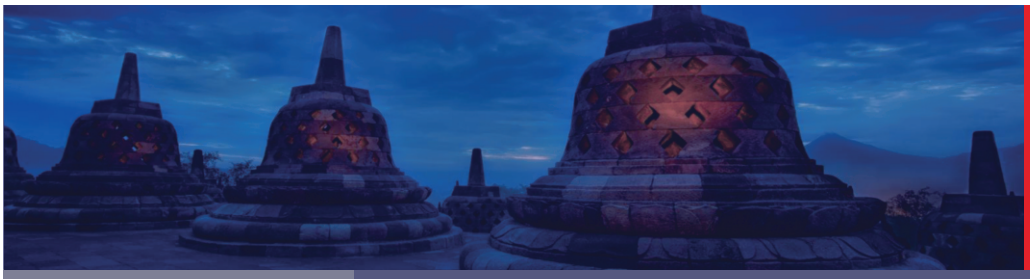

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Foreword of the Chairman

Assalamualaikum wr. wb.

Good morning ladies and gentlemen.

Praise be to Allah who has given abundant blessings so that we can hold this international conference.

This conference is aimed at improving the quality of assessment implemented in schools and other institutions. The quality of assessment determines students' ways of learning, so that it is hoped that the quality of education improves. Besides, this conference is a means of information exchanges in the forms of seminars dealing with results of research in educational assessment and evaluation. The expectation is that there is always improvement in educational assessment and evaluation methods, including in it is the instrument – both cognitive and noncognitive instruments.

The participants of this conference are the lecturers and teachers who teach educational assessment and evaluation, practitioners of assessment and evaluation, and researchers of assessment and evaluation. This conference can be held in cooperation with the Graduate School, Yogyakarta State University, Association of Educational Evaluation of Indonesia (HEPI), and Centre for Educational Research, Ministry of Education and Culture of Indonesia, supported by the Australian Council for Educational Research (ACER), Intel, Intan Pariwara Publisher, and many other institutions. For this reason, on behalf of the Organizing Committee, I would like to thank the Rector of Yogyakarta State University, Prof. Dr. Rochmat Wahab, M.Pd., M.A., and the Director of Graduate School, Yogyakarta State University, Prof. Dr. Zuhdan Kun Prasetyo, M.Ed., and all other institutions for their assistance and contribution that have made this conference possible. I would like to thank HEPI's Local Coordination Unit and all sponsors for supporting this conference and also all the audience for participating in this conference.

To the committee members, both in Jakarta and Yogyakarta, I would like to thank them for the hard work they have performed and for the togetherness so that this conference can be held.

Last but not least, we apologize for all the incoveniences you might encounter during this conference. Please enjoy the conference.

Wassalamu'alaikum wr. wb.

Prof. Djemari Mardapi, Ph.D.

Foreword of the Chairman of Himpunan Evaluasi Pendidikan Indonesia (HEPI)

Assalamu'alaikum Wr. Wb.

Indonesian Association for Educational Evaluation (HEPI) is a professional organization in education holding in the high esteem the principles of professionalism and knowledge development in the field of educational and psychological measurement, assessment, and evaluation. HEPI was established in November 19, 2000 in Yogyakarta, with a vision to become a professional organization that excels in the field of evaluation and measurement in education and psychology in Indonesia. Its mission is to develop up-to-date methodologies of evaluation, assessment, measurement, and data analysis in education and psychology, as well as studies of policies and technical implementation of the field for improving Indonesian education quality.

As a professional organization, HEPI brings together experts, practitioners and interested persons in the field of evaluation, assessment, and measurement of education, psychology and other social sciences. HEPI is open to anyone who has the interest the field with no restriction in terms of educational background and working experiences. Hopefully, through HEPI, members of the association can sustainably develop themselves as professionals. The existence of HEPI is also expected to contribute to the improvement of the quality of national education through research, consultancy, seminar, conference, publication, and training for members of the organization and for public audiences.

HEPI organizes annual workshop and conference in cooperation with the Regional Chapter of HEPI and universities. In 2016, for the first time HEPI organized **International Conference on Educational Research and Evaluation: Assessment for Improving Student's Performance** in May 29-30 2016 in Yogyakarta. This conference is jointly organized by HEPI and Yogyakarta State University and supported by the Center for Educational Assessment the Ministry of Education and Culture, Australian Council for Educational Research (ACER), INTEL Indonesia, and Intan Pariwara Publisher.

It is important to note that the choice of the HEPI 2016 conference theme is driven by the fact that the quality of our national education is still under expectation as shown by the results from School National Exam and international surveys conducted by some international agencies. HEPI believes that a number of factors contribute to the low quality of national education, including low teacher's knowledge and skills in classroom and school assessment. Therefore, improving the competence of teachers in classroom and school assessment is urgently required. In this context HEPI as a professional organization and individual members of the organization have to play an active role in improving teachers' competence in quality learning assessment.

In line with 2016 conference theme, HEPI invited two respected guest speakers , namely, Professor Geofferey Masters, Ph.D., Director of the Australian Council for Educational Research (ACER), who presented a paper on Assessment to Improve Student Competency and Professor Frederick Leung, Ph.D., from the University of Hong Kong, who delivered a paper on the International Assessment for Improving Classroom Assessment.

As a tradition, in 2016 conference HEPI organized two pre-conference workshops. The first workshop is on the conceptual introduction of Rasch model by Jahja Umar, Ph.D., senior lecturer at the Faculty of Psychology, State Islamic University Jakarta and the second workshop was delivered by Heru Widiatmo, Ph.D., researcher at American College Testing (ACT) Iowa, United States on Measuring Higher Order Thinking Skills (HOTS).

On behalf of HEPI, I would like to express my heartfelt gratitude to Rector of the Yogyakarta State University, invited speakers, resource persons, HEPI regional chapters, sponsors, speakers, participants, invited guests, and organizing committee who have worked hard in making this international coneference a success. Thank you very much for your participation and support and we are looking forward to seeing you in the next conference.

Last but not least, we hope that all of us get much benefit from this conference for enhancing Indonesian quality education through quality assessment.

Wassalamualaikum wr. wb.

Chairman,
BAHRUL HAYAT, Ph.D.

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Developing an Authentic Assessment Science Process Skills, Creative Thinking Skills and Manipulative Skills

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Abstract - This research is aimed to know the procedure of instrument development of authentic assessment and to know the worthiness of authentic assessment instrument of development result is seen from the content validity by the validator. This research is a development research by model of non-test instrument. Development model of non-test instrument used has steps as follows: (1) determining of the instrument specification, (2) writing the instrument, (3) determining the instrument scale, (4) determining the scoring system, and (5) beating out the instrument. The writer used quantitative and qualitative technique to analyze the data obtained. The qualitative approach was used to analyze the input from experts and teachers, and the quantitative approach was used to analyze the results of experts' validation using Aiken's validity. Conclusion of this study are as follows: (1) The procedure of the development of authentic assessment follows the stages of research and development. The stages include pre-survey research, problem analysis, analysis of curriculum, research studies, experts' consultation, and drafting an instrument. The stages of development include experts' validation. (2) The quality of the develop products the developed authentic assessment has a valid criterion as an instrument, in terms of aspects of the construct, substance, and language. All these aspects meet a very good criterion and can be used with revisions.

Keywords: *authentic assessment, science process skills, creative thinking skills, manipulative skills*

I. INTRODUCTION

Natural Sciences is the mastery of facts, concepts, principles, and a process of discovery. The process of discovery in learning the natural sciences in accordance with the Nature of Science (NOS) means that science is a way of knowing. Lederman, et al. (1992: 231), stating that "that science is a way of knowing and there are values and beliefs inherent to the development of scientific knowledge". Based on these statements, NOS is defined as the concept of complex natural sciences involves philosophy, sociology, and historical knowledge.

Natural Sciences are the mastery of facts, concepts, principles, and a process of discovery. Learning the natural sciences is based on the contents of the standard form students who have a body of knowledge; standard process will shape the students with scientific skills, thinking skills and strategy of thinking; the standard scientific inquiry will form students capable of critical and creative thinking; as well as a standard assessment evaluates students humanely.

The learning process is directed at the development of the third realm of knowledge, attitudes, and skills should be implemented as a whole or holistically, meaning the development of one domain cannot be separated from other domains. The question that still occurs in the process of learning one's current assessment of the natural sciences still dominated the test form, which can only measure the realm of knowledge. The fact that learning the natural sciences is not always judged by using an assessment form test to measure student learning objectives. Assessment can be done by collecting information about students to give more accurate information about the skills and attitudes of students. The assessment directive can also be done to measure the learning process of students (Phopam 2008:6). That kind of assessment called the authentic assessment.

Authentic assessment is an assessment of immediate or direct size so that the assessment will be more obvious when votes directly to do with the granting of a task or project (Mueller 2006:1). Authentic assessment can be used to measure performance, achievement, motivation, and attitude of students in relevant activities in learning. The results of the study are eligible to be used as a basis in determining the kind of authentic assessment is (Stiggins, 1994:67): students ' ability against (1) the substance of knowledge; (2) knowledge in doing the reasoning and solving problems; (3) skills in the mastery of knowledge; (4) the making of a product; and (5) achievement attitude in applying knowledge. The basic types of assessment methods offered by Stiggins (1994:83) include: (a) selected response assessment; (b) assessment essay; (c) performance assessment; and (d) personal communication assessment.

Portfolio, containers of evidence are becoming valuable tools for teacher and student assessment for reflection and metacognition, and for building collegial relationships (Collins, 1992: 451). Science process skills are all necessary to acquire, develop, and apply the concepts, laws, and theories of natural science, both in the form of mental skills, physical skills as well as social skills. The project assessment is an activity of the task of judging students from the stages of planning, implementation, and reporting that can develop creative thinking skills. According to Wang (2011: 1) defines creative thinking as the ability to sense problems, make guesses, generate new ideas, and communication results. Perfomance assessment requires students demonstrated their skills when performing the experiments so that can develop the manipulative skills. Manipulative skills i.e. the skill of preparing teaching materials and tools, take precautions and treatment (Das, 2007).

The material has different characteristics of natural sciences so not all matter natural sciences can be taught with the same method. Thus, the assessment instrument used of course will also be different, because if the instruments used are the same for all natural sciences material then there will be some aspects which cannot be measured. The selection of basic competence (KD) should be conducted to determine the appropriate type of assessment. In the development of this research material of the selected class VII natural sciences KD 2.3 can be used kind of an assessment portfolio. The assessment of the project can be used on a KD 3.8 with learning that directs students to develop creative thinking skills through assessment project. In addition, KD 3.6 performance assessment can be used to measure manipulative skills students in doing the experiment.

Referring to the problems outlined, then researchers trying to develop authentic assessment instrument can measure a few skills students i.e. science process skills, creative thinking skills and manipulative skills on some of the KD in the natural sciences learning in junior high school.

II. RESEARCH METHOD

A. Type of Research

This research included in the classification of research development. The products developed in this research in the form of instrument performance assessment, portfolio and project. Research development uses a five-step development instrument non test. Procedure of development following the stages of the development of non instrument test. Stages of the development of authentic assessments include (1) determining of the instrument specification, conduct an analysis of the specification of the instrument being developed include the analysis of students, needs analysis, analysis of curriculum, selecting the shape and format of the instrument, determine the indicators, making the latticework of instruments; (2) writing the instrument, writing of authentic assessment was developed based on the lattice that have been created and then draw up the details of the statement; (3) determining the instrument scale, the scale of the instrument that was used in the development of this authentic assessment instrument in the form of scales with a scale of 1 to 4; (4) determining the scoring system, a system of scoring in this authentic assessment instrument refers to the scale of use that is the scale of 1 to 4 to the emergence of student activities provided by the observer; and (5) beating out the instrument, perform the validation material, expert assessment and teacher.

B. Population and Sample

Population development of this authentic assessment is grade VII of the entire SMP/MTs in DIY. As for the samples used to involve grade VII of 3 SMP/MTs that is in DIY i.e., SMPN 2 Playen, SMPN 1 Piyungan and SMPN 2 Girisubo

C. Research Instrument

Data collection instruments used in this study consist of guidelines for interviewing sheet, observation sheet, and sheet now.

D. Data Analysis Techniques

Analysis of the validation of the content of the descriptive and quantitative basis. Quantitative analysis using V'aiken analysis (Azwar,2014: 113) by the following formula:

$$V = \frac{\Sigma s}{n\ c - 1}$$

Description:
s = r – lo
n = number of panels of assessors
lo = lowest validity assessment
c = highest validity assessment
r = the numbers given by an assessor

III. RESULT AND DISCUSSION

A. Procedure the development of Authentic Assessments

The products developed are authentic assessment instrument which covers the instrument performance, portfolio, and projects. The instrument used to measure the performance of science process skills learners in the material system for excretion. The portfolio of instruments used to measure critical thinking skills learners on the material pressure of the liquid. Project assessment instrument used to measure problem solving skills learners on optical materials on the human eye. The assessment instrument developed is in the form of sheets of observations accompanied by grating and rubric assessments. Authentic assessment instruments development procedure is as follows.

1. Preliminary Studies

Some of the things done on the preliminary study include: analysis of the problem, an analysis of the curriculum, and the analysis of the learners. Problem analysis was done based on interviews with a number of teachers of science in SMP N 2 Playen, SMP N 2 Girisubo, and SMP N 1 Piyungan. The issues that emerged from the interviews that is not yet the availability of valid assessment instruments to measure skills learners, so it is important to develop these instruments. Curriculum analysis conducted to determine the competence of the basic curriculum of 2013 which corresponds to the selected material. Learner analysis aims to find out the characteristics of the students i.e. students of class VII junior high school.

Table 1. Curriculum Analysis Result

Types of Skills	Core Competence	Basic Competencies
Science Process Skills	3. Memahami pengetahuan (faktual, konseptual, dan prosedural) berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya terkait fenomena dan kejadian tampak mata. 4. Mengolah, menyaji dan menalar dalam ranah konkret (menggunakan, mengurai, merangkai, memodifikasi dan membuat) dan ranah abstrak (menulis, membaca, mengarang) sesuai dengan yang dipelajari di sekolah dan sumber lain yang sama dalam sudut pandang/teori.	3.9 Memahami konsep suhu, pemuaian, kalor, perpindahan kalor, dan penerapannya dalam mekanisme menjaga kestabilan suhu tubuh pada manusia dan hewan dalam kehidupan sehari-hari. 4.10. Melakukan percobaan untuk menyelidiki pengaruh kalor terhadap perubahan suhu dan perubahan wujud zat. 4.11. Melakukan penyelidikan terhadap karakteristik perambatan kalor secara konduksi, konveksi, dan radiasi.
Creative Thingking Skills	3. Memahami pengetahuan (faktual, konseptual, dan prosedural) berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya terkait fenomena dan kejadian tampak mata. 4. Mengolah, menyaji, dan menalar dalam	3.8 Mendeskripsikan interaksi antar makhlukhidup dan lingkungannya 4.12 Menyajikan hasil observasi terhadap ineraksi mahluk hidup dengan lingkungan sekitarnya

Types of Skills	Core Competence	Basic Competencies
	ranah konkret (menggunakan, mengurai, merangkai, memodifikasi, dan membuat) dan ranah abstrak (menulis, membaca, menghitung, menggambar, dan mengarang) sesuai dengan yang dipelajari di sekolah dan sumber lain yang sama dalam sudut pandang/teori	
Manipulatives Skills	3. Memahami pengetahuan (faktual, konseptual, dan prosedural) berdasarkan rasa ingin tahunya tentang ilmu pengetahuan, teknologi, seni, budaya terkait fenomena dan kejadian tampak mata 4. Mencoba, mengolah,dan menyaji dalam ranah konkret (menggunakan, mengurai, merangkai, memodifikasi,dan membuat) dan ranah abstrak (menulis, membaca, menghitung, menggambar, dan mengarang) sesuai dengan yang dipelajari disekolah dan sumber lain yang sama dalam sudut pandang/teori.	3.6 Mengenal konsep energi, berbagai sumber energi, energi dari makanan, transformasi energi, respirasi, sistem pencernaan makanan, dan fotosintesis 4.8 Melakukan pengamatan atau percobaan sederhana untuk menyelidiki proses fotosintesis pada tumbuhan hijau. 4.9 Melakukan percobaan untuk menyelidiki respirasi pada hewan.

2. Determine the instrument's specifications

Science process skills indicators used in the assessment instrument are the prediction, measurement, experimentation, concluding, and communication. Indicators of creative thinking skills used in the instrument are analyzing, losing an idea, synthesing, evaluating, creating, and visualizing. Indicators of manipulative skills used in the instrument teaching tool is to use correctly, clean the tool properly and store teaching tool teaching correctly.

3. Writing instruments

Writing instruments are carried out taking into account the aspect of material, construction, and language. The assessment instruments developed contain: title, usage instructions, scoring guidelines, e.g. scoring, and the observation sheet.

4. Determine the scale of the instrument and scoring system

The instrument was developed using a scale of 1-4. Scoring is determined in accordance with the scale used. The highest score of each indicator is 4 and the lowest is 1.

5. Reviewing instruments

Authentic assessment instruments developed were investigated by seven rater i.e. two expert lecturers and of five practitioners (teachers).

B. Results of Authentic Assessment Validation

Validation of product based on the assessment of the substance, construction, and language. Subsequent validation results are analyzed with the V'aiken approach that aims to quantify the magnitude of the content validity coefficient (V). The magnitude of the numbers V obtained confirmed with numbers based on table V'aiken. The minimum figure should be reached based on table V Aiken (1985: 134) category 4 range and number of panel 7 are 0,86. The magnitude of V is obtained on the validation of the portfolio assessment sheet to measure process skills in science is about 0,86-1. The magnitude of V is obtained on the project assessment sheet validation to measure creative thinking skills are about 0,90-1. The magnitude of V is obtained in the performance assessment sheet to measure manipulative skills is of 0,89-1.

Based on the results of the analysis of the magnitude of the content validity of the assessment instrument's third showed that magnitude V instruments already exceed the minimum coefficient of V'aiken. Thus, the assessment instruments developed meets the validity of the content. In addition to knowing the validity of the instrument developed, validation is aiming to obtain advice which can be used as material for the repair of the instrument before conducted trials at the school.

C. Revision of the product

Assessment instruments are revised based on some suggestions by experts and practitioners. During limited trials and operational field test or measurement is in not discovering things that demanded he do revision, so that the revision could be made only when the process of examination of the instrument. In more detail, some revisions to the product can be outlined as follows.

1. Revisions to the usage instructions of the instrument so that more communicative and clear.
2. Revision of the observation sheet so that each observation sheets are given examples of scoring.
3. Revision of the rubrics so that homogeneous and focus on the systematic sequence.
4. Details of revision of the statement so that the statements communicated and homogeneous with other grains in one indicator.
5. Details of revision of the statement on the indicators devised the hypothesis so that made that clear parameters for measuring the skills of learners and presented grain statement about the interconnectedness between variables.
6. The revised grain statement on indicators composing the purpose of probation order made clear parameters for measuring the skills of learners and presented a statement stating the presence of grains of the verb.
7. Revision details of a statement on the observation sheet so that the language clarified.
8. Revised assertions so that the grains statement made clear parameters for measuring the skills of learners.
9. Revised assertions so that the grains statement clarified.
10. Revision of the format of the observation sheet so that there are six columns on a sheet for granting score the learners are assessed.
11. Clarify how to use observational science process skills sheet that is by adding the phrase "give a sign check (√) in the number of students in student performance met observation of grain" on a

IV. CONCLUSION AND SUGGESTION

Conclusion of this study are as follows: (1) The procedure of the authentic assessment development follows the stages of research and development. The stages include pre-survey research, problem analysis, analysis of curriculum, research studies, experts' consultation, and drafting an instrument. The stages of development include experts' validation. (2) The quality of the developed products the developed authentic assessment has a valid criterion as an instrument, in terms of aspects of the construct, substance, and language. All these aspects meet a very good criterion and can be used with revisions.

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