

## **The Application of Authentic Assessment As A Testing Technique In Seafaring Vocational Education and Training**

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**Abstract:** It is apparent that testing technique in seafaring vocational education and training is not an activity to test a certain concept but how to interpret and apply the concept into a form of competence which is useful in seafaring activities. A proper and dynamic testing technique has a significant effect on the accuracy of test results to determine competency level. A testing technique had been developed, that is authentic assessment. The research design used Research and Development by adapting development approach. This research is in line with its objectives, to develop authentic assessment as an appropriate technique for competence testing specifically in seafaring vocational. The analysis of cross tabulation show a strong correlation between students' scores and the application of developed authentic assessment. It is proven in assisting students to work out their maximum abilities. They show positive responses in average towards the use of the developed authentic assessment.

**Keywords:** Authentic assessment; Seafaring vocational; Competence.

### **Introduction**

Investigating testing technique in learning activities is a continuing concern within last decades. The development is based on the development of science and technology that has brought changes in almost all disciplines including seafaring vocational education and training.

It is widely believed that testing technique in seafaring vocational education and training is not merely an activity to test a particular concept but how to interpret and apply the concept in the form of competence so that it can be used to act as a real seafaring officer in actual seafaring activities. That is why, a proper, creative and dynamic testing technique has a significant effect on the accuracy of further test results. As an emphasis, an appropriate testing must be effective, interactive, creative, educational and enjoyable. One step to make it happen, a proper testing technique is surely needed.

A proper testing technique will increase the effectiveness of test implementation so that the measurement of competency levels as one purpose of test can be achieved optimally. It is also said that a proper one will clearly state its objectives, how and where it is carried out.

As regards, one of the most well-known testing techniques in education is authentic assessment. This technique can be applied in vocational education and training testing. Authentic assessment is more focused on assessment during the learning process. It is more effective and able to provide useful information for teachers to improve teaching and learning quality.

Authentic assessment is a considerable and effective tool to improve learning process if the results are used as feedback for teachers and students to increase their competence. Through the technique, teachers in seafaring vocational schools are recommended to apply a learning concept which helps them and students to be able to connect the material taught with factual conditions of seafaring activities.

Equally important, authentic assessment in this context relates to evaluating students' performance in carrying out certain tasks in real situations through simulations or teaching aids in learning activities. Muchtar (2010) identifies that assessment is an integral part of the learning process. Assessment is often considered one of three main pillars that determines learning activities. The three pillars are planning, implementation and evaluation. If those are synergistic and sustainable, then it will determine the quality of learning. Therefore, an assessment must be designed and implemented according to learning planning and implementation. Its system must be developed in line with the development of learning models and strategies.

On the other hand, the standard of education, training and testing of seafaring education in Indonesia has been implemented, but then the competency level testing as described in the IMO (International Seafaring Organization), Model Course 7.01: Officer in charge of a navigational watch and Model Course 7.02: Officer in charge of an engineering watch still tends to the characteristics of conventional testing methods. Such testing does not motivate students to think creatively, because the questions raised are only emphasized on cognitive aspect which is generally in the form of written test instrument.

Referring to the observation, commonly testing on seafaring education is done by assessing learning outcomes, whereas an assessment of the process is rarely applied. The technique used is also less varied because it tends to be oriented to written test form, while the use of authentic assessments such as performance assessment, portfolio, project and self-assessment as well as other non-tests are not fully used. The techniques listed in current learning plan mostly do not use rubrics or marking criteria assessment and have no clear description of the implementation.

With regard to it, one testing technique that can be used in seafaring vocational education and training is authentic assessment. It is a process of gathering information conducted by teachers or instructors regarding the development and achievement of students' learning through various techniques which are able to reveal, prove or show precisely that learning objectives and competencies are surely mastered and achieved. On the whole, an innovation is needed to determine the most appropriate testing technique in the implementation of competency tests for students of seafaring vocational schools.

### **Troubleshooting**

As was pointed out in the introduction to this article regarding testing technique for seafaring vocational education and training, how appropriate is the application of authentic assessment in competence testing for seafaring vocational students?

### **Authentic assessment**

In terms of authentic assessment, it involves students' competencies in the form of knowledge, comprehension and useful skills as the measurements. Students are given the opportunity to demonstrate their competence. The assessment is a form of task that requires students to show some meaningful real-world performance which is the application of the essence of knowledge, comprehension and skills (Mueller, 2016). The term 'meaningful' is referred to as an object related to or in accordance with the real needs of life, which in this context is the activity of seafaring shipping from one port to another.

As noted by Hart (1994), authentic assessment is one that involves students in authentic

assignments that are useful, important, and meaningful. It encourages them to apply scientific knowledge in real context instead of making up or pretend to do. Several techniques of the assessment techniques include: 1) performance assessment; (2) portfolios; and (3) self-assessment (O'Malley & Pierce, 1996).

What is more, authentic assessment has been an important component of education reform since the 1990s. Wiggins (1993) asserted that traditional assessment methods to measure achievement, such as multiple choice, true or false, matchmaking tests, etc. have failed to reveal the real performance of students. Such tests have failed to obtain a complete picture of students' attitudes, skills and knowledge linked to their real life outside of school or in a society.

Preliminary work on authentic assessment was undertaken by Hart (1994) in which he stated that it is an assessment made through students' presentation or performance in the form of work assignments or various specific activities with straight educational meaning. This is in line with a statement by Marzano & Kendall (2007) that authentic assessment contains three elements of innovation in the field of assessment. First, it does not measure the achievement of traditional learning goals, but rather emphasizes the real abilities of the learning subject. Second, it is comprehensive, develops all the subjects' learning abilities through learning activities according to constructivism. Third, it does not use a traditional test system but a variety of ways.

Within authentic assessment, the process of it is an inseparable part of the learning process where it must reflect the real world problems and not only academic ones. Again, it must use a variety of measures, methods and criteria that are appropriate to the characteristics and essentials of the learning experience. Assessment must be holistic which covers all aspects of the learning objectives (cognitive, affective and psychomotor).

Similarly, authentic assessment changes the role of students in the process of assessment, from passivity to active participants. They will actively collaborate to each other and are able to participate in evaluating their progress. Authentic assessments can enable learning in many ways whereas standardized tests are exclusive and narrow.

It is almost certain that characteristics of authentic assessments are carried out during and after the learning process, where it can be used for formative and summative needs. What is measured is skill and performance, not only by memorizing facts. It is carried out continuously, integrated and can be used as feedback.

Regarding it, authentic assessment prioritizes both process and outcome assessments. In such way, the entire performance of students in a series of learning activities can be assessed objectively and not solely based on final result (product). The performance showed by students during the learning activities is varied, which makes the assessment must be conducted during and in accordance with the learning process activities.

With respect to it, techniques in authentic assessment also vary. It may use non-test and test models at the same time, and can be done at any time in consort with learning activities, but all of them must remain well-planned. This can be seen by giving daily quizzes, class exercises, assignments, interviews, observations, questionnaires, field/daily notes, portfolios, and so forth. Assessments are carried out through a variety of ways or models, involving various domains, and include these processes and products which are then referred to as authentic assessments. Such learning process will produce students' objective, real, concrete, accurate, meaningful and true performance.

As discussed above, authentic assessment emphasizes the ability of students to demonstrate their knowledge in a real and meaningful way. Assessment activities are not only about checking how deep students' understanding but also their real performance according to what they have mastered.

A longitudinal study by Marzano (in Achmad & Susilo, 2013) reports that authentic

assessments include an emphasis on real abilities of students, developing all abilities of students through constructivist's learning activities and does not use a test system. This type of assessment is a solution due to its emphasis on students' learning process.

With reference to assessment type in authentic assessments, it emphasizes the performance measurement by doing things as the application of knowledge that has been mastered theoretically. It requires students to demonstrate their knowledge, skills and response strategies. They are not only asked to respond to answers as in traditional tests, but are required to be able to state answers or demonstrate the competence behind their theoretical knowledge. In assessing the ability through port navigation of leaving the port for example, they must be able to analyze the situation at hand, perform according to the procedures and required standards.

A good authentic assessment requires a direct link to the learning process activities. Likewise, the learning process will run effectively if it is supported by an effective assessment by the instructor or teacher. Thus, it can be said that it is actually a comprehensive assessment conducted with regard to all learning activities that include the learning process and products so that all students' efforts are highly appreciated. Connectivity among lesson plans, learning activities, authentic assessments and feedback from the series of processes can be seen in the following figure:

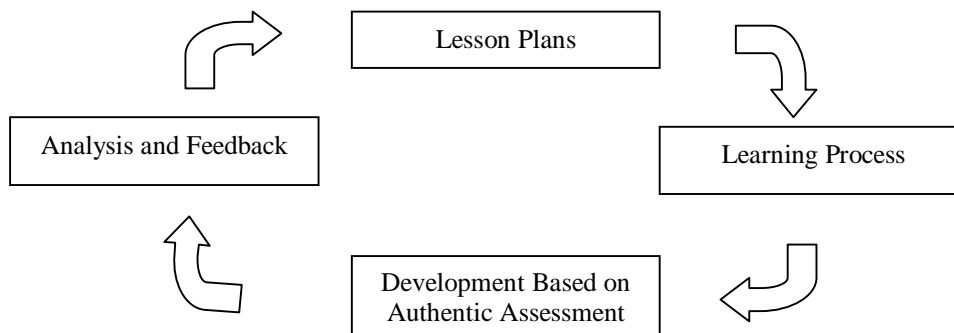


Figure 1. Learning Development Based on Authentic Assessment

It has commonly been assumed that the assessment of traditional learning outcomes tends to reduce the meaning of a regulated curriculum, because it does not discuss the true essentials of students' learning processes and outcomes. If traditional assessments tend to reduce the role meaning of a curriculum, unable to describe basic competencies, and have low predictive power on the degrees of attitude, skills and ability to think articulated in many subjects or disciplines; at the same time the authentic assessments will gain a strong position. Any approach used in the assessments still does not escape from weaknesses and strengths. However, it is time for professional teachers in all education units to guide the movement and integrate the potential of students, schools, and environment through an assessment of authentic learning processes and outcomes.

### Research Method

The type of research used is R & D (Research and Development) through development approach by Gall & Borg (2003). It is in line with the main objective, which is to develop authentic assessment and to broaden the application for competency testing specifically in seafaring vocational education and training.

Research and development is a research process used to develop and validate educational products (Gall & Borg, 2003). The term 'products' is not only in the form of material objectives,

such as textbooks, educational movies, and other related kinds, but also concerns to several matters that aim at establishing processes and procedures: learning methods, methods of organizing learning, or testing methods.

The purpose of developmental research is not only to develop products, but rather to discover new insights through basic research and to answer specific questions regarding practical problems through applied research. By doing so, this research chose to adopt the R & D development method by Borg & Gall on the consideration that this method is simple and practical for educational context.

In relation to it, Gall & Borg (2003) explain the procedures of implementing developmental research by following its cycle: (1) research and information collecting; (2) planning; (3) develop preliminary form of product; (4) preliminary field testing; (5) main product revision; (6) main field testing; (7) operational product revision; (8) operational field testing; (9) final product revision; and (10) dissemination and distribution.

The development of competency level testing techniques becomes a developed authentic assessment referring to the educational development method. This is selected based on simple and practical considerations to be implemented in the context of vocational education and training. Again, it is expected that this research can be carried out practically and effectively. That is why the ten steps by Gall & Borg (2003) are further modified into four stages as follows:

1. Preliminary Study;
2. Development of testing techniques;
3. Realization of testing techniques; and
4. Evaluation and revision of testing techniques;

Having discussed the steps, the following addresses process of testing. We must assure that validity test is done by an expert in the first step. This development is complemented by several research tools and instruments. After fulfilling the validity criteria, testing will be carried out which is purposed to explain whether the testing technique that has been developed can be classified as practical and effective.

## **Discussion**

### **Testing**

Several activities at the testing stage are carried out to assess the level of practicality and effectiveness of the developed technique. In addition, this testing activity is carried out to find out whether it is practical and effective or not. Data on the level of practicality and effectiveness are obtained through an assessment using validated instruments of practicality and effectiveness. If needed, the devices and instruments can be refined to eventually establish a practical and effective testing technique.

### **Data Analysis Techniques**

In terms of data obtained through testing activities using the developed technique, they are then analyzed qualitatively and quantitatively. The analysis is carried out to answer the problem statement: whether the testing technique in the form of a developed authentic assessment can be considered as practical and effective or not.

Likewise, practical and effective data of developed testing technique can be seen from the following three aspects: (1) average normalized gain; (2) minimum learning mastery standard (known as *Kriteria Ketuntasan Minimal* or *KKM* in its Indonesian term); and (3) classical learning mastery.

### Average Normalized Gain

In the case of analysis of the normalized gain of learning outcomes before and after applying the developed authentic assessment, it is processed to determine students' progress in their learning outcomes. The measurement of improvement before and after learning is discovered using the Wilcoxon signed-rank test. Ghozali (2002) argues it is a non-parametric test to measure the significance of the difference between two pairs of ordinal and interval scale data but with an abnormal distribution. It is an alternative test of paired t test if it does not meet the assumption of normality. Also, it is used to measure the significance of differences in students' test scores before and after treatment. Through this test, it is revealed that there are two variables, independent variable which comprises learning of two groups (before and after learning treatment), and one dependent variable which comprises the scores of learning outcomes. Both groups of before and after treatment are paired up because the samples or subjects used are the same individuals or are in the same observations. Each sample of students has two attributes, that is test scores before and after learning using the developed authentic assessment.

Equally important, data on average values are analyzed using descriptive statistics. Data on students' test results are analyzed quantitatively using descriptive statistics with the aim of describing the characteristics of students' learning outcomes. The distribution of scores is presented in the form of a frequency distribution after converted to a scale of five with the following learning outcomes categories.

Table 1. Categories of Students' Learning Outcomes

Score Interval	Category
80 – 100	A = Excellent
70 – 79	B = Good
60 – 69	C = Fair
50 – 59	D = Inadequate
0 – 59	E = Poor

### Minimum And Classical Learning Mastery Standard

Minimum learning mastery standard is not less than 70. It is a minimum standard set. Referring to this criterion, students who obtains score as  $N \geq 70$  are categorized to have achieved mastery of learning outcomes. On the other hand, classical learning mastery standard is determined by the number of students who obtain a minimum score of 70. Students' learning outcomes are regarded as effective if classical learning mastery standard is achieved at least 85% of students with the minimum score of 70.

### Students' Responses Analysis

Students responses are obtained from the results of the distributed questionnaires after learning and testing using the developed authentic assessment. The classification of the category aspects of students' responses is based on the following criteria:



Table 2. Categories of Students' Responses

Mean Score	Category
5,0	Strongly Positive
4,0	Positive
3,0	Less Positive
2,0	Less Negative
1,0	Negative

As revealed by the students' responses towards learning using the developed authentic assessment, it is then considered effective if there are more than 70% of students giving responses with a minimum category of less positive. If students' responses with less negative are greater than 30%, it is necessary to revise the test instrument. Subsequently, it is then re-analyzed until reaching more than 70% of students who give responses with a minimal category of less positive.

## Results

Taken together, the results of the analysis with SPSS show that the mean score for negative rank is 0, while the positive rank shows mean score as 15 with the total ranking of 435. The calculated Z value of -5,166 with a probability level of 0,000. Moreover, probability value of 0,000 is far below  $\alpha = 0.01$  which can be concluded that there are significant differences in students' learning outcomes before and after testing using the developed authentic assessment.

From the analysis results, it also shows an increase in students' learning outcomes after the application of the developed authentic assessment. This can be seen from the score difference of paired t test method which illustrates the difference before and after treatment using the assessment. There are 30 students observed in total where 29 students had an increase, one student with constant score, and no students with a decrease. In addition, the number of students who experienced increased learning outcomes through the developed authentic assessment is 96.7% and only 3.3% of students had steady results.

The analysis results using cross tabulation show the Pearson's chi-square significance of 0,000, which indicates that there is a strong correlation between students' scores and the application of the developed authentic assessment.

## Students' Responses Questionnaire

This questionnaire is conducted to determine students' responses to the application of testing using the developed authentic assessment. It is distributed to 30 students who took the test. The statistical analysis results were then performed on the questionnaire results. Here are the following results of the statistical analysis:

1. Referring to the results of the statistical analysis, it is revealed that 28 students or 93.3% of respondents stated strongly agree and only 2 or 6.7% agreed with the statement that the developed authentic assessment has successfully assisted students in applying their competence;
2. Referring to the results of the statistical analysis, it is revealed that 28 students or 93.3% of respondents stated strongly agree and only 2 or 6.7% agreed with the statement that the developed authentic assessment truly assessed the ability of each student;
3. Referring to the results of the statistical analysis, it is revealed that 27 students or 90% of respondents stated strongly agree and only 3 or 10% agreed with the statement that the developed authentic assessment made the learning and testing process more interesting and enjoyable;
4. Referring to the results of the statistical analysis, it is revealed that 25 students or 86,6% of respondents stated strongly agree and only 4 or 13,3% agreed with the statement that the

developed authentic assessment gave each student an opportunity to assess their own abilities; and

5. Referring to the results of the statistical analysis, it is revealed that 26 students or 86,6% of respondents stated strongly agree and only 4 or 13,3% agreed with the statement that the developed authentic assessment presents the real situation and conditions on sea expeditions.

Turning now to the average percentage score of 30 respondents towards the five statements, it is found that there are 89.3% of students responding with the mean score of 4.6. As referred to the previous table column of categories of students' responses, they mostly give a strongly positive statement about the application of the developed authentic assessment.

### **Conclusion**

After all, vocational education and training testing techniques are still carried out conventionally. This type of testing is considered inappropriate to test students' level of competence or the level of knowledge, understanding and skills of students. This condition also becomes a sign that the objectives of testing have not been achieved optimally. In dealing with this, it is necessary to apply other testing techniques. A developed authentic assessment is proven to assist students to present their maximum abilities specifically in seafaring vocational education and training. The mean percentage score based on the distributed questionnaire is 89.3% where students give responses with a mean score of 4.6. It implies that students have strongly positive statement about the application of the developed authentic assessments.

### **Suggestions**

Seafaring vocational education and training is recommended to apply authentic assessment in its learning specifically for competency level testing technique. Furthermore, it is also suggested to conduct socialization and training on the application of developed authentic assessment to all teachers in related fields.

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