

## Section V

### Use of Assessment Results to Improve Candidate and Program Performance

#### **Portfolios**

Teacher candidates in the Mathematics Department at Keene State College are required to submit a series of portfolios for completion of their program. These portfolios include: (1) Content Knowledge Portfolio, (2) Pedagogical Knowledge and Field Experience Portfolio, (3) Unit Plan Portfolio, and (4) Student Teaching Portfolio. The portfolios are key assessments for the content knowledge, pedagogical knowledge, field-based experiences, effect on student learning, and dispositions of the teacher candidates. Knowledge of the use of various types of technologies is expected to be displayed within the teacher candidates' portfolios. This demonstrates that the teacher candidates not only know how to incorporate a variety of technologies into their teaching but that they also reflect on the effects of its use in a mathematics class.

Specific problem assignments, test questions, group projects, etc. that are required portfolio items are discussed and created by the members of the Mathematics Department by examining the standards and indicators from the National Council of Teachers of Mathematics and the New Hampshire Council of Teacher Education. Evaluation of the portfolios is not intended to assess individual items as they have already been evaluated within specific courses, but, rather, to focus assessment on the teacher candidate's ability to reflect on the standards indicated within each item and to demonstrate their dispositions and beliefs about teaching and learning.

The multiple portfolios address many of the NCTM Standards that are only partly addressed by other assessments. They also demonstrate the teacher candidate's ability to present information in a skillfully organized manner as well as reflect a high degree of communication. Evidence from the portfolios also provide a snapshot of teacher candidate growth and a description of how the teacher candidates convey to their students important contextual and technological applications of mathematics.

#### **Content Knowledge**

All teacher candidates must prepare and submit a portfolio that includes content-based items from their required mathematics courses twice during their program. This Content Knowledge Portfolio demonstrates their competency in the content areas. Prior to the beginning of each academic year, faculty members are given a list of required portfolio items to be assigned, graded, and collected within each designated course. The items are assigned as homework problems, group assignments, projects, or given as test questions. Then they are collected by the instructor and stored in each teacher candidate's mathematics file in a central location in the Mathematics Building.

During Math 225 (Introduction to Abstract Mathematics) teacher candidates are given all the materials from their mathematics file to compile into a portfolio. Since teacher candidates typically take this course during their second year, it contains items and materials from the teacher candidates' first two years in the program. At the completion of the academic year, the Mathematics Department members assess each portfolio using the rubric found in Attachment 2a. After the teacher candidate has submitted the content knowledge portfolio for its first evaluation, this same procedure of assigning work, collecting items, and storing the materials continues for two more years.

Math 475 (Issues and Trends in Mathematics Education) occurs during the fall semester of the teacher candidates' senior year and prior to their student teaching experience. Teacher

candidates submit their content knowledge portfolios for a second time at the completion of this course. This portfolio contains content knowledge materials from upper level mathematics courses as well as from the senior-level mathematics education seminar and their teaching methods course. At the completion of the academic year, the Mathematics Department members assess each portfolio using the rubric found in Attachment 2b.

### **Professional/Pedagogical Knowledge, Dispositions and Effect on Student Learning**

The teacher candidates submit their Pedagogical Knowledge and Field Experience Portfolio along with their Student Teaching Portfolio and Unit Plan Portfolio at the completion of their program. Rubrics for these portfolios are found in Attachments 3a, 8, and 9 respectfully. The Pedagogical Knowledge and Field Experience Portfolio, the teacher candidates' second portfolio, illustrates their understanding of pedagogical concepts and describes their field experiences prior to student teaching.

In the third portfolio, the teacher candidates are assessed on their ability to write a well-developed unit plan that addresses their knowledge of mathematical ideas and concepts as well as their understanding of the pedagogical demands related to teaching. In addition, the teacher candidates are expected to demonstrate that they are able to effectively incorporate appropriate teaching resources and instructional techniques within their lessons.

The Student Teaching Portfolio, the fourth of the required portfolios, assesses the teacher candidates in specific areas such as lesson planning and preparation, instruction, classroom environment, professional development, and effect on student learning. The portfolio includes artifacts that the teacher candidates accumulate during their student teaching experience. Typical artifacts are: lesson and unit plans; pictures of bulletin boards and class activities; examples of student work; displays of assessment techniques; use of technology; descriptions of attention to equity, diversity, and diverse learning styles; evaluations and observations by both the cooperating teacher and the college supervisor; attendance certificates from conferences; and other proof of their professionalism. Of particular interest are the graded work assignments of the secondary students in the teacher candidate's classroom. By observing the graded student work, one gains an insight into the types of assignments and the level of mathematical understanding of the classroom students.

### **Portfolio Grading Assessment Process**

Two faculty members from the Mathematics Department are randomly assigned to read and assess each portfolio with a common rubric. After all portfolios have been evaluated, the scores are recorded. If there are any discrepancies in the scoring or if there are students who do not receive an exemplary or proficient grade, a third faculty member evaluates the portfolio. In the event that a student falls short of achieving a proficient grade on the portfolio, the plan is for the teacher candidate's Mathematics Department advisor to arrange meetings with the student to discuss those areas in which additional improvements are needed. The advisor will encourage the teacher candidate to reflect on ways in which the work can be improved and will work with the teacher candidate to resubmit the portfolio.

Overall, the Mathematics Department feels that since all the teacher candidates met or exceeded its expectation regarding their portfolio assessments, the assessment rubrics are appropriate and demonstrate a solid mathematical content knowledge understanding of the teacher candidates. These teacher candidates' scoring on the portfolios serve as further evidence that they were thoughtful and knowledgeable in the standards addressed and were successful in planning and implementing thorough, effective lessons that enhanced their students' learning.

### **Reflection and Planned Changes**

Several changes are being planned regarding program and candidate performance. A campus wide committee, the KSC Teacher Education Council, has recently been formed. This committee is comprised of members from all the facets of the teacher education program. In addition to faculty representatives from the academic areas, other members included: the college president, the provost, the academic deans, as well as the directors of the special education, educational leadership, and educational counseling programs.

As previously noted, new assessments and scoring rubrics have been created for the teacher candidate clinical observation form along with a clinical observation assessment rubric (Attachment 5) and a summative clinical evaluation form (Attachment 6). These assessments will be implemented during the 2006-2007 academic year and will include clearer explanations of the ratings. They will also serve as a better determinant of candidate strengths as well as a good means for consistently targeting areas that merit attention.

Although the teacher candidates are assessed within their portfolios pertaining to their beliefs and dispositions, the College has decided to institute a new procedure for next year. A new disposition assessment form is a college wide initiative and will be used by the college supervisor and the cooperating teacher. The intent is that this new form will present a more consistent and reliable assessment (see Attachment 7).

At the conclusion of each portfolio scoring session, the Mathematics Department meets to report the teacher candidates' portfolio grades as well as to review the required items within their portfolios. If any portfolio items do not live up to the expectations of the department members, exhibit a high level of difficulty for the teacher candidates, or seem to be worded awkwardly, they are discussed and either modified or deleted. During the last assessment process, the department members agreed that the items related to standard 14.2 and the student project for Calculus I needed to be rewritten to make the directions more explicit. At the same time the department members could not agree on whether two standards (14.6 and 15.3) should be included within its secondary mathematics curriculum. Although it was decided not to include items pertaining to these standards in the portfolios, it did provide a valuable discussion among the department members. The inclusion of the items will be reconsidered during the next academic year when the department members meet during its professional development days. Overall, the Mathematics Department is pleased with the portfolio process as the candidates reported finding value in being able to review their work over a period of time from several courses and to reflect on the growth of their mathematical content and pedagogical knowledge.