Using Quick Writes as a Classroom Assessment Tool: Prospects and Problems

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Abstract
Educators are currently exploring the expanded use of a variety of new assessment tools in the classroom in response to pressures to enhance student learning. The present study examined quick writes as a tool in the context of third-grade classroom assessment. Third-grade teachers administered the same brief writing probe before and after students took a field trip to a wetlands. Analyses suggested that student responses did change to reflect learning gained on the trip. Post-trip responses were also related to an objective test covering the same content and to elements of the state standardized test. The measure was also sensitive to variations across classes that highlighted the need for stressing common administration guidelines (e.g., time allocation, nature and length of instructions) as a crucial element of classroom assessments re-administered across time. This study suggested that quick writes are a promising tool for classroom teachers that can be sensitive to instruction and potentially useful for instructional decision making.

Introduction

Faced with escalating pressure to raise standards, educators on all fronts are reexamining ways to increase learning in the classroom. One area emerging in importance is the expanded, comprehensive use of assessment by classroom teachers (Black & Wiliam, 1998; Mertler, 2005; Stiggins, 1999). Standards set by the U.S. National Council for Accreditation on Teacher Education (NCATE) and affiliated learned societies require that teacher preparation programs

demonstrate how their teacher candidates are influencing P-12 student learning (Professional Standards, 2002). Such documentation of student growth often requires sophisticated knowledge of assessment techniques, yet educational researchers indicate that assessment has been neglected by educators (Mertler, 2005). Teachers are likely to spend one-third to one-half of their professional time on activities linked to assessment, but they possess inadequate assessment skills (Mertler, 2005; Stiggins, 2002; Wise, Lukin, & Roos, 1991). Only half of the U.S. states require training in assessment for certification (Stiggins, 1999), and few teacher education programs require that undergraduates take an assessment course, resulting in practicing teachers feeling unprepared for classroom assessment demands (Lomax, 1996; Stiggins, 1991; Wise et al., 1991).

Developing practical and useful assessment for the classroom is a difficult and complex process (Maclellan, 2004). Teachers need methods that assess deep understanding as required by state standards rather than mere rote learning of facts. Coping with large numbers of students requires efficient methods that can yield useful information on student strengths and needs. Perhaps most difficult, teachers must be able to interpret and apply the information extracted from the assessment to enhance student learning.

As one response to classroom assessment needs, "quick writes" have been developed in the context of science units as a technique for gauging change in student understanding over time, allowing teachers to meet the learning needs of students and to obtain valuable information for instructional modification where necessary (Bass, 2003; Baxter, Bass, & Glaser, 2001). A quick write is a brief written response to a question or probe requiring students to explain a principle or phenomenon. Quick writes can eliminate the frustration that frequently accompanies traditional testing methods by providing students more flexibility of response. In addition, written expression beyond recall knowledge allows students to construct their own representations leading to eventual facility with newly learned subject matter (Bass, 2003).

In this paper, we explore the use of quick writes as a classroom assessment technique in the context of learning associated with a science field trip. An estimated 2% of the annual budget is allocated to field trips in the average American school district (Pace & Tesi, 2004). However, the effort devoted to examining the effectiveness and efficiency of such experiences within the general context of student academic achievement is not extensive (Koran,

Koran, & Ellis, 1989; Orion & Hofstein, 1994; Rudman, 1994). How or if a specific trip has been of assistance requires a quick response tool of practical use to the classroom teacher. In addition, to embed quick writes in the larger classroom assessment context, we also examine administration and scoring methods as well as the relationship between quick write performance and other measures of achievement such as an objective test on the same material and end-of-year standardized test scores.

Method

Participants

All five third-grade classes from one elementary school in the rural Southeastern U.S. were selected for this study. The third-grade teachers for these classes had worked with the authors on projects related to science instruction for the previous two years as part of a professional development schools initiative with a local university (Green & Smith, 2005). The pre-K-fifth-grade elementary school from which these classes were drawn has a population of approximately 500 students. Seventy-four percent of the students are European-American, 24% are African-American, 2% are of other minorities, with 47% of the students eligible for free or reduced lunch.

For the present study, 87 third-grade students participated, of whom 51 were female and 36 were male. The average age of the sample was 8.59 years with a range from eight to ten years. Ethnic composition included 65 European-Americans (77%), 16 African-Americans (18%), and 3 students of other minorities (3%). Each class participated in a one-day field trip experience to the wetlands project area at the local university. The field trip was integrated into the existing general science curriculum for the third grade.

Instrument

To examine the impact of the field trip, several measures were devised. Based on the work of Bass (2003), the authors developed a quick write probe, which is the focus of this paper, aimed at eliciting student understanding of wetlands ecology. They met with the five third-grade teachers and revised it for clarity and to ensure it was at an appropriate level for the students. The following probe was agreed on by the authors and the teachers: "You have a friend who has never studied wetlands before. Explain to your friend one

plant and one animal you think you might find in a wetlands. Explain how they interact with each other."

At this meeting with the teachers, instructions for the students were also developed collaboratively. The teachers agreed to read these specific instructions (and offer no other information) and to provide exactly 15 minutes writing time for both pre- and post-administrations. Two dates for administration (one before the field trip and one after) were agreed on by the teachers. A copy of the specific instructions and dates was included for each teacher with probes and answer sheets for all students the week before the field trip.

The material presented on the field trip fell into two "threads:" 1) names and basic biology of plants and animals found in the wetlands area, and 2) ways in which these plants and animals interact. A scoring rubric for the quick writes (see Figure 1) was developed by the authors based on a holistic five-point scale ranging from 0 (1 organism mentioned) to 4 (two organisms from wetlands with at least one accurate interaction and other interaction, habitat, or life cycle information mentioned). This format was modeled after the scoring procedures of Bass (2003). The rubric was discussed and modified by the first two authors during three initial passes through the quick writes. Next, an undergraduate honors student in biology rated each protocol. The correlation between the two sets of ratings reached .75 for the post-trip quick write. Discrepant scores were resolved into final ratings by the first two authors. All scoring was completed with raters blind to time of testing. In addition, the types of ecological interactions named by students were coded from 0 (none or incorrect), to 3 (biologically correct interaction between two organisms and present in the local wetlands) (see Figure 2).

Procedure

Before the field trip, each teacher had taught classroom lessons related to wetlands in the context of the science kits and state science standards for third grade. On the Monday before the field trip, each teacher administered the pre-trip quick write (prQW).

During the field trip, which occurred on two different days because not all classes could attend simultaneously, students were directed to several learning stations in groups of eight. These included a guided tour of the wetlands area, a microscopy station, a nature walk, a graphing station, and a worksheet

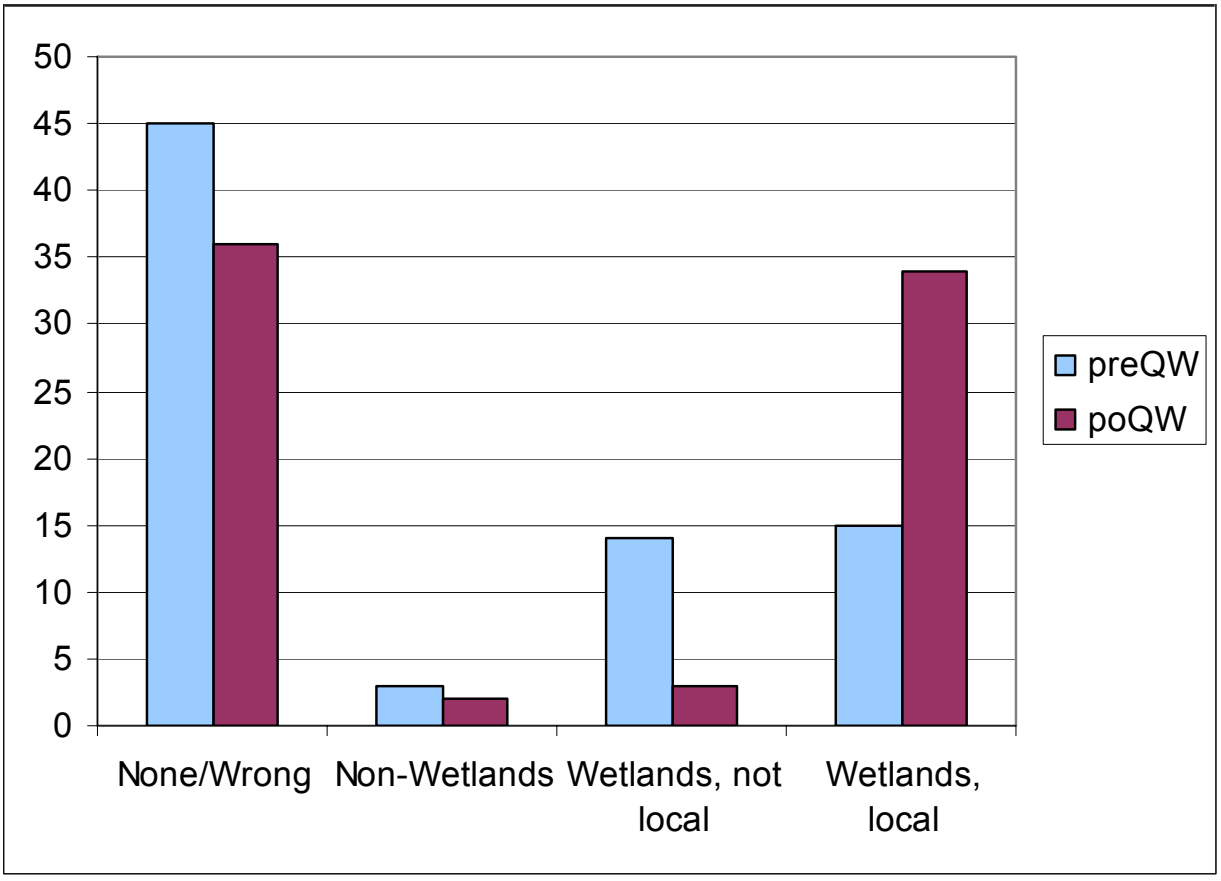
Figure 1

Scoring Rubric for Wetlands Field Trip Quick Write

Score	0	1	2	3	4
Description	One organism, no interaction, wetlands or not, e.g., dog, rose, tadpole. Also general terms like "plant" and "animal."	At least two organisms listed, not wetlands. May have interaction. ("Plant" is insufficient description for a wetlands organism)	Two wetlands organisms properly named (one plant and one animal) but no interaction OR only one properly named with interaction.	Two wetlands organisms (one plant and one animal) with one accurate interaction, (e.g., tadpole eats algae). Grasses, weeds can be included as wetlands plants.	Two wetlands organisms with more than one accurate interaction or biological information mentioned (e.g., invasive species, food chains, life cycle.) "Producer" or "consumer" not enough to boost to a four.

Figure 2

Types of Ecological Interactions Mentioned Before and After Field Trip



station where students explored the nature of wetlands food chains. Each group was accompanied by a teacher or parent, and each station was monitored by one of the researchers with the exception of the nature walk.

On the Friday following the field trip experiences on Tuesday and Thursday, teachers administered the post-trip quick write (poQW) to students. This second quick write was identical to the first in all respects. In addition, a test with 21 multiple choice questions and 5 brief answer questions was devised by the researchers and modified and then approved by the teachers. The teachers administered this test a week after the field trip. Finally, one month later, teachers administered the end-of-year state standardized test, which contains language arts, math, science and social studies sections.

Results

Pre-Post Differences

To determine whether student responses to the writing probe changed after the field trip, results of all classes were pooled and analyzed using a paired-sample *t*-test. This analysis revealed a significant difference with a one-tailed *t*-test between mean scores before vs. after the field trip, $t(69) = 2.72$, $p < .004$, using only students who had participated in both administrations ($N = 70$). In addition, means were examined and paired sample *t*-tests were conducted between prQW and poQW scores for each class. These findings indicated significant increases for three classes and near significance for one more (see Table 1).

Because gains between the prQW and poQW could be attributed merely to a practice effect, we examined the data more closely for specific types of changes related to field trip content. First, we examined the types of organisms students mentioned and found that they cited more wetlands organisms on the poQW than on the prQW (see Figure 3). In particular, the number of organisms that live at the specific wetlands visited (e.g., alligator weed, tadpole) went up from 49% of the organisms mentioned on the preQW to 79% on the poQW. Wetlands organisms not found in this wetlands (e.g., lily pad, alligator, venus fly trap) and non-wetlands organisms (e.g., rose, dogwood) went down (from 23% to 15%). These differences were statistically significant, $\chi^2(2) = 43.5$, $p < .001$.

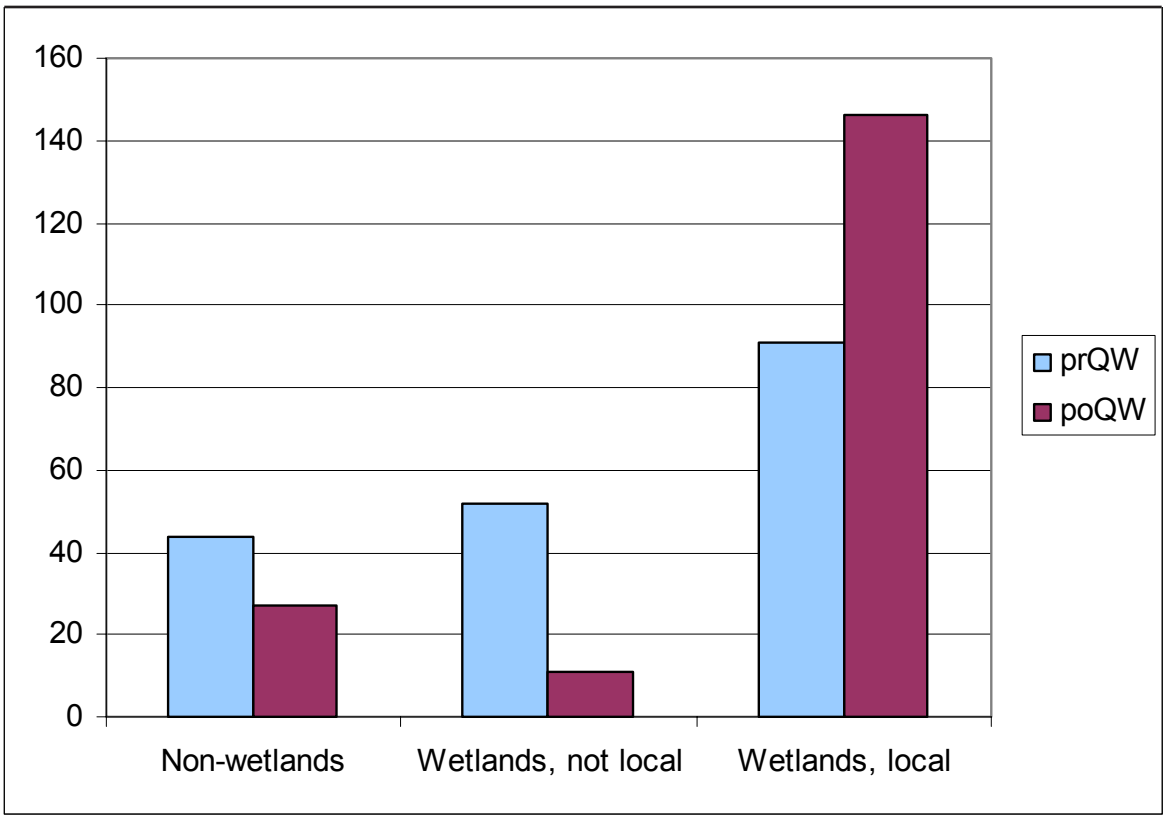
Table 1

Means and Significance Tests on prQW and poQW Rubric Scores by Classroom

Class	prQW Mean	poQw Mean	*t*
1	1.47	1.69	1.75, $p < .06$ ($n = 14$)
2	2.80	2.67	-0.64, $p < .73$ ($n = 14$)
3	1.94	2.56	1.90, $p < .05$ ($n = 16$)
4	1.53	2.14	1.85, $p < .05$ ($n = 14$)
5	2.15	2.64	1.91, $p < .05$ ($n = 12$)
All	1.96	2.33	2.72, $p < .004$ ($n = 70$)

Figure 3

Types of Organisms Mentioned by Students in prQW and poQW



Next, we examined the types of ecological interactions that students mentioned in the prQW versus the poQW (see Figure 2). For example, if a student wrote, "A duck eats algae," s/he described a trophic interaction between two organisms in the specific wetlands visited. Some students also mentioned competitive interactions such as: "Venus fly trap might eat all of the frog's flies." First, 58% of the students on the prQW and 48% of the students on the poQW found it difficult to describe an interaction between organisms, probably because describing an interaction requires a higher level of thinking than naming an organism. Nevertheless, the number of interactions specific to the local visited wetlands increased from 19% to 45% of the responses, and the number of interactions between wetlands organisms not found locally decreased from 18% to 4%. Numbers in some cells were too small to conduct a chi-square test of significance. Instead, we counted the number of responses (32 of 39 or 82%) that changed from prQW to poQW in a positive (rather than a negative) direction (sign test). This count yielded a two-tailed binomial probability less than .05 (with the expected result being 50% of the responses changing in a positive direction and 50% changing in a negative direction).

Relationship between Quick Writes and Other Measures

To examine the validity of the quick write measure, correlations were calculated between poQW scores and other measures related to student academic outcomes.

Quick writes and objective test. PoQW scores were first correlated with another measure of student outcomes related to the field trip, the 21-item objective measure. The correlation between students' poQW scores and the objective test was .29, $p < .02$. This relatively low correlation could be due to multiple sources of error in one or both of the measures, or perhaps it shows the quick-write provides unique information about student learning not reflected in the 21-item test.

Quick writes and state standardized achievement test. The poQW was not significantly correlated with the science score on the state standardized achievement test ($r = .17$, $p < .14$). The objective test correlated .41 ($p < .001$) with the science portion of the state standardized achievement test. This second correlation was likely higher because both measures use multiple choice items. Interestingly, the poQW score was most strongly correlated with the English total (reading + writing) score on the standardized test ($r = .40$, $p <$

.0004), most likely reflecting the writing demands of the quick write method. See Table 2 for correlations between poQW scores and other sections of the annual standardized test.

Table 2
Correlations between poQW and Scores on Annual Standardized Test

Standardized test section	*r*	*p*
English Total	.40	< .001
Writing	.25	< .040
Reading	.32	< .005
Math	.25	< .030
Science	.17	< .140
Social Studies	.17	< .140

Quick writes and demographic variables. None of the one-way ANOVAs between poQW and race/ethnicity, gender, and socioeconomic status (as determined by free/reduced lunch status) was statistically significant.

Classroom Administration Issues

To determine whether quick write scores varied significantly across the classrooms, a one-way analysis of variance by classroom was conducted on both prQW rubric scores $F(4,70) = 4.61$, $p < .02$), and poQW rubric scores $F(4,69) = 3.25$, $p < .02$). Both were statistically significant. The significant effect for classroom in these analyses, as well as patterns within certain classrooms noted during scoring of QW responses, suggested classroom differences in preparation for and administration of the measures related to the field trip. For example, examining the average length of responses by classroom suggested to us that some teachers may have provided students

more time than others because both prQW and poQW responses for some classrooms were much longer than for others (e.g., mean number of words for Classroom 2 was 91.3 and 88, while the mean number for Classroom 4 was 24.3 and 21.8 (see Table 3).

Table 3
Mean Word Counts on prQW and poQW by Classroom

Classroom	prQW Word Count	poQW Word Count
1	46.3	39.0
2	91.3	88.0
3	45.1	45.5
4	24.3	21.8
5	52.5	49.7

Note. A one-way ANOVA conducted on prQW word count means by classroom yielded an F of 18.25, $p < .0001$. The same analysis on poQW yielded an F of 16.89 ($p < .0001$).

These patterns produced a significant one-way ANOVA for mean word count by classroom on both prQW and poQW. In fact, our hunch proved correct. When queried, the teachers indicated that they had altered the agreed upon 15-minute time limit for both quick writes. One had students write for 20 minutes, one for 10 minutes, and one for 5 minutes. We therefore concluded that these differences accounted for the variations in word count. *T*-tests on differences between prQW and poQW word counts for each classroom were not statistically significant, suggesting that teachers were consistent in time allocations within their own classroom on prQW and poQW.

Analysis of the types of organisms mentioned across classrooms also revealed interesting trends. These data show considerable variation across classrooms in both the types of wetlands organisms mentioned and the total number of organisms mentioned. For example, nine students in one classroom mentioned alligators on the prQW and one mentioned them on the poQW. In another class, six students mentioned lily pad on the prQW but only one mentioned them on the poQW. These findings suggested that teachers may have provided prompting beyond the standardized instructions initially agreed upon. Similarly, the total number of organisms mentioned would be expected

to be twice the number of students responding. Variations in this number may suggest variation in teacher diligence in having students meet the goals of the assignment.

To determine whether the classroom variations on the word counts and on the QW scores were a result of higher achieving students in some classes, rank orders of means on all of the science achievement measures were compared in Table 4. Visual inspection of this table reveals that no class consistently scored higher or lower than others across measures. In fact, no class had the same rank on all three measures, and only two classes had the same rank on two measures.

Table 4
Comparison of Mean Scores on Three Measures Across Classrooms

Class	PoQW Mean (*SD*)	Rank order	Objective Test Mean (*SD*)	Rank order	Standardized Science Mean (*SD*)	Rank order
1	1.69 (1.02)	5	16.5 (.71)	1	2.29 (.22)	3
2	2.67 (1.11)	1	14.8 (.79)	3	2.50 (.23)	2
3	2.56 (.96)	3	13.4 (.82)	4	2.00 (.22)	4
4	2.14 (.86)	4	13.1 (.76)	5	2.56 (.23)	1
5	2.64(.91)	2	14.9 (.82)	2	1.93 (.23)	5

Discussion

Despite the non-standardized testing conditions between prQW and poQW, significant gains were exhibited by the students in three of the five classes. In addition, the increases in specific organism names and interactions between them mentioned by students are another important source suggesting learning gains. Based on these analyses, we conclude that quick writes are a promising method for measuring the impact of field trips. These findings add to the developing body of literature suggesting that quick writes may be a useful assessment tool for classroom teachers (Bass, 2003).

The relationships between quick writes and other student achievement variables were moderate but promising. For example, the brief quick write essay was significantly correlated with an objective test on similar but not identical content. The strong relationship between the English score and the

poQW reflects the significant writing skills required by the quick write method. Positive correlations between the quick writes and these measures suggest that quick writes address important aspects of content potentially useful to teachers in gauging student understanding.

The evidence of variations in responses by classroom in word count and time allotted, suggests that administration of the quick writes was not consistent across classes. Currently in education, accountability is stressed, and the variety of measurements of student outcomes has mushroomed. Hand-in-hand with the accountability emphasis should come an appreciation of the need for control in educational measurement for valid data to be collected, especially if the same measure is administered across time. Teachers rarely conduct classroom activities requiring strict control of variables, so the importance of such factors may not be obvious. In the present study, the evidence suggests that standardization was not a prominent concern of the participating teachers.

In addition, the class variations in rank on the three science achievement measures and the frequency of certain organisms within certain classes on the prQW suggest the possibility of varying amounts of "coaching" by teachers. Holding review sessions and revisiting material periodically are both commonly recommended pedagogical practices. However, complexity and nuance are involved in ensuring that student outcome measures reflect actual mastery of the content and are not unduly elevated by variations in such teacher practices. Few published data address the issue of teacher compliance with rules of any sort for such classroom assessment practices; however, teacher anxiety over student performance on standardized tests is commonly referenced (Richter, 2003; Toppo, 2003). Opening a dialogue regarding best practices surrounding preparation for and administration of classroom assessment, especially when using a repeatable measure such as quick writes, is also an important direction for future research and instruction.

Although beyond the scope of the current study, the present data also suggest that quick write responses could serve as a valuable formative assessment tool for teachers. For example, noticing that 48% of the students could not describe an interaction between organisms after explicit instruction on this topic provides potentially important information valuable for planning instruction. Discussions with teachers participating in the present study revealed that, for a variety of reasons, they did not feel ownership of these

data and did not use them formatively. In future research using quick writes, working with teachers to detect patterns in responses and to note gaps in student understanding for remediation is a priority. Research has shown that support for teachers embedded in everyday details of their ongoing activities is an effective approach for influencing beliefs and practices (Borko, Mayfield, Marion, Flexer, & Cumbo, 1997). However, the use of written work may not be seen as a valuable assessment tool for assessing student understanding (Maclellan, 2004). Thus, a key component of this process will be focusing on relating quick write activities conceptually to other ongoing assessment practices. In addition, helping teachers examine their implicit beliefs about assessment and what makes it useful may also provide motivation for modifying practices (Graham, 2005).

Our work also raises several issues about the implementation of quick writes as a method for examining the impact of field trips or other instruction. Our scoring used an imposed rubric with prQW and poQW scored separately. We noticed that relatively small changes in the rubric could significantly influence scores. We also noted evidence in the student responses of learning unrelated to specific interactions between a plant and an animal (e.g., "algae pollutes the wetlands," or "algae eats fertilizer and helps the wetlands by cleaning them"). These observations suggest that a paired-sample scoring design, where the teacher compares responses across time for each student relative to the learning goals, might provide a more accurate and informative measure of what was learned than focusing on a specific score. Issues such as common timing for the prQW and poQW, the need for similarities in prior instruction without "coaching," and the need for adequate training of teachers, should also be addressed explicitly in situations where quick writes are administered several times across a unit to monitor impact of instruction.

References

Bass, K. M. (2003). *Monitoring understanding in elementary hands-on science through short writing exercises.* Unpublished doctoral dissertation, University of Michigan.

Baxter, G. P., Bass, K. M., & Glaser, R. (2001). Notebook writing in three fifth-grade science classrooms. *Elementary School Journal, 102*, 123-140.

Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan, 80,* 139-144.

Borko, H., Mayfield, V., Marion, S., Flexer, R., & Cumbo, K. (1997). Teachers' developing ideas and practices about mathematics performance assessment: Successes, stumbling blocks, and implications for professional development. *Teaching & Teacher Education, 13* 259-278.

Graham, P. (2005). Classroom-based assessment: Changing knowledge and practice through preservice teacher education. *Teaching and Teacher Education*, *21*, 607-621.

Green, S., & Smith, J., III. (2005). Small things draw big interest: Introducing microscopes to third-grade science classes. *Science and Children, 42*(4), 30-34.

Koran, J., Koran, M., & Ellis, J. (1989). Evaluating the effectiveness of field experiences: 1939-1989. *Vistitor Behavior, 4,* 7-10.

Lomax, R. G. (1996). On becoming assessment literate: An initial look at preservice teachers' beliefs and practices. *The Teacher Educator*, *31*, 292-303.

Maclellan, E. (2004). Initial knowledge states about assessment: novice teachers' conceptualizations. *Teaching and Teacher Education, 20,* 523-535.

Mertler, C. (2005). Secondary teachers' assessment literacy: Does classroom experience make a difference? *American Secondary Education, 33*(2), 76-92.

Orion, N., & Hofstein, A. (1994). Factors that influence learning during a scientific field trip in a natural environment. *Journal of Research in Science Teaching, 31,* 1097-1119.

Pace, S., & Tesi, R. (2004). Adult's perception of field trips taken within grades K-12: Eight case studies in the New York metropolitan area. *Education, 125,* 30-41.

Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education. (2002). Washington, DC: NCATE.

Richter, A. (2003). Teacher stress rising, but venting helps. *District Administration, 39*(12), 12.

Rudman, C. (1994). A review of the use and implementation of science field trips. *School Science and Mathematics, 94,* 138-141.

Stiggins, R. J. (1991). Relevant classroom assessment training for teachers. *Educational Measurement: Issues and Practice*, *10*(1), 7-12.

Stiggins, R. J. (1999). Evaluating classroom assessment training in teacher education programs. *Educational Measurement: Issues and Practice*, *18*(1), 23-27.

Stiggins, R. J. (2002). Assessment crisis: The absence of assessment for learning. *Phi Delta Kappan, 83*, 758-765.

Toppo, G. (2003, April 23). Teachers, not just students, find anxiety in testing. *USA Today.* p. 9D.

Wise, S. L., Lukin, L. E., & Roos, L. L. (1991). Teacher beliefs about training in testing and measurement. *Journal of Teacher Education*, *42*(1), 37-42.