

ALTERNATIVE ASSESSMENT: ANALYTICAL RUBRIC IN ASSESSING MULTIMEDIA COMMUNICATION SKILLS IN 21ST CENTURY LANDSCAPE

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The purpose of this study is to build an analytical rubric for Alternative Assessment for science activities in order to facilitate teachers in assessing multimedia communication skills by inculcating 21st Century Skills. The study attempts to answer a key question i.e. whether the analytical rubric for Alternative Assessment is appropriate to assess multimedia communication skills in science activities in school? The research was conducted by taking into account the advice of 11 experts in science education and five science teachers as assessors to evaluate the reliability of analytical rubric for multimedia communication skills in school. Three round Delphi technique was used to validate the analytical rubric and inter-rater reliability Intra-Class Correlation-ICC was computed to measure the reliability of the rubric. The study found that the rubric has a high validity of 82.0% and high absolute agreement for multimedia communication rubric ($ICC = 0.90$). Therefore the multimedia communication skill rubric can be adopted and implemented in schools. The study also found that there are a number of issues and constraints in the implementation of alternative assessment, but the construction of the rubric is a shift in assessing student outcomes that are emerging according to the global environment. However, further research on the validity and reliability of the rubric is necessary.

KEYWORDS: Analytical Rubric, Alternative Assessment, Multimedia Communication Skills, 21st Century Skills.

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INTRODUCTION

Is the Malaysian education system capable of producing human capital which are competent in the 21st century skills? What are the characteristics that are essential to be shown by the students to fulfill the needs of the employment market today? Often, the employees complain about the incompetence of graduate students and in Malaysia there is a shift of mindset of employees in seeking candidates who are balanced in academics as well as possessing soft-skills like communication skills, problem solving skills, interpersonal skills and have the ability to be flexible in handling problems (Gurinder & Sharan, 2008). Does the assessment in the education system promote such skills and evaluate them in order to produce students with a capacity to endure challenges in the future?

Students in the 21st century must be able to exercise new set of skills to prepare themselves for the ever-changing society in the global world (Kamisah et al., 2009). The 21st century skills are directing on the ability in application of technology through digital era literacy and students who have critical and creative thinking along with excellence in interpersonal and social skills (Mastura et al., 2012). Therefore, the importance to assess the 21st century skills is necessary but how to assess these sets of skills specifically in the science education settings needs to be answered.

Alternative assessment or authentic assessment is a wise step to expand individual potential and for promoting generic skills. Alternative assessment is a method that is different from conventional “paper-pencil” tests, which include observation, exhibition, oral presentation, experimentation, making portfolios, interviews and projects (McMillan, 2011). Malaysian education system is encouraging teachers to nurture active learning and conduct more hands-on activities (Kamisah et al., 2007). However, does the practice in science education in Malaysia support alternative assessment approach in expanding 21st century skills?

There are some challenges in executing alternative assessment in schools. The prime issue is evaluation of students' performance and developing a sound scoring scheme. The development of a rubric is a method to overcome scoring complications. Zimmaro (2007) stated that rubric acts as a scoring guideline to evaluate students' performance by using specific statements about a standard performance. What is the rubric that is applicable for alternative assessment and inculcating 21st century skills and also to provide space for students to expand their multimedia communication skill? The study is to develop an analytical rubric to assess multimedia communication skills and taking into account the validity and reliability of the rubric. Expectantly, this rubric can be implemented as an assessment tool and enable teachers to diversify their approach in teaching and learning process.

REVIEW OF LITERATURE

According to Ak and Guvendi (2010), education should not rely on memorizing facts and repetition of what has been done by the previous generations; it should be innovative and develop individual educational activities that enable the individual to adapt to change and uncertainty of global situation. Therefore educational institutions must provide skilled human resources in accordance with the requirements of the 21st century.

As defined by The New Media Consortium (2005), 21st century literacy is a set of abilities and skills that overlap between digital literacy, visual and aural. This includes the ability to recognize and the ability to understand the strength of the picture and sound, manipulate and transform digital media, to disseminate information and adapt it into new forms to be understood more easily. Thus the ability and skill in using technology and access to information and to be able to interpret it in forms that can be understood and globally acceptable is a necessary component of in the 21st century literacy skills.

Students need to acquire 21st century skills in analysing information and determine the validity of the information received through the mass media such as the Internet. Literacy can be integrated into the digital age through multimedia communication and interpersonal and social skills, that can also be developed through the ability to select appropriate materials and information as well as what is needed by the society (Trilling & Fadel, 2009). Hence, 21st century skills, particularly in terms of technical and analytical abilities to acquire information and interpreting analytical skills can be developed through multimedia communication.

Multimedia communication refers to communication through the media devices such as phones or computers. It is also based on the general classification of semiotic representation systems for both visual and aural presence. In addition, it also includes text, audio, music, pictures, animations and videos (Wolf, Gridwodz & Steinmetz 1997). There are several activities that require multimedia communication skills such as producing short films, brochures, posters, Power-Point presentations, song writing, blog and website construction. Assessment of multimedia communication skills are particularly important in the 21st century because most of the daily activities in this century utilise various technologies as a link in the delivery of multimedia information clearly. Alternative assessment is therefore the best way of assessing multimedia communication skill in science education.

Most countries in the world are in need to implement the alternative assessment strategies that can provide measurable results, including student achievement and program effectiveness (Libman, 2010). Recent developments regarding the assessment system in Singapore has given an increasing attention to alternative assessment as an approach to reduce the negative

effects of tests and exams (Kelvin, 2013). Thus teachers can integrate assessment with instruction to make it more attractive and improve learning outcomes by using the rubric to assess the student's ability in particular skills of the 21st century.

According Kishbaugh et al. (2012), the application of assessment is not to grade product but to evaluate teaching goals, adjust the assessment according to the students' needs and planning in building instruction that is meaningful to the students' learning. Rubrics can also help students set up their standards of achievement and to guide them to make the best products by comparing their performance to the standards. Rubric is an assessment tool to promote a standard that allows teachers to produce assessments that are objective (Kohn, 2006). Thus, the rubric is seen to benefit the students but also teachers in improving the quality of teaching and learning, particularly in activities which are real or authentic.

There are two categories that need to be clarified either holistic rubric or analytical rubric. In holistic scoring, the assessor will make a general assessment of the quality but analytical scoring accomplished during the assessment that will assess the various dimensions of achievement in a particular assignment (Jonsson & Svingby, 2007). According Nitko (2001), a holistic rubric requires the teacher to make the overall scoring of students' output processes and products without having to evaluate each component separately. While in analytical rubric, teachers will be scoring products and students achievement separately according to the criteria and summing the total score (Mertler, 2001). Often, holistic scoring using a large-scale assessment such as the statement in essay form is carried out, as it is easy and accurate. Nevertheless scoring analytically is useful in the classroom because the scoring will help teachers to monitor the students to keep on track, giving feedback about students' strength and the needs of students. Thus, the construction of criteria in the rubric must be taken care of by the assessor to ensure that it will measure what is to be measured.

RESEARCH METHODOLOGY

This study adopts a qualitative approach using the Delphi technique that is designed as a group communication process which aims in carrying out a detailed examination and discussion of specific issues to set goals for environmental goals, investigation of policies and predict future events (Chia-Chien Hsu & Sandford, 2007). In this study, the Delphi technique is used to determine the appropriate rubric used to assess multimedia communication skills. Theoretically, the Delphi process occurs repeatedly until the conditions are identified and met (Chia-Chien Hsu & Stanford, 2007).

After completing Analytical Rubrics the rubric round Delphi has achieved the necessary requirements and specifications. Content validity achievement will be calculated using the percentage of estimates (Sidek & Jamaludin 2005) in this case. If the percentage is more than 70% the rubric has good content validity. For testing of reliability using Inter-rater reliability (IRR), the assessor will record the score on observed behaviour and compare it with other observers to see the similarities and the deviations. Each assessment must have high credibility and reliability and based on evidence (Una et al, 2012). This means that an assessment should be fair and consistent so that the same results are produced at any given point of time.

This study used the Intra-class correlation coefficients (ICC) and teachers were assigned as assessors to evaluate the multimedia communication skill using the rubric. The purpose of this study is to show that there is a high degree of acceptance among assessors in analytical scoring rubric.

DATA ANALYSIS

The details about data analysis have been given in this section.

Table 1
Analysis of Validity Percentage for each Delphi Round.

Round	No. of Experts	Percentage of Validity (%)
1	5	82.0
2	3	83.3
3	3	91.1

From results in Table 1, it can be concluded that the 3 round Delphi shows a high validity of 82.0%, 83.3% and 91.1% by experts. According to Sidek and Jamaluddin (2005), the manual or module, which had a value of more than 70%, is considered acceptable and can be implemented.

Table 2
Item Statistics for Mean and Standard Deviation in Scoring Multimedia Communication Skills.

Assessor	Mean	SD
1	2.00	0.63
2	1.50	0.84
3	2.17	0.41
4	1.67	0.82
5	1.67	0.82

Based on results given in Table 2, Assessor 1 had the highest mean score of 2.17 and SD of 0.41 and Assessor 5 had the lowest mean 1.50 and SD of 0.84. Even though the mean and SD is not consistent between assessors further correlation analysis is needed to see the relation between assessors.

Table 3

Correlation Matrix Between Items in Scoring by Assessors for Multimedia Communication Skills Rubric.

Assessor	1	2	3	4	5
1	-	0.76	0.78	0.78	0.78
2	0.76	-	0.88	0.59	0.89
3	0.78	0.88	-	0.80	0.80
4	0.78	0.59	0.80	-	0.70
5	0.78	0.89	0.80	0.70	-

Table 3 shows scoring correlation between assessors for multimedia communication skills rubric. Assessor 2 and Assessor 5 show the highest correlation of 0.89 compared to Assessor 2 and Assessor 4 who show the lowest correlation of 0.59. This shows that all assessors have a strong positive correlation except for Assessor 2 and Assessor 4, which have a fair positive correlation. It may be conclude that all assessors scored consistently in using the rubric.

Table 4

Intra-Class Correlation Coefficient for Absolute Agreement Between Assessors Using the Multimedia Communication Skills Rubric.

	Intra-Class Correlation	95% Confidence Interval	
		Lower Bound	Upper Bound
Single Measures	0.65	0.31	0.93
Average Measures	0.90	0.69	0.98

Based on results in Table 4, the intra-class coefficient of correlation for absolute agreement between assessors using the rubric shows a high absolute agreement of 90% (ICC = 0.90. CI, 0.69 to 0.98). This shows that all assessors reached a high absolute agreement of 90% and the multimedia communication skills rubric has a high reliability index.

DISCUSSION AND CONCLUSIONS

Activities include all aspects of multimedia communications involving the use of various media such as website development, computer software programs,

posters, brochures, Power Point presentations and so on. Products or processes that are produced by the students should have a theme or topic highlighted apparent from the headlines and sub themes. It should be consistent with relevant sustainability objectives, and effectively communicates the theme to the audience (Coon, 2011). Each product must contain the concept, facts, statistics, and stories of scientific phenomena, relevant and complete with references (Lauer & Hendrix, 2009). Graphic elements such as pictures, charts, tables, drawings, scientific diagrams and graphs are clear, effective with aesthetic value, animation, space, colour, texture and shape as well as creativity. Students should also have written objectives, clear and accurate information with sentence structures and scientific explanations, descriptive, informative without mechanical errors such as spelling and grammar (Coon, 2011).

Literacy skills are the ability to access information and to analyse information that can be established through activities that involve Internet access and other electronic media (NCREL, 2003). Additionally, students can develop their interpersonal and social skills in the activities implemented. Literacy in digital era demands the students to independently access information appropriate to the needs of the activity. It will also train the students for self-access learning approaches and lifelong learning. Thus multimedia communication skill activities are appropriate to foster literacy skills of the digital age which is an element in 21st century skills.

Based on an analysis using the intra-class correlation coefficient, the multimedia communications rubric's absolute agreement reached 90%. It can be concluded that it has a high reliability for use in schools. According to Akbulut and Akbulut (2011), activities that involve the use of technology such as website development, posters, brochures etc., are more effective than traditional assessments involving limited writing and oral examinations. These activities complement existing communication skills and skills needed in the present technology. According to Libman (2010), the importance of implementing alternative assessment is to ensure that students are equipped with skills to enable them to participate in an increasingly complex world. Therefore, the researchers argue that in an effort to plan, implement, supervise and assess alternative assessment, it is important to provide guidance and support in the development of quality students equipped with skills needed in the 21st century.

Communication skills play an important role in the process skills of science. The concept of higher order thinking and the nature of science requires students to have the skills in communicating science in the form of charts,

graphs, scheduling technology (Kishbaugh, 2012). It is beneficial for students to communicate in specific disciplines of science and can be expressed through writing research papers, posters, brochures, presentations greatly needed in their future career. It also coincides with the expert opinion stating that alternative assessment managed to uncover students' potential and made them more creative and innovative to meet the demands of the 21st century.

There is a challenge for educational institutions for implementing alternative assessment in measuring competency based on assessor observations that raises questions about the reliability and validity of the assessment. The goal of assessment is to help students' learning rather than requiring high reliability, however the assessment must be valid. When given a task using an assessment tool, the understanding of the criteria of expected competency is very important. Stemler (2004) states, there are three approaches in determining accurate and consistent scoring. First, each assessor gives the degree of measurement; the assessment is consistent based on the correlation between assessors and finally measuring the degree of scoring attributes that is generally compared to the error component.

There are several factors that will affect the implementation of alternative assessment such as the assessor's expertise, the possibility of bias and the competency of assessors (Good, 2012). According to Wolf and Stevens (2007), the difficulty to measure the achievement of each criterion in the rubric can be reduced by providing more action-specific verbs such as make a list, draw, discuss, to explain, compare, criticise, forecasting and so on. A well-designed rubric allows the assessment to have a high validity and reliability and its primary use is to improve the quality of teaching and learning. Wolf and Stevens (2007) stated that, the use of an assessment rubric does not necessarily make it easier. However, good rubric allows assessor or teachers to demonstrate their professional knowledge and use it regardless of the students' diverse personality or limitations in learning.

Bresciani et al. (2009), state that despite the use of rubric, it doesn't eliminate the variation between assessors. However, a well-designed rubric alleviates problems and provides training in assessment to ensure its reliability. Scoring and reliability of an assignment is influenced by several factors such as the objectivity of the tasks / items/ scoring, difficulty of the assignment, homogeneity of assessors, time allocation, the number of assignment and domain coverage needed.

Thus, alternative assessment requires a high belief system in teachers because each measurement has to be performed without the influence from the centre (Board of Examination). However, training to improve the competence

of teachers in assessing this type of assessment is essential to ensure the reliability of assessment by ensuring that the gap was not too big.

The rubric that has been tested in this study has been found to be valid and reliable through Delphi technique using inter-rater reliability. The rubric is expected to facilitate teachers as an assessment tool and diversify their approaches in teaching and learning process to foster 21st century skills in preparing students in their future careers.

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