

Chapter 5

Recommendations, Reflections, and Conclusions

Introduction

This study was designed to investigate the process of implementing a program of portfolio assessment in chemistry classrooms. The research questions addressed were:

- 1] How do the teachers define portfolios?
- 2] How do the teachers implement portfolios in their classrooms?
- 3] How do the teachers' definitions of portfolios change during the trimester when they initially implement the procedure?
- 4] What are the students' understandings of portfolios and how they are used?
- 5] How do the students' definitions of portfolios change over the trimester?
- 6] What do teachers and students believe portfolios represent regarding the learning that occurs in the science classroom? and
- 7] What do the data collected via this study demonstrate about portfolios as a valid means of assessing student progress?

An overall analysis of the data revealed qualitative differences regarding portfolio definitions and the stated value of portfolios for the students and the teachers. Teachers and students considered the use of portfolios to be valuable and useful. This value was defined in terms of student self assessment and evaluation, teacher assessment and evaluation, college admission, goal setting, promotion of student organization of notes and study materials, and recognition of student success versus student failure.

My Personal Reflections

In this section of my document, I try to encompass and synopsise the entire research process from my point of view. I strive to explain my growth as a researcher and my struggles during the research study and the entire doctoral process.

In Margot Ely's (1995) book, Doing Qualitative Research: Circles Within Circles, she interviews many of her students about their

experiences with qualitative research. Her students describe their journey in terms that are very familiar to me. Many use metaphors to describe their individual voyages. Each of their stories illustrate personal conflicts and individual learning. I, too, have struggled. I have struggled with the process of qualitative research from the beginning of my doctoral studies. My prior experiences with research were all quantitative. My strong background in the hard sciences only served to reinforce my prior beliefs that the only good and meaningful research was quantitative in nature.

My background in education, however, led me to question the concept of quantitative research superiority. This question set up a rather strong dichotomy in my own beliefs. During the entire research process, I grappled with the ambiguity associated with naturalistic inquiries. My need to control variables and not influence my findings caused me a great deal of anxiety because I wanted to do what was right and make the correct decisions.

I begin to realize that there were often multiple answers to my questions. I also started to understand how important my role was in the research as I began to see myself as an instrument in the research process. I now realize that the experiences I bring and my understandings of the phenomenon under study are important and need to be integrated into and interpreted as part of the entire research process.

The methods I used for conducting this study were consistent with the guidelines I outlined in Chapter 3 of this document. Quotations from transcripts or fieldnotes were used to support the conclusions. In some cases, statements were paraphrased to maintain confidentiality. Triangulation of data was achieved through the use of fieldnotes, interview transcripts, PMI charts, and student portfolios.

I discussed the data collection process, methods of data collection, and analysis with many of my colleagues, including other graduate students, committee members, and faculty in several disciplines. This continuous dialogue allowed me to learn throughout the entire process. Through extensive reading and this dialogue process, I learned how to plan a qualitative research study and how to collect various types of data in such a study. I also learned how to analyze and interpret the collected data.

The research process allowed me to begin to understand the “messiness” of qualitative research. The methodology and data collection had no clear cut boundaries. All decisions about the research were made by me with careful, thoughtful reflection on the guidelines presented by experts in the field of qualitative research. The very constructivist nature of qualitative research was troublesome at times for me and I still struggle with questions and finding answers to these questions. The study allowed me to more fully comprehend the existence of multiple realities. It also presented me with the challenge of interpreting and presenting these different realities in a coherent understandable manner.

During the planning and implementation of this research, I learned about designing qualitative research projects and I learned a great deal about the value of qualitative research while analyzing the data collected. Transcripts containing the voices of the participants contained more data than I could possibly analyze for a single study, so additional questions were formulated and archived for future analyses. These questions included inquiries focusing on assessment in a broader sense such as What do students and teachers think is the best way to assess learning in chemistry?

Implications

As a single, stand alone study, this document could be used as a model for guiding future schools in their quest for implementing an alternative program of assessment or other innovation. The research site was a small specialty school and was selected because of the progressive view the school has toward assessment. This factor, however, limits the generalizability of the findings of this research. Other factors limiting this study were time, capital and human resources.

The initial implementation of portfolios only occurred once in this school. Capturing this phase of the research project had to be completed during the first trimester. I spent as much time as I could at the site, but had I been able to observe everyday during this phase, I would have been able to collect additional data.

By conducting all the interviews and transcribing them all myself I

invested a great deal of time, but I came to know my data very well. Perhaps the use of additional human resources would have provided additional perspectives and/or more data.

As a result of using qualitative techniques for conducting this study, other researchers using similar strategies in the same setting but focusing on different questions could possibly produce different findings and reach different conclusions. Even though this study could be replicated methodologically, it would not yield the exact same findings due to the constructivist nature of the research and the individual nature of the research participants. Participants constructed their own realities and I interpreted these realities through my own cognitive frame.

Recommendations for MVGS

I have generated several recommendations for the teachers and students at MVGS. These recommendations are offered with regard to the current body of literature and the status of portfolios at MVGS during the research project. The recommendations include:

- Teachers should align sources of evidence with chemistry course competencies or objectives
- Teachers should have students attach individual captions to each piece of evidence included in the portfolio
- Teachers should increase the total percentage of the final grade allotted for portfolios
- Teacher should continue to use portfolios in their classrooms
- Teachers should be provided with a professional development workshop on portfolio assessment
- Teachers should implement portfolio conferences.

MVGS's curriculum is competency based, so the content of each subject area is divided into competencies. Under each competency is a list of enabling objectives. Tasks and assignments are designed around these objectives to allow students to obtain the information in each competency. I recommended that teachers at MVGS structure their portfolios so that evidence is aligned with competencies or objectives. At the completion of the course, the students would have a portfolio that reflects material learned in Chemistry organized around course competencies and/or objectives.

To illustrate this recommendation, I will address one Competency from the MVGS Governor's School Chemistry Competencies/Objectives 1996-1997 document included in Appendix H. Competency 4 states: Organize laboratory data using proper report and logbook format. Under this competency are several enabling objectives. One objective reads: "Write a simple laboratory report which includes title, introduction, experimental design diagram, procedure, results, and conclusion." During my many visits to various classrooms, I observed students actively engaged in laboratory activities where they were instructed to construct such documents as those described in this Competency and Objective. I recommend that students create portfolios that are organized around the Competencies or Objectives.

One way I see of accomplishing this would be for the teachers to have students provide evidences that support their acquisition of the knowledge and skills outlined in each of the competencies. Students could be given the choice of demonstrating any of the objectives delineated under each competency. The students would have the task of selecting evidence that demonstrates their comprehension of various competencies/objectives, thus making them active participants in the assessment process.

Another suggestion is the use of captions for each piece of evidence in the portfolio. The use of captions would clarify why each item is included in the portfolio and signify what skill/competency is evidenced by that item. Captions turn documents into evidence. They also would require the student to reevaluate their work and reflect on the learning involved. Captions would assist the teachers in portfolio evaluation by eliminating any questions about why pieces of evidence were included in the portfolio.

Teachers should increase the total amount of the final grade that portfolios represent. Currently, five percent of each students' grade is determined by the portfolio. If any of the other recommendations set forth are incorporated into the portfolio process then students will be spending more time working on portfolios. If the process is important, then it is reasonable to suggest that the grade reflect this importance. If portfolios are aligned with courses competencies or objectives, I suggest

increasing the total grade percentage to twenty-five percent. The portfolio produced would provide student created evidence that demonstrates skills and knowledge learned in the course. These skill and knowledge will be organized around course competencies or objectives.

Portfolios should continue to be used. As alluded to earlier, change is a process, not an event. Teachers and students are seeing benefits in the use of portfolios in Chemistry. The data collected via this dissertation study support that statement. Time will allow the portfolio process to evolve and become a more valued process.

Teachers at MVGS need to be exposed to the literature and research base on portfolio assessment. A professional development workshop on portfolios is suggested. The use of conferences as a part of the portfolio process needs to be explored by the teachers. My recommendation for an effective teacher development program would be for the teachers to identify their needs and a workshop should then be structured to allow the teachers access to information that addresses those needs.

A final recommendation would be for teachers to use portfolio conferences to assist students in setting future learning goals. These conferences are a positive student-teacher interaction that benefit both parties. Providing students with the opportunity to reflect on their learning experiences is an integral part of portfolio assessment. Conferences would meet this portfolio requirement. Portfolio conferences would allow the teacher to share evaluation responsibilities with the student, thus prompting student self reflection and self evaluation which are valuable outcomes of portfolio conferences.

Further Study

To expand the scope of this project and produce a more in-depth understanding of portfolio assessment at MVGS, there is more research that could be conducted. Additional interviews with the teacher and student participants may provide additional information regarding their stances on portfolio assessment. Math teachers at MVGS could be interviewed and their data could be incorporated into the present study. Since the student participants in this study are all compiling math portfolios, as well as, science portfolio, the math teacher's perspective on

portfolio assessment might add an additional dimensions to this study. Additional science teachers could also be studied to increase the amount of data collected, as well. More students could be interviewed, either individually or in focus groups. Parents might be interviewed about their understanding and views of portfolio assessment.

A longitudinal study could be used to follow students through the process of using portfolios as a tool for college admissions. Additional data collected from these sources would add other dimensions to this study. Another possible research project could focus on looking at the initial implementation of portfolio assessment at a different field site and comparing and contrasting the findings with the current research project.

Eggs ----- Caterpillars ----- Butterflies

As I reflected on the entire research study, I spent time thinking about the metaphor I selected to help tell the story of portfolio assessment at MVGS. The humble beginning with the pilot study equated to the tiny egg that would eventually become a butterfly. As the study progressed, the caterpillar emerged and matured as the portfolio implementation phases of the process progressed. The caterpillar began the process of change by enclosing itself in a chrysalis as the first trimester and in reality the first year of portfolio assessment came to a close. As for the adult butterfly emerging, that decision will be made by the teachers that continue to reflect and change the process of portfolio assessment at MVGS.