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Profile of Character-Based Online Response Assessment in the Practical Class of Fundamental Physics Muhammadiyah University of Makassar

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Abstract---*The purpose of this research is to describe the online response assessment in the Fundamental Physics I Practical Class at Muhammadiyah University of Makassar and to find out the validity and reliability of the character-based online response assessment in the practical course of Fundamental Physics I. This research is categorised as research and development with Four-D model which includes four stages, namely defining, designing, developing and disseminating. This research was conducted at Faculty of Teacher Training and Education (FKIP) Muhammadiyah University of Makassar. The research subjects were students of the Physics Education study program who took the Basic Physics Practicum course I of the 30 people and the laboratory assistant of 8 people. The result of this research was a set of assessments in the form of online-based response assessment instruments that has been through (1) expert validation, (2) revisions based on validator's assessment, suggestions and comments, (3) tryout, and (4) revisions based on data analysis of trial results, and suggestions from laboratory assistants. Furthermore, the assessment instrument is declared eligible to be used in limited socialisation, and based on analytical results, the instrument of a character-based online response assessment on the course of Fundamental Physics I is valid, reliable and practical.*

Keywords---*Character-based, Fundamental Physics, Online Response, Response Assessment.*

I. BACKGROUND OF STUDY

In Permendiknas Number 16 Year 2007, it is stated that in the teaching and learning process, assessment is one of important elements that must be mastered by an educator in carrying out his duties. Assessment is an activity conducted to determine the learning outcomes or the student achievement. Learning outcomes can be categorised into three domains, namely cognitive, psychomotor, and affective domains. Character-building is a system of cultivating the character values to learners which involves knowledge, awareness or willingness, and actions to implement those values, either in the interaction to God Almighty, community, environment, and nation in order that the learners become better human beings. Character-building is not limited to the transfer of knowledge about good values but reaches out to ensure that they remained embedded and integrated into mind and action [1]. The trend of change and innovation in the world of education will continue to occur and develop in the 21st century entering today [2]. In addition to rapidly developing technology, it turns out that there are quite important things that are actually increasingly declining among students, this is character. This is one of the considerations of researchers to

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study learning that takes into account the character of students, further how to assess the basic physics practicum. Integrating character education in lectures can be done by incur porating character values in planning (syllabus and lesson plans), teaching materials and media, implementation in class, assessment, monitoring, and evaluation of overall activities [3]

Attempts to build character at early age through education are believed as as appropriate ways. Looking at the golas of the National Education, qualified human beings are not only limited to cognitive level but also affective and psychomotor level. This statement is supported by research on social skills that is focused on looking at the affective domain. The results of his research show that there is a positive value on learning social skills. So, it is not only the cognitive domain that is important, but the affective and psychomotor domains are no less important [4].

In fact, however, the learning activities that have been applied indicated that the character-based assessment application was still very limited. To support the assumption, a preliminary observation was conducted by distributing questionnaires to students. This observation was to find out how far the character pillars are needed in the online response of a practical work is needed. The results shows that it is very important to make a further experiment on this case. From the students' response analysis, it can be known that the importance level of independence was 69, 35%, honestly 77,62%, cooperation 71,33%, responsibility 74,76%, and discipline 49,87%(Nurlina et al., 2018). In line with the data, the fundamental physics I score for students of physics education program at Unismuh Makassar was low. The average score of students in the practical course in 2015 was 68.19 and only 67.71 in 2016. In odd semester 2015, only 24% or 24 out of 117 students could gain A score (80 points above), while in 2016, only 36 out of 94 students (38.3%) (Data from Physics Education Program Muhammadiyah University of Makassar, 2017).

Based on that condition, it is necessary to seek for teaching innovations in the Physics Education Study Program. One of them is in the assessment aspect. The students need an assessment instrument that can measure aspects of student characters and it should summarise all activities before, during, and after the response. Hence, there is a demand to develop a character-based online response assessment in conducting the practical course of Fundamental Physics I. The assessment is expected to assist lecturers in providing students with a structured assessment from the initial activity to the final practice.

II. RESEARCH OBJECTIVES

2.1 Assessment

Assessment is the primary feedback mechanism in the science education system. For example, the assessment data obtained by students is feedback about how well students can achieve the goals expected by the lecturer or their parents, feedback with lecturers that is how well their students learn, the feedback leads to changes in the science education system by stimulating changes in policy, guiding the development of professional lectures, and encouraging students to improve their understanding of science [5]. The assessment or measurement of learning outcomes is often associated with formative evaluation and summative evaluation. Formative evaluation or formative assessment is increasingly becoming a focus in policy documents on educational assessment and in the professional development of teachers [6].

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Quality of carrier system the quality of the assessment system and the quality of both related to each other. A good learning system will produce a good learning quality the quality of learning can be seen from rating result [7].

2.2 The Concept of Character Building

Character education in higher education is a challenging enterprise[8]. In character education in schools and colleges, all components (education stakeholders) should be involved, including the components of the education itself, i.e. curriculum content, learning and assessment processes, handling or management of subjects, school management, implementation of activities, financing, and ethos of environmental work. Character education is considered as behaviour that must be performed in carrying out education[3].

2.3 Practical Course of Fundamental Physics Subject

This course is a supporting course for Fundamental Physics I Subject. The nature of this course is a practical class with a load of 2 credits. The objective of the course is to strengthen the students' Fundamental Physics concept and to improve the skill through the experience of solving a real physical problem. Because, social skills will be defined as socially acceptable behaviours that enable the person to interact with others in ways that elicit positive responses and assist in avoiding negative responses for them[4]. Students will earn about the theory of uncertainty in the measurement and data analysis techniques statistically and graphically and equipped with the basics of the use of measuring tools learned from the Fundamental Physics I subject before conducting various laboratory activities. Because, necessary to form the intellection of comprehending and retaining science education to bean exclusive relationship of life experiences along with organized experiences in an educational environment structured to facilitate learners to construct on their learned conceptual comprehensions insignificant methods to obtain a complete understanding of given scientific concepts[9].

The theories contained in the Fundamental Physics I subject will be proved through practical class activities. In Fundamental Physics I activity, there are several experiments: Motion, Friction, Simple Harmonic, Density, Ohm Law, Hooke Law, Black Principle and law of Refraction (Fundamental Physics Practical Course Module, 2017). In thecase of the Fundamental Physics, assessment of practical class uses character-based assessment instrument.

2.4 Character-Based Assessment in Practical Class of Fundamental Physics I

According to[1 0] , most students still have difficulty in practicum, especially students in the first year, although hundreds of books of physics, maybe even thousands, but they still have difficulty in learning physics.

Depdiknas (2006) stated that the aims of physics learning in the curriculum of education in this country is to prepare the students to possess the following abilities: Shaping a positive attitude towards physics by realizing the regularity and beauty of nature and glorifying the greatness of God Almighty, cultivation a scientific attitude that is honest, objective, open, tenacious, critical and can work with others to develop experience to formulate problems, propose and test hypotheses through experiments, design and assemble practical instruments, collect, process, and interpret data, and communicate results of oral and written experiments.

The character that mentioned above is in line with the character proclaimed by Kemendikbud RI to be developed in the learning process. Among the characters mentioned, there are four characters that become a requirement of

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Physics Education study program students in doing a practical class of Fundamental Physics I which is independent, cooperative, honest, and responsible.

Students who have positive character towards learning and experiment can be predicted to gain success in learning Physics. On the contrary, if students have negative character of learning and experiment, then they will have difficulty in learning. The character can be viewed as a source of motivation, then it is hoped that after attending the practical course, students will have more positive character than before the experiment. Based on the above explanation, it can be concluded that the assessment of character-based experiment is a procedure and format of student learning progress in finding facts that can train the skills, understanding, and attitude to prove something scientifically and manifest through character education to form the habit of continuous practice.

III. METHODOLOGY

This research is categorized as research and development as this focuses on the study of products in the form of character-based physics assessment instrument. The development model used in this research is Four-D model. The design of this model includes four stages, namely define, design, development, and disseminate. This research was conducted at Faculty of Teacher Training and Education (FKIP) Muhammadiyah University of Makassar. The subjects of the research were students of Physics Education study program taking the Fundamental Physics practical course totaling 30 people and Laboratory Assistants of Physics Education Program totaling 8 people. In this study data collection techniques used were: 1) cognitive techniques in which the initial data of the students' learning were collected through online tests; 2) observation where the observation sheet was given to the assistant to measure the characters developed during the practical class; and 3) questionnaire for students and laboratory assistants.

Data analysis techniques used in this studywereas follows: 1) Analysis of expert variables; 2) Analysis of practical data; 3) Analysis of questionnaire data of students response and 4) Analysis of questionnaire data of lecturer response/laboratory assistant.

IV. FINDINGS

The results of validity and reliability analysis by using **Gregory Test** showed that the online Response assessment pertained valid because the value of validation obtained was 0.87. Based on theoretical criteria requirements, it is stated valid if the content validation coefficient is high >0.75 or >75% (Ruslan, 2009). Meanwhile, a Medium value obtained for reliability was 86%, so it can be categorized reliable because the reliability was above 75%.

Assessments on each aspect had met both valid and reliable criteria, but there were some expert suggestions that need to be addressed for the perfection of an online response assessment. The suggestions for each topic are as follows:

1. Time allocation should be reviewed for all practical topics
2. The use of the operational word on some points of question needs to be adjusted to the grid.

In the online response stage, there were eight practical topics developed in the form of essays to dig up the initial

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information or the initial understanding of students before carrying out the work in the laboratory. The response was done online by way of student sends response task via email according to the topic of an experiment to be practised. At this stage, the character being measured was discipline.

The following is the recapitulation of the grades obtained by students for each topic of the experiment.

Table1:Online Response Grades

No	Topic	Achievement %	Rubric
1	Motion and Straight Motion	81.53	Good
2	Friction	70.03	Pretty Good
3	Simple Harmonic Motion	75.64	Pretty Good
4	Law of Refraction	73.24	Pretty Good
5	Hooke's Law	77.78	Pretty Good
6	Density	71.78	Pretty Good
7	Ohm's Law	75.88	Pretty Good
8	Black Principle	73.92	Pretty Good
	Average	74.97	Pretty Good

The result of online response data analysis mentioned above is a recapitulation of the students' score of each practical topic. On the topic of motion and straight motion, there were 1 of27 students who gained only 47.89% (very bad) and one student who gained 63.38 (bad) and they were declared failed for the online response of that topic. Meanwhile, 6 students received a very good grade, 14students with good grade and 5 students with the pretty good grade. On the topic of friction, there were four students who got bad grade and regarded as failed on the online response while the others got very good grade (1 student), good grade (15 students) and pretty good grade (7 students).

In simple harmonic motion' topic, there were four students who got bad grade and declared failed, two students with very good grade, seven students with good grade and 13 students earned pretty good grade. In case of refraction law' topic, there were two students who obtained very bad grade, three students with bad grade, three students with very good grade, and14 students with pretty good grade. On the Hooke's law, there were two students who got bad grade, two students with very good grade, 12 students who gained good grade and nine students with pretty good grade.

Furthermore, the topic of density, one student got very bad grade, four students with bad grade, two students with very good, seven students with good grade and 11 students with pretty good grade. The topic of Ohm's Law was slightly different; five students got bad grade. Four students who got very good grade, seven students with good grade and 11 students with the pretty good grade. Lastly, for Black Principle' topic, there were four students with bad grades, eight students with good grade and 14 students with pretty good grade.

Based on the calculation results, there was no significant increase on the students' grade from the first topic to the eighth topic although several revisions had been made. The grade that was obtained by students in online response was not too much different. If converted to a university grading, then the grade is still relatively low. It means there are still items that cannot be answered by students. This happens because the material of each topic contained in planning is different during the trial even though the steps in the preparation of the assessment

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instrument are essentially the same. The measured character at the time of online response is the character of student discipline in sending response task. The following table presents a recapitulation of measurable online response characters on each practical topic.

Table 2: Recapitulation of Online Response Character

No	Topic	Discipline Character(%)			
		VG	G	PG	B
1	Motion and Straight Motion	40.74	48.15	7.41	3.7
2	Friction	59.26	33.33	0	0
3	Simple Harmonic Motion	3.7	81.48	14.81	0
4	Law of Refraction	37.03	51.85	7.41	3.7
5	Hooke'Law	62.96	29.63	0	0
6	Density	11.11	33.33	51.85	3.7
7	Ohm'Law	74.07	14.81	11.11	0
8	Black Principle	3.7	70.37	18.52	0

The table above shows that the students discipline character in submitting online response tasks for each experiment varies greatly. The very good category (AB) was the highest on the topic of Ohm' law experiments. The good category (B) was highest on the topic of simple harmonic motion experiments. The sufficient category (C) was highest on the topic of the Black principle. Meanwhile, the character of students' discipline in the less category was found on the topic of motion and straight motion, the law of refraction and density as many as 3.70% of the students.

V. DISCUSSION

According to the findings, there was no significant difference in Internet usage between male and female primary school students. The findings showed that male students had higher prevalence of excessive Internet usage than female students as supported by several past studies. This might be due to the low self-controllability of male students in using Internet in which they were more likely to involve in excessive usage of Internet than female students. This study had proven that excessive Internet usage did not necessarily occur in specific gender because there was no significant difference in Internet usage between male and female students. The gender gaps in accessing Internet had been reducing as Internet access at home and school were becoming more common. Both male and female students might show equivalence of Internet usage but the patterns, purposes or motivations of using Internet would be different as supported by Mok and MCMC.

The results suggested that there was a significant difference in level of anxiety symptom between male and female primary school students. The findings showed that female students had higher prevalence of anxiety problem than male students. According to most studies, females were usually found to have higher prevalence of anxiety disorder than males at a younger age. This was probably because females were easier to be influenced than males in terms of emotion due to the gonadal hormones of females in increasing the prevalence and severity of anxiety disorders in females. Females showed fear extinction more easily compared to males. In contrast, male gonadal hormone was reported to have the function of reducing anxiety by reducing the reaction of stress. Furthermore, females were more protected by their parents since young age. Therefore, the parenting style of protecting female children physically had increased their feeling of vulnerability. Male children would be encouraged and praised for

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their assertiveness and independent more than female children and that gave the males stronger sense of security that they had control over the environment.

VI. CONCLUSION

The online response assessment aims to measure students' initial ability before conducting an experiment. Also, this activity is also used to see how far the readiness of students to conduct an experiment. Thus, some indicators should be revealed in this activity. Therefore, the assessment instrument of online response activities should atleast be able to express students' ability regarding:

a. The knowledge of concepts or theories relating to experiments,

b. The knowledge of the practical objectives to be performed,

c. Understanding of the variables that work in the experiment, whether independent variables, bound, and control (if any),

d. The knowledge of practical procedures broadly,

e. The knowledge in using various mathematical equations related to experiments

The measurable character of online response activities is discipline. It can be seen at the time the student sends the task by laboratory assistant's email with the specified time.

Based on the data of the assessment by two validators, who are considered experts in the field of physics and judgment, it is known that the component of assessment instrument which had an average value of the validator for the online response assessment instruments were generally in the valid category. This means that regarding assessment aspects, the developed assessment' instrument met the criteria of validity.

An instrument, can be categorized reliable when the percentage of the agreement obtained is greater than 0.75 or above 75%. From the data of reliability analysis, the online response activities for character-based assessment included into the reliable category, because the average of reliable level obtained from each aspect of the online response instrument was 86%. It shows that the instrument of character-based online response assessment is feasible to use in the Fundamental Physics I practical course.

A. Conclusion

The form or format of character-based practical work assessment instrument using a modified 4-D assessment instrument development model resulted on an online-based response assessment instrument that had been through (1) expert validation,(2) revisions based on appraisal, and validator comments, (3)tryout, and(4) revisions based on tryout data analysis, and suggestions from laboratory assistants. Furthermore, the rating instrument is declared eligible to use in limited socialization. Based on the results of the analysis, the instrument of the character- based online response assessment for the Fundamental Physics I course was proven valid, reliable and practical.

B. Suggestion

Based on the results of the study, it can be suggested that:

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1. Lecturers and lecturers assistant of the practical class can use the character-based online response assessment instruments that have been produced in this research.
2. The institution of the department should be able to seek the procurement of online response based on character as an integral part of the manual book.
3. Since the character-based online response assessment instrument in the Fundamental Physics I course was newly produced, then the researchers in the field of education are expected to conduct research on the development of instruments in the course of Fundamental Physics II Practical Course.

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