDIE model](image)

**Figure 2. ADDIE model**

2.1. Analysis
Analysis is the first step in the ADDIE model. In this step the program designer must conduct a needs analysis to gather information related to the problems faced by students at the high school level.

2.2. The design
Design is the second step in the ADDIE model in which researchers design and prepare online learning tools so that students are expected to be able to achieve the objectives and competencies of these subjects.

2.3. Development
Development is the third step in the ADDIE model. In this step, the Development Phase aims to improve the product of the learning tools developed to determine the feasibility of the final product.

2.4. Implementation
Implementation is the fourth step in ADDIE. In this step, implementing online learning tools in class according to the teaching plan using the inquiry learning model.
2.5. Evaluation
Evaluation is the final step in the ADDIE model. In this step, online learning tools are evaluated to improve their efficiency and effectiveness.

3. Result and Discussion
Product of this research was developed in the form of online learning tools using Inquiry Learning learning models on rigid objects equilibrium material. Display products online learning tools in the Figure below.

![Figure 3. Basic Competencies and Learning Objectives](image)

![Figure 4. Learning Activities](image)

![Figure 5. Learning Activities](image)

![Figure 6. Rating](image)

Validation assessments by experts using a Likert scale interval. Likert scale is used to measure behavior, opinions, and perceptions about social problems or phenomena. The data obtained are then grouped according to Table 1.

| Score      | Category  |
|------------|-----------|
| 0% -20%    | Very bad  |
| 21% -40%   | Bad       |
| 41% -60%   | Enough    |
| 61% -80%   | Well      |
| 81% -100%  | Very good |
The indicators assessed at the material expert validation stage consist of several indicators which can be seen in Table 2.

| Table 2. Results of Expert Material Validation |
|-------------------------------|-----------------|-----------------|
| Indicator                     | Validator 1     | Validator 2     |
| Terms of Material Learning    | 76.00%          | 84.00%          |
| Material Coverage             | 83.33%          | 73.33%          |
| E-learning compliance with Physics Material | 76.00%          | 76.00%          |
| Average percentage            | 78.44%          | 77.78%          |
| Overall percentage            | 78.11%          |
| Category                      | Well            |

The results obtained by the validation of material experts in validator 1 and validator 2 on the indicator of material requirements in learning show the percentage of 76% validator 1 and 84% validator 2. The indicator Coverage material shows the percentage of 83.33% validator 1 and 73.33% validator 2. In the indicator of the suitability of e-learning with physics material shows the percentage of 76% validator 1 and 76% validator 2. The results of validation by the two validators of learning material experts show an average score of 78.44% according to material expert validators 1, 77.78% according to material expert validator 2. The overall validation result is 78.11% in the good category. Based on these results, the developed online learning tool (RPP independent learning) can be used for physics learning on rigid objects equilibrium material. The results of the media expert validation are shown in Table 3.

| Table 3. Media Expert Validation Results |
|-------------------------------|-----------------|-----------------|
| Indicator                     | Validator 1     | Validator 2     |
| Visual communication          | 80.00%          | 77.14%          |
| Device Engineering Aspects    | 90.00%          | 90.00%          |
The results obtained by the validation of media experts on validator 1 and validator 2 on visual communication indicators show the percentage of 80% validator 1 and 77.14% validator 2. On the indicator of engineering aspects of the device shows the percentage of 90% validator 1 and 90% validator 2. On the indicator usefulness shows the percentage of 76% validator 1 and 88% validator 2. The results of the validation of the two learning media expert validators showed an average score of 82% by the validator 1, 85.05% by the validator 2. The overall validation results obtained were 83.52% in the very good category. From these results it can be concluded that the online learning tools (RPP independent learning) developed can be used in physics learning on rigid equilibrium material. The results of the learning expert validation in table 4.

**Table 4. Learning Expert Validation Results**

| Indicator                  | Validator 1 | Validator 2 |
|----------------------------|-------------|-------------|
| Characteristics of the learning module | 83.33%      | 80.00%      |
| The stages of the Model Inquiry     | 79.00%      | 79.00%      |
| Learning Assessment                 | 80.00%      | 80.00%      |
| Average percentage                 | 80.78%      | 79.68%      |
| Overall percentage                 | 80.23%      |             |
The results obtained by the learning expert validation on validator 1 and validator 2 on the learning module characteristic indicator show the percentage of 83.33% validator 1 and 80% validator 2. The indicator of the stages of the inquiry model shows the percentage of 79% validator 1 and 79% validator 2. The learning assessment indicator shows the percentage 80% validator 1 and 80% validator 2. The validation results of the two learning expert validators showed an average score of 80.78% by validator 1, 79.68% by validator 2. The overall validation results obtained were 80.23% in the category well. From these results it can be concluded that the online learning tools (RPP independent learning) developed can be used in physics learning on rigid equilibrium material. The results of teacher validation in table 5.

### Table 5. Teacher Validation Results

| Indicator | Validator |
|-----------|-----------|
| The suitability of media components in learning devices with physics material | 85% |
| Language of writing material | 90% |
| Characteristics of learning devices | 81.33% |
| Average percentage | 85.60% |
| Category | Very good |

The results obtained by the learning expert validation on validator 1 and validator 2 on the learning module characteristic indicator show the percentage of 83.33% validator 1 and 80% validator 2. The indicator of the stages of the inquiry model shows the percentage of 79% validator 1 and 79% validator 2. The learning assessment indicator shows the percentage 80% validator 1 and 80% validator 2. The validation results of the two learning expert validators showed an average score of 80.78% by validator 1, 79.68% by validator 2. The overall validation results obtained were 80.23% in the category well. From these results it can be concluded that the online learning tools (RPP independent learning) developed can be used in physics learning on rigid equilibrium material. The results of teacher validation in table 5.

![Figure 9. Validation Results of Learning Experts](image)

![Figure 10. Teacher Validation Results](image)
The results of the teacher's validation on the suitability indicator of the media component in the learning device with the physics material showed a percentage of 85%, the percentage of the language writing material indicator showed a percentage of 90% and the indicator of the learning device showed a percentage of 81.33%. Based on the average percentage of the overall indicator shows the percentage of 85.60% can be categorized in very good category.

| Validation       | Validation Results | Overall percentage | Category      |
|------------------|--------------------|--------------------|---------------|
| Learning Expert  | 80.23%             |                    | Very good     |
| Media Expert     | 83.52%             |                    |               |
| Material Expert  | 78.11%             | 81.89%             |               |
| Teacher          | 85.60%             |                    |               |

Figure 11. Validation results of experts and teachers

Based on the results of the validation of learning experts showed a percentage of 80.23%, the results of the validation of the media experts showed a percentage of 83.52% and the results of the validation of the material experts showed a percentage of 78.11%, the results of the teacher's validation were 85.60%. Based on the validation results of the three experts and the overall average teacher showed a percentage of 81.89%, it can be categorized in a very good category.

Based on the validation results of the three material experts, media, learning and teachers, it can be concluded that the development of online learning tools using Inquiry Learning models in physics learning on rigid body equilibrium material gets 81.89% results in the excellent category.

This research is entitled the development of online learning tools using Inquiry Learning Model on rigid body equilibrium material. This study aims to determine the feasibility of online learning tools using the Inquiry model assisted by Edmodo application. Based on the results of the learning expert validation shows the percentage 80.23%, the results of the validation of media experts showed a percentage of 83.52% and the results of the validation of the material experts showed a percentage of 78.11%, the results of the teacher's validation were 85.60%. Based on the validation results of the three experts and the overall average teacher showed a percentage of 81.89%, it can be categorized in a very good category. Based on the results of the validation of the three material experts, media, learning and teachers, it can be concluded that the development of online learning tools using Inquiry Learning learning models in physics learning on rigid objects equilibrium material gets 81.89% in the excellent category and is suitable for use in learning physics in the material rigid equilibrium. The strengths of this tool include: (1) Learning tools that are accompanied by observing real life phenomena that are provided through video will make students actively involved, (2) Students can access anywhere and anytime because they are not face to face as in class, (3) Practicing students' abilities in using ICT and making maximum use of the internet.
4. Conclusions
Based on the results of the validation of learning experts showed a percentage of 80.23%, the results of the validation of the media experts showed a percentage of 83.52% and the results of the validation of the material experts showed a percentage of 78.11%, the results of the teacher's validation were 85.60%. Based on the validation results of the three experts and the overall average teacher showed a percentage of 81.89%, it can be categorized in a very good category. This online learning tool can be declared very good or feasible to use in physics lessons on rigid equilibrium material. So, the development of online learning tools using inquiry learning models on rigid equilibrium materials is effective and suitable for the physics learning process of class XI in high school.

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