

Chapter 1

Introduction

The purpose of this study was to investigate the process of implementing a program of portfolio assessment in chemistry classrooms. This research focused on the implementation of portfolios as defined by the teachers and students of a small math, science, and technology magnet school. Three individual teachers and twelve students from their respective classes were the participants in the study in which teacher and student beliefs and perceptions about portfolios and their use as assessment tools were examined. One goal of this study was to help Mountain Valley Governor's School, hereafter, MVGS, look at this first year of portfolio usage, evaluate the process, and make any changes warranted by the data. The teachers in the study were unsure whether portfolios were worth the time and effort it took the students to compile them and for the teachers to assess them. The teachers were also uncertain whether the portfolio process was beneficial to the students. My analyses of the data suggest that portfolios are beneficial for the teachers and the students.

Authentic assessment, performance-based assessment and alternative assessment are currently popular topics in education at all academic levels (Adams & Hamm, 1992; Boyle, 1994; Brown & Irby, 1995; Valeri-Gold, Olson, & Deming (1991/92). According to Powell (1993) authentic assessment means making your assessment strategies match your instructional practices. Wiggins (1989) expands this definition by stating that authentic assessments are "designed to be truly representative of performance in the field" (p. 45). Reed (1993) defines performance based assessment as assessment that requires students to demonstrate skills or competencies in open-ended situations. Alternative assessment is a broad term used to describe assessment other than traditional multiple-choice standardized achievement tests (Worthen, 1993). Portfolios are a type of assessment instrument that can be described using all three of these categories.

The portfolio concept is emerging, evolving, and being promoted nationwide as a comprehensive means of assessment used to showcase the skills and accomplishments of students. Paulson and Paulson (1991) define portfolio assessment as:

A purposeful, integrated collection of student work showing student effort, progress, or achievement in one or more areas. The collection is guided by performance standards and includes evidence of students' self-reflection and participation in setting the focus, selecting contents and judging merit. (p. 295).

Some researchers use metaphors to help explain the purpose of portfolios. Whether they are described as “windows in the mind”, “personal learning stories”, “containers of evidence”, or “laboratories for constructing meaning from experience”, each metaphor offers an image not unlike Paulson and Paulson's.

The shift from traditional modes of assessment to more alternative forms was occurring as the reconceptualization of the teaching and learning processes evolved. Traditional assessments regard students as passive learners, “empty vessels” (Freire, 1990) waiting to be filled with knowledge by their teachers. As cognitive psychologists, teachers, and other educational professionals modify their existing beliefs about learning, it is reasonable to infer that modes of assessment will change. Alternative forms of assessment should be utilized to a greater extent. These forms of assessment include portfolios, which consider learners as “social activists” engaged in constructing their own meaning in a “community of learners” (Short & Burke, 1991).

The primary research questions framed in the study are:

- 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?

Silverman (1994) outlines four key types of data in a qualitative research project:

- 1] fieldnotes of observations,
- 2] documents/texts,
- 3] interview transcripts and
- 4] audio-visual or audio recordings of events which are used to create transcripts.

The data for this dissertation included all four types of data delineated by Silverman.

Specific data sources included school created documents, transcripts of interviews, and fieldnotes accumulated over the time line of the research. Preliminary fieldwork, conducted in a two semester sequence of ethnographic research methods in the fall and spring of 1995-96, helped formulate the initial questions.

Briefly described, I conducted in-depth interviews with three science team members and the director of the school. Preliminary analysis of the data allowed me to identify many questions from this small pilot study. These questions were transformed and articulated into the primary research questions for the study.

A Case for Portfolio Assessment in the Schools

The National Science Education Standards outline what students need to know, understand, and be able to do to achieve scientific literacy at different grade levels. The intent of these Standards can be expressed in a single phrase: Science standards for all students. Implementation of the Standards will require major changes in many of the United State's science classrooms. The Standards assert that science is an active process. "Hands-on" activities, while essential, are not enough. Students must have "minds-on" experiences as well.

The current reform programs in science education involve the implementation of varied forms of instruction; it stands to reason that assessment will evolve with the curriculum (Baxter, Shavelson, Goldman & Pine, 1992). The use of techniques such as cooperative learning and integrated studies make multiple-choice tests inappropriate measures of student abilities (Hamm & Adams, 1991). These innovative changes are creating a need for more authentic methods of assessment. One such method, the use of portfolios, is now being used as a form of assessment in

social studies, math, science (Collins, 1990) and Language Arts (Russell, 1983). Materials collected and reviewed in a portfolio can offer teachers a suitable alternative assessment, as well as a means of evaluation (Paulson, Paulson & Meyer, 1991).

One of the valuable features of portfolios is that they offer a view of student performance over time (Valeri-Gold, Olson, & Deming, 1992). Aiming to document both the process and the product of learning, portfolios differ significantly from traditional assessments which seek only to evaluate end products. Portfolios facilitate student learning by inviting students to participate in the assessment process and to reflect on their own learning.

Student ownership of portfolio assessment also “place[s] students in the position of learning to assess themselves, share who they are with others, and set their own learning goals” (Tierney, 1994, p. 232.) Students’ acceptance of responsibility increases as they are given this kind of control (Paulson et al., 1991; Vavarus, 1990). They become active participants in the educational process and they begin to view education as something for which they are responsible and not something that is imposed upon them.

Fu (1992) echoes these same sentiments and goes one step further: We, teachers and parents, will understand our children better if we are willing to listen to what they say about themselves instead of judging them by our own standards of what we want them to be. For years we have evaluated students passively and never allowed them to be a part of the assessment themselves. They accept and believe what they are told. They do what they are told to do in their learning, they don’t understand themselves as learners (p.183).

For the purpose of evaluation, portfolios offer the teacher and the student an ongoing means of assessment. Goodman (1991) extends this same concept by stating that evaluation and assessment should be ongoing daily experiences in the classroom. Portfolios also empower students to make decisions about their own learning by having them set goals, develop criteria, and self-evaluate (Newman & Smolen, 1993).

Other benefits of portfolios have been documented. Teachers, students and researchers have reported growth in students’ pride and

confidence as a result of portfolio assessment (Frazier & Paulson, 1992; Krest, 1990; Voss, 1992). Portfolios also provide teachers with a multi-dimensional view of a student's development. While using portfolios the teacher has the opportunity to examine "many different indicators of achievement" (Valencia, 1990). Teachers begin to see the whole child including what is outside the classroom (Buschman, 1993; Camp & Levine, 1991; Hansen, 1992; Milliken, 1992; Smith, 1993; Tierney, 1992; Voss, 1992). Information gathered via the portfolio process can also be used to plan more effective instruction (Heibert, 1994). Lastly, Gomez, Grave, & Bloch (1991) asserts that portfolios allow teachers to pursue questions about students' skills that would not be possible were work not collected, preserved and made available for both teachers and students to revisit.

As the concepts of teaching and learning are being revisited by educational psychologists, teachers and other members of the educational community, recommendations for assessment practices are being updated. As learning becomes viewed as a constructed process within which "learners build their own knowledge structures rather than merely receive them from their teachers" (Cooper, 1994, p. 2), more authentic practices, such as portfolios, are being embraced as instruments of assessment.

Freudlich, Gitomer, Duschl, and Faux (1992) sum up what portfolios should be in this passage:

The portfolios envisioned are part of a new classroom culture where the philosophical and psychological underpinnings of the curricula are based on the field of the history and philosophy of science and the research of cognitive psychologists. In the portfolio culture the assessment of student work is not terminal. Rather the purpose is to provide the teacher and the student with information that each can use to facilitate the process of meaningful learning concepts and to develop reasoning. The classroom culture encourages students to be active rather than passive learners and teachers to be facilitators and role models rather than information givers . . . A portfolio culture is based on a growth model of student development rather than a deficit model. This means that the student is viewed in terms of what they possess and how they grow and not on what they lack. We expect that portfolio instruction will become tailored to the individual needs of the

student (p.3).

The Science Team members at MVGS were in the process of planning and starting to implement portfolios in their individual classrooms. The teachers in the pilot study were aware of the components of portfolios and planned the use of portfolios in their classrooms with respect to these components outlined in the literature. For the school year following the pilot study, there was a change in faculty at MVGS. The new faculty modified the information created the prior year and implemented the process in their individual classrooms. The teacher participants were aware of their lack of knowledge concerning the implementation of portfolio assessment and wanted feedback and assistance with the process.