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# Implementation of Formative Assessment Strategies Perceived by High School Students and Teachers: Professional Development Implications

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**Implementation of Formative Assessment Strategies Perceived by  
High School Students and Teachers:  
Professional Development Implications**

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Research Association, October 20, 2010, Rocky Hill, CT.**

### **Purpose of the Study**

The purpose of this study was to investigate three questions relating to formative assessment. Question 1 examined the level of implementation of formative assessment strategies among high school teachers and students. Question 2 analyzed the level of agreement between teachers and students perceptions of levels of implementation of formative assessment strategies. Finally, Question 3 investigated the relationship of the disciplines teachers taught; the amount and kinds of professional development teachers had; and district urbanicity relative to teacher levels of implementation of formative assessment strategies.

### **Framework**

Formative assessment is a systematic process to continuously gather evidence about learning for both student and teacher. The data are used by teachers to identify a student's current level of learning and to adapt lessons to help the student reach the desired learning goal. Students use formative assessment strategies to guide themselves toward independent learning (Brookhart, 2009; Guskey, 2003; Heritage, 2007). Implementing classroom assessment for learning, or formative assessment, improves student achievement (Arter, 2009; Black & William, 1998; Brookhart, 2009; Chappuis, Chappuis, & Stiggins, 2009; Heritage, 2007; Hess, 2010; Popham, 2008; Thompson & William). Recognition of the effectiveness of formative assessment comes at a time when our nation is choosing to focus and fund high-stakes summative tests as the sole instrument needed to evaluate all educational stakeholders (Bracey, 2009) and not on building teacher capacity to capitalize on the research proven effective instructional strategies of formative assessment (Elmore, 2007; Stiggins, 2002).

The theoretical foundation for this research is embedded in social constructivism. In order to work with and support a social-constructivist model of learning and teaching, classroom assessment must change to better represent critical thinking and problem solving skills in each content area. Additionally, assessment processes must change in the way in which it is used and thought about by teachers and students (Shepard, 2000). When determining what students know and can do, a social constructivist model of assessment engages students to test what they know with their peers, during self-evaluation, and through a variety of modalities (Brooks & Brooks, 1993). Knowing that students learn in diverse ways means providing students with opportunities to express their knowledge in different and authentic ways. Therefore, a “broader range of assessment tools is needed to capture important learning goals and processes and to more directly connect assessment to ongoing instruction” (Shepard, 2000, p. 8).

## **Methodology**

### **Sample**

A total of  $N = 129$  high school students in grades 9 – 12 from an urban, suburban, and urban ring community secured parent permission and completed a questionnaire entitled *Formative Assessment Use Scale – Students*. A total of  $N = 137$  teachers from each of the same schools completed the *Formative Assessment Use Scale – Teachers*. A total of  $N = 28$  students and  $N = 19$  teachers were interviewed in focus groups from these same  $N = 3$  schools. Students participated during non-academic advisory periods. Teachers in the urban and suburban schools completed the questionnaires with the researcher available to respond to questions after school during faculty meetings, while teachers in the urban-ring school completed them on their own time

with a handout of explicit directions. Interviews took place during common preparation periods during the school day.

### **Instrumentation**

Questionnaires entitled, *Formative Assessment Use Scale – Teachers* and *Formative Assessment Use Scale – Students*, containing demographic items were employed. The survey was specifically designed for this study and developed by the researcher. The 13 quantitative items ask teachers and students to respond to the level (*almost never - 1, sometimes - 2, usually - 3, and almost always - 4*) with which they use specific research based formative assessment strategies. The teacher and student items sought the exact same information in the same order, but the wording was modified to represent the participants' perspective as teacher or student. Volunteer students ( $n = 5$ ) and teachers ( $n = 5$ ) piloted each survey prior to their use. The pilot survey participants provided feedback regarding their recommendations and interpretations of the questions and recommendations (Borg, et al., 2007).

Interview guides support trustworthiness, dependability, and credibility of the qualitative data (Lincoln & Guba, 1985; Rubin & Rubin, 1995). Examples of the questions in the teacher interview guide are: *How do you know how students are progressing? What do you do with that information? What are professional development opportunities available to teachers to support these strategies?* Examples of student questions are: *How do you know what is expected of you to learn? What are the ways that you measure your progress in school?* The panel of content experts also reviewed the interview questions.

**Validity and Reliability.** Content validity was supported through the literature, (Black & Wiliam, 1998a; Shepard, 2000; Thompson & Wiliam, 2008), and expert judgment concerning formative assessment strategies. The questionnaires were reviewed by a panel of  $N = 5$  formative assessment experts which included Dr. Karin Hess from the National Center for the Improvement of Educational Assessment; Rick Richards, School Improvement Specialist at the RI Department of Education; Dr. Anne Seitsinger, Director of the National Center on Public Education and Social Policy, and  $n = 2$  RI Association of Secondary School Principals (Creswell, 2003; Borg et al., 2007). The survey was piloted with  $n = 5$  teachers and  $n = 5$  students for understanding of the instructions, the content of the items, and the response format employed. The total teacher population was  $N = 254$ . The response rate for the teacher surveys was 137/254. The total student population selected for this study was  $N = 180$  and the response rate was 129/180.

### **Data Analysis**

Research Question 1 was analyzed through descriptive statistics such as frequencies, percentages, means, and standard deviation. These data reflect the reported levels of implementation of formative assessment strategies by teachers and students. Cronbach's alpha reliability coefficient of at least .80 was achieved to determine internal consistency of individual responses to the set items

Research Question 2 was analyzed utilizing t-tests at the dimension and item levels. These analyses described the differences between the levels reported by teachers and students. Using the Bonferroni adjustment, the significant level for the 13 item level comparisons were set at .001 and effect sizes were reported.

Research Question 3 examined the relationship between teachers' reported levels of implementation of formative assessment strategies and the four independent variables: content discipline taught, amount and kinds of professional development, and district urbanicity. Data analysis of both dependent and independent variables generated descriptive statistics. A one-way ANOVA indicated significant differences of perceptions of implementation levels. Additionally, using a Pearson product-moment correlation found significant relationships regarding kinds and amount of professional development received relative to reported levels of implementation. Finally, a one-way ANOVA was used to examine differences among and between each district relative to their levels of implementation of formative assessment strategies.

The qualitative data derived through interviews and the open-ended questions on the questionnaire of teachers and students were used to corroborate responses on the quantitative aspect of the questionnaire. Each data set was analyzed to discover themes through the long-table approach (Patton, 2002). An audit trail and a third party completed verification. The researcher merged the two data sets so that a complete picture was developed regarding the extent that the quantitative and qualitative data converge and confirm. The technique for merging the two data sets was through discussion, or narrative descriptions and quotes, from the qualitative data describing a statistical report (Creswell & Plano Clark, 2007).

## **Results**

### **What Teachers Reported**

Teachers among the three schools indicated that they include formative assessment strategies throughout the instructional period. Ranked highest in response, teachers

stated that they plan their formative assessment ahead of time ( $M = 3.16$ ), continually modify their instruction based on student feedback ( $M = 3.3$ ), and engage students in activities and problem solving in the same ways they will ultimately be tested ( $M = 3.28$ ). As questions on the survey asked teachers of their use of specific strategies, rates of implementation began to fall. Ranked within the medium rate of implementation, somewhat more than half of the teachers stated that they often use rubrics aligned to standards ( $M = 2.92$ ) and that they schedule class time for students to revise their work ( $M = 2.91$ ). Teachers reported low rates of implementation of providing students time for student peer assessment ( $M = 2.48$ ) and quizzing without grading ( $M = 2.19$ ). Qualitative data corroborated these findings; however, 56% of teachers stated that their preferred formative assessments were summative assessments such as common end-of-course assessments.

### **What Students Reported**

Students reported high levels of implementation of only one formative assessment strategy, their opportunities to use rubrics aligned to standards ( $M = 3.11$ ). Following, students stated that their teachers ask them open-ended questions ( $M = 2.97$ ) and that they are shown examples of student work assessed against rubrics aligned to standards. Far fewer students indicated that they are given time during class to revise their work ( $M = 2.33$ ) or that teachers change their instructional approach when they do not do well on quizzes ( $M = 2.03$ ). Qualitative data corroborated these findings. Additionally, when students were asked how they best recognized their own progress in learning, 80% of respondents based it on their grades. Deeper inquiry during student interviews found that students perceive that their grades are a number that represents



many forms of differently weighted data, depending on which teacher and/or department who is grading. Interestingly though, 58%, stated that they believe teachers consider their overall knowledge, not just their grades, when determining how students are learning. *I believe teachers don't go by grades, but understanding if I get what they are asking, I am doing something correctly*, stated a student from the urban-ring school.

### **Similarities and Differences between Student and Teacher Perceptions**

Research Question 2 examined if the levels of reported implementation of formative assessment strategies were similar for teachers and students. Table 1 presents item means, standard deviations, and *t* test data, for questions that probe whether there is agreement between students and teachers on the perceived levels of implementation of formative assessment strategies used in the classroom. There were six areas of significant disagreement between students and teachers.

The greatest area of disagreement came in response to questions regarding teacher modification of instruction. Teachers ranked these items the highest while students ranked these toward the bottom. Item 11, *Teachers change the way they teach me when I do not do well on a quiz or test*, students reported a very low *sometimes* ( $M = 2.03$ ) with a wide deviation, ( $SD = .94$ ). Teachers' response to item 11, *I modify my instructional strategy when a student does not do well on a quiz or assessment*, was significantly higher ( $M = 3.07$ ,  $SD = .83$ ). The researcher calculated an effect size of ( $d = 1.18$ ) with respect to the difference of perceptions in the student and teacher mean scores (Cohen, 1988). Based on the guidelines provided by Cohen, an effect size of ( $d = 1.18$ ) would be considered in the large range. The second question about teacher modification of instruction when students do not appear to comprehend concepts, the

Table 1

*Means and Standard Deviations for Responses to Questions Pertaining to the Implementation of Formative Assessment Strategies from Both Groups of Participants: Students and Teachers (N = 266)*

To what level do you agree that each strategy is used? <sup>a</sup>	Students (n = 129)		Teachers (n = 137)		t	p	d
	M	SD	M	SD			
1. Rubrics are used to assess student work	3.11	.87	2.92	.80	1.85	.07	
2. Rubrics are distributed at the beginning of units	<b>2.84</b>	.86	<b>2.51</b>	.91	3.07	.002*	.37
3. Exemplar student work is available and discussed	2.65	.87	2.50	.92	1.39	.17	
4. Open-ended questions guide next steps for instruction	2.97	.73	3.04	.80	-.72	.47	
5. Written and oral feedback address standards	2.90	.83	2.66	.81	2.34	.02	
6. Students self-assess and get feedback prior to grading	2.68	.85	2.74	.93	-.50	.61	
7. Students peer-assess and get feedback prior to grading	2.56	.85	2.48	.85	.73	.46	
8. Students practice with like-problems prior to testing	<b>2.95</b>	.76	<b>3.28</b>	.81	-3.40	.001*	.42
9. Students are quizzed without grading	<b>1.85</b>	.87	<b>2.19</b>	.91	-3.09	.002*	.38
10. Homework is used for purposes other than grading	2.54	1.02	2.86	.91	-2.69	.008	
11. Instructional strategies are modified post grading	<b>2.03</b>	.94	<b>3.07</b>	.83	-9.364	.001*	1.18
12. Instructional strategies are modified when students do not appear to understand	<b>2.52</b>	.87	<b>3.52</b>	.69	-10.46	.001*	1.28
13. Class time is scheduled for student feedback and revision	<b>2.33</b>	.92	<b>2.91</b>	.88	-5.17	.001*	.64

\* Using the Bonferroni adjustment required significance at the  $p < .004$  level. <sup>a</sup> The response scale was as follows: 1 = *almost never*; 2 = *sometimes*; 3 = *usually*; 4 = *almost always*. Note. Effect size guidelines indicate .20 = small; .50 = medium; .80 = large.

mean score for this question was significantly lower ( $p = .001$ ) for students ( $M = 2.52$ ,  $SD = .87$ ) than for teachers ( $M = 3.52$ ,  $SD = .69$ ). The calculated effect size of ( $d = 1.28$ ) is also considered in the large range (Cohen, 1998). Students perceive that they are provided less time to get feedback and revise their work ( $M = 2.33$ ,  $SD = .92$ ) than their teachers ( $M = 2.91$ ,  $SD = .88$ ). The calculated effect size is considered in a medium/large range at ( $d = .64$ ). When considering opportunities to engage in and get feedback on the kinds of problems that will be on tests, students reports significantly less chances ( $M = 2.95$ ,  $SD = .76$ ), than do teachers ( $M = 3.28$ ,  $SD = .81$ ). The effect size is considered in the small to medium range ( $d = .42$ ) (Cohen, 1988).

While students and teachers agree that rubrics are used to assess, they do not agree upon when those rubrics are distributed. Students report that they are passed out at the beginning of the unit more so ( $M = 2.84$ ,  $SD = .86$ ) than do their teachers ( $M = 2.51$ ,  $SD = .91$ ). The effect size is small to medium at ( $d = .37$ ). Finally, in regards to students being quizzed on their knowledge without grades being recorded, students state that they believe they are being graded more so ( $M = 1.85$ ,  $SD = .87$ ) than their teachers do ( $M = 2.19$ ,  $SD = .91$ ). The effect size calculated in this instance is also small to medium at ( $d = .38$ ).

Table 2 illustrates the ranking in decreasing order of students and teachers perceptions of the level of implementation of formative assessment strategies in all three schools. An important finding in this part of the survey was the recognition of how differently students and teachers perceive the overall implementation of formative assessment in their schools.

Table 2

*Student and Teacher Rankings of the Level of Implementation of Formative Assessment Strategies*

Items on Questionnaire in the Order Asked	Student Ranking	Teacher Ranking
a. Rubrics are used and aligned explicitly to the RI Grade Span Expectations and/or national content standards	1	5
b. Students have rubrics aligned to GSEs and/or national content standards at the beginning of each unit	5	10
c. Students are given examples of annotated student work and time to discuss and understand how it is scored against a rubric aligned to the GSEs and/or national content standards	6	11
d. Students participate in planned activities that include the asking of open-ended questions that help students uncover what they know and need to learn.	2	4
e. Students are given written or oral feedback about their work explicitly addresses how they did or did not meet the GSEs and/or national content standards.	4	9
f. Students have opportunities to assess their own work and get feedback prior to handing it in for a final grade.	7	8
g. Students have opportunities to work with peers to assess their work and get feedback prior to receiving a final grade	8	12
h. Units of study include opportunities for students to engage in and get feedback on the kinds of problems that will be on their tests or exams.	3	2
i. Quizzes assess students on their knowledge without grades being recorded.	13	13
j. Homework is used for purposes other than grading.	9	7
<b>k. Teachers modify their instructional strategies when a student does not do well on a quiz or assessment.</b>	<b>12</b>	<b>3</b>
<b>l. Teachers modify their instructional strategies on the spot/while teaching when a student or group of students does not seem to understand.</b>	<b>10</b>	<b>1</b>
m. Teachers schedule class time for students to revise their work and provide ongoing feedback to them during that process.	11	6

## Differences and Similarities Among and Between the Schools

Table 3 demonstrates the examination of the aggregated  $N = 3$  school data that revealed significant differences in six items, and when disaggregated by school, significant differences were found in only three items at the urban and urban-ring schools and in four items at the suburban school. Of the items measured significantly different by all three schools individually, only items 11 and 12 were common. Both of these pertain to formative assessment strategies used by teachers that call for the modification of instructional practices.

Table 3

### *Differences and Similarities Among and Between the Schools in Regards to Student and Teacher Agreement of Levels of Implementation*

Items Demonstrating Significant Differences	All Schools	Urban	Suburban	Urban-Ring
2. Rubrics are distributed at the beginning of units	X			
8. Students practice with like-problems prior to testing	X			
9. Students are quizzed without grading	X			
10. Homework is used for purposes other than grading	X		X	X
11. Instructional strategies are modified post grading	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
12. Instructional strategies are modified when students do not appear to understand	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
13. Class time is scheduled for student feedback and revision	X	X	X	

*Note.* Results are derived from a series of  $t$ -tests among all students and all teachers participants ( $N = 266$ ); urban students and teachers ( $n = 94$ ); suburban students and teachers ( $n = 98$ ); and urban-ring students and teachers ( $n = 74$ ).

## Relationship of Discipline Taught to Levels of Implementation

Teacher demographics by discipline indicate the following number and total percentages: arts ( $n = 11$ , 8%), English, ( $n = 22$ , 16%), mathematics ( $n = 21$ , 16%), science ( $n = 19$ , 14%), social studies ( $n = 14$ , 10%), World Language ( $n = 14$ , 10%), special education ( $n = 19$ , 15%), and *other* ( $n = 14$ , 10%). Included in the classification of *other* are health and physical education, business, and technology educators.

Table 4 presents the means and standard deviations for the first of two formative assessment strategies indicated in the ANOVA associated with significant differences.

Table 4 shows that a significant difference between the means at the  $p < .001$  level was found concerning the statement: *My students have opportunities to assess their own work and get feedback prior to handing it in for a final grade*. The mean for World Language teachers ( $M = 3.29$ ) was greater than that of the teachers classified as *other* ( $M = 2.00$ ). The mean for special education teachers ( $M = 3.26$ ) was also significantly higher than for teachers classified as *other* ( $M = 2.00$ ). Therefore, it appears that there is a level of agreement among the World Language and special education teachers about their providing students the opportunities to self-assess and revise their work before final grading, while teachers classified as *other* more often disagree with the assumption.

Table 4

*ANOVA Summary for Implementation of Formative Assessment Strategies by Discipline Taught: Student Self-Assessment*

Formative Assessment Strategy where Students have opportunities to:	Arts (n = 11)		English (n = 22)		Math (n = 21)		Science (n = 19)		F	p	$\eta^2$	Summary of Significant Differences
	M	SD	M	SD	M	SD	M	SD				
<b>Self-assess their work and get feedback prior to grading</b>	<b>3.27</b>	.65	2.55	.89	2.38	.89	2.68	.89				
Formative Assessment Strategy where Students have opportunities to:	Soc Studies (n = 14)		Language (n = 14)		SpEd (n = 19)		Other (n = 14)		F	p	$\eta^2$	Summary of Significant Differences
	M	SD	M	SD	M	SD	M	SD				
<b>Self-assess their work and get feedback prior to grading</b>	2.71	.75	<b>3.29</b>	.99	<b>3.26</b>	.73	<b>2.00</b>	.96	4.65	.001	.15*	Language > Other SpEd > Other

Note. The response scale was as follows: 1 = *almost never*, 2 = *sometimes*; 3 = *usually*, 4 = *almost always*.

\* Effect size guidelines indicate .01 = small; .09 = medium; .14 = large.

Table 5 indicates a significant difference at the  $p < .001$  level was determined regarding the item that asked teachers to consider: *I schedule class time for students to revise their work and provide ongoing feedback to them during that process*. While arts teachers measure ( $M = 3.73$ ), compared to science teachers ( $M = 2.47$ ) and social studies teachers at ( $M = 3.07$ ). Teachers classified as *other* measured ( $M = 2.50$ ). This is indicative of arts educators in greater agreement of the statement.

Table 5

*ANOVA Summary for Implementation of Formative Assessment Strategies by Discipline Taught: Scheduling Time for Revision*

Formative Assessment Strategy where Students have opportunities to:	Arts (n = 11)		English (n = 22)		Math (n = 21)		Science (n = 19)		F	p	$\eta^2$	Summary of Significant Differences
	M	SD	M	SD	M	SD	M	SD				
<b>Use scheduled class time to revise work and get teacher feedback</b>	<b>3.73</b>	.65	3.18	.80	2.81	.75	<b>2.47</b>	.84				Arts > Science

  

Formative Assessment Strategy where Students have opportunities to:	Soc Studies (n = 14)		Language (n = 14)		SpEd (n = 19)		Other (n = 14)		F	p	$\eta^2$	Summary of Significant Differences
	M	SD	M	SD	M	SD	M	SD				
<b>Use scheduled class time to revise work and get teacher feedback</b>	<b>2.36</b>	.75	3.07	.92	3.37	.68	<b>2.50</b>	.94	4.65	.001	.16*	Arts > Other > Social Studies

*Note.* The response scale was as follows: 1 = *almost never*; 2 = *sometimes*; 3 = *usually*; 4 = *almost always*.

\* Effect size guidelines indicate .01 = small; .09 = medium; .14 = large.

### Teacher Implementation and Professional Development

Table 6 shows significant relationships were found between assessing student work with rubrics (L1) and receiving professional development in developing rubrics, ( $r = .20$ ,  $r^2 = .17$ ,  $p < .05$ , Effect Size = Medium/Large). These items had



Table 6

*Correlation of Level of Implementation of Formative Assessment Strategies to the Kinds and Amounts of Professional Development Reported by Teachers in the Urban, Suburban, and Urban-Ring High Schools*

Types Professional Development	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13
Rubric	<b>.20<sup>a</sup></b>	<b>.21<sup>b</sup></b>	.16	.13	<b>.20<sup>c</sup></b>	.05	.11	.11	.02	-.02	.16	-.07	.09
Feedback	.17	<b>.23<sup>d</sup></b>	.18	<b>.18<sup>e</sup></b>	<b>.25<sup>f</sup></b>	<b>.22<sup>g</sup></b>	.08	-.02	.15	.04	<b>.19<sup>h</sup></b>	.09	.14
Questioning	.03	-.02	<b>.22<sup>i</sup></b>	.03	-.06	.03	.13	.08	-.01	.10	.07	.01	-.01
Assessment	-.06	-.04	.12	.01	-.06	-.06	.11	.09	.07	.01	.15	-.08	-.07
Instructional Units	-.02	-.10	.06	.14	-.02	-.02	-.03	.06	.08	-.06	.01	-.01	-.02
Lesson Plans	.10	.03	<b>.22<sup>j</sup></b>	.09	-.05	.06	-.05	.14	.03	-.04	.03	<b>.19<sup>k</sup></b>	.08
Reading	.09	.15	.16	.01	-.14	-.14	-.15	-.03	-.10	-.09	.04	.10	.02

*Note.* The following represent each of the 13 items relating to levels of implementation of formative assessment strategies on the teacher survey:

L1, Assess with rubrics;  
 L2, Rubrics begin lesson;  
 L3, Show exemplars;  
 L4, Open-ended questioning;  
 L5, Feedback aligned to standards;  
 L6, Students self-assess;  
 L7, Students peer-assess;  
 L8, Students practice with assessments;

L9, Quizzes are not graded;  
 L10, Homework is not graded;  
 L11, Instruction is modified after quizzing;  
 L12, Instruction is modified during instructional time;  
 L13, Students practice during class with teacher feedback and time to revise.

<sup>a</sup> $r = .20$ ,  $r^2 = .17$ ,  $p < .05$ , ES = Medium/Large

<sup>b</sup> $r = .21$ ,  $r^2 = .10$ ,  $p < .05$ , ES = Medium.

<sup>c</sup> $r = .20$ ,  $r^2 = .15$ ,  $p < .05$ , ES = Medium.

<sup>d</sup> $r = .23$ ,  $r^2 = .15$ ,  $p < .05$ , ES = Medium.

<sup>e</sup> $r = .18$ ,  $r^2 = .06$ ,  $p < .05$ , ES = Small/Medium.

<sup>f</sup> $r = .25$ ,  $r^2 = .13$ ,  $p < .01$ , ES = Medium.

<sup>g</sup> $r = .22$ ,  $r^2 = .14$ ,  $p < .05$ , ES = Medium.

<sup>h</sup> $r = .19$ ,  $r^2 = .12$ ,  $p < .05$ , ES = Medium.

<sup>i</sup> $r = .22$ ,  $r^2 = .19$ ,  $p < .05$ , ES = Medium/Large

<sup>j</sup> $r = .22$ ,  $r^2 = .19$ ,  $p < .05$ , ES = Medium/Large

<sup>k</sup> $r = .19$ ,  $r^2 = .08$ ,  $p < .05$ , ES = Medium

Effect size (ES) guidelines indicate .01 = small; .09 = medium; .25 = large.

a positive correlation indicating that there was a consistent relationship between those who answered positively about assessing using rubrics, and those that answered positively about receiving professional development on this same topic. Thus, individuals who use rubrics as a strategy to assess student work may be being influenced by the professional development they receive about rubric development.

Significance was found in a number of the relationships pertaining to the professional development topic regarding the provision of feedback to students that is aligned to learning goals. Item 5 (L5) on the questionnaire states, *The written or oral feedback that I give students about their work explicitly addresses how they did or did not meet the standards.* In Table 2, teachers ranked it 9th out of 13 strategies. There was a significant positive correlation ( $r = .25$ ,  $r^2 = .13$ ,  $p < .01$ , Effect Size = Medium) between the use of feedback strategies and the amount of professional development on this same topic that teachers report they have received. This may indicate that the professional development received was insufficient.

There was a significant positive relationship found between the level of implementation of the use of exemplar student work that was assessed based on standards (L3) and the attendance at professional development with the topic of, *Developing lesson plans that include planned formative assessment strategies during the learning process* ( $r = .22$ ,  $r^2 = .19$ ,  $p < .05$ , Effect Size = Medium/Large). In Table 2, teachers ranked their use of this strategy in tenth place out of thirteen items. Therefore, it may be that the professional development teachers received in this regard did not strongly recommend teachers to plan to present exemplar student work as a model for students who are engaged in learning a similar concept or skill.

A significant positive relationship was demonstrated between the level of implementation of teachers modifying their instruction on the spot during instructional time (L12) and the professional development topic regarding how to develop lesson plans that include formative assessment strategies during the instructional phase of teaching ( $r = .22$ ,  $r^2 = .19$ ,  $p < .05$ , Effect Size = Medium/Large). Teachers ranked modifying their instruction during this time as the formative assessment strategy most implemented ( $M = 3.52$ ,  $SD = .69$ ). According to the findings in Table 2, where student and teacher agreement on the same question was measured, a significant difference was indicated. Therefore, those teachers who responded positively to implementing this strategy, responded significantly similarly to getting professional development to support the modification of instruction when students are not learning; however, students did not report the benefits ( $M = 2.52$ ;  $SD = .87$ ).

### **Relationship of Levels of Implementation to Urbanicity**

Table 7 presents the significant differences among the levels of implementation of formative assessment strategies reported by teachers in relation to each school's urbanicity. Upon examination of the results of the ANOVA, two items emerged as significant.

In regards to the statement, *My students have opportunities to assess their own work and get feedback prior to handing it in for a final grade*, significance at the  $p = .003$  level was determined, followed by a post-hoc Scheffé. Teachers in the urban-ring school ( $M = 3.12$ ,  $SD = .83$ ) responded positively, significantly more than both the urban ( $M = 2.48$ ,  $SD = .93$ ) and suburban ( $M = 2.64$ ,  $SD = .91$ ) schoolteachers.

Table 7

*ANOVA Summary for Level of Implementation of Formative Assessment Strategies of Teachers by Urbanicity*

To what level do you agree that each strategy is used:	Urban ( <i>n</i> = 93)		Suburban ( <i>n</i> = 98)		Urban-Ring ( <i>n</i> = 74)		<i>F</i>	<i>p</i>	$\eta^2$	Summary of Significant Differences
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1. Rubrics are used to assess student work.	3.05	.85	2.93	.79	2.79	.75	1.14	.324		NSD
2. Rubrics are distributed at the beginning of units.	2.73	.91	2.44	.81	2.40	1.01	1.60	.206		NSD
3. Exemplar student work is available and discussed.	2.70	.85	2.38	.87	2.45	1.02	1.48	.232		NSD
4. Open-ended questions guide next steps for instruction.	3.15	.77	2.98	.82	3.00	.80	.58	.564		NSD
5. Written and oral feedback addresses standards.	2.65	.74	2.65	.84	2.69	.84	.03	.969		NSD
6. Students self-assess and get feedback prior to grading. *	<b>2.48</b>	.93	<b>2.64</b>	.91	<b>3.12</b>	.83	5.90	.003	.07*	U-R >Suburban U-R > Urban

(continued)

Table 7 ANOVA Summary for Level of Implementation of Formative Assessment Strategies of Teachers by Urbanicity (continued)

To what level do you agree that each strategy is used? <sup>a</sup>	Urban (n = 93)		Suburban (n = 98)		Urban-Ring (n = 74)		F	p	$\eta^2$	Summary of Significant Differences
	M	SD	M	SD	M	SD				
7. Students peer-assess and get feedback prior to grading.	2.58	.93	2.35	.76	2.57	.86	1.19	.309		NSD
8. Students practice with like-problems prior to testing.	3.10	.84	3.31	.87	3.40	.67	1.53	.219		NSD
9. Students are quizzed without grading.	2.28	.99	2.16	.92	2.14	.84	.25	.779		NSD
10. Homework is used for purposes other than grading.	2.62	.99	2.92	.82	3.02	.90	2.27	.108		NSD
11. Instructional strategies are modified post grading.	3.00	.82	3.09	.89	3.12	.77	.23	.794		NSD
12. Instructional strategies are modified when students do not appear to understand. **	<b>3.30</b>	.72	3.57	.72	<b>3.67</b>	.57	3.27	.041	.03	U-R > Urban
13. Class time is scheduled for student feedback and revision.	2.78	.83	3.04	.86	2.86	.95	1.11	.333		NSD

Note. NSD = No Significant Difference.

Post-hoc Scheffé mean difference is significant at the  $p = 0.05$  level. \*\* Using the Bonferroni adjustment required significance at the  $p < .004$  level.

\* Effect size guidelines indicate .01 = small; .09 = medium; .14 = large. <sup>a</sup> The response scale was as follows: 1= *almost never*;

2 = *sometimes*; 3 = *usually*; 4 = *almost always*

Regarding the statement, *I modify my instructional strategies on the spot/while teaching when a student or group of students does not seem to understand*, significance was not detected with the Scheffé post-hoc, therefore a Bonferroni adjustment was applied ( $.05/13 = .004$ ). The urban-ring teachers indicated ( $M = 3.67$ ,  $SD = .57$ ) that they agreed with the statement significantly more than the urban teachers did ( $M = 3.30$ ,  $SD = .72$ ).

### **Summary of Major Findings**

1. Examination of the aggregated  $N = 3$  school data revealed significant differences in six items; when disaggregated by school, significant differences were found in only three items at the urban and urban-ring schools and in four items at the suburban school. Of the items measured significantly different by all three schools individually, the only items in common among all three pertained to formative assessment strategies used by teachers that call for the modification of instructional practices when students are struggling.
2. Student and teacher rankings of formative assessment strategies that they recognize implemented are dissimilar.
3. Teachers stated that grades were their primary way (69%) of communicating student progress to their students. Students stated in the open-ended portion of the questionnaire that grades were their principal source for informing them about their progress in school.
4. Arts educators provided students more opportunities than any other kind of teacher to revise their work and get feedback in school ( $M = 3.73$ ). Interestingly, they provided significantly more opportunities than did science ( $M = 2.47$ ) and socials

studies ( $M = 3.07$ ) teachers, as well as teachers categorized as *other* ( $M = 2.50$ ).

Providing these opportunities seems natural in the arts areas where students are generally given considerable time to work on their assignments in class. However, it was surprising that in science, where students are expected to inquire and experiment with concepts and structures, science teachers indicated few opportunities for students to revise and get feedback during school.

5. Teachers from the urban-ring and suburban schools spoke at length about the kinds of professional development that was being offered directly by the school or district. These teachers reported that the school leadership, in conjunction with the School Improvement Team, planned and funded PD that was directly embedded into their instructional practices. Whether it was calibrating assessment scoring or learning how to use notebook sized White-Boards with a classroom full of students, teachers spoke of the fact that it was available for all teachers and, in some cases, required. Their only complaint on this regard was that they wanted more.
6. At the end of the teacher questionnaire, after many questions focused on strategies that may provide snapshots of student progress, teachers were asked to describe the formative assessment strategy that they used most. The results of this question made it clear that most teachers do not yet understand formative assessment. Of the  $N = 69$  responses,  $n = 49$  indicated that summative assessments were their preferred formative assessment.

### **Educational Implications**

Implementing formative assessment strategies is recognized to be effective for improving student achievement. The strategies are grounded in social/constructivist

learning theory and supported by decades of research. Teachers, who participate in well planned, scaffolded, and supportive professional development and continually work with their colleagues, are able to assess and appropriately modify their instruction based on these assessments. When properly implemented, students develop greater self-efficacy in their skills toward becoming self-regulated learners.

In this political climate of “Race To The Top” where teachers, administrators, and state education leaders are now competing for their virtual existence, the stakes for are higher than ever. Unfortunately, the selected strategies are large-scale testing companies to develop larger tests and multiple smaller scale products, including multiple annual interim tests, tenth grade college and career readiness tests, and so called formative assessments that mimic the large annual test. To qualify for sparse federal education funds, states are changing laws, to include evaluating teachers based on student achievement measured against large-scale tests. However, the rush to the top, and to success, must not become a barrier for improving instruction and local assessment. Leaders must recognize that real achievement will only occur when systems of balanced assessment includes formative assessment defined and implemented in a way to support students in their ability to become independent learners. Additionally, formative assessment must be implemented in conjunction with significant professional development.

The results of this study found that, while many high school students and teachers are beginning to implement a few formative assessment strategies in this North Eastern state, there is a tremendous distance to go before improved student achievement will result. While many teachers perceive that they have skills and knowledge regarding



formative assessment, the data showed otherwise. Many teachers still employ instructional and assessment strategies that are ambiguous and counter productive. Students concur with this description.

However, there is some evidence of fertile soil for advancing formative assessment initiatives within current regulations and present efforts of continuous school improvement. The study found that teachers are using rubrics; they expect that students revise their work, and they are beginning to engage students in the processes of self and peer collaboration for the purposes of learning and assessing. Two of the three districts studied have also demonstrated systemic thinking around professional development for all secondary teachers focused on instructional and assessment best practices.

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