Action Oriented Reflection as a Formative Assessment Strategy

to Improve Student Learning

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Abstract

The major components, or pillars, of effective education in the 21st Century can be captured by the acronym SMART. The first four letters (S- Standards, M- Methods, A- Assessment and R- Reflection) are in chronological order of sound pedagogical practice and the fifth (T- Technology) represents a tool to be utilized throughout effective teaching and learning and across the other four components to deepen student understanding. Given the articulation of curricular standards (S) and the employment of Methods of Authentic Learning (M), this paper focuses on Authentic Assessment (A) in effective education, and more specifically on key elements of formative assessment including the use of a student Action Oriented Reflection (AOR) strategy designed to spur proactive steps toward improving learning results. Through regular self-evaluation of areas of clear understanding and identification of concepts needing reinforcement students can take positive steps resulting in improved understanding and greater academic success.

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When asked what assessments are most students answer by saying something along the lines of, "they are tests or at least quizzes." If queried what they think the difference is between formative and summative assessments they might respond with, "I guess the word formative is just teacher-speak to distinguish a quiz from a test." For a final question when asked if they are graded, most students would answer, "well duh, why else would a teacher give them?"

Educators today are increasingly embracing the notion that early and frequent opportunities for students to generate actionable feedback throughout the learning journey, whether used as a component of graded outcome or not, can benefit student understanding and academic success. Teachers are also becoming more adept at using formative assessments to inform their subsequent teaching practice.

This paper cites research on the effective use of formative assessments and reports on the author's study of a specific form of formative assessment using student self-reflection, herein called Action Oriented Reflection (AOR). AOR is most notably different than journaling since its focus is on students developing and carrying out action plans to strengthen concepts needing greater understanding in order to achieve greater academic success.

Current Assessment Practice

In my Grade 8 Algebra I class at Shanghai American School I employ formative assessment strategies that benefit student understanding including unit pre-assessments, sample problems when I teach, assigning problems for students to work at their collaborative table clusters, directed questioning of students, and open response questioning of the class. With this year's rollout of our one-to-one MacBook laptop program I regularly use mathematics software such as Maths 300 and internet-based virtual manipulatives such as

Explore Learning's Gizmos. I also provide time at the end of class for students to begin homework during which I work individually with students, assign homework problems including odd-numbered questions which students can check the answers against in the textbook Selected Answers appendix, offer individual tutoring sessions, and at the beginning of the next class I ask for homework questions they found difficult, solving them with the class. I do not assign a grade for these except in the case of homework where I assign a completion score, looking for earnest student effort in solving problems.

I also employ formative assessments such as quizzes and authentic projects, unit summative assessments and semester examinations that are all included in the course grade as a component of quantifying cumulative student understanding.

While I believe the formative assessment strategies mentioned above are effective and overall my students perform well, there are always opportunities for improvement and my subject teaching partner and I have been discussing the merits of integrating a student reflection component. The results from this study will greatly inform our implementation strategy.

Research Basis for Formative Assessment and Reflection

Fisher and Frey (2007) make a clear distinction between formative and summative assessments, arguing that the latter are given at the end of unit or course, and that they serve entirely different functions in learning; teachers use them for grades and promotion while students use them to gauge their progress toward course or grade-level goals and benchmarks. The authors suggest, "formative assessments are ongoing assessments, reviews and observations in a classroom" (p. 4) and state that they should be used throughout the unit and that while teachers use formative assessment results to check for understanding, students use them to self-monitor understanding.

Black & Wiliam (1998) define formative assessment as "all those activities undertaken by teachers and/or by students which provide information to be used as feedback

to modify the teaching and learning activities in which they engage" (p. 7). Marzano (2006) argues, "formative classroom assessment can and should begin immediately within a learning episode and span its entire duration. Additionally, formative assessment can take a wide variety of formats, both formal (e.g., paper-and-pencil quiz) and informal (e.g., a discussion with a student)" (p. 9).

Nickerson (2007) reported a direct correlation between Algebra II student achievement on summative assessments and the quality of their journaling during the learning unit. He found upper quartile students expressed their thoughts and examples in a more personalized context in journal entries while lower performing students tended to copy material from the textbook. Corley (2000) found that electronic journaling by his first-year college education students resulted in gains in student learning and understanding, with journals providing structure to promote thinking and reflecting. Campbell (2009), in a study of Year 8 boys, argues that online journaling improves student ownership of the learning process, goal-setting ability, and motivation to achieve their goals. Grossman (2009) suggests teachers consider that there is a continuum of reflection engagements including content-based reflection, metacognitive reflection, self-authorship reflection, and transformative and intensive reflection.

Building upon the findings of both Corley and Grossman, I believe students can achieve greater success by employing a combination of content-based reflection and metacognition, where students continually evaluate their understanding, establish an action plan for improvement and implement that plan, documenting the steps taken to deepen their understanding.

Change in Assessment Practice

The primary goal of AOR is to spur students to take proactive steps toward improving their understanding during the formative learning phase resulting in improved achievement

on subsequent formative and summative assessments. Since in the past many students have

openly voiced displeasure with reflection, particularly in the form of passive journaling

which they characterize as busy work with no near-term benefit, a second goal is to improve

student attitudes toward reflection when it is accompanied by self-direction and the potential

for tangible evidence of benefits from their efforts.

The change instituted to achieve these objectives was the required daily

documentation in a running Word or Pages AOR file on student MacBook laptop computers,

using an Action Oriented Reflection Template provided by the teacher (Figure 1.1). Students

devoted the last five minutes each class to complete the template and save their running AOR

file in an electronic Algebra I folder on their laptops. As the template reflects, students are to

document the topics studied that class day, which concepts they feel confident about and

what topics they need to work on to gain a deeper understanding. Students are to then

complete the four Plan columns for any areas identified they need to focus on.

Figure 1.1
Action Oriented Reflection Template

Name:		Date:			
Topic(s) we studied today:					
I have a **strong** understanding of:					
I **need a better** understanding of:					
PLAN				**RESULT**	
Specific area of focus:	What I need **to do** to get a better under-standing:	**Who** I need to get with to get a better under-standing:	**When** I am taking action:	**Action** I took:	Where my under-standing is **now:**

After class when students complete homework, take positive action such as seek help

from a friend or the teacher, or otherwise find their understanding changes they are to
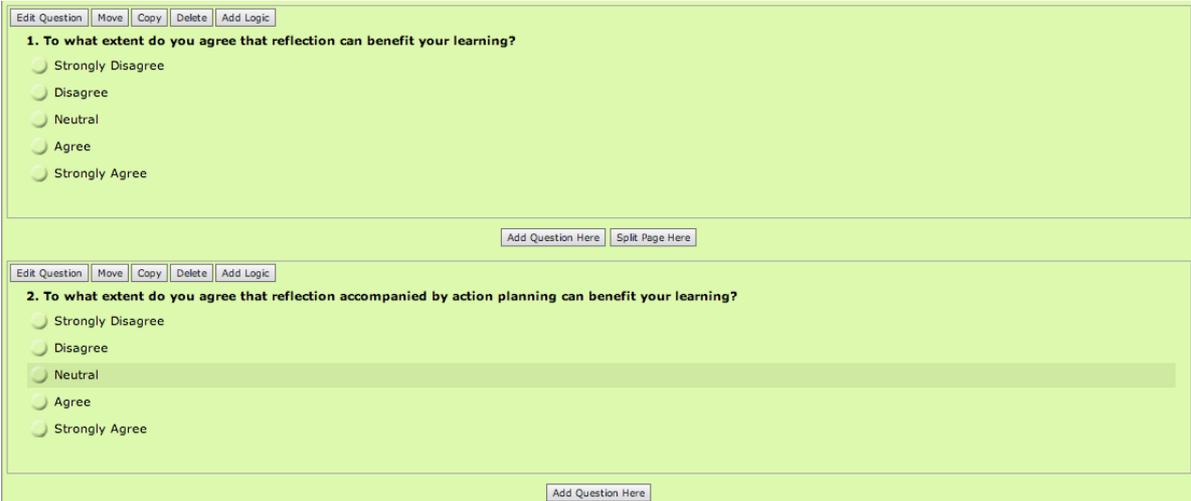
complete the final two Result columns for the appropriate day's template. I then review their

running AOR file at the beginning of class as a component of homework check to discuss

their learning progress and determine any appropriate next steps.

Implementation

The AOR test class was selected based on quantitative analysis of both formative and

summative test results year-to-date of all four of my Algebra I classes, with the criteria being

the test class needs to be a middle-performing group, neither the highest nor lowest, and the

class is gender balanced. The analysis determined that my E1 class fit both criteria.

On March 29, 2010, the class completed the AOR Class Pre-Survey (Figure 1.2) to

establish the baseline attitudinal disposition toward reflection. During the administration of

the survey students asked clarification questions about what 'reflection' and 'action planning'

mean and I answered in general, unbiased terms without influencing their perspectives.

Figure 1.2
Action Oriented Reflection Class Pre-Survey

I then presented an overview of AOR, the template, the reason their class was chosen

and asked for their cooperation and participation. The class agreed. Students then

downloaded the template from my class blog, created a running Word or Pages file, we held

class and they completed their first AOR at the end of class.

Throughout the remainder of the Polynomials unit students completed the template the last five minutes of each class day. When students felt they clearly understood that day's material there was no need to fill out the action planning portion of the template. When students reached the end of class and felt additional reinforcement was necessary to achieve a deep understanding of the material they completed the action planning section accordingly.

When I reviewed their running AOR file at the beginning of class my primary focus was looking for Plan column entries, the steps taken, and most importantly the student's assessment of their understanding after taking the action documented in the Result columns of the template.

Upon completion of the case study students again completed the AOR survey, forming the basis for direct evaluation of student attitude changes by participating in AOR.

Measurement Methodology of AOR Impact

The effect of AOR on student achievement was measured by the change in formative and summative assessment results achieved during a unit of study of Polynomials in Grade 8 Algebra I, compared to year-to-date (YTD) formative and summative assessment average, by employing test class versus control group achievement analysis. The AOR test class consists of 19 students, 9 girls and 10 boys, and three Algebra I control classes total 54 students, 27 girls and 27 boys, who did not participate in AOR. Measuring the change in this fashion accounts for the potential for differing current versus previous subject content difficulty to impact the assessment result comparison.

Changes in student attitude toward reflection were measured by conducting anonymous AOR test group pre and post surveys. Point values were assigned to the answer options as follows: Strong Disagreement (1 point), Disagreement (2 points), Neutral (3 points), Agreement (4 points) and Strong Agreement (5 points). A weighted average for the AOR class was then calculated for each of the two questions by multiplying the number of

students assigning each answer option by each assigned point value (1 through 5), summing

this data, and then dividing by the number of students in the class. Attitudinal changes were

then easily measured by comparing pre and post AOR test group survey data. Since a

foreseeable risk in template use is students potentially desiring to avoid the work of

completing an improvement plan, even when they recognize an area of need, a third question

was added to the Post-Survey (Figure 1.3) to attempt to quantify this tendency.

Figure 1.3
Action Oriented Reflection Class Post-Survey

Results

Student Formative and Summative Assessment

     Formative assessment results of the AOR E1 class indicated a +2.53% overall

improvement versus their YTD average compared to a control group improvement of

+5.21%. Analysis of the data revealed one AOR male student (B7), who had a YTD

formative assessment average of 85.29%, scored 61.11%, significantly lowering the control

group average and making comparative analysis difficult. Gender analysis showed a +6.94%

improvement for girls versus +0.44% for boys, again lowered by student B7.

Summative assessment results of the AOR E1 class showed a +0.09% improvement compared to a control group improvement of +3.67%. Analysis of the data revealed student the same male student B7, who had a YTD summative assessment average of 89.01%, scored 66.67%, significantly lowering the control group average and making comparative analysis difficult. Gender analysis showed a +2.74% improvement for girls versus -2.29% for boys, again lowered by student B7.

Student Attitudes toward Reflection and AOR

The pre-AOR weighted average for Question 1 (To what extent do you believe that reflection can benefit your learning?) was 3.00, exactly neutral, and after participating in AOR for three weeks and completing six AOR entries the post-AOR weighted average increased to 3.44, slightly positive. The pre-AOR weighted average for Question 2 (To what extent do you believe reflection accompanied by action planning can benefit your learning?) was 3.44 and after AOR the post weighted average increased to 3.89, more positive.

Post-AOR Question 3 (To what extent is this statement true for you? There were times when I actually didn't understand something but I did not say so because I did not want to complete the template.) showed there was there a slight disincentive tendency (66.7% of students replied 'once or twice') for students to fill out the template since this requires effort and time on their part.

Conclusion

Given the short duration of this study, one unit lasting three weeks consisting of one formative and summative assessment each, and six AOR entries for the test class, valid statistical analysis of AOR impact was not possible. It should also be noted that the Polynomials unit where AOR was incorporated had four separate interruptions: Education Review Board (ERB) standardized testing (two days), Parent Conferences (two days), China Alive (five days), and two lost class days at the end of the unit due to two additional holidays

being imposed on our school for the opening of World Expo in Shanghai, which resulted in many modified schedules and discontinuous lesson sequencing. This served to decrease available AOR time and potentially adversely affect student learning. From a statistical standpoint, further research needs to be conducted over a longer period of time, capturing extended student AOR resulting in more data to enable greater confidence in the measurable impact of AOR on student learning.

However, student surveys show positive attitudes toward reflection as a strategy to improve learning and important insights and implications for future work were gained. Gender analysis revealed a possible disproportionate benefit for girls engaging in AOR. This clearly warrants further investigation. The planning, implementation and execution of laptop-based reflection and action planning, as well as the Internet-based surveys, all went smoothly. Students adeptly integrated reflection into their other responsibilities which would be an important consideration for transference to all subject areas should future work show AOR to be statistically beneficial to student learning.

Upon reflecting on the frequency and depth of student-teacher AOR discussion, perhaps a web-based reflection and feedback platform such as through student wikis using interactive documentation such as with Google Docs would prove more beneficial than the laptop-based AOR employed in this study. This could greatly aid teacher access to student reflection postings and potentially result in more meaningful engagement as students proceed along their learning journey toward understanding and success.

References

Black, P. & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in*

Education: Principles, Policy & Practice, 5(1), 7. Retrieved March 28, 2010, from

Academic Search Premier database.

Campbell, C. (2009). Middle years students' use of self-regulating strategies in an online

journaling environment. *Journal of Educational Technology & Society, 12(*3), 98-106.

Retrieved March 29, 2010, from Academic Search Premier Database.

Corley, E. (2000). A qualitative study of student perceptions regarding electronic journaling.

(ERIC Document Reproduction Service No. ED447791) Retrieved March 29, 2010, from

ERIC database.

Fisher, D. & Frey, N. (2007). In *Checking for understanding: formative assessment*

techniques for your classroom. Alexandria, VA: Association for Supervision and

Curriculum Development.

Grossman, R. (2009). Structures for facilitating student reflection. *College Teaching, 57*(1),

15-22. (ERIC Document Reproduction Service No. EJ822808) Retrieved March 29, 2010,

from ERIC database.

Marzano, R. (2006). In *Classroom assessment & grading that work*. Alexandria, VA:

Association for Supervision and Curriculum Development.

Nickerson, L. (2007). Journaling as a test preparatory measure in secondary mathematics:

successful student strategies. *Online submission*. (ERIC Document Reproduction Service

No. ED497396) Retrieved March 29, 2010, from ERIC database.