The Current Practices of Science Teachers in Authentic Assessment

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Abstract

The purposes of this research were to 1) determine primary science teachers' view of authentic assessment and 2) examine problems in developing and using authentic assessment in primary science classrooms. Samples were 76 school administrators and 239 science teachers from primary schools in Bangkok. Two questionnaires were used to gather assessment views from participants.

School administrators reported that an analysis of learning standards and setting assessment committees were the most important step for developing assessment tools. They indicated that teachers had several problems in developing and using authentic assessment. For example, they had many tasks to perform which were not teaching activities. They also had to teach subjects that were not their major. These made teachers had less time to do a variety of authentic assessment as they should.

Teachers indicated that an analysis of learning standards and contents was the most practical step. Forming a teacher committee to create an instrument was unnecessary. In lecture method, teachers usually used both selected response and constructed response items. They added portfolio assessment with inquiry based approach as well as practical experiment tests to assess students' understanding. Teachers agreed with administrator views about their additional tasks. Some of teachers responded that they did not have enough understanding in order to create assessment tools. Most of them expressed the need for more training; especially in developing tests to assess thinking skills, attitude, and scientific processes.

Introduction

Authentic assessment has been widely used in science education. There are many definitions of authentic assessment. For example, Mueller (2005) defines authentic assessment as direct measures of students' acquired knowledge and skills through formal education to perform authentic tasks. Moreover, Pellegrino *et al*. (2001) asserts that authentic assessments provide multiple paths to demonstration of learning in comparison to traditional assessments like answering multiple-choice questions that lack variability, owing to students' ability to demonstrate knowledge and skills they possess. There are several challenges to using authentic assessment methods. Authentic assessment is often based on performance assessment: students are asked to demonstrate their knowledge, skills, or competencies in whatever way they find appropriate. An authentic assessment usually includes a task for students to perform and a rubric by which their performance on the task will be evaluated.

Many researchers have studied authentic assessment. For example, Fook & Sidhu (2010) reported that authentic assessment had more acceptances from students and should therefore be viewed as an alternative to traditional standardized assessment. Their study identified that assessment strategies should be closely related to teaching and learning. Moreover, they indicated that assessing authentic performances should become integral parts of the instructional cycle and feedback provided by the lecturer and peers should be formative in order to help the students assess their strengths and weaknesses, identifying areas of needed growth and mobilizing current capacity. Mallet (2008) used online collaboration as a authentic assessment method for promoting and assessing generic graduate capabilities such as writing in a context-relevant manner and the development of self-awareness with regard to mathematical strengths and limitations. The assessment strategy was found to be valid and largely reliable, although a number of issues arose with regard to reliability of peer-provided, formative feedback. The finding showed the successful of the method that presented along with a number of examples of positive outcomes resulting from the use of online collaboration as a learning activity. Moreover, Hall (2004) indicated that productive pedagogies in pre-service teachers should be used authentic assessment for better prepare future teachers.

Refer to Thai National Education Act (1999, 2002) and the Partnership for 21st Century Skills, learning management will set into child center for students to think, practice and having systematic studying through various activities. In expected that learning of students will occur during student participate directly in doing activities and make students to understand the content, use inquiry method for seek the knowledge, solving problem with scientific methods including development the higher-order thinking. Moreover, it is expected that the learning process as above will make students to develop in scientific attitude, moral and ethics in using science and technology including communicate and collaborate with others effectively.

For classroom assessment, teachers as the most important role who determine criteria and tools for assessing abilities, skills, higher-order thinking, problem solving and its application that reflects in knowledge, skills and abilities of students and in role of person who will bring result of assessment to develop students in order to search for abilities, strong point and follow up the development of students including to support in additional teaching and developing necessary skills in higher according to the potential of students. Therefore, teachers have to understand in the context of assessment and have knowledge in method of authentic assessment to process assessment precisely and effectively. This research intends to study the understanding in authentic assessment of science teachers in primary schools in order to the practical implementation and use of authentic assessment methods and finding the solving problem. Moreover, the result will be useful for improving the teachers in authentic assessment which will make learning management to achieve the objective learning.

Research Objectives

1. To determine primary science teachers' view of authentic assessment.
2. To examine problems in developing and using authentic assessment in primary science classrooms**.**

Research Questions

1. What are the primary science teachers' views of authentic assessment?
2. What are problems in developing and using authentic assessment in primary science classrooms?

Method

This research was a descriptive study conducted in the first semester in 2009 academic year. Participants in this study were 76 school administrators and 239 primary science teachers from primary school in Bangkok, the central part of Thailand. All participants signed the consent form for participating in this study.

Instruments used in this research were two self-reported questionnaires: school administrators and primary science teachers. Both of questionnaires consisted of two parts: view of authentic assessment and problem in developing and using authentic assessment.

School administrators' questionnaire had three parts: (1) background information (2) view of step for assessment plan and (3) view of problem in developing and using authentic assessment.

These are examples from school administrators' view of authentic assessment.

1) Do you think it is necessary to analyze the learning standards?
   ☐ Yes ☐ No
   reason.....
   In practical ☐ Done ☐ Never
2) Do you think it is necessary to setting assessment committees?
   ☐ Yes ☐ No
   reason.....
   In practical ☐ Done ☐ Never
3) Do you think it is necessary to selecting evaluators?
   ☐ Yes ☐ No
   reason.....
   In practical ☐ Done ☐ Never

These are examples from school administrators' view in developing and using authentic assessment.

1) What factors could be the problems in developing and using authentic assessment? (Can choose more than 1 choice)
   ☐ lack of science teacher in their own school
   ☐ teachers had to teach subjects that were not their major
   ☐ teachers had many tasks to perform which were not teaching activities
   ☐ teachers did not have enough understanding in order to create assessment tools
   ☐ teachers were not familiar with other assessment tools, except multiple choice
   ☐ some students and parents did not involve in assessment process
   ☐ students did not do well in reading and writing
   ☐ other.....
2) Do you have any strategies to develop your staffs in assessment?
   ☐ Yes ☐ No
   How?.....

The questionnaires for primary science teachers consisted of three parts: (1) background information (2) view of step for assessment plan and (3) view of problem in developing and using authentic assessment.

These are example from primary science teacher s' view of authentic assessment.

1) What do you get from step for assessment plan?
(Can choose more than 1 choice)

- ☐ learning objectives
- ☐ content
- ☐ tool
- ☐ number of item
- ☐ criteria
- ☐ time
- ☐ evaluators (e.g. students, friend, teachers, parents)
- ☐ other.....

2) Who would be the evaluator to involve in assessment process?
(Can choose more than 1 choice)

☐ students ☐ friend
☐ parents ☐ teachers

3) How do you use the result of assessment?

Statement	always	sometime	never
(1) designing learning activities which are suitable for students	☐	☐	☐
(2) supporting in additional teaching and developing necessary skills	☐	☐	☐
(3) supporting and following up the students' development	☐	☐	☐
(4) improving and developing the teaching and learning	☐	☐	☐

4) Have you ever used the authentic assessment?
☐ Yes ☐ No
reason.....

5) What advantages do you get from using the result of authentic assessment?
.....
.....

In this study, the quantitative data were using descriptive statistics in term of frequency and percentage.

Results

The results of this study were reported in two parts. The first part describes the view of authentic assessment from school administrators and primary science teachers. The second part describes the problems in developing and using authentic assessment.

1. View of Authentic Assessment

1.1 School Administrators' View of Authentic Assessment

As clear from the background information of school administrators, they had long experiences in classroom teaching profession. They were 76 school administrators from 76 primary schools.

From school administrators' view, they reported the most important step for developing assessment tools that their schools had done. The result in Table 1 showed percentage of answer from school administrators. 92.1 % indicated that an analysis of learning standards was the most important step for developing assessment tools, followed by setting assessment committees and selecting evaluators, respectively. The lowest percentage was found in the topic of item analysis that was 55.3 %.

Table 1. School administrators' view of authentic assessment

Topic	**Important step for developing assessment tools**	
	Do	Do not
Analyzed learning standards	92.1	2.6
Set assessment committees	85.5	3.9
Selected evaluators	81.6	3.9
Set assessment plan	82.9	5.6
Analyzed content quality	64.5	26.3
Analyzed Items	55.3	22.4

1.2 Primary Science Teachers' View of Authentic Assessment

These finding from 239 primary science teachers were reported in four parts, i.e. step for assessment plan, ratio of evaluators, ratio of assessment tools, and using the result from assessment. Teachers indicated that an analysis of learning standards and contents was the most practical step. Forming a teacher committee to create an instrument was unnecessary.

Step for assessment plan

Table 2 showed the results of step for assessment plan. The highest percentage was found in the topic of learning objective that was 86.1%, followed by content and tool, respectively. The lowest percentage was found in the topic of evaluators that was 45.0 %.

Table 2. The results of step for assessment plan

Topic	**Percentage**
Learning objective	86.1
Content	75.6
Tool	68.1
Number of item	55.9
Criteria	73.9
Time	59.2
Evaluators (Teacher, student, parents)	45.0

Ratio of evaluators

Figure 1 showed the percentage of evaluators. The results indicated that student had higher role in assessment than teacher, friend and parents, respectively.

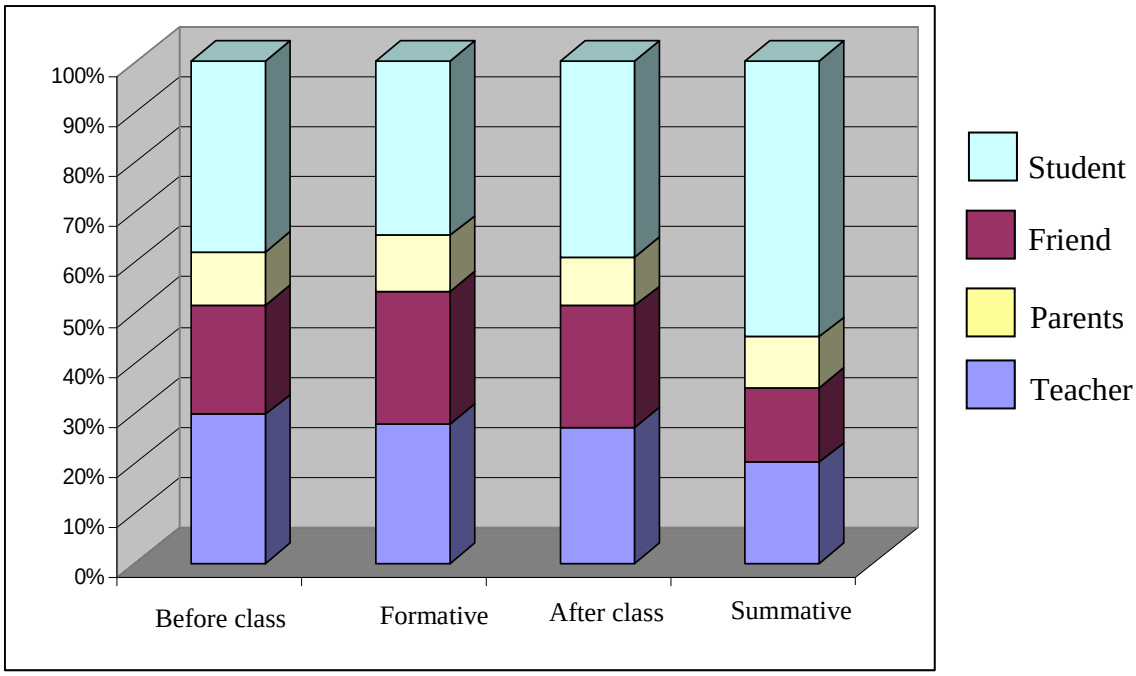

Figure 1. Percentage of evaluators

Ratio of assessment tools

Figure 2 showed the percentage of selecting tool for assessment in several teaching method. In lecture method**,** teachers usually used both selected - response and constructed - response items. They added portfolio assessment as well as practical to assess students' understanding. According to inquiry method, they used performance task higher than selected - response and constructed - response items. Moreover, when teachers used experiment method, they let students did hands - on activities and run experiment.

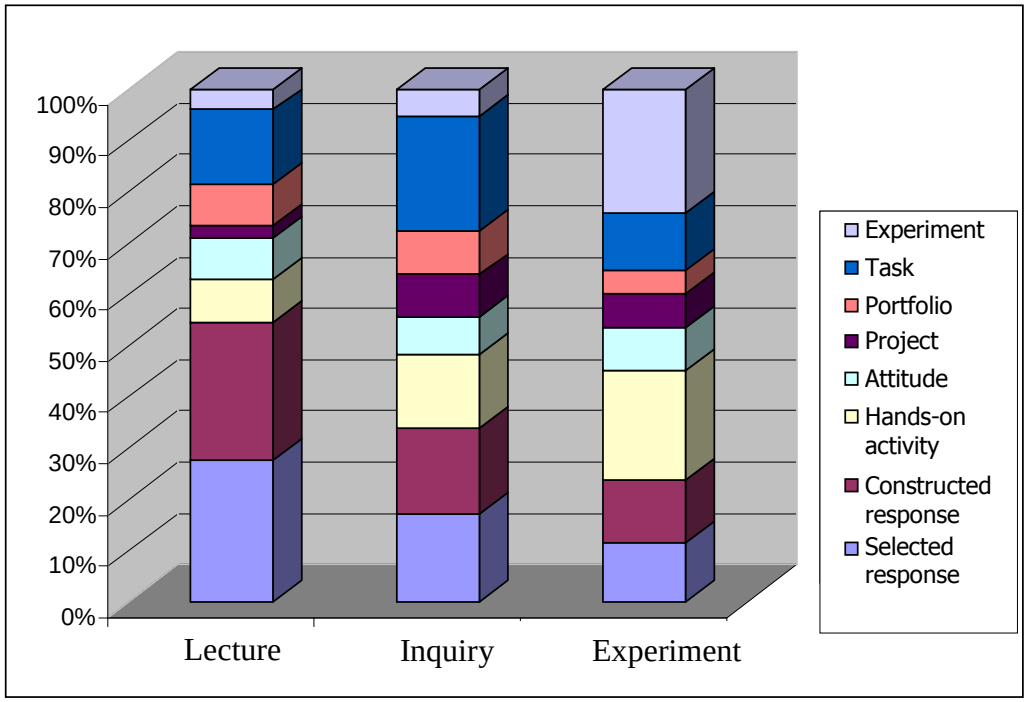

Figure 2. Selecting tool for assessment

Using the result from assessment

Results indicated that teacher used assessment four times in each semester: before class, formative assessment, after class and summative assessment. Results help teacher to improve the teaching and learning and to follow the development of students' learning.

2. Problems in Developing and Using Authentic Assessment

2.1 School Administrators' View in Developing and Using Authentic Assessment

School administrators reported that an analysis of learning standards and setting assessment committees were the most important step for developing assessment tools. They indicated that teachers had several problems in developing and using authentic assessment (Table 3**)**. 81.6 % of school administrators indicated that they had many tasks to perform which were not teaching activities. 68.2 % of school administrators also had to teach subjects that were not their major.

Table 3. School administrators' view in developing and using authentic assessment

Statement	Percentage
Teachers had many tasks to perform which were not teaching activities	81.6
Teachers had to teach subjects that were not their major	68.2
Teachers did not have enough understanding in order to create assessment tools	63.2
Lack of science teacher in their own school	50.0
Students did not do well in reading and writing	40.0
Some students and parents did not involve in assessment process	31.6
Teachers were not familiar with other assessment tools, except multiple choice	22.4

2.2 Primary Science Teachers' View in Developing and Using Authentic Assessment

Teachers indicated that an analysis of learning standards and contents was the most practical step. Forming a teacher committee to create an instrument was unnecessary. In lecture method, teachers usually used both selected response and constructed response items. They added portfolio assessment with inquiry based approach as well as practical experiment tests to assess students' understanding. Teachers agreed with administrator views about their additional tasks (Table 4**)**. 86.1 % of teachers indicated that they had many tasks to perform which were not teaching activities. 67.1 % of teachers also thought that students had low performing in reading and writing. 59.1 % of teachers responded that they did not have enough understanding in order to create assessment tools.

Table 4. Primary science teachers' view in developing and using authentic assessment

Statement	Percentage
Teachers had many tasks to perform which were not teaching activities	86.1
Students did not do well in reading and writing	67.1
Teachers did not have enough understanding in order to create assessment tools	59.1
Teachers had to teach subjects that were not their major	57.4
Lack of science teacher in their own school	49.4
Some students and parents did not involve in assessment process	26.6
Teachers were not familiar with other assessment tools, except multiple choice	27.4

Discussion and conclusion

From the findings, school administrators reported that an analysis of learning standards and setting assessment committees were the most important step for developing assessment tools. This might be sure because it was the necessary step in teaching and learning science. Furthermore, analyzing items was the least important step for developing assessment tools because teachers did not understand in authentic assessment.

Primary science teachers had several problems in developing and using authentic assessment. They indicated that they had many tasks to perform which were not teaching activities, they also had to teach subjects that were not their majors, and they did not have enough understanding in order to create assessment tools. In summary, most of them expressed the need for more training in topic of developing and using authentic assessment, developing assessment tools especially in developing tests to assess thinking skills, attitude, and scientific processes. Research results also provide a guideline for educators in finding a proper way to help teachers develop their understanding of authentic assessment and create assessment tools.

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