# Validation of Learning Media Using Argument Driven Inquiry (ADI) Learning Model

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***Abstract*** -The subjects in this study are the development of learning media using the ADI (Argument Driven Inquiry) learning model on electrolyte and non-electrolyte material. Learning media developed aim to improve self-efficacy and student learning outcomes. Development of learning media is carried out using the 4D development model. Data validity is obtained based on the results of the assessment by three validators from the chemistry lecturer, where the assessment is carried out using a validity test sheet in the form of questionnaire. This study aims to describe the validity of the learning media developed consisting of Lesson Plan, Student Worksheets, knowledge assessment sheets, student response questionnaires, student activity sheets, motivational questionnaire sheets, self-efficacy questionnaire sheets, and student response questionnaire. The results of the assessment of the three validators were found that the learning device developed got the value of modus 4 with a very valid category.

***Keywords***- Validation, learning instruments, Argument Driven Inquiry, self-efficacy

## I. INTRODUCTION

Curriculum 2013 which has been implemented in Indonesia in its implementation has always undergone improvements in accordance with the development of science and technology. The 2013 curriculum applied at this time emphasizes more on character and competency education, so students are expected to be able to have a strengthening of spiritual attitudes, and social attitudes, and be able to increase curiosity, creativity, psychomotor, and intellectual knowledge [1].

One of the expected achievements can be achieved by creating a more innovative learning process, and learning is more student-centered so that students are more active in learning activities. Teacher-centered learning will focus on learning where the teacher is the source of information so students will be more passive in learning activities. Another case when learning is student-centered, students who were previously accustomed to receiving information (notified) from the teacher will actively find out.

Self-efficacy is very important in learning activities because it can affect cognition, motivation, affective process which will affect one's behavior and can have an impact on someone's perseverance in learning [2]. Hairida (2012) In his research also suggests that the higher self-efficacy, student achievement in learning chemistry will get higher. Conversely, if students' self-efficacy is low, their learning achievement will also be low **[**5].

To support the educational objectives described above, one of them is the availability of learning that corresponds with the demands of education both nationally and internationally. Learning media are a set of materials used for the learning process, for example lesson plan, student worksheets, and assessment sheets. This learning media is made so that the learning conducted in the classroom can run well in accordance with the learning objectives and competencies to be achieved. Learning media determine so much on the achievement of the desired learning objectives, so that a valid learning instrument is needed to get the learning objectives which correspond with the competencies to be achieved.

## II. RESEARCH METHODH

The development model used in this study is the 4-D (four-D Model) [7]. Which consists of four stages, namely definition, design, development and dissemination.

First, the definition phase is carried out need-analysis which includes curriculum analysis, student analysis, task analysis, concept analysis, and formulation of learning objectives. Second, the design phase aims to produce learning media based on the ADI learning model. The results at this design stage are called draft I. Learning media developed include learning lesson plans, student activity sheets, and assessment sheets, motivational questionnaires, self-efficacy questionnaires, student response questionnaires. Third, the development phase is carried out to study and evaluate the learning media developed, especially on aspects of concepts, novelty, language, and ease of use by students, teachers or education experts.

At the development stage, validation of learning instruments was carried out. It was carried out by experts to get an assessment and input in the form of suggestions and criticisms of the draft learning instrument I. The instrument validation is content

validation, language, format, and corresponds with the ADI learning model. Suggestions and criticisms from the validator are used to improve learning media that have been developed by researchers before learning media are tested on the subject of research. The revised learning media based on the validation results is called draft II.

Data from the validation results were analyzed using quantitative descriptive analysis by calculating the average value given by the validator. This score is then adjusted to the assessment criteria shown in Table 1 [8].

**Table 1.** Criteria for assessment of learning instrument

| Score | Category |
|---|---|
| $3{,}6 \leq P \leq 4$ | Very Valid |
| $2{,}6 \leq P \leq 3{,}5$ | Valid |
| $1{,}6 \leq P \leq 2{,}5$ | Less valid |
| $1 \leq P \leq 1{,}5$ | Not valid |

The validation agreement was calculated based the formula:

$$Percentage\ of\ Agreement = (1 - \left[\frac{A-B}{A+B}\right]\ x100\%$$

that
A = the highest score given by the assessor
B = the lowest score given by the assessor

An instrument is satisfied to valuation agreement if the percentage of agreement is ≥ 75%. Based on the criteria in Table 1, the learning instrument developed in this study are said to be valid if they get a score ≥ 2.6.

## III. RESEARCH FINDING

The results of the validation of the learning instruments include the plan for implementing the lesson, student worksheets, motivation armature sheets, student activity sheets, self-efficacy questionnaires, and knowledge assessment sheets which will be explained as follows:

### *1. Results of the Lesson Plan Validation*

The lesson plan developed by using the learning model ADI where using the learning model is expected to be able to improve self-efficacy and student learning outcomes in electrolyte and non-electrolyte material in class X of SMAN 7 Surabaya. The developed lesson plan is arranged for 3 meetings, in which each meeting consists of 2 lesson hours consisting of 45 minutes for each lesson. The following is the result of lesson plan validation which has been validated by 3 validators from chemistry department in UNESA.

Tabel 2. Validation of Lesson Plan

| No | Diskription | Modus | Category | PoA (Average) (%) |
|---|---|---|---|---|
| 1. | Lesson plan format | 4 | VV | 87,38 |
| 2. | Learning activities | 4 | VV | 100 |
| 3. | Supporting Learning activities | 4 | VV | 100 |
| 4. | Language | 4 | VV | 86 |

V = Valid; VV = Very Valid; PoA = Percentage of Agreement

Based on the results of the validation by the three validators in table 2 shows the data that in general the results of the validation of the Lesson Plan are arranged to have very valid categories and can be used with a slight revision. In addition, there is also a modus 4 with very valid criteria and an average reliability of 91.8% so that it can be categorized as reliable. The developed lesson plan can be used with a little revision. Followings are some suggestions for improvement from 3 validators.

**Table 3.** Suggestion and Enhancement Lesson Plan

| No. | Suggestion | Enhancement |
|---|---|---|
| 1. | Destination numbering is adjusted by indicator numbering | Numbering has been adjusted to the learning indicator |
| 2. | Learning objectives must be ABCD | Learning objectives have been adjusted for ADCD |
| 3. | The introduction and closing of the learning step are corrected | The introduction and closing of the learning steps have been corrected |

### *3.2 Results of Student Worksheet Validation*

Student Activity Sheet by using the Argument Driven Inquiry learning model developed to improve learning outcomes and also student's self-efficacy consists of 3 Student Activity Sheet which is used for 3 times. The developed worksheet is used to guide students to make it easier to understand the concepts of electrolyte and non-electrolyte solutions. The following are the results of the Student Activity Sheet Validation validated by 3 Validators

**Table 4.** Validation of Student's Worksheet

| No | Diskription | Modus | Category | PoA (Average) (%) |
|---|---|---|---|---|
| 1. | Student's Worksheet format | 4 | VV | 95 |
| 2. | Eligibility | 4 | VV | 93 |
| 3. | Language | 4 | VV | 86 |

V = Valid; VV = Very Valid; PoA = Percentage of Agreement

Based on the results of validation by the three validators in table 4, it shows data that in general the results of validation of Student Worksheets compiled get modus 4 with a very valid category and can be used with a slight revision. In addition, the reliability data of an average of 93.3% was also obtained, giving the meaning that Student Worksheets can be categorized as reliable. The followings are some suggestions for improvement from 3 validators.

**Table 5.** Suggestion and Enhancement Student's Worksheet

| No. | Suggestion | Enhancement |
|---|---|---|
| 1. | Some writing procedures need to be fixed | The writing system has been fixed |
| 2. | The answer key is incorrect | The wrong answer key has been corrected |

### *3.3 Self efficacy Questionnaire*

The self-efficacy questionnaire is one of the instruments developed in this study. The self-efficacy questionnaire that has been developed is used to measure the increase in student self-efficacy, where self-efficacy questionnaires are developed based on the dimensions of self-efficacy including magnitude, strength, and generality. The following is the result of student self-efficacy questionnaire validation which has been assessed by three validators.

**Tabel 6.** Self efficacy Questionnaire

| No | Diskription | Modus | Category | PoA (Average) (%) |
|---|---|---|---|---|
| 1. | Format | 4 | VV | 100 |
| 2. | Language | 4 | VV | 96,5 |
| 3. | Contents | 4 | VV | 100 |

V = Valid; VV = Very Valid; PoA = Percentage of Agreement

Based on the results of validation by three validators in table 6, the data show that in general the results of the self-efficacy questionnaire validation compiled have modus 4 with a very valid category and can be used with a slight revision. Besides, the reliability data of 98.6% also gives the meaning that the results of the validation of the self-efficacy questionnaire are included in the reliable category. The following are some suggestions for improvement from 3 validators.

**Table 7.** Suggestion and Enhancement Self efficacy Questionnaire

| No. | Suggestion | Enhancement |
|---|---|---|
| 1. | Some statements are made in negative statements. | Some statements have been made in negative statements. |
| 2. | A goal is given for each point. | At each point added to the goal |

### *3.4 Learning outcomes test instrument*

The learning outcomes test instrument developed consisted of the pretest and post-test questions. Each test instrument consists of 10 multiple choice questions which are arranged based on learning indicators on electrolyte and nonelectrolyte material. The following is the result of the validation of the learning outcomes test instrument from three validators.

**Table 12.** Learning outcomes test instrument

| No | Diskription | Modus | Category | PoA (Average) (%) |
|---|---|---|---|---|
| 1. | Concept | 4 | VV | 86 |
| 2. | Construction | 4 | VV | 100 |
| 3. | Language | 4 | VV | 93 |

V = Valid; VV = Very Valid; PoA = Percentage of Agreement

Based on the results of validation by three validators in table 12, the data shows that in general the results of the learning outcome test validation are compiled with modus 4 with a very valid category and can be used with little revision. In addition, the reliability data of 90.6% also gives the meaning that the results of the validation tests of student learning outcomes are included in the category of reliability. Here are some suggestions for improvement of 3 validators.

**Table 13.** Suggestion and Enhancement Learning outcomes test instrument

| No. | Suggestion | Enhancement |
|---|---|---|
| 1. | There are several keys and cognitive domains that are not appropriate. | The answer key and cognitive domain have been adjusted |
| 2. | The cognitive domain used is at least C4. | The problem used uses a minimum of C4 cognitive domains |

## IV. DISCUSSION

### *1. The Lesson Plan*

The lesson plan is a very important guide prepared by the teacher in the implementation of learning activities. The implementation plan is prepared based on the basic competency that has been set, so that it is expected that the learning objectives can be achieved thoroughly. The lesson plan which was developed by using the ADI learning model (Argument Driven Inquiry), with the applied learning model expected to be able to improve students' self-efficacy. Teachers who have high self-efficacy are teachers who successfully teach their students and even naughty students [9]. The developed lesson plan was arranged for 3 times face-to-face applied to electrolyte and non-electrolyte material. In the first meeting discussed the electrical conductivity of electrolyte olutions, the nature and type of electrolyte solution, electrolyte strength and electrolyte properties.

### *2. Student Worksheets*

Student Worksheets is teaching material that is packaged in such a way that students are able to learn material taught independently [10]. Good learning is learning that emphasizes the participation of students who are active in learning, and the teacher only functions as a facilitator [8]. With the opinion above, in this study the researcher facilitates students to learn by using LKS for guidance in conducting practical work, thus students are expected to be able to gain an understanding of the concepts learned. The results of Student Worksheets validation are good if the worksheets compiled by the researcher pay attention to the following: (1) The titles on the Student Worksheets must be in accordance with the material, (2) the material presented is in accordance with the level of student development, (3) the material presented is simple, logical, clear, and systematic (4) able to make students actively involved in learning activities, (5) the appearance of student worksheets is simple, clear and easily understood by students, (6) images and graphics in accordance with concepts (7) location of images, tables, and questions must be appropriate, and (8) develop interest and be able to invite students to think.

### *a. Self-Efficacy Questionnaire*

The self-efficacy questionnaire is used to measure the increase in self-efficacy of students. The self-efficacy questionnaire assessment includes the suitability of the format, language, and content. Based on the results of the assessment of 3 validators, the format conformity data obtained modus 4 with a very valid category and reliability of 100% with the reliable category. Language points in the self-efficacy questionnaire get modus 4 values with very valid categories and reliability of 96.5% with the reliable category. For the content format, get the modus value of 4 with a very valid category and 100% reliability with the reliable category. Thus the self-efficacy questionnaire developed was declared very valid and reliable.

### *b. Test of learning outcomes*

The student learning outcomes test instruments are composed consisting of 10 questions for the *pretest* and 10 questions for the *posttest.* Questions are arranged based on learning indicators, namely on electrolyte and non-electrolyte material. With the existence of cognitive processes *self-efficacy* students will appear to apply the various knowledge they have as well as to overcome the existing problems. In working on the problem, it takes strong *self-efficacy* in dealing with problems when working on questions and other demands. With high *self-efficacy*, a person will be able to set themselves to achieve the goals of the challenges that exist, and by using good analytical thinking able to show good performance when conducting tests [11]. S*elf-efficacy* possessed by students is able to have an impact on student achievement in accordance with the objectives to be achieved [12].

## V. CONCLUSION

Based on the results of the research conducted, it can be concluded that the learning device developed using the ADI learning model on electrolyte and non-electrolyte material is declared valid with a modus value of 4, and a reliability of 80% -100% with a reliable category.

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