

WHAT DOES CREATING A SCIENCE PORTFOLIO
SHOW STUDENTS ABOUT THEIR LEARNING?

by

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STATEMENT OF PERMISSION TO USE

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April 2012

DEDICATION

I want to thank my wife for her love and support as I worked on this project.

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ABSTRACT

Teachers are often surprised to find that their students have forgotten material that they demonstrated mastery of on a recent assessment. To address this issue, many teachers attempt to give students more meaningful encounters with course material through various types of alternative assessment. This study examines the effects of creating an assessment portfolio on student achievement and compares alternative assessment strategies to traditional assessment strategies. During the study students reflected on assessments that they completed and created a portfolio to show what and how they learned. Students completed surveys and interviews to determine how they felt these assessments helped them to learn.

INTRODUCTION AND BACKGROUND

Project Background

Teaching and Classroom Environment

I have taught fifth through eighth grade science at St. Bernard School in Bellflower, California for the last nine years. St. Bernard School is a private pre-k to 8 Catholic School with a diverse student population of 146 students. The class sizes are small, ranging from 12 to 23 students in each of my classes. The study was conducted in the sixth grade class, which has a high energy level and is extremely creative and playful, all of which mesh well with my teaching style. This is the class' second year with me, so they are familiar with my teaching style and expectations. Moreover, I am familiar with their learning needs and what teaching techniques are most effective at helping them to learn; this class does well with a lot of interaction and excels at presentation-based assessments and learning games.

Problem Statement and Focus

Over the course of my teaching career, I've utilized a variety of assessment types. I relied heavily on traditional paper and pencil tests and quizzes to assess my students' learning during my first year of teaching. I was shocked to learn through class discussion that many of my students, even "A" students, had forgotten several key concepts only a few days after they had been assessed. I decided that my assessments should not only assess my students' learning, but also help support it. Since then, I've used a mix of traditional and alternative assessments in my classes. I have noticed that students seem to retain knowledge for quite some time after I began to employ this strategy.

Because I teach the same students for four consecutive years, I am afforded the ability to informally assess how well my students retain knowledge over a long period of time. In addition to this, many of the alumni from my school have described their high school science courses as “easy” and “mostly review.” I’ve interpreted these statements to mean that my students remember what they’ve learned in my class well into high school.

I feel that alternative assessments effectively support learning because they force students to reflect on and apply content knowledge instead of merely memorizing it. I would like to see if I can take things a step further and give my students an additional meaningful encounter with course materials by having them reflect on their learning by creating a portfolio.

This study entailed my students creating a portfolio consisting of assessments they have completed to demonstrate their mastery of course objectives. My focus question is: Does creating an assessment portfolio support student learning? As a means of answering this question, I need to learn whether creating a portfolio changes students’ views toward assessment, how students feel about assessment techniques, and how the results of alternative assessment compare with more traditional assessment methods.

CONCEPTUAL FRAMEWORK

According to Gardner and Hatch (1989) there are seven different types of intelligence (Logical- mathematical, Linguistic, Musical, Spatial, Bodily-kinesthetic, Interpersonal, and Intrapersonal) and children begin to show strengths and weaknesses in some of these areas as early as age four. Although Gardner (2006) himself and many

critics of multiple intelligence theory, including Sternberg (1999) and Waterhouse (2006), cite a lack of empirical evidence, it has been embraced by educators and has been used for the basis of instructional design at all levels of academia (Smith, 2008). If consideration is given to multiple intelligences through differentiating instruction, it is logical to assume that assessment should also reflect these differences. Traditional paper and pencil tests target only the Logical-mathematical and Linguistic Intelligences, but alternative assessments can potentially target them all.

Alternative Assessment refers to any assessment that is not a traditional pencil and paper test (Doran, Chan, Tamir, & Lenhart, 2002). These include various types of presentations, portfolio assessments, performance assessments, and authentic assessments. The terms “performance assessment” and “authentic assessment” encompass a wide range of activities and are often used almost interchangeably (Palm, 2008). Besides appealing to multiple intelligences and differing learning styles, alternative assessments are effective tools because they also serve as a learning activity. Wilson (2006) says that instruction that fosters learning includes constant feedback from imbedded assessments that serve as a learning activity and formative assessment.

Alternative assessments benefit students by giving all learners the opportunity to truly demonstrate what they know in a creative and enjoyable format. These activities give students another encounter with course material in a meaningful way, and as Kamen (1996) points out, help instruction and assessment to merge. These assessments help students to apply concepts and prepare for adult life. As Wiggins (1990) said, “The best tests always teach students and teachers alike the kind of work that most matters; they are enabling and forward-looking, not just reflective of prior teaching.”

Nicaise, Gibney, and Crane (2000) performed a study on student perceptions of alternative assessment. The study collected data from observations, interviews and an examination of classroom materials in three aerospace high school courses. Most of the students described the course as hands-on and based on real world skills. Their research also showed that students benefitted more from smaller, student-driven projects than the central project of the course, a mock space shuttle mission. This research did, however, show that having a class perform several small, student-driven projects overextends the teacher; many students felt that they would have benefitted from more instructor interaction, which was unavailable.

Another study of interest was conducted by Yildirim (2004), who focused on the perceptions of students and teachers toward assessment in Turkey. The study collected data from questionnaires and interviews from social studies students and teachers at various high schools. The study found that teachers were only somewhat satisfied with their traditional assessments (mostly short answer and essay questions) and students did not feel that these tests adequately reflected their understanding.

These studies support both the use of alternative assessments in my classroom and the methods I would like to use to answer the questions posed by my action research project. Each of the studies collects data from surveys and interviews. Both of these methods seem appropriate for assessing how different assessments may or may not support student learning.

Brualdi (1998, para. 2) says that performance assessment “provides teachers with information about how a child understands and applies knowledge.” This can refer to “almost anything” (Palm, 2008, p.3), including creative drama, written responses, and

many more. In the science classroom, these often come in the form of inquiry labs where the process of problem solving is assessed (Solano-Flores & Shavelson, 1997). Ascher (1990) argued that these types of assessments were more equitable for disadvantaged students and enriched the education of all students. Bowers (1989) recommended that performance assessments replace standardized tests for the purpose of evaluating student and school achievement. Slater (2011) agreed, commenting that performance assessment excels at evaluating processes and the understanding of concepts. He did, however argue that it is best used alongside other assessment types, because it is poor at assessing knowledge of facts.

Wiggins (1990) describes authentic assessment as assessment that presents a student with an open-ended problem that mirrors the complexities of real-life challenges. Authentic assessments include a wide range of techniques, including electronic portfolios (Glaser & Prestidge, 2000), mock space shuttle missions (Nicaise, Gibney, & Crane, 2000), creative drama, and interviews (Kamen, 1996), provided they mimic experiences from outside of school.

There have been several studies on the use of authentic assessment in the classroom. Kamen's case study (1996) on the effects of a fourth grade teacher implementing authentic and performance assessment showed very positive results. He collected data from student achievement, videotaped instruction/ assessments, and interviewed students, the teacher, and administrators. Kamen found that both the teacher and students felt that they learned well and preferred to use the alternative assessments, such as scrapbooks, drama, logs, and interviews, to traditional ones because they felt they helped to support learning and were more representative of student achievement.

Portfolio assessments have several benefits for both students and instructors, as they improve communication with parents, promote student self-assessment, and aid teachers in individualizing instruction (Benson, 1998). Moreover, Tiwari (2003) showed that creating portfolios had several positive outcomes, including increased understanding, increased interest in learning, and spontaneous student collaboration on preparation for assessments. In order to ensure validity and reliability of student portfolios, Driessen (2005) stresses the need for standardization, performance criteria, and utilizing multiple evaluators to assess the portfolios. Creating a portfolio will give students the opportunity to reflect on how they are learning as they are learning. This should give students new insight into themselves as learners and help them discover ways to improve their understanding.

METHODOLOGY

The research methodology for this project received an exemption by Montana State University's Institutional Review Board and compliance for working with human subjects was maintained. It involved my students creating an electronic portfolio consisting of several assessments. These assessments demonstrate their mastery of course objectives. My focus question was: Does creating an assessment portfolio support student learning? I also wanted to learn how students feel about various assessment techniques and how alternative assessment methods compare with more traditional assessment methods.

Participants

The sixth grade class had 18 students, 10 boys and 8 girls. The class had 11 Hispanics, 4 Asians, and 3 African Americans. Compared to the average for the school, the class had slightly more Hispanics and less Asians than the average. Fifteen of the students speak a language other than English at home, including Spanish, Tagalog, Bicol, and Ilocano. Eight of the students received free or reduced lunch.

Intervention

The intervention involved students creating an electronic assessment portfolio as a means of helping them reflect on their learning. They created their portfolio using assessments they complete during two units of course material. After each assessment, they completed a reflection log, found in Appendix E, to determine what that assessment showed about their learning. Both the original assessment and these reflections were included in an electronic portfolio created using Microsoft Power Point.

The students created their portfolio during Computer Lab, a one hour block of time on Wednesdays. They updated it with the assessments they completed and reflected on over the past week, giving the students the opportunity to add to their portfolio on a regular basis.

The first unit was on fossils and geologic principles. This unit contained an assortment of assessments, including a traditional test, three quizzes, a presentation on fossil formation, and a performance assessment on relative dating. There were three quizzes, one given at the end of each section. Each quiz consisted of questions based on the reading and class discussion from the previous section. The unit concluded with a summative test consisting of multiple choice, matching, and short answer questions given

at the end of the unit. The presentation involved students creating a short piece of creative drama to demonstrate the process of fossil formation. The performance assessment for this unit of study was a three day project on relative dating. On the first day students “cooked” several batches of play-dough in class. On the second day students used their play-dough to create models of rock layers, including various types of unconformities and intrusions. Other groups reconstructed the order in which the layers, intrusions, and unconformities were created on the third day. The same content was assessed through both traditional and alternative assessment methods so that comparisons could be made.

The second unit covered in the intervention was on Earthquakes. This unit contains a variety of assessment types, including traditional quizzes, a traditional test, a performance assessment, and a presentation on a historic earthquake. The students took two traditional quizzes, each given at the end of section of the unit. Students also took a test consisting of multiple choice, matching, and short answer questions at the end of the unit. In addition to these traditional assessments students completed a performance assessment on earthquake triangulation at the end of the second section. The final project for the unit was an oral group presentation on a historic earthquake. This project assessed many of the same topics that are covered in the paper and pencil test, such as fault types, magnitude, plate tectonics, geographic location, and the relative preparedness of the affected area.

Data Collection

I collected data from a variety of sources, which are briefly outlined in Table 1.

Table 1
Data Triangulation Matrix

Focus Questions	Data Source 1	Data Source 2	Data Source 3
<i>Primary Question:</i> 1. Does creating an assessment portfolio support student learning?	Instructor observations and journaling	Student surveys	Student interviews
<i>Secondary Questions:</i> 2. Does creating an assessment portfolio change student perceptions of portfolio assessment over time?	Instructor observations and journaling	Student Surveys	Student interviews
3 Does creating an assessment portfolio change student perceptions of alternative assessment over time?	Student surveys and interviews	Student Reflection Journals	Instructor observations and journaling
4. How do alternative assessment results compare with traditional assessments?	Student surveys and interviews	Compare results of alternative and traditional assessments that assess same content.	Teacher observations/journaling

Before I began the intervention, I interviewed six students that represent a cross-section of my class. They were selected based on their ability to be open and honest with me. The interview questions can be found in Appendix B. I hoped to ascertain my student's general opinions about various assessment types, and which they feel they benefit from. I used the data from this interview to create a survey, found in Appendix C, which I administered before the intervention. This survey showed me how well my

interviewees represented my class and gave me a tool to measure whether my class' opinions of assessment changed over the course of the intervention.

I also kept a journal, which can be found in Appendix A, to have additional data to draw from. These entries were used to record my general observations and impressions on how the class reacted to each assessment. These included specific observations, such as "aha" moments when students gained understanding of a concept, or general impressions, such as a particular student or group of students seeming anxious or confused. I used these journals to support or refute what my students told me through their reflection logs, surveys, and interviews.

I also collected data from the reflection logs that my students completed. These logs asked students to reflect on what an assessment shows about their learning, both as they prepared for and completed the assessment. In order to encourage adequate reflection, sample answers were modeled before the first few journals. This data let me know if alternative assessments supported my students' learning and how they compared with traditional assessments. I hoped these logs would also show me if my students' views of assessment changed over the course of the intervention and whether or not the process of making a portfolio has helped my students to learn about how they learn.

I also analyzed the assessments my students completed as a data source. All of the material assessed by the alternative assessments was also assessed by traditional assessments. I compared how my students performed on different assessments of the same concept to determine if these assessments would yield similar results.

After the intervention was complete, I collected data from a post-survey and interview. I used the information I've gained from the student reflection logs and my

observations to modify the pre-survey and create a post-survey, located in Appendix F. This showed me whether or not their attitudes toward assessment changed over the course of the intervention. I used this data to create an exit interview, found in Appendix D. This gave me a detailed explanation of why my class' views of assessment did or did not change.

DATA AND ANALYSIS

I used the data I collected to attempt to answer my focus questions. I collected both quantitative and qualitative data from a variety of sources. Taken together, they have enabled me to draw some meaningful conclusions to my questions.

Creating an assessment portfolio supports student learning.

My first claim is that creating an assessment portfolio supports student learning by helping them reflect on and improve their study habits.

The strongest evidence for this claim comes from my post-surveys. The fourth free response question on the survey asked students what they learned from making a portfolio. Student responses to this question are summarized in Figure 1. Although 11% of my students felt that they learned nothing from making a portfolio, one of these two students wrote "I haven't learned anything. I still know that I study every night & I still HATE quizzes and tests." The other simply put "Nothing." 45% of my students described some way they needed to improve as a student. Typical comments that fell into this grouping were "I need to study more" and "I learned from making a portfolio that I must concentrate because I have a limited amount of time and I don't always finish." Another 33% said that making their portfolio showed them what they had learned.

Typical responses from this grouping are “The things I did in the (Trimester)” and “That you just put all your grades in a portfolio and you get to see it later if you need it.” These responses are further explained during the exit interviews, which are discussed later.

Another 11% stated that they learned “how to make” a portfolio.

Responses to survey question “What have you learned from creating a portfolio?”

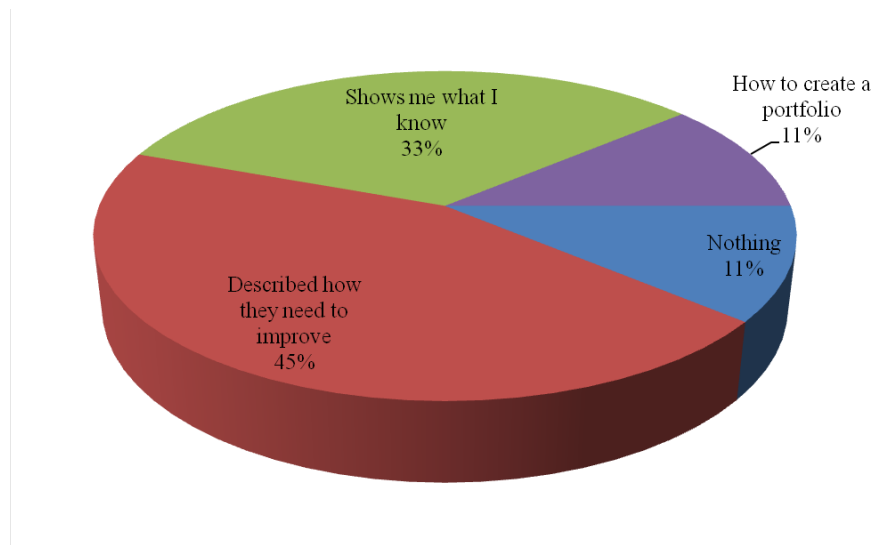


Figure 1. Student responses on post-intervention survey to the question “What have you learned from creating a Portfolio?” (N=18).

The exit interviews also support my claim that creating portfolios help students improve their study skills. One of the students who stated that creating a portfolio showed him what he learned on the post-survey also said that he had to “be honest.” After further discussion, he said that he had to be honest about how much he studied, which made him study more. One student commented how making a portfolio helped him realize what his areas of strength and weakness are, and that he would use this information to better prepare himself in the future. Two other students said creating their portfolios helped them realize what they should spend more time studying for in preparation for a test (by thinking about what they knew or didn’t know on quizzes).

Additional support for this claim comes from my journals and the student's reflection journals. Student comments on their journals early in the intervention tended to read something like "need to study more" and shifted to entries like "studied enough," or "I practiced a little every night" toward the end. A few comments were similar to "I actually studied and I got a A this time!" I also noticed that students seemed to be better prepared for assessments later in the intervention and even appeared to be more focused during class time prior to the final test that was included in their portfolio.

Although I am convinced that making their portfolios helped my students improve their study habits, there is another possible explanation. The end of my intervention coincided with the end of the second trimester, so my students could have been motivated to improve their grades just before report card time. I doubt this though, because although many students mentioned grades on their reflection journals, grades were not really discussed on their surveys and interviews, and those that did mention grades in the interview used them as an easy evaluation of their learning- one student said "If you get an A that shows you learned the material," rather than a goal to strive for.

I also discovered that portfolio assessment is a useful tool for students to review what they have learned.

The students' responses to "What have you learned from creating a portfolio?" have already been illustrated in Figure 1, but they support this claim as well. 33% of the class stated that creating a portfolio helped them review what they learned. Although only a third of the class, it is a high number for a free-response question. Another 22% (they were grouped into the "described how the need to improve" group) described how their portfolio showed what they didn't understand, which helped them know what to

focus on while preparing for a test. I asked a few follow up questions for these two issues in the post-interview.

When asked, all of the interviewed students said that they felt that portfolios could help them review. One student who disliked making her portfolio due to the repetitive nature of the reflection journals admitted “Yeah, I have to give it that. Like if I did bad and I have to study harder, it told me to study more.” Another student commented “Yeah, they help me memorize what I learned. It can help me remember what to study and I can probably remember it for another week or two weeks.” Two other students told me they wished I had let them print out their portfolios so they could use them to study at home. Another student went on to say that portfolios show “what you should work on or if there’s gaps in your learning so I can ask you.”

My own observations and journals also show that portfolios can be useful tools for review. I had several students ask me if they could review their portfolios to study a few days before each of the tests. I also noticed students were flipping through their notebooks as they completed their reflection journals after assessments. When I asked them what they were doing they told me they were highlighting things they missed or had trouble with so that they could study them for the end of unit test. I have never noticed this behavior from my class before, and haven’t seen it in any of my other classes either.

Other explanations could be that only a minority of my class views their portfolio as a review tool or that I’m misinterpreting some of the written responses on the survey. As an example, one student answered the question “what have you learned from creating a portfolio” by writing “that you just put all your grades in a portfolio and then you get to see it later if you need it.” I interpreted this to mean that the student felt he could look

back into his portfolio if he needed to review something, but I could be wrong. However, the fact that all of my interviewees stated that they felt that their portfolio could be useful for them to review convinced me that my initial interpretations were right. It seems that portfolios can be a useful tool for students to review both what they have learned and what they still need to learn.

Creating a portfolio helped students form opinions toward portfolio assessment.

Creating a portfolio has helped students to form opinions about portfolio assessment.

Two of the questions on the Likert Scale portion of the pre-survey and post-survey were designed to gauge any change in my students' perceptions about portfolio assessment. The first question "Preparing for and creating a portfolio helps me learn" had a Mean score of 3.0 (Neutral) with a standard deviation of .97. The average score dropped to 2.9 with a standard deviation of 1.16 on the post-survey. Although the average decreased slightly, the change was not significant, $t(36) = .2883$, $p = .7748$. The second Likert Scale question about portfolios, "I like making portfolios" had a larger decrease. The pre-survey had a Mean score of 3.16, with a standard deviation of .92. The post-survey average dropped to 2.88 with a standard deviation of 1.2. The difference between Pre-and Post- surveys was not significant, $t(36) = .8072$, $p = .4294$. Both averages are also very close to "neutral." Although the Likert Scale questions do show slight differences on the Pre and Post Surveys, these changes are explained by the interview data.

My interviews revealed that although my students had relatively neutral opinions both before and after the intervention, their opinions did shift from having no opinion to

having a mixed opinion. In the pre interview, all six of interviewees stated that they had yet to form an opinion about portfolios. These responses ranged from “It depends on what it is. It might be fun” to a more positive undecided response “okay, cause most of the things we do to learn is pretty fun. It’s probably gonna be fun, cause, I’m giving it to you. Yeah.” The responses on the post-interview were much more descriptive. Four out of six students described what they viewed as the positive and negative aspects of creating their portfolios. The negative comments centered around the reflection journals, which were described as “boring,” “tedious,” and “repetitive.” One girl stated that although she could see how they might be helpful to other students “I didn’t get why I had to write how I prepared. I always study.” The fifth student stated that he liked making portfolios because they helped him memorize what he learned. When asked if he thought if the reflection logs were boring he answered “a little bit, but I didn’t really mind all that much.” The last student said that he liked creating his portfolio a lot and enjoyed the process. All of the students stated that they enjoyed creating the portfolios on the computer the most. Typical responses were “I like making portfolios but I did not like the papers (reflection logs) we had to fill out” and “I really liked putting everything into the power point.”

My observations and journals further support that student’s opinions towards portfolio assessment remained relatively unchanged during the course of the intervention. The students seemed unhappy about completing reflection journals after assessments, but the amount of complaints decreased as the study went on. Informal discussions with students revealed that they still disliked them, but felt that complaining did not help. Most students disliked the monotony of filling out the same questions on the reflection

journals frequently, but inputting this same information into the computer was enjoyable for them. The students also appeared to find value in creating their portfolio, by using words such as “useful,” “helpful” and “good for me.”

Although we discussed it in class prior to the intervention, none of my students had ever made a portfolio before, so they did not really have an opinion before we began. Surveys, interviews, and observations all reflect this. After the intervention, students seemed to have an an undecided opinion due to seeing both the strengths and weaknesses of the activity.

Creating a portfolio has helped students to form opinions about alternative assessment.

Creating a portfolio has helped students form opinions about alternative assessment.

Comparing the Pre and Post Survey results shows a few significant differences in how my students felt they learned from projects (defined in class as visual products such as posters, comic strips, etc.) and presentations (defined in class as skits, speeches, etc.). The average response to the question “Preparing for and creating a presentation helps me learn” was 4.72 (between agree and agree strongly) with a standard deviation of .57 on the pre-survey. This dropped to an average score of 4.0 with a standard deviation of 1.09 on the post survey. This is a significant difference. The responses to “Preparing for and creating a project helps me learn” experienced a similar significant decrease; changing from 4.61 with a standard deviation of .5 on the pre-survey to 4.13 with a standard deviation of .81 on the post-survey. Although statistically significant, both the pre and post- survey values translate to “agree” or “agree strongly,” showing that my students feel that they learn from alternative assessments.

The surveys also asked students from what type of assessment they felt they learned the most. The responses to this question can be found below in table 2. On the Pre-Survey, 55% of students reported that they felt creating presentations helped them learn the most. This number dropped to 33% on the post survey. The percentage of students who felt that creating a project helped them learn the most increased slightly, from 22% to 33%. Only 17% of students felt that studying for a test helped them learn better before the intervention; 22% thought so after. Finally, the students who believed that performance assessments helped them learn the best changed from 5% before the intervention to 11% after the intervention.

Table 2

Summary of responses to “What type of assessment do you feel helped you learn the best?” (N=18)

Assessment type	Pre- Survey	Post-Survey
Presentation	10	6
Projects	4	6
Tests	3	4
Performance Assessment	1	2

While these changes speak to my students’ opinions, the rationale provided on the surveys gives a more complete picture. In the pre-survey, a relatively large portion (39%) gave a response similar to “because it’s fun” for their rationale as to why a certain assessment type helps them to learn. 50% of the class did not give a reason why they felt a particular assessment type helped them to learn. On the post-survey, only 17% gave “it’s fun” as their reason, and only 11% gave no reason. I attribute this change to the fact that students learned how to analyze what they have learned during the course of the intervention. This change could also be caused by the students realizing that all

assessment types aren't just fun and games, but require real time and effort over the course of the intervention. A few students even commented that creating their portfolio made them think about assessment for the first time on their post-survey; I followed up on this in my post interview.

All of the interviewed students explained that they never really thought about assessment before. They added that no one has ever asked them their opinions on the subject, except for two students who recalled informal conversations with me, as I frequently ask a few students about my assessments to get a quick, informal evaluation. Typical responses were "Never thought about it before we started it (portfolio assessment)" and "No one asked what I think about assessments, I just did this, this, and this (what the teacher told her to do)."

My journals and observations showed me that my students seemed pretty engaged in all of the assessments, but they seemed to enjoy alternative assessments more. The class tended to be the most nervous before a presentation, and the most focused before a test. Students also seemed much more vocal in casual discussion about classroom activities and assessment as the study progressed. I even had one student approach me trying to convince me that instead of taking a quiz, she should be allowed to make a puppet show because, as she said, "It's more fun and creative and I'll remember it better!"

Another explanation could be that my students got more comfortable both discussing and writing about assessment during my study. This would explain both my survey results and my journals/observations, but it does not explain the interview results,

in which my students stated that they had never thought about assessment before they began making their portfolios.

Alternative assessments can successfully assess some, but not all of the same things as traditional assessments

My study has confirmed that alternative assessments are poor at judging knowledge of content vocabulary and the recollection of facts.

During the intervention student's knowledge of vocabulary was assessed through both alternative and traditional methods, and yielded very different results. One alternative assessment, a group presentation on fossil types, was specifically designed to assess knowledge of vocabulary. Overall, the class did very well, as all groups demonstrated knowledge of all content vocabulary; the average score was 19 out of 20. On the quiz the next day many of the student's did poorly; the average score was a 13 out of 20.

Although there was no score assigned specifically for using content vocabulary on the earthquake presentations, its use was required to achieve a high score on the presentation. Every group used academic language and content vocabulary adequately during this assessment. The responses on the corresponding vocabulary section of the test were not quite as impressive, as the average for this portion of the test was 75%.

All of the interviewed students said that they remembered what they presented, but did not recall specifics from other parts of their group's presentation. Although they stated that they both preferred and learned more from alternative assessments, most (five out of six) said that they would use a test or a quiz to assess vocabulary if they were a teacher. Interestingly, the only interviewee who preferred traditional tests and quizzes to

alternative assessment said that she would assign a skit to assess vocabulary because “it really shows everything you know about a word.” When asked if they felt that they spent more time practicing for a presentation or studying for a test, four students said that they spent more time preparing for a presentation. Three of these students said that this was because everyone would know if they did poorly and did not want to “look stupid.” The last student in this group said that he spent more time preparing for presentations because “they’re harder for me.” The two students who said they spent more time studying for a test both said it was because tests are more difficult for them. One added “because you don’t really know what’s gonna be on it, so you have to study and read everything over and over again.”

My journals and observation show that alternative assessments seem to give students a “work around” to not knowing content vocabulary. Students showed that they understood several concepts without using the correct vocabulary during both presentations and performance assessments. In group presentations students only had to memorize a fraction of the vocabulary, as other group members presented the rest of the material. Students don’t need to use vocabulary on performance assessments, and can also explain a concept without using any vocabulary while creating a visual product. Another interesting observation I noticed is that students seemed to care more about alternative assessments, as evidenced by the fact that they spent more time preparing for them than for traditional tests and quizzes.

Another possible explanation is that my students were confused at the phrasing of the vocabulary questions on the test and quizzes. However, I doubt that because the phrasing on the vocabulary portion of the test is the same as is used in classroom discussion. The

quiz required students to write down a definition for each vocabulary word in a short-answer format, which eliminated any possible confusion.

My study also shows that performance assessments are superior at assessing the mastery of skills.

Comparing the results of performance assessments and traditional assessments showed that several students who performed well on performance assessments were unable to answer questions about the process. Closer inspection revealed that these were mostly (all but one) ELL students. As an example, one student was able to correctly interpret a p and s wave travel time graph, adjust these distances for the scale of the map, and triangulate the epicenter of an earthquake. The same assessment had a question that read “In the space below, describe 3 procedures you used to locate the epicenter of the earthquake. Answer in complete sentences.” This student answered “used the boxes and I counted it.” Another student who also correctly triangulated the earthquake responded “1. I use the compass. 2. I also use the calculator. 3. I also use my pencil and eraser.” Although 88% of my class could triangulate the earthquake, only 55% of my class could describe how they did it. This trend continued on the chapter test, as 66% of the class demonstrated understanding of how to triangulate an earthquake on a short answer question. These results were similar to the other performance assessment completed in the study. On the relative dating assessment, 94% of the class was able to correctly identify the relative ages of layers in diagram, but only 72% could adequately explain why, and only 55% could identify the geologic principals they used in the process.

When interviewed, students stated that they remembered how to complete the performance tasks that were assessed in class. Although only half of the interviewed

students (three) were able to explain how to perform the task accurately, all were able to actually perform the task (I had a rock layer diagram on hand at the time). A partial explanation for this is that ELL students may have had difficulty expressing themselves in English, but could still perform the task.

My journals showed that I was pleasantly surprised at how well my students performed on our two performance assessments. Some students who I thought were confused on the topic during class discussion completed the tasks with relative ease. One student who traditionally performs poorly on assessments was actually the first student done with the earthquake triangulation assessment. I also noticed that my ELL students did very well on these two assessments. Informal conversations with these students revealed that they enjoyed them.

The poor English language skills of some of my students may have interfered with my results. It may be as simple as ELL students don't need language skills to complete a performance task; they can remember the procedures in any language. The results could be skewed by the high percentage of ELL students in my class. Even if this is the case, I still feel performance assessment is a fair judge of their knowledge because it removes the language barrier as an obstacle for the teacher to learn what the student understands.

This study also shows that students remember more material from alternative assessments than traditional assessments.

Students reported on the short answer portion of their surveys that they learned more from all types of alternative assessments than traditional assessments, with the exception of performance assessment, which received a slightly lower score in the post survey. These results have already been summarized in Table 2. Only 17% of students felt that

tests supported their learning better than alternative assessments on the Pre Survey, but this number increased to 22% on the post-survey. The Likert Scale portion of the surveys (summarized in Table 3), however, tells a slightly different tale. On this section of the survey students rated all assessment types, with the exception of portfolio assessment as roughly equal in supporting their learning. The average scores for traditional tests, presentations, performance assessments, and projects all round to 4, or “agree.” Taking both the free-response and Likert portions of the survey into account, it seems as if students do feel that they learn better from alternative assessments, but not by much.

Table 3

Averaged Likert scores for how well students feel a particular assessment type helps them learn. (N=18)

Assessment Type	Pre –Survey	Post-Survey
Test	4.11	3.94
Performance Assessment	4.11	3.88
Presentations	4.72	4
Portfolios	3	2.93
Projects	4.61	4.13

During interviews, five out of six students said that they learned best from either performance assessment or presentations. All six felt that these assessment types supported their learning. A typical response to why they prefer presentations was “the way you get to express and show what you learn, it shows we can be varied, fun, educational... it allows you to be creative and express yourself with a wide amount of outcomes.” This statement also sums a trend that I noticed: the students felt that they learned from presentations and projects because they were able to be creative while completing the assessment. This helped them to remember the information and concepts being assessed. Three of the students also said that they using multiple “skills” at the same time helped them to learn. These “skills” refer to writing, artistic, and acting

abilities. Two students felt an added benefit of presentations was that they could also learn from watching other student's presentations. All of the students reported that they could still complete the tasks they learned for performance assessments, even if they could not explain how to perform the action. One student discussed how she leaned best from studying for a test, even though she also said that she disliked studying for them.

My journals and observations show some of the same trends. I begin most periods with a brief review of material. When reviewing content that had been assessed by an alternative assessment, students seemed more engaged and more of the class actively participated in the review activity. I interpreted this to mean that the students remembered more of the material.

I can think of a few alternate explanations for some of this evidence. For instance, my students could have been more responsive due to the fact that the alternative assessments were more enjoyable for the students. This "fun factor" could also explain why students rate alternative assessments higher than traditional assessments; they have used which one they liked better as a tie-breaker. I don't think this is the case, however. My students are pretty honest and in their interviews they were very clear that they felt that they remembered more from alternative assessments. The interviewed students were representative of my class. Their answers covered the breadth of responses on journal questions but not the frequency of those responses.

The data collection process for this study has been rewarding. I was able to collect the information from a variety of sources and, more importantly, develop lines of communication for discussing my students' learning with the class.

INTERPRETATION AND CONCLUSION

This action research project was designed to see in what ways portfolio assessment and alternative assessment support student learning. Data was collected to determine if student's perceptions of various assessment types changed as the study progressed, and to see if different types of assessment could assess the same things.

Portfolio assessment supports student learning in multiple ways. Reflecting on how they prepared for assessments allowed my students to learn where their study habits were lacking. Although some students learned that their study habits were already great, several students reported that the reflection process helped them to improve. An additional side effect I noted in my journals was that my students began to discuss how they studied with each other as they filled out their reflection journals. As an example, one student told me how she switched from "reading everything over and over" to having her mother help her study using a game that another student told her about. Students also used their portfolios to review their learning. Several students asked to see their portfolios to study, and all of the interviewed students felt that their portfolio could be a useful study tool. Moreover, my observation journals show that students began to spontaneously review their notes with each other after assessments, which they had not previously done. When asked why, most students responded with statements like "I want to make sure I don't miss anything" and "If you put it on the quiz, it's probably gonna be on the on the test too." These statements match with the survey results, in which students said that creating their portfolio showed them where their knowledge had fallen short. All in all, I feel that creating a reflective portfolio has greatly improved my student's preparation for assessments.

Creating a portfolio has forced my students to form an opinion about portfolio assessment. None of my students had created a portfolio before the intervention. Although they profoundly disliked the reflection journals, my students eventually saw their benefits. My observations, student surveys, and student interviews all showed that students enjoyed creating their portfolios in Microsoft Power Point, and the freedom of design that the program allows. Although I feel that the benefits to students outweigh the fact the reflection logs are “boring” and “repetitive,” I would recommend that I either use a shorter reflection sheet or have students reflect less frequently. When I asked my students their opinion on the subject during interviews, all of the interviewed students agreed that less frequent reflection was preferable, and would eliminate the repetitiveness of the activity.

Creating a portfolio has given students an opportunity to form opinions about alternative assessment. Students reported that they had never thought about assessment on both surveys and interviews before the intervention. My journals also show that students became more accustomed to discussing assessment as the study progressed, even to the point where they tried to persuade me to change the type of assessment they were going to have. My data also shows that students prefer alternative assessments that allow them to be creative and express themselves in a verbally or visually unique way. But that they also agree that this is not the most effective way to assess every topic.

I’ve also learned that there is no one ideal assessment, just an ideal assessment for the situation. Based on the observation in my study, traditional assessments were the best at judging the knowledge of facts and vocabulary. Performance assessments were best used to determine a student’s ability to perform a task or perform an action.

Presentations and visual projects were best used to assess a student's understanding of a concept. Students reported that while all assessment types help them learn, projects and presentations are the most effective at helping them learn; this could also be due to the fact that students reported spending more time preparing for these assessments.

VALUE

Completing this project has allowed me to investigate my assessment techniques in a new way, and given me insight into how my students learn. Although I've always had informal discussions with students about their learning, the answers I received were not nearly as detailed as those I received during interviews or surveys. For this reason I plan on continuing to use surveys and interviews with my students to continue to get information to allow me to continue to improve my teaching and their learning.

The action research process has also changed my views on assessment. To be totally honest, I preferred alternative assessment methods to traditional methods prior to the intervention. Although I still used several traditional assessments, I felt that alternative assessments were better both in how well they assessed what my students knew and in how they helped them learn. I have a new found respect for traditional assessments, as they excel at assessing certain aspects of learning, such as vocabulary, where other assessments seem to perform poorly. To draw an analogy, my view of assessment has shifted to be like tools in a tool box. Just as every tool has a specific function, so does each assessment. I've also begun to incorporate performance assessment into traditional tests so that I can assess multiple things at the same time (like

a multi-tool, to continue the analogy). I feel that this is a good approach and utilize the best assessment type for the content that is to be assessed.

I have also learned that reflection is a powerful tool to help students grow as learners. Having students reflect on what they did well on and what they needed to improve on had beneficial results. Most students want to succeed and do well, but some are at a loss for how to improve besides to “try harder.” Reflection gives them the opportunity to learn what exactly it is they need to do to learn. In my case, at least, this also led to a classroom culture where communication between students and the teacher was open and honest, so we could figure out how to help each other improve.

When I was designing this project I decided to use electronic portfolios for two reasons: we have nearly unlimited electronic storage; and my principal wanted me to investigate the feasibility of establishing school-wide electronic portfolios. The general idea is that we would have a collection of every student’s work from Pre-K until they graduated in the eighth grade. This would allow us to assess both each student’s growth and our teaching from year to year. The only technical problem I encountered was that I had hoped to have students include video of them in their portfolios, as the Jr. High teachers all have the students give presentations quite frequently, but the network slows to a crawl (and the video does not play at all) when multiple people are working with video at the same time. This makes students working with video nearly impossible. Nevertheless, my principal was encouraged by my results, and decided to go ahead and implement the plan. Unfortunately, she is leaving the school this year, so we are getting a new principal next year, and I will have to discuss benefits of implementing these portfolios.

My study did, however, leave me with some more questions. During the study, I noticed that my ELL students did surprisingly well on performance assessments. I would like to explore this idea further, to see if it was just chance, or if performance assessments really “level the playing field,” so to speak, with native English speakers. At the same time, I wonder if relying on performance assessment will hamper these students’ language acquisition. Another interesting observation I made was that my students viewed the reflection logs and creating the portfolio in computer lab as two distinct things. I wonder if reflection without creating a portfolio would have similar results to my study. The final question this study brought up has to do why my students reported learning more from projects and presentations. They reported both learning more and spending more time preparing for these assessment types. Although it seems common sense, I would like to learn if there is a direct correlation between how much time a student spends preparing for an assessment and how much they learn.

Using a research based action research process has greatly benefited my teaching. I, like many teachers, have relied heavily my “gut feeling” to gauge the effectiveness of techniques used in class. All too often this gives an incorrect or incomplete picture of their students’ understanding. Analyzing data in an action research project has allowed me to draw meaningful, correct conclusions about the effectiveness of the strategies I employed. I will continue to use this process in the future so that I can grow as a teacher. I would also encourage all teachers to use a data analysis so that they can truly understand how their practices are affecting their student’s learning, and why this is happening. I feel that this process has been extremely useful to me, and should be used more widely in teacher-training programs.

This capstone project has been greatly rewarding for myself and my students. Not only has it improved my teaching in the short term, but it has given me a tool to continue to grow as an educator. As my high school basketball coach, Milo Ortiz, used to make us recite: “Good, better, best. Never let yourself rest until your good is your better and your better is your best.”

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APPENDICES

APPENDIX A

TEACHER JOURNAL REFLECTION FORM

Journal Reflection Form

Date: _____

Assessment _____

Overall, how did you feel the assessment went today?

Overall, how did the students seem to react to today's assessment? (Did they seem anxious, excited, etc...)

Did you see any evidence that this assessment supported student learning?

Did you hear any interesting remarks about the assessment?

Do you have any additional comments to make?

APPENDIX B

STUDENT PRE-INTERVIEW

APPENDIX C

PRE-PORTFOLIO SURVEY

Pre-Portfolio Survey

Please answer the following questions about our recent portfolio project honestly using the scale below. Participation in this research is voluntary and participation or non-participation will not affect a student's grades or class standing in any way.

	Disagree	Disagree	Neutral	Agree	Agree
1. Preparing for and taking a test helps me to learn.	1	2	3	4	5
2. Preparing for and completing a performance assessment helps me to learn.	1	2	3	4	5
3. Preparing for and giving a presentation (speech, skit, song, etc.) helps me to learn.	1	2	3	4	5
4. Preparing for and creating a portfolio helps me to learn.	1	2	3	4	5
5. I like taking tests and quizzes.	1	2	3	4	5
6. I like completing performance assessments.	1	2	3	4	5
7. I like giving presentations (speech, skit, song, etc.).	1	2	3	4	5
8. I like making portfolios	1	2	3	4	5
9. Preparing for and completing projects helps me to learn	1	2	3	4	5
10. I like completing projects	1	2	3	4	5

Short answer questions:

What type of assessment do you feel is the fairest judge of your learning? Why?

What type of assessment do you enjoy doing the most? Why?

Which assessment do you feel helped you learn the best? Why?

APPENDIX D

STUDENT POST-INTERVIEW QUESTIONS

APPENDIX E

ASSESSMENT REFLECTION LOG

Assessment Reflection Log

What did you do to prepare for this assignment?

What does this assignment show about your learning?

In what ways did this assignment help you to learn?

What are the strengths of this assignment?

What are the weaknesses of this assignment?

On a scale of 1-10, how would you rate this assignment? Why?

APPENDIX F

STUDENT POST-SURVEY

Post-Portfolio Survey

Please answer the following questions about our recent portfolio project honestly using the scale below. Participation in this research is voluntary and participation or non-participation will not affect a student's grades or class standing in any way.

	Disagree	Disagree	Neutral	Agree	Agree
1. Preparing for and taking a test helps me to learn.	1	2	3	4	5
2. Preparing for and completing a performance assessment helps me to learn.	1	2	3	4	5
3. Preparing for and giving a presentation helps me to learn.	1	2	3	4	5
4. Preparing for and creating a portfolio helps me to learn.	1	2	3	4	5
5. Preparing for and completing projects helps me to learn.	1	2	3	4	5
6. I like taking tests and quizzes.	1	2	3	4	5
7. I like completing performance assessments.	1	2	3	4	5
8. I like giving presentations.					
9. I like making portfolios.					
10. I like completing projects.					

Short answer questions:

What type of assessment do you feel is the fairest judge of your learning? Why?

What type of assessment do you enjoy doing the most? Why?

Which assessment do you feel helped you learn the best? Why?

What have you learned from creating a portfolio?

Do you think that making a portfolio has changed your opinions about assessment?

Please explain.