Improving Instruction and Increasing Student Learning through the Use of the One-minute Paper

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Abstract

Assessment is practiced in every institution of higher education through evaluating student learning as well as the effectiveness of instructional strategies in a variety of methods (Fenno, 2002). An instructor can measure student learning during the semester by using formative assessment as well as student performance at the end of the course by using summative assessment (Brown et al., 1997; Greer, 2001). The ideal assessment in educational settings presents its practice in meaningful ways to improve student learning together with student performance or achievement. However, Yorke (2003) states that the essential role of assessment in improving student learning is decreased. He posits that assessment of learning focusing on student achievement has received greater attention than assessment for learning which is more concerned with improving student learning. To tackle the problem, Cross and Angelo (1993) suggest that one way to turn our attention back to promote formative assessment to help students increase their learning in an on-going course is to practice at least one classroom assessment strategy in on-going courses.

The paper explores the effects of the use of the one-minute paper (OMP), a classroom assessment technique, on instructors and students. Consideration includes the development of student learning throughout a semester and the effectiveness of instructor teaching strategies.

The paper reports the finding of the qualitative study that was conducted in the spring 2009 semester. The paper offers considerations and recommendations that administering formative assessment can help students increase their learning and instructors adapt their teaching techniques appropriately during a semester. Furthermore, the idea of using formative assessment should be promoted in any courses with different class sizes.

Key word: One-minute paper, classroom assessment, and metacognition
Background and Significance of the Problem

Assessment fulfills more than one role, and it is divided into two categories in a learning context: summative and formative (Biggs; 1996). The primary purpose of assessment is to gain evidence of accountability for measuring the level of ability a student possesses, and it is also an instrument for helping students improve their learning (Astin, 1993; Erwin & Knight, 1995; Knight, 1995). In other words, summative assessment measures student outcomes whereas formative assessment has a primary part to play in improving their learning.

However, the learning outcomes become the most important to students rather than focusing on attention on learning (Falkchikov, 1995). Simultaneously, instructional strategies that enlist formative assessment are not well-known in many levels of education including higher education even if the literature promotes an increased use of formative assessment to improve learning (Dweck, 1999; Pintrich, 2000; Yorke, 2003).

In response, besides underlining desired learning outcomes, implementing classroom assessment, a major form of formative assessment, during instruction throughout a semester might be a method to increase student learning. The one-minute paper (OMP), a type of classroom assessment technique, can help yield beneficial effects for improving student learning (Cross & Angelo, 1993). The OMP is defined as a very short, in-class writing activity in response to an instructor-posed question, which prompts students to reflect on the day’s lesson and provides the instructor with useful feedback. In addition, students can consolidate the major point of what they learn into long-term memory (Menges, 1988). Doing the OMP regularly helps students and instructors see how they construct new knowledge. Moreover, it engages students in metacognitive thinking which raises awareness of students’ cognitive processes (Statt, 1998). That is students are able to monitor and evaluate themselves while learning.

To date in the United States context, the OMP has been integrated into instruction in various undergraduate courses; such as, Introductory Accounting, Economics, Computer Sciences, Astronomy, Psychology, Mathematics, Biology, Spanish, Medicine, and Sociology (Almer, Jones, & Moeckel, 1998; Bressoud, 1999; Cantillon, 2003; Chizmar & Ostrosky, 1998; Choinski & Emanuel, 2006; Murphy & Wolff, 2005; Zeilik, 2003). However, no research has been completed recently on the effectiveness of the OMP, in the Thai context. At the same time, there have been a few studies about how formative assessment affected student learning or instructional strategies modification in Thai educational context (Wongsathian, 2000).
Objectives

Assessment should be set in a course curriculum to improve both learning outcome and student learning. Assessment is a generic term for a set of processes that measures the outcome of student learning, and one of the best ways of developing student learning is by altering the method of assessment (Brown, Bull & Pendlebury, 1997; Greer, 2001). However, the use of assessment for improving student learning is hardly observed in classrooms even though it is required to be implemented more and more in higher education (Yorke, 2003). By this, the study aims to

1) explore the usefulness of the OMP, a classroom assessment strategy, for promoting student learning in the Thai context.
2) determine the effectiveness of the OMP in facilitating teacher assessment of student progress and developing effective instructional modifications.

Research Questions

The implementation of the OMP as an integral part of instruction might help students to better understand the content being taught and to improve their learning as well as to lead and help the instructors to modify instruction to achieve greater results. Three questions were explored:

1) How does the OMP promote student learning?
2) What are the effects of using the OMP on students and instructors?
3) What are students’ and instructors’ perceptions of the usefulness of the OMP?

Research Methodology

The study used the case study research approach to explore whether implementing a classroom assessment technique, particularly using the OMP in a classroom throughout a semester, could help students improve their learning as well as instructors improve their teaching effectiveness in Prince of Songkla University (PSU), a university in the south of Thailand. All of the process was intended to reveal the instructors’ and students’ common perceptions related to using a classroom assessment technique in on-going courses.
Participants and Settings

Five instructors and 240 students (number enrolled) from five selected courses at the primary campus and a branch campus of Prince of Songkla University (PSU), the largest university in the south of Thailand, participated in the study. Seven criteria were used for selecting courses: required and elective, length of class sessions, frequency of class sessions per week, students’ faculties attending each course, students’ school year attending each course, class size, and multiple campuses (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Courses Criteria</th>
<th>CP</th>
<th>MA</th>
<th>PEUS</th>
<th>RC</th>
<th>SAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective / required courses</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td>Length of class session (minutes)</td>
<td>50</td>
<td>150</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Frequency/wk</td>
<td>Thrice</td>
<td>Once</td>
<td>Twice</td>
<td>Twice</td>
<td>Twice</td>
</tr>
<tr>
<td>Students’ faculty/major (major)</td>
<td>Chinese</td>
<td>Medicine</td>
<td>Mixed</td>
<td>Mixed</td>
<td>Animal Science</td>
</tr>
<tr>
<td>Students’ school year</td>
<td>Second</td>
<td>Third</td>
<td>First</td>
<td>Second</td>
<td>Fourth</td>
</tr>
<tr>
<td>Class size</td>
<td>Small</td>
<td>Large</td>
<td>Small</td>
<td>Small</td>
<td>Small</td>
</tr>
<tr>
<td>Campus (primary and branch)</td>
<td>Primary</td>
<td>Primary</td>
<td>Branch</td>
<td>Primary</td>
<td>Primary</td>
</tr>
</tbody>
</table>

Following are the selected courses: Chinese Pronunciation (CP), Medical Administration (MA), Preparatory English for University Study (PEUS), Reading Comprehension (RC), and Small Animal Care (SAC). The number of students enrolled in these selected courses is shown in Table 2.
Table 2  
*Number of Students Enrolled in the Selected Courses*

<table>
<thead>
<tr>
<th>Courses</th>
<th>No. of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP</td>
<td>20</td>
</tr>
<tr>
<td>MA</td>
<td>110</td>
</tr>
<tr>
<td>PEUS</td>
<td>50</td>
</tr>
<tr>
<td>RC</td>
<td>35</td>
</tr>
<tr>
<td>SAC</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
</tr>
</tbody>
</table>

*Instruments*

Four instruments were used in the study: OMP sheet, instructor’s report form, classroom observation form, and interview protocols.

1) The OMP Sheet

The OMP sheet is a half A4 paper with two questions, one on each side, proposed by Cross and Angelo (1993):

1) What was the most important thing you learned in class today?

2) What important questions that you have from class today remain unanswered? (Appendix A)

2) The Instructor’s Report Form

The researcher provided an instructor’s report form together with OMP sheets weekly. This report form was for the instructors to write briefly what topic or topics or what course content they planned to explain or re-teach the students in the next class after they had read the students’ responses from the OMP sheets. (Appendix B)

3) The Classroom Observation Form

The classroom observation form, used during observations of each course, included guidelines for taking notes that would be useful to examine the instructors’ time management, their pace of processing the OMP, and their class control during the process of the OMP. Moreover, the information received from observations was needed to examine the students’
completion of the OMP to see if they were involved and satisfied with the activity, and length of
time they spent in writing the OMP. (Appendix C)

4) The Interview Protocols

There were two sets of the interview questions: one for student interviews and another for
instructor interviews. Each set contained five, broad, open-ended questions to elicit information
about the instructors’ and the students’ perceptions of student learning and pedagogic practice
due to the OMP, and how the classroom assessment technique affected both the instructors and
the students (Appendices D and E).

Data Collection Procedures

To establish trustworthiness, several methods were employed to collect data: explaining
documents, conducting interviews, and conducting observations. Data collection through each
method occurred at various intervals during the semester. Following are the details of the data
collection.

1) The OMP Sheets

The OMP was administered only once a week in any session the instructor considered
appropriate or convenient. Every course, except MA, had two-three sessions per week so the
instructor was able to decide when the OMP should be done. The OMP was administered a total
of 10 weeks for the semester. Students attending the class wrote briefly what they saw as the
most significant things they had learned on one side of the sheet, and then they wrote what their
major questions were on the other side of it before returning it to the instructor.

2) Instructors’ Reports

All instructors were asked to write a brief report of what they decided to do in the next
class according to the students’ responses to the two questions on the OMP sheets.

3) Observations

Through observation and without participating in any activities occurring in the class, the
researcher got firsthand information of the OMP process. The observations were carried out on
the behaviors of the students while they were doing the OMP at the end of a session. The first
three observations of all five courses in the first three weeks and the other two after the students
took midterm examinations were carried out to see whether there were differences in the length
of time students spent doing the OMP and their behavior toward writing the OMP at those two periods of the semester.

4) Interviews

This study employed the semi-structured interview. At the end of the semester, face-to-face interviews with the five instructors, two students in each small class, and four students in the large class were conducted to find out instructors’ and students’ perceptions of the benefits of using the OMP in class. For this study, stratified purposive sampling was used to elicit characteristics of the particular students who received the different grades in each class that used the OMP through the semester. By doing this, it also facilitated comparisons between students who got different grades.

Data Analysis Procedures

During the semester the researcher described what and how the students responded to the two questions on the OMP sheets. To strengthen interpretations as well as to improve credibility of the study based on the available evidence, the data were gathered from three sources: document analysis, observations, and interviews. Document analysis was involved with instructors’ reports and the OMP sheets.

The instructors’ reports were analyzed to discover what the instructors planned to do in the next class as a result of the students’ feedback and whether any changes of their instructional arrangement emerged during the semester.

The OMP sheets completed by the students in the five courses were placed by course into three groups. Group I was the sheets done in the first three weeks, Group II were ones completed in the second three weeks, and Group III was for the last four weeks of doing it. Afterwards, all the sheets were placed again according to the time frame to see the whole picture. The OMPs were examined according to the significance of the answers the students provided on the OMP sheets. The answers were analyzed to see how well the student could evaluate the lesson they learned and specify the points they thought the most important and the most difficult. Besides, the amount of information on the OMP sheets was also investigated to discover how many questions most students tended to ask and what those questions were. By examining this throughout the semester and comparing three groups of the sheets, the researcher got the overall picture of the students’ underlying perceptions of the advantages of doing the OMP.
Also, the notes in the classroom observation form and the research diary taken during observations described how the students responded to the OMP. Then, occurrences in the classroom were examined to determine the effects of using the OMP on the students. Besides, at the end of the semester the information the researcher received from interviewing the instructors and the students was described.

Finally, the metacognitive learning strategy was considered to determine whether doing the OMP enhanced the students’ learning. This strategy was used to examine the students’ and the instructors’ perceptions of the advantages and disadvantages of doing the OMP in class throughout the semester as well.

**Potential Researcher Bias**

In the study, the researcher was the only person who collected and analyzed the data. In some ways being in bias that might affect data collection and analysis might the researcher’s positive perception of the OMP as a beneficial classroom assessment technique.

Nonetheless, trustworthiness, integrity, and credibility of the researcher were needed to counteract the bias that would occur. Guba and Lincoln (1985) claim that triangulation by using several data collection strategies is one way to help lessen the bias. Thus, interviews, observations, and document analysis were used as data collection strategies in this study.

**Result of the Study**

Findings resulted from the analysis of pertinent documents, classroom observations, and interviews with instructors and students, leading to an understanding of how the OMP helped students improve their learning and instructors’ teaching modifications. Four themes were derived from analyzing the OMP sheets, the instructors’ report findings, the instructor and student interview findings, and the classroom observations. These themes also answered the research questions as follows.

1) How does the OMP promote student learning?

Findings indicated that the students and the instructors agreed that the OMP helped promote student learning. Completing the OMP helped students reflect on their ability to accomplish the standard of a targeted goal. The students weekly practiced evaluating themselves through the use of the OMP. They had to think about the lesson they had just learned carefully.
before answering on the OMP sheets about the points they thought the most important as well as the most difficult points they encountered in the lesson. By doing this regularly, both students and instructors realized the level of students’ understanding of what they had studied. Moreover, the instructors made adjustments to ensure the students achieved targeted standards-based learning goals that they set for a learning period. They could determine next steps during the learning process as soon as they realized the students’ difficulties. In addition, the students could improve their learning since they gradually became familiar with thinking about what they had just learned, and realized how much they could grasp a significance of what their instructors recently taught. The OMP involved the students’ ability to adopt self-evaluation and self-monitoring as a part of their learning behavior. At the same time, when incorporating the OMP into classroom activities, the instructors eventually adapted their instructional strategies to serve their students’ needs. Although the students had typical classroom behaviors like other Asian students in that they did not have verbal interaction with their instructor as much as American students, the instructors were able to receive their feedback through the use of the OMP.

2) What are the effects of using the OMP on students and instructors?

The use of the OMP regularly during the semester significantly affected the students’ learning improvement and the instructors’ teaching modification. The OMP was a means that the students could use to reflect on their competence to themselves and the instructors. The more information the instructors had about students, the clearer the picture they had about the students’ achievement or where learning gaps occurred. In the same way, the more the students realized how much they achieved the learning target in a period, the more they could improve themselves to reach it. By using the OMP every week continuously throughout the semester, the students’ feedback helped the instructors improve their teaching practice as well. The instructors also adopted metacognitive strategy into their teaching profession. They thought about what they had done in the previous class and plan to arrange an appropriate teaching plan.

3) What are students’ and instructors’ perceptions of the usefulness of the OMP?

Both the students and the instructors perceived the OMP as a means to check how well the students learned the content in a period. Due largely to the students’ responses on the OMP sheets, the students could better understand their own learning path while engaged in metacognitive thinking, in addition, the instructors could plan a lesson which served their students’ needs. By doing the OMP habitually; moreover, the students were involved as
assessors of their own learning and as resources to their instructors. Both the instructors and the students benefited from the OMP.

Conclusions

The OMP, a type of formative assessment, was perceived by the instructors and the students as a way to improve student learning as well as instructional modification. The students seemed to develop the concept of metacognitive thinking through the repeated use of the OMP in a class for a semester when reflecting on what they had just learned in a period. When the students were engaged in metacognitive thinking, they learned to evaluate their progress toward the completion of a task before planning how to deal with a given learning task. Finally, they learned to monitor their ability to learn over the semester. Diversity of students’ cultural background might cause varying students’ perceptions of usefulness of using the OMP. In a culture where students depend on the instructor and do not have interaction with classmates or the instructor, the OMP is a means students can use to provide feedback to the instructor. Students in an Asian culture can learn to think about their learning and can give feedback to instructors in a non-threatening manner if provided a mechanism to do so.

In addition, the OMP is a tool to improve teaching practice. It was noticeable that all instructors who participated in the study were interested in modifying their behaviors, teaching materials, or classroom activities. Some prepared supplementary exercises relating to the points that the students thought difficult while others arranged several teaching materials to help them better understand the lesson. Some also tried to modify their behaviors by speaking more slowly and explaining the important points more than one time. Furthermore, the instructors were willing to include the OMP into their original teaching plan even though they realized that the process of the OMP both inside and outside classroom took extra time. Their use of the students’ responses to prepare for a particular period depended on the students’ needs. Receiving the students’ feedback provided the instructors with an opportunity to reflect on their teaching practice as well as to modify their teaching practice so as to establish quality instruction. Quality instruction was very important since it directly affected student learning.

In conclusion, the results of the study brought me an idea to apply the concept of metacognition to encourage student and instructor to do more reflection. And, for me, the OMP could be one way to help promote metacognitive thinking among students and instructors. By
using metacognitive strategy, students could assess how well and how much they had learned while instructors could reflect on their teaching performance.
References


APPENDICES

Appendix A

The One-Minute Paper Sheet

Name: ________________________ Student’ ID: __________ Date: __________

Course: ___________________________ Section: ________

The One-Minute Paper Sheet

Please answer each question in 1 or 2 sentences:

1) What was the most important thing you learned in class today?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

2) What important questions that you have from class today remain unanswered?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________


Note: the one-minute paper sheet is a half A4 paper with the first question on one side of the sheet, and another question on the other side of it.
Appendix B

The Instructor Report Form

Name: ________________ Date:_______ Course: _______________ Section: _____

According to the latest students’ responses to the one-minute paper, please write briefly about the issue(s) you intend to put into the teaching plan for the next session.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
### Appendix C

#### The Classroom Observation Form

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Instructor | No. of students |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Classroom Environment:

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

2) How time was used in the process of the one-minute paper:

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

3) Students’ behavior toward the one-minute paper:

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
Appendix D

Questions for Instructor Interviews

1. What do you do when you learn from an assessment that a student or many students do not understand the lessons?

2. What are advantages and disadvantages to you as an instructor of using the one-minute paper?

3. What are advantages and disadvantages to your students of using the one-minute paper?

4. Have you changed anything about your teaching behaviors or classroom activities as a result of feedback from the one-minute paper? Please describe any changes.

5. How did the one-minute paper and your feedback help the students increase their learning?

6. Please add any comments about the one-minute paper that you would like to share.
Appendix E

Questions for Student Interviews

1. What are advantages and disadvantages to you as a student of using the one-minute paper?
2. When compared doing the one-minute paper with not doing it, to what extent do you think it helps you learn the course contents?
3. In your opinion, how useful was practicing writing the one-minute paper regularly and getting the feedback from the instructor help you improve your learning?
4. After you did the one-minute paper in this course, would you apply the same technique in other courses? Why?
5. Please add any comments about the one-minute paper that you would like to share.