

The Use of Electronic Portfolios in an Elementary Mathematics Methods Class

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Abstract

*This article describes how one midwestern university developed and sustained electronic portfolios to evaluate preservice teachers' achievement of objectives for a math methods course and required field experience. Additionally, the authors share the template and scoring rubric they have implemented in their courses. Feedback from preservice teachers enrolled in the methods courses/field experience suggests that the electronic portfolio is beneficial in encouraging reflective practice, enhancing technology skills, and understanding instructional methods that may be applied in future classroom teaching. Moreover, the instructors identify other positive aspects associated with the assignment such as increased retention of course material and motivation toward learning content with understanding.*

Traditionally, many preservice teachers tend to view mathematics assessment as quizzes and tests along with grades for homework exercises. According to the National Council of Teachers of Mathematics Assessment Principle (National Council of Teachers of Mathematics, 2000, p. 22) assessment should “support the learning of important mathematics and furnish useful information to both teachers and students.” Rather than administering a test at the end of instruction, assessment should be viewed as an integral part of teaching. Gathering information about students’ mathematical understandings and misconceptions can be done through many alternative forms of assessment, such as interviews, performance tasks, and portfolios. In a content-specific methods course it is essential that teacher educators provide meaningful opportunities for learning about effective instructional strategies, including assessment methods, if the expectation is for new teachers to be able to apply the methods in their own instruction (Liebars, 1999).

### Background

In education, portfolios were first unveiled as an assessment method for determining student learning in K-12 schools. More recently, universities have implemented portfolios in an effort to document their students’ learning for accreditation purposes (Bullock & Hawk, 2001; Wetzel & Strudler, 2006). This accountability has led to the incorporation of performance products, such as electronic portfolios, into many teacher preparation programs (Bullock & Hawk, 2001).

An electronic portfolio, also referred to as an e-folio, is a purposeful collection of work (Sosin & Pepper-Sanello, 2008). The individual’s progress and achievements, which are captured electronically, are exhibited for one or more areas of expertise. Shulman (1998) recommended, “Portfolios include not only the documentation of teaching, but the documentation of student learning. In the ultimate nirvana, the very best teaching portfolios will consist predominantly of student portfolios.” Portfolios have become useful partners in testing and evaluating skill sets of teachers. In teacher preparation programs, portfolios may be used to document a preservice teacher’s acquisition of knowledge and teaching as well as his/her ability to teach (Bullock & Hawk, 2001). Preservice teachers may create a teaching portfolio that contains evidence of their knowledge, skills, abilities, and dispositions of their teaching at various stages of development.

Electronic portfolios can be Web based or formatted using other digital media such as a CD. E-folios in education represent a teaching candidate’s accomplishments by showcasing teaching, learning, and reflective artifacts (Costantino & Lorenzo, 2002). The electronic portfolio broadens the typical paper-pencil format by including artifacts that may potentially blend audio, video, graphics, and text. In addition, hypermedia links can be used to connect specific content standards to various artifacts.

There are many benefits associated with the electronic format. First, the e-folio allows preservice teachers to demonstrate their technological competence (Costantino & Lorenzo, 2002). With an electronic format, the portfolio becomes more widely accessible and is easy to duplicate. When reviewing the e-folio, the audience experiences a multimedia presentation rather than passively reading about a preservice teacher’s accomplishments (Wyatt & Looper,

2004). Wolf and Dietz (1998) found that hiring personnel favored the use of electronic portfolios, citing such benefits as better representation of candidates' perspectives, practices, and teaching talents.

In portfolio development, reflection is the key component (Bullock & Hawk, 2001, p. 31). Reflection helps a preservice teacher both discover and document their changing views and knowledge of teaching. In a survey of midwestern K-12 principals, nearly 57% indicated they would like to view a portfolio artifact with evidence of reflection on teaching experiences in a teaching candidate's portfolio (Strawhecker, Messersmith & Balcom, 2007).

As early as 1933, Dewey (1985) proposed the importance of reflective thinking that is paramount in the education of preservice teachers. Reflection should be an integral part of a teacher's preparation and practice and needs to be experienced throughout the entire learning and teaching process (Holm & Horn, 2003). Dunn (2005) contended that the process of engaging in critical reflection requires a paradigm shift as well as causes a considerable amount of disequilibrium on the part of preservice teachers, but that this is necessary for the broadening of their vision for teaching mathematics in diverse classrooms. In order to develop into an effective teacher, teachers need to become more thoughtful about their practice (Bullock & Hawk, 2001). Having preservice teachers reflect on their experiences is extremely important for developing strong teachers of mathematics, and for helping those teachers abandon ineffective teaching methods they experienced as students during their elementary years. McIntyre, et al (1996) also asserted that increased practice in field experiences *without* reflection failed to lead to professional growth.

In addition to preservice teachers' reflection on their field experiences, reflection is also important in terms of what preservice teachers learn in their course work. McDiarmid (1990) noted that purposeful experiences paired with reflection opportunities could help preservice teachers attend to key learnings and establish a more immediate need for knowledge. Soto-Johnson, Iiams, Oberg, Boschmans, and Hoffmeister (2008) found that active reflection helped preservice elementary teachers reinforce their conceptual understanding of mathematics and articulate their teaching intentions for their future classrooms. Moreover, McCarthy's study (2008) suggested that preservice teachers' views of reflection in their mathematics classes were positive and valuable to future instruction.

### Context

The university committed to renewing the teacher education program in the late 1990's. Seven key "rocks" guided the development of the renewed program, with one of the guiding rocks labeled as Field-Based Programs. Support from a tri-partite team (comprised of faculty from K-12 schools, Arts and Sciences, and Teacher Education) led to what is now known as the Math Methods Field Experience, a hands-on, school-based experience involving work with elementary-aged children and hosted by one local partner school. Two other co-requisite courses are taken concurrently with the field experience, the methods course and also a mathematics content course. The methods course/field experience is taught and supervised by teacher education faculty, with faculty from the math department responsible for instruction of the content course.

For the preservice teachers, this mathematics “block” typically represents their first field experience working directly with children. For this reason, pairs of preservice teachers work with pairs of children on approximately 10 Fridays throughout the semester. The small group design more readily provides opportunities for preservice teachers to focus intently on what the child says, thinks, and does with regard to mathematics. With larger groups of children, preservice teachers with limited classroom management skills may focus more on management issues rather than on the mathematical thinking of children.

In two separate half hour sessions, preservice teachers partake in grade-specific math partner games with first grade students and later third grade students. The math methods instructors provide materials and directions for the partner games while the preservice teachers prepare and practice the games outside of class.

As one preservice teacher directs the math game session, the other takes extensive notes in an attempt to document students’ understandings and misconceptions. These observations are recorded on designated field note forms that include important glossary terms, specific to each mathematical concept. In addition to taking notes, the preservice teacher captures digital pictures of events to support his/her notes. Midway through a session, the preservice teachers switch roles and a second math game is introduced to the pair of children.

As the semester progresses, preservice teachers begin to work individually on the required math methods e-folio. The template and scoring rubrics for the e-folio are found in Appendix A; the first page of the assignment showcases a preservice teacher’s philosophy about teaching mathematics that was written on the first day of class. For the next three pages, the preservice teachers compose their “artifact write-ups” for each of four specified areas of study: Early Number Sense, Problem Solving, Basic Facts, and Effective Teaching Methods. The format for artifact write-ups include: 1) pictures of a child involved in the mathematical process and/or a student’s work sample from the session; 2) a paragraph describing the context in which the artifact was created, including the math concept being studied and relevant details about the activity; 3) a paragraph describing how the artifact shows what the student understands and does not understand in regard to a particular math concept. In this paragraph, preservice teachers are to demonstrate command for two different glossary terms. Over the past five years, the e-folio assignment has evolved so as to allow authentic assessment of many of the course and field objectives, including: develop awareness of methods of teaching mathematics in a diverse classroom setting; identify and use problem solving strategies appropriate to various problem situations; understand the importance of a developmentally appropriate curriculum with activities in mathematics which make children curious about learning; develop meaning for the operations by modeling and discussing a variety of problem situations related to the operations (basic fact development); understand the role of technology in teaching mathematics; understand the importance of using manipulatives to teach mathematical concepts; reflect on individual teaching practices to improve instruction and guide professional growth; and select or develop appropriate methods of classroom assessment.

## Methods

The researchers began with the following question:

What is the meaningfulness of the e-folio assignment from the perspective of the preservice teachers?

Qualitative data were collected after grades were posted at the conclusion of the Spring 2009 semester and again at conclusion of the Summer 2009 session. Of 57 students, 25% were emailed a short series of five reflective questions with regard to the e-folio experience in Math Methods I. The students included in this sample were purposefully selected based on their reflective capacity demonstrated throughout the semester. In addition, unsolicited comments were also collected via university-required teaching evaluations from the three sections of Math Methods students.

## Findings

At the conclusion of the semester, preservice teachers were asked to reflect on five questions pertaining to the e-folio assignment. The length of the individual responses varied, but the overall sentiment of the feedback was very positive. A sampling of the responses collected from the past two semesters are included in Appendix B.

One such finding uncovered through the responses related to a course objective, “Understand the importance of a developmentally appropriate curriculum with activities in mathematics which make children curious about learning.” Through reflection and exposure to the various resources used in the field preservice teachers gained perspective on the impact curricular materials have on student learning as well as insight into differentiation of instruction. In addition, the preservice teachers also revisited the various teaching methods presented throughout the semester as they reflected on an individual choice for the *Effective Teaching Method* section of the e-folio. This reflection allowed for more purposeful thinking about the use of manipulatives, technology, mathematical games, and children’s literature while encouraging the abandonment of ineffective teaching methods from their past (Bullock & Hawk, 2001). The above findings solidified the alignment between course objectives and the assignment.

With the Every Day Counts Partner Games (Gillespie & Kanter, 2005), preservice teachers easily selected an alternative method of assessment aligned with the NCTM Assessment Principle (NCTM, 2000). Many preservice teachers observed and documented the performances that transpired during a mini-session. Additionally, the preservice teachers gained invaluable experience asking questions to determine what a child understands or does not understand. By collecting artifacts over time, the preservice teachers also acquired perspective on how a math portfolio works. The capstone of these assessment experiences had preservice teachers analyzing children’s mathematics work collected over a semester.

During the final weeks of the semester, preservice teachers shared a short presentation of their e-folio as a celebration of their learning and accomplishments. Viewing the assignment

from this vantage seemed to help most of the preservice teachers relax and share. The methods instructors reported a boost in preservice teachers' confidence in their readiness as a future teacher of mathematics during the e-folio presentations. For many preservice teachers, being in the role of "teaching" their peers made a drastic difference in how they viewed themselves. For preservice teachers, presenting their e-folios verbally and electronically appeared to enable them to crystallize and strengthen their thinking. These presentations were positive experiences both on the part of instructors, and more importantly, for the preservice teachers.

### Discussion

Preservice teachers' involvement in the development of their math methods e-folios provided many benefits. Findings included those observed by instructors, as well as written comments from preservice teachers. In general, the math methods e-folio experience has enabled preservice teachers to gain better command of the concepts and related terminology presented in the course. With a relevant context in which to apply their math methods learning, the preservice teachers had many more opportunities to grapple with the complex concepts of number sense, basic facts, and problem solving. This growth in understanding was evident in class discussions as well as on preservice teachers' performance on the final exam. Another lifelong benefit included the opportunity for the preservice teachers to develop and use higher level thinking skills. This occurred as they evaluated the children's work, which comprised much of their e-folios, and as they synthesized their knowledge of key concepts and terminology in the accompanying artifact write-ups. Moreover, both content and methods instructors have noted an increase in preservice teachers' motivation toward learning since the e-folio assignment has been implemented.

As instructors, the additional data gathered via student comments allowed a further analysis of the effect of the e-folio assignment from a student's perspective, which addresses the research question of this study. The instructors learned that most of the course objectives and goals of the assignment were also apparent to the preservice teachers, such as reflecting on individual teaching practices, selecting appropriate methods of assessment, and developing an awareness of methods of teaching mathematics in a diverse classroom setting. Instructors were able to evaluate which course objectives were omitted, including the specific use of technology or manipulatives. This came as a surprise as each weekly session involved a concrete model and on occasion, the use of computers or calculators. Interestingly, some other relevant teaching skills surfaced, which included the role of communication during mathematics, lesson planning to include appropriate objectives and communication with parents to report student progress. Lastly, the most common challenge shared by the preservice teachers dealt with technological issues. In the future, this is expected to improve the findings are communicated with the instructors of the sophomore – level education class, which focuses on technology skills.

### Conclusion

Preservice teachers' written feedback summarized the impact of the e-folio assignment and solidified the observations documented by the course instructors. One prominent theme from the comments pointed to the role of reflection, which is consistent with one of the objectives for the course. Holm and Horn (2003) contended that reflection be integrated into a

teacher's preparation and continually practiced. Additionally, the comments from the preservice teachers reiterated how specific assessment methods are utilized with the children and several comments speculate about how these strategies will be beneficial to their practice in the future. If the expectation is for new teachers to be able to apply various methods in their own teaching, it is important that teacher educators provide meaningful opportunities for learning about the methods (Liebars, 1999).

With regard to preservice teachers' futures, instructors have witnessed an increase in scores on the final exam for the course, which is believed to be correlated with the meaningful, higher-level work they do with the e-folio assignment. Furthermore, preservice teachers have begun a professional portfolio in that they have documented a beginning philosophy about teaching elementary school mathematics coupled with analyses of student work in a desired, electronic format (Wolf & Dietz, 1998).

The development of the e-folio assignment for the Math Methods course and field experience has evolved over the past five years. This model may be easily adapted for use in other content-methods courses in teacher preparation. With two course instructors, there was the opportunity to collaborate on a regular basis and modify small aspects of the assignment over time to get to this current stage of development with the e-folio. Therefore, an e-folio in the beginning stages of development may warrant more areas of concern and fewer noticeable benefits for preservice teachers. Another potential limitation includes instructor bias, as we are the primary investigators describing the e-folio's implementation based partially on our observations. Finally, the e-folio assignment has prescribed artifacts and formatting; however, other forms of portfolios in education typically allow for more student choice. This has potential to skew preservice teachers' views of the potential uses of portfolios in an elementary classroom.

As a follow-up study, teacher educators who use portfolios as a type of assessment could conduct research to determine whether or not portfolios are used in K-12 classrooms of former preservice teachers. Additionally, research methods used on a larger scale could be utilized to further analyze the impact of the e-folio assignment on preservice teachers' beliefs and/or learning.

Appendix A  
e-folio Template

|  |  |                             |                                  |
|--|--|-----------------------------|----------------------------------|
| <b>Math Methods e-folio</b>                                  | <b>Fall 2009</b>                                 |                             |                                  |
| (NAME)   |  |                             |                                  |
| <a href="#">Early Number Sense</a>                           | <a href="#">Problem Solving</a>                  | <a href="#">Basic Facts</a> | <a href="#">Teaching Methods</a> |
| <a href="#">Initial Philosophy Statements</a>                | <a href="#">Concluding Philosophy Statements</a> |                             |                                  |
| <b>Initial Philosophy Statements</b>                         |  |                             |                                  |
| (date written)   |  |                             |                                  |
| 1. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| 2. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| 3. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| <b>Concluding Philosophy Statements</b>                      |  |                             |                                  |
| (date written)   |  |                             |                                  |
| 1. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| 2. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| 3. I believe<br>Therefore as a teacher of mathematics I will |  |                             |                                  |
| 1  |  |                             |                                  |

**Math Methods e-folio** **Fall 2009**  
(NAME)

[Early Number Sense](#) [Problem Solving](#) [Basic Facts](#) [Teaching Methods](#)  
[Initial Philosophy Statements](#) [Concluding Philosophy Statements](#)

## Early Number Sense

Artifact (date collected)

Artifact Title:  
Child's Name:  
Grade Level:

During this activity ...

This artifact shows ...

2

Scoring Rubrics

| <b>Initial Philosophy Statements Rubric</b> | Proficient  | Progressing  | Beginning  |
|---|---|--|--|
| <b><u>Visual Appeal</u></b>                 | *DATE has been changed <u>Spring 2009</u><br>* NAME has been changed to <u>first and last name</u>  | *Missing one criterion from the level 2 performance.     | *Missing both criteria from the level 2 performance.           |
| <b><u>Statements</u></b>                    | * All Statements are numbered and typed exactly as on back of <u>Personal Data Form</u> (with the exception of spellchecking/word omission) |  | * Statements have been modified.                               |
| <b><u>Conventions</u></b>                   | *Almost no grammatical, spelling, or punctuation errors. (2 or less)  | *A few grammatical, spelling, or punctuation errors. (3) | Many grammatical, spelling, or punctuation errors. (4 or more) |

| <b>Instructor-Approved Artifact</b>   | <b>Proficient</b>   | <b>Progressing</b>  | <b>Beginning</b>   |
|---|---|---|--|
| <b>Visual Appeal</b> <i>must have an appropriate artifact (refer to the Portfolio power point)</i>  | <ul style="list-style-type: none"> <li>* Headings have been correctly modified</li> <li>* Artifact and Artifact Write-Up on page</li> <li>* Photographs are date stamped</li> <li>* Artifact is neatly displayed</li> </ul>   | <ul style="list-style-type: none"> <li>* Two of the criteria for Visual Appeal are met</li> </ul>   | <ul style="list-style-type: none"> <li>* <b>Inappropriate artifact is displayed</b></li> <li>OR</li> <li>* None of the criteria for Visual Appeal are met</li> </ul>   |
| <b>Conventions</b>  | <ul style="list-style-type: none"> <li>* Almost no grammatical, spelling or punctuation errors (2 or less)</li> </ul>   | <ul style="list-style-type: none"> <li>* A few grammatical spelling, or punctuation errors. (3)</li> </ul>  | <ul style="list-style-type: none"> <li>* Many grammatical, spelling, or punctuation errors. (4 or more)</li> </ul>   |
| <b>Artifact Collection</b><br>(During this activity...)<br>* Use language at an acceptable level for that of a Math Methods student<br><b>**4-6 sentences</b> | <p><b>Specifically describes the context in which this artifact was created, including the math concept being studied and</b></p> <p><b>**relevant details</b> from the activity.</p>   | <p>* Somewhat describes the context in which this artifact was created, including <u>either</u>:</p> <ul style="list-style-type: none"> <li>- <b>math concept</b> being studied</li> <li>- <b>**relevant details</b> from the activity</li> </ul> | <p>* Inadequate description of the context in which this artifact was created, fails to address:</p> <ul style="list-style-type: none"> <li>- <b>math concept</b> being studied</li> <li>- <b>**relevant details</b> from the activity</li> </ul>                          |
| <b>Analysis of Artifact</b><br>(This artifact shows...)<br>* Use language at an acceptable level for that of a Math Methods student<br><b>**4-6 sentences</b> | <p>* Specifically describes what can be seen about the student's understanding or lack of understanding <u>within this artifact</u>.</p> <p>* Analysis paragraph is validated by details <u>found in Field Notes</u></p>  | <p>* Somewhat describes what can be seen about the student's understanding or lack of understanding <u>within this artifact</u>.</p> <p>(Strays from what is seen in the actual artifact.)</p>  | <p>* Does not describe what can be seen about the student's understanding or lack of understanding <u>within this artifact</u>. (Does not refer to artifact.)</p> <p>* Analysis paragraph cannot be validated <u>through Field Notes</u></p>                               |
| <b>Word Choice in Analysis of Artifact</b><br>(This artifact shows...)  | <ul style="list-style-type: none"> <li>* Properly uses (<b>Bolds and underlines</b>) exactly 2 <i>Instructor-Approved Glossary Terms</i> in the Analysis paragraph (demonstrates clear understanding of each term)</li> <li>* Analysis paragraph is validated by details <u>found in Field Notes</u></li> </ul> | <ul style="list-style-type: none"> <li>* Properly uses (<b>Bolds and underlines</b>) 1 <i>Instructor-Approved Glossary Term</i> in the Analysis paragraph (demonstrates clear understanding of the term)</li> </ul>                               | <ul style="list-style-type: none"> <li>* Did not properly use <i>Instructor-Approved Glossary Terms</i></li> <li>* <i>Instructor-Approved Glossary Terms</i> not bolded/underlined</li> <li>* Analysis paragraph cannot be validated <u>through Field Notes</u></li> </ul> |

### Concluding Philosophy Statements Rubric

|  | Proficient  | Progressing  | Beginning  | Beginning  |
|--|---|--|--|--|
| "I Believe ..." statements                                   | All 3 belief statements are specific to Math instruction, are complete and aligned with TE311 instruction | 2 of the 3 belief statements are specific to Math instruction, are complete and aligned with TE311 instruction | 1 of the 3 belief statements is specific to Math instruction, is complete and aligned with TE311 instruction                             | None of the 3 belief statements are specific to Math instruction, are complete and aligned with TE311 instruction              |
| "Therefore, as a mathematics teacher I will..." (actionable) | All 3 statements are complete, actionable and aligned with TE311 instruction                              | 2 of the 3 statements are complete, actionable and aligned with TE311 instruction                              | 1 of the 3 statements is complete, actionable and aligned with TE311 instruction   | None of the 3 statements are complete, actionable and aligned with TE311 instruction   |
| Terminology and Language Usage                               |   |  | Uses terminology and language at an acceptable level for that of a student who has nearly completed Math Methods.                        | The use of terminology and language is NOT at an acceptable level for that of a student who has nearly completed Math Methods. |
| Growth from Initial Philosophy Statements                    |   |  | Considerable growth between <i>Initial Philosophy Statements</i> and <i>Concluding Philosophy Statements</i>                             | Very Little growth between <i>Initial Philosophy Statements</i> and <i>Concluding Philosophy Statements</i>                    |
| Typing of Statements   |   |  | All Statements are typed exactly as on the TE311/13 Concluding Philosophy Statements (with the exception of spellchecking/word omission) | Statements have been modified.   |
| Conventions  |   |  | A few grammatical spelling, or punctuation errors. (1 or less)   | Many grammatical, spelling, or punctuation errors. (2 or more)   |

## Appendix B

### Math Methods Preservice Teachers' Survey Responses to Questions

#### 1) *What do you believe was the purpose of the Math Methods e-folio?*

- I believe the purpose of it was to help us understand the terms and to reinforce the concepts we learned while in class.
- The Math Methods e-folio shows your work with a student using all the tools and strategies you learn from class. It helps the student with hands-on learning. True learning occurs as you are the teacher and also because as the teacher you learn about teaching strategies and what concepts the student is learning.
- I think the e-folio was used to help us reflect on the learning or absence of learning that was happening with our students and to analyze the strategies (our students) used.
- I believe the purpose of the Math Methods e-folio is to learn to observe and interact with your students at the same time.
- I believe the purpose of the e-folio was to help Math Methods students learn how to describe and analyze their experiences in the classroom. Basically, this gave us a chance to reflect on how the sessions went, what the students did and didn't understand, or what we could have done better. The e-folio gave us a way to do some evaluation, so that we can do better in the future.
- I believe that the Math Methods e-folio is multipurpose. The e-folio demonstrates the depth of understanding that was attained by the Math Methods students. This is a helpful assessment tool for both the students and the instructors. It can also be a useful addition to the students' educational portfolio. Preparing the e-folio helps the Math Methods students to organize their thoughts and relevant data that they have collected. It also aids the education students in learning how to assess elementary students and in assessing themselves. The Math Methods e-folio is a necessary tool for this course.
- I believe that the e-folio was a tool for us to reflect on what we were teaching, how the child was learning, and to have a closer look at where our children were skill wise. Concentrating on one area really caused me to look deeply at those three things (Early Number Sense, Problem Solving, Basic Facts).
- I believe that the purpose of the Math Methods e-folio was to encourage us to reflect on the different mathematical concepts that we were learning, and to review on the different methods that the children use. It also helps us to look at the differences in learning styles among children.

#### 2) *What did you learn by completing your Math Methods e-folio?*

- I learned how to plan better for my student so I could show their true potential and understanding of the concepts. For me as the student I learned about problem solving and letting children brainstorm for themselves. At times I thought some of the problems were too hard for our students. To my amazement I was wrong and I didn't give the students enough credit. One main thing I took from that is always making sure to plan on how to extend and challenge the student with the activity. It is always best to be over planned.
- I learned what each term meant and how I used it (through) working hands on with a child. I learned the importance of having objectives for lessons.

- The e-folio helped me to reflect on each skill the students were learning. It was nice to be able to look at exactly what they did or didn't know and be able to extend or bring down the material. The e-folio overall was a very important reflection tool.
- I found that the more I took notes and began writing, the more I understood my math buddies. It felt like as I analyzed their understanding, I could tailor the games to them. Essentially, working on the e-folio helped me to focus on my buddies and learn how to teach to the individual child, which I think is incredibly important.
- I learned a great deal while preparing my e-folio. Preparing this e-folio taught me how to prepare for lessons, how to manage time, what and how to assess, and the value of both written and spoken communication skills.
- I learned by completing it that it helps to look back and reflect on what I have been learning. By having an artifact, I learned that sometimes the best reflection comes with a visual to help refresh my memory.
- I approached the e-folio presentation with some trepidation. However, my concerns quickly faded once the presentations started. I do believe that a quick presentation of one's e-folio is a great learning and communication tool for us as Math Methods students. The sharing was as beneficial to us as it is to elementary students learning mathematics.

**3) *How might you be able to use these skills as a "real" teacher in the future?***

- I know now that there are resources for me to use as a teacher and that I can plan and carry out lessons for young children.
- First I think having a math portfolio for students helps the teacher really analyze where the child is at on their concepts and then plan so we can help children grow in their math skills. Second, I think it is awesome to be able to show the parents their child's knowledge and growth.
- The math methods e-folio really made me think about skills in which I will use when I become a "real" teacher. For instance, in the e-folio, I looked at the students and reflected on what they could or couldn't do. I assessed their progress and the activity as a whole. The reflection aspect of the e-folio can also be expanded when I become a "real" teacher as I will take the information I gained from the student and plan activities that will further enhance the student's learning. The e-folio also instilled in me the knowledge in which to create belief statements about my teaching. This will be very vital as it will help guide my teaching.
- As a teacher I will use these skills to analyze and reflect on my students after observations in the classroom. These skills will help me to assess their needs and to differentiate my teaching practices.
- The skills that I learned in Math Methods I will help me in the future as a real teacher because I will be able to observe my students while interacting with them. Then I will be able to concisely summarize it and keep track of their progress, not only in math but across the spectrum.
- In the future, I will be able to use these skills by reflecting on the different lessons that I taught that day, and to notice and document the different styles of learning and levels of improvement.
- Preparing this e-folio taught me how to prepare for lessons, how to manage time, what

and how to assess, and the value of both written and spoken communication skills. All of these newly acquired skills will be utilized by me when I am a preschool teacher.

**4) *What was the most difficult part of the Math Methods e-folio?***

- The most difficult part was knowing if I was using the terms correctly. It was sometimes hard to put into words what I was seeing the child do.
- I think this was a fairly easy assignment. There is just so much information obtained from our field visits that it is hard to know what to include.
- Technology was my primary difficulty when preparing the portfolio. What should have been an easily maneuverable template became a nightmare for me. I don't know how the instructors could improve this; this was due to my weakness in technological knowledge. However, I did attain more knowledge in this area through the trial and error method.
- The most difficult part of the e-folio was in describing the artifact and using the math methods terms. I had problems staying within the current section when picking the terms that went best with the learning strategy of that artifact.
- The only thing that was difficult was getting information to fit into the format. One problem I had was that when I pasted a picture into the document I had to reformat everything to make it fit. I learned to type all my information in first and then paste in my pictures.
- Some of the topics were difficult on the second half as I was limited to the activities I could write on and I did not get good information in which to complete my portfolio. This was probably the most frustrating part of the assignment.

**5) *Is there anything else you would like to share with regard to the e-folio?***

- I think the e-folio was a good learning tool. It allowed me to see where my math buddies were developmentally and where they needed work. It also allowed me to reflect a little on how I could have changed my teaching style to better suit the students I was working with.
- The e-folio seemed like it would be a lot of work, but when I sat down and did it, it was easier than I thought it would be. I also liked the sessions where we took time to peer-review our portfolios.
- I enjoyed this assignment and think its a great tool for showing future teachers the various mathematical skill levels and situations they will come across. It really helps for reflection and analysis of students after observation.
- Just that a portfolio not only shows what the student can do, but (may) also show the successful strategies used by the teacher. Also that I think students could design their own format with guidance on what needs to be included.

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