

EAST CAROLINA UNIVERSITY MIDDLE SCHOOL MATHEMATICS TEACHER PREPARATION PROGRAM

In addition to reviewing program documents and other materials, interviews were conducted with 29 individuals for the East Carolina Middle School Mathematics case study. Of these, 19 were interviewed individually or in groups of two or three: the dean of the school of education, the director of teacher education, the two program coordinators for the middle grades, a middle grades mathematics teacher who served as a teacher-in-residence in the Department of Mathematics, three clinical coordinators who work with and provide professional development for cooperating teachers and serve as liaisons between the university and Clinical Schools Network partners, a principal, a cooperating teacher, five mathematics education faculty members, and four mathematics professors, including the former chair of the Department of Mathematics.

The other 10 interviewees, who are cooperating teachers and principals who represent their districts in the Clinical Schools Network, were interviewed as a group. Interviews lasted one to two hours.

Program Description

Institutional Context. East Carolina University (ECU), located in Greenville, North Carolina, had an enrollment of approximately 19,000 in 2001–2002. ECU is the third largest university in the state. The university operates a decentralized teacher education model in which 26 programs (only 8 of which are in the School of Education — approximately 1,200 candidates) prepare candidates in undergraduate, graduate, and lateral entry programs (BA degree holders seeking licensure). There are 106 full-time and 38 part-time education faculty members and more than 50 other faculty members university-wide involved in the preparation of teacher candidates.

ECU has the largest undergraduate and graduate teacher education program in North Carolina, with approximately 800–900 candidates completing teacher preparation programs annually. Approximately 500 (two-thirds of whom are undergraduates) are from programs within the School of Education. The teacher education program at ECU is the 15th largest program in the nation and ranks 11th nationally in terms of the number of minority educators prepared. Degrees awarded include the Bachelor of Science in Education, Master of Arts in Education, and the Master of Arts in Teaching. Candidates are prepared for 38 different licensure areas plus alternative licensure (lateral-entry BA degree holders in other fields). ECU teacher education programs are accredited by the

National Council for Accreditation of Teacher Education (NCATE) and the North Carolina Department of Public Instruction (NCDPI).

The Middle School Mathematics Program. Faculty members in the middle school mathematics program at ECU are driven by the belief that it is impossible to be a successful middle school mathematics teacher without being a successful middle school teacher. Putting this belief into practice means that middle school candidates take six courses specific to middle school preparation and eight mathematics courses, six of which were developed specifically for prospective middle grades mathematics teachers. Candidates also complete a mathematics methods course, which includes a one-day-per-week field experience, eight professional core courses in pedagogy, and a year-long internship. The mathematics concentration for middle school candidates was developed by mathematics education and mathematics faculty members, with guidance from the Middle Math Advisory Board (including mathematicians, mathematics educators, and a middle grades faculty member) and middle grades mathematics teachers. The middle school mathematics program has two full-time and one part-time middle school faculty members and four full-time and one part-time mathematics education faculty members. There are about 13 middle grade mathematics program graduates each year.

Evaluation of Individuals, Groups, and Program Components

Data Collection. Table 2 summarizes data that the middle school mathematics teacher education program of East Carolina University (ECU) collects on the progress of individuals, groups, and program components. These sources of data were rated by program leaders (the two full-time middle school faculty members and a key mathematics education faculty member) as having “much” or a “great deal” of influence on decision making related to program change.

Program leaders reported 13 sources of data collected on the progress of individuals. Of these, 54 percent were described as performance-based measures, such as the Candidate’s Portfolio and the Practicum Feedback Forms. All of the data sources collected on individuals are used for formative evaluation purposes; 31 percent are used for summative evaluation, and 23 percent are used for confirming evidence. The primary recipients of the results are the candidates (preservice teachers enrolled in the program), program faculty members, and administrators in the School of Education. Selected data also are provided to the director of partnerships (who coordinates placements in 15 partner school districts), the chairs of content departments, Clinical Teachers (who supervise candidates in field experiences), University Supervisors (who observe and evaluate candidates in senior-year internships), program graduates, principals who

employ these graduates, the dean, and NCDPI. Department chairs and the dean were more often cited as recipients of evaluation data on faculty members. Principals, graduates, and the director of partnerships received information most relevant to summative and confirming evidence (test scores of graduates' students, principals' observations of graduates, and Internship Progress Reports).

TABLE 2. SUMMARY OF KEY DATA SOURCES FOR EAST CAROLINA UNIVERSITY

<i>SOURCE OF DATA</i>		
<i>INDIVIDUALS</i>	<i>GROUPS</i>	<i>PROGRAM COMPONENTS</i>
Candidates' portfolios (semester interviews/presentations)	Praxis II scores (cohorts of students, semester)	Quality tools surveys (professional courses, minimum of two/semester)
Praxis II scores (semester)		Course evaluations (professional courses, semester)
Practicum feedback forms (candidates, semester)		Interviews with liberal arts faculty (content courses, as needed) Observations and interviews (capstone mathematics course and mathematics methods course, annual)
Progress reports (four times during internship), final evaluation forms (end of internship)		Informal surveys of students (field-based experiences, following each teaching experience)
Student Opinion of Instruction Survey (teacher ed. faculty, semester)		Observations by clinical teachers (field-based experiences, following each teaching experience)
Peer evaluations of faculty (semester for nontenured, upon request for tenured)		Interviews with graduates (teacher ed. program and content areas, biannual)
Clinical teacher feedback forms (clinical teachers, semester)		Survey of teacher ed. program graduates (following two years' experience, annual)
Test scores of graduates' students (annual)		Survey of teacher ed. program graduating seniors (content areas, teacher ed. program, support services; annual)
Interviews with graduates (teacher ed. program and content areas, biannual)		Survey of recent teacher ed. program graduates (graduate degrees, teacher ed. program and content areas, annual)
		Survey of employers of teacher ed. program graduates (annual)
Candidates' portfolios (semester interviews/ presentations)	Praxis II scores (cohorts of students, semester)	Quality tools surveys (professional courses, minimum of two/semester)

Four sources of data are used to collect information about the progress of groups (e.g., cohorts of candidates in courses, candidates in internships). Fifty percent of these were described as performance-based measures. All of the four were reported to contribute to formative evaluation information; two (Praxis II scores, internship grades) provided summative data; and none resulted in confirming evidence. Recipients of the information most often were program faculty members and the director of partnerships and the Office of Teacher Education.

Evaluation of program components was aided by data collection using 14 measures. Only one of these sources (7%) was described as a performance-based instrument (observations by clinical teachers). The measures used to evaluate program components were most often used as formative evidence (86%). Thirty-six percent of these measures provided summative evidence; 14 percent provided confirming evidence. The primary recipients of information about program component evaluation were program faculty members, followed by the director of teacher education, principals employing graduates, chairs of content departments, teachers (data from focus groups), and candidate advisors (Advising Survey).

Data Management Capacity. Databases that permit examination of individual candidate, course, and program progress are centrally maintained in the Office of Teacher Education. The director of teacher education and the staff of the Office of Teacher Education coordinate data collection across all teacher preparation programs and, with the assistance of the ECU Institutional Planning and Research Office, complete data analysis and reporting for ECU, state, and federal agencies and for the participating programs and school districts.

Clinical coordinators and university supervisors use specified forms to collect data about candidates and program elements. They also collect data informally through conversations with cooperating teachers, principals, and candidates. There are formal and informal opportunities for the clinical coordinators to communicate the results of their informal data collection with middle school program faculty members. The university supervisors in the middle school program meet almost daily to discuss how the program is progressing. At least twice annually, they hold a formal “retreat” to examine various sources of data and reflect on the effectiveness of program components. The small size of the middle school program and strength of the relationships among faculty members make the collection and use of informal data manageable.

Process for Acting on Results. Candidate feedback is sought in a number of ways because it is valued as a source of information about changes that should be made to the program. One way information is obtained from candidates is through the university-wide Student Opinion of Instruction Survey. These results are shared with the faculty member

teaching the course and the department chair. To impress upon candidates the importance of these evaluations, one mathematics education professor talks to candidates about the value of what they write on the open-ended section of the evaluation. To receive additional feedback, he includes in some of his assignments questions that ask for feedback about various aspects of the course. Similarly, another mathematics educator includes an end-of-course survey that asks for specific course feedback that the university survey is too general to produce.

Candidates provide feedback to the program by completing surveys after each field experience and at the end of the final internship. The final survey addresses candidates' experiences in the teacher education program and the content areas as well as their views about support services. As a result of these surveys and observations of candidates' performance during student teaching, a number of changes have been made to the program. These include making enhancements to assignments and assessments of performance as well as adding three courses — technology, special education, and strategies — to the middle school program.

Examination of candidates' performance also provides feedback about program components. For example, the mathematics concentration is designed with a capstone course — a mathematical modeling course that looks back at the mathematics of the program through real-world projects. The course is designed to examine candidates' performance to determine if changes are necessary in the courses leading up to the capstone experience. This means if the instructor notices that few students are able to use particular geometry concepts or technologies to solve problems in the capstone course, he knows revisions to the geometry course will be needed to help students learn appropriate concepts. The mathematics methods course operates in a similar manner.

It is common practice for the middle grades program staff to conduct pre-assessments of their candidates. They also formally and informally interview candidates during classes to determine their progress and to obtain feedback on the program. For example, as students work on their portfolios, professors meet with them and ask how the program could be improved for them. Middle school program faculty members meet on a regular basis to review the data collected from these formal and informal conversations. Program staff members are frequently in K–12 schools, both inside and outside their region of the state, working with teacher candidates, consulting, or conducting research. They use all of these opportunities to informally gather information for program improvement. Information also is gathered formally from K–12 cooperating teachers and principals of schools in which candidates teach. The focus of this data collection is always how the program can be made better for the teacher candidates and K–12 students.

Changes to the program also result from keeping abreast of state requirements. For example, in 1994 the state's movement toward an accountability-based system prompted the addition of an assessment and evaluation course to the curriculum. In 1998 North Carolina adopted the INTASC standards. As a result, the portfolios that candidates prepare were redesigned to align with the standards.

Another way that data are collected and used is by piloting new ideas on a small scale and systematically collecting data on the effectiveness of the approach to determine if the new approach should be implemented more widely. The year-long internship is an example of a change that was piloted on a small scale and then expanded to all teacher education programs at ECU.

In addition to the processes for acting on results at the program level, there are also processes for making changes or assigning consequences for individuals. For example, the middle school mathematics teacher preparation program, as other ECU teacher preparation programs, admits students to upper-division coursework in professional studies and middle school specialization in their junior year based upon several criteria. These include a GPA of 2.5 (on 4.0 scale); satisfactory completion of a speech and hearing screening, written essay, technology requirements, and a 16-hour early field experience (a grade of C or higher); and a passing score on PRAXIS I: Reading, Writing, and Mathematics. Thirty-five percent of applicants do not meet these requirements and are not admitted to the program.

Candidates must maintain a 2.5 GPA. Candidates' progress is monitored every semester to ensure that the GPA does not fall below 2.5. If it does, the candidate is dismissed from the program. Although candidates can appeal to the Director of Teacher Education for an exception, they are not likely to have one granted except in unusual circumstances. Middle grades program faculty members closely monitor candidates' progress in their courses and are clear about the expectations and provide models of acceptable levels of performance. As one of the middle grades program professors remarked, "For you to get a 2.49, it's pretty difficult. . . . because we're on you the whole time." If candidates are struggling, program faculty provide assistance, including working one-on-one with individual candidates. Candidates know they can go to faculty for help.

Evidence of Teaching All Children. As stated in ECU's award application, all candidates in ECU teacher preparation programs must take a course in special education. This concern about addressing the needs of diverse learners is specifically addressed as one of the four themes of the middle school program. (The other three themes are assessment as a driving force of instruction, teachers as reflective practitioners, and teaming and collaboration with peers, professionals, and educators.) In addition, one of the state competencies that candidates must meet is understanding the diversity of

students and the implications for the teaching and learning of mathematics. The middle grades mathematics methods course at ECU specifically addresses tools for helping diverse students learn mathematics.

The mathematics concentration also focuses on the diverse learner in several ways. For example, several of the courses focus on alternate solutions, stressing to the pre-service teachers the need to understand various ways of thinking so that they can build on the knowledge base of diverse learners with very different learning styles. Some of the courses also include a focus on student error patterns as a means of investigating the mathematics from a particular domain. Other means of honoring the learning styles of all children are the use of multiple representations and various tools (e.g., technology and manipulatives).

According to the three clinical coordinators interviewed, the School of Education has incorporated diversity topics into all of its courses as part of meeting NCATE accreditation standards. One of the ways that the program determines if candidates are able to teach all students is by using the Teacher Performance and Appraisal Instrument, an evaluation form required by the state.

As described by one of the middle school faculty members, the approach that the middle school program takes to helping candidates learn about and address the needs of diverse learners is by approaching diversity from various aspects of identity. These include biological identity (which involves race and gender), social identity, existential identity (which involves characteristics such as personal likes and dislikes), and cultural identity. Candidates begin to build their understanding of diversity and its implications for teaching through specific activities in their first middle grades education course and continue to expand that understanding throughout the program. By the end of the program, candidates are able to design lessons and assessment plans based on the individual needs of students as well as the social and historical context of the school. Candidates answer questions about how well prepared they think they are to work with diverse populations when they complete the exit survey at the end of the teacher preparation program. In addition, part of the School of Education's diversity plan includes the collection of similar data from graduates.

Alignment of Evaluation with Program Standards and Goals

Program Goals. According to one middle school program faculty member, the standards and goals for the middle school program are a synthesis of NCATE, INTASC, and National Board standards. These standards and goals, which were developed over a period of time, are under continuous revision. The INTASC standards are introduced to

candidates during one of the initial courses in the program. Subsequently, the standards are broken into five domains and addressed over the scope and sequence of the program. By the end of the program, candidates complete a portfolio that demonstrates that they have met all of the standards.

The middle school mathematics program award application states that the goals and objectives of the mathematics concentration are directly linked to the North Carolina Middle School Mathematics Licensure requirements, and that the program is designed to address state guidelines for program accreditation. The guidelines for program accreditation were strongly influenced by the National Council of Teachers of Mathematics's professional teaching standards and recommendations for teacher preparation from the Mathematics Association of America. These guidelines, on which the ECU middle school mathematics program is designed and continually assessed, are as follows:

1. The program should develop a knowledge of the nature of mathematics — its characteristics and interrelationships and its relation to other disciplines and the physical world.
2. The program should be taught by faculty members who model good mathematics teaching.
3. The mathematics program should broaden and deepen the student's understanding of mathematics, particularly in those areas that are directly related to the middle school curriculum.
4. The program should include a reflective examination of middle school mathematics by reexamining 5–12 school mathematics topics in ways that develop deeper insights and understandings and broader perspectives of mathematics and its role in our world.
5. The program should include the study of middle school students as learners of mathematics.
6. The program should include study in current pedagogy and the uses of materials and equipment specifically related to the teaching of mathematics.
7. The program should develop an awareness of the need and the disposition for continued learning in the field of mathematics and the teaching of mathematics.

Another goal, or expectation, of the middle school mathematics program is that graduates are able to serve as change agents in their schools because they have the ability and desire to “make a difference.” According to one middle school professor, by the time candidates

leave the program, they are able to think critically, synthesize information, and make judgments.

Determination of Proficiency. According to one of the middle school program faculty members, the program emphasizes performance-based assessments, which are scored using rubrics. Program faculty members work collaboratively to develop and refine rubrics and have frequent conversations about how well the rubrics are working. Sometimes the rubric that is used is from an external source, such as the PRAXIS rubric for essays or INTASC indicators; other times it is developed by program faculty members based on their experiences in the field, conversations with K–12 teachers, and observations of what candidates need to be able to do in order to teach in a K–12 standards-based environment. The key point is that the determination of levels of proficiency is not done in isolation; faculty members work together to critically examine existing sources and make adjustments as necessary based on experience and usefulness to the field.

Similarly, mathematics education and mathematics faculty members had many conversations about what constituted acceptable candidate performance when the mathematics courses for the middle school program were being developed. During the development phase, mathematics educators and mathematicians had semi-weekly meetings about course development, mathematics standards, student thinking, and assessment. Although not all of the mathematicians involved in course development are teaching the courses, they still follow the progress of the courses. In addition, mathematics education faculty members who teach the courses consult informally on a regular basis about the efficacy of the courses.

The dean noted that, because of legal issues, more attention should be paid to how levels of proficiency are determined. For example, if a candidate was denied admission to the teacher education program based on the writing and speaking assessment that is part of the admissions process, that person could question the criteria. The dean anticipates that there will be many more conversations about this topic given the increased emphasis on performance assessment by NCATE and the university's regional accrediting agency. Recognizing that ECU's K–12 partners have some experience in determining levels of proficiency and answering the question, "How good is good enough," the dean has approached the K–12 partners about working collaboratively with the School of Education on this issue.

The Development of Program Evaluation

Development Efforts. When the coordinator of the middle school program came to ECU seven years ago, the middle grades program faculty members changed their

approach to gathering and using feedback from candidates. In her words, they began to listen carefully to what candidates were saying about the program. They started by asking candidates open-ended questions about the field experiences, for example, “What were good things about this experience?” “Could you meet the requirements from the class in this field experience?” and “What are things you would change about this experience?” They also increased communication with the cooperating teachers (called clinical teachers by ECU’s program), making it clear to the teachers that there was someone they could call at the university if they had questions or comments about the middle school program, candidates’ performance, or their role. By opening these lines of communication, the middle grades program helped to build the foundation of the emerging partnership between ECU and K–12 schools.

The coordinator attributed her desire to make changes at ECU to her practitioner focus and to her experiences in field-based programs, both as a student and as a professor. She began her change efforts by talking with other faculty members about what she observed and heard from candidates when they were in the K–12 schools. As she was given responsibility for courses, she made changes to them, which included adding performance-based assessments in all courses in the program and adding a requirement to put together a portfolio. Based on her knowledge of INTASC standards and her practitioner orientation, she recognized that candidates weren’t learning the knowledge and skills they needed to be effective K–12 standards-based teachers. To help candidates address this gap, she added a requirement for a performance-based child portfolio to the assessment course. By completing the portfolio, candidates learn how to assess a child’s beginning level of knowledge, make recommendations to address the child’s needs, determine how to teach the child, and then determine the child’s level of knowledge as a result of teaching.

The coordinator emphasized that part of the reason the middle grades program has been able to make changes is because it is small and because she and the other key middle school faculty member have similar philosophies about middle grades education, a similar willingness to make changes, and a similar work ethic. They meet almost every day to discuss day-to-day details, but they also meet in “retreat mode” several times a year to consider the program from a larger perspective. During these meetings, they review their course evaluations and feedback from clinical teachers and candidates and think about what was added to the program that year and what might need to be changed.

Part of the reason it was easy to make changes fairly quickly when the coordinator first came to ECU is that the chair of the department at the time had a middle grades background and had confidence in the coordinator and her colleague. According to the coordinator, she and her colleague communicated with the chair and sought her advice about what they were working on and the changes they wanted to make. The director of

teacher education provided support to their change efforts as well. The coordinator described the director of teacher education as a mentor — someone who served as a sounding board, providing advice and telling them when they were on the wrong track. In the coordinator’s words, “We’ve had lots of support when we needed support and lots of autonomy when we needed autonomy.”

Over time, the orientation of the program has become more student centered, which the coordinator describes as working in partnership with candidates to make them colleagues. She also emphasized that the program has high expectations of its candidates and takes a “tough love” approach. Feedback the coordinator has received from clinical teachers and principals suggests that the changes are working — the quality of interns and graduates of the middle grades program has dramatically increased over the last five years.

The Clinical Schools Network (CSN), a university-school partnership of 15 school districts in eastern North Carolina, was evolving during this time as well. The network, established in 1996, is a vehicle for ECU’s teacher education program to disseminate information about teacher education at ECU and to receive feedback about program components. The network provides an opportunity for members to learn with and about one another. For example, districts share information about how they are handling requirements for the performance-based licensure process for new teachers and the types of assistance they need from the university.

According to one member of the network, when the network was formed, the university members and public school members were separate. Now they function as one group, which has created opportunities for the group that were not available in the beginning. He and another member described the evolution as a “giving process on both parts” that developed because they became more familiar with each other through regular opportunities to meet and talk. One network member recalled a meeting that ECU held to gather feedback about ECU’s teacher education program from K–12 central office staff and principals. This member characterized the meeting as an open and honest one that highlighted the fact that K–12 and the university “were sometimes operating in parallel universes.” After that meeting, ECU started modifying its program, listening more closely to K–12 staff, and treating them as equal partners. A major study of the CSN was conducted to determine what was working, what could be done better, and what needed to be changed. The group concluded that much of what they were doing was working well, so few changes were made to the format.

The clinical coordinator positions, which are held by former K–12 teachers, were established in the early days of the Clinical Schools Network (1996). From that time, it was clear that one of the roles of the clinical coordinators would be to collect data from the clinical teachers. As the coordinator of the middle school program explained,

however, it took some time to clearly define the clinical coordinators' data collection responsibilities. In the early days of the K–12 partnership, clinical coordinators went to the schools and met with each teacher who had a practicum student or intern. They gathered information about the program by asking teachers if there were any problems, how things were going, and what the university could do to make the experience better for them as a clinical teacher or for the teacher education candidates. Coordinators collected these data formally but did not report the results to program faculty. According to one middle grades faculty member, it seemed that the clinical coordinators did not maintain a neutral stance. It took some time, conversations with the director of teacher education, and clarification of their roles and responsibilities by the dean before the clinical coordinators understood their role, the importance of sharing information with program faculty, and the value of seeing both sides without taking sides.

In the coordinator's opinion, the communication problem between clinical coordinators and program faculty was solved in large part by developing data forms that specifically address the responsibilities and roles of each group (i.e., supervisor, clinical teacher, candidate). The candidate completes an evaluation of the university supervisor, the clinical teacher completes an evaluation of the candidate and the supervisor, and the supervisor completes an evaluation of the candidate. These forms were developed with input from members of the Clinical Schools Network.

Another activity that clinical coordinators began in 1996 and continued for several years as part of program evaluation was individual interviews with all of the clinical teachers who had interns. Feedback from these interviews is used to make changes in the program. For example, feedback from interviews and other feedback elicited from CSN members resulted in changes in the first-semester, senior-year field experience. Candidates now visit schools on a different day each week rather than always visiting on Friday.

While the middle grades program was being revised and the Clinical Schools Network was developing, change efforts were underway in the Department of Mathematics. As described in the award application, in 1994 the ECU Department of Mathematics set a goal to revise its program for middle school mathematics teachers. Five mathematics education faculty members and four mathematics faculty members talked about the process for developing new courses for the middle school mathematics concentration. Three of these eight talked specifically about the role of grants from the National Science Foundation and the North Carolina Statewide Systemic Initiative in this effort. The others spoke more directly about their involvement in developing and/or teaching the courses.

According to the three faculty members who spoke about the NSF grant, the grant provided funds for ECU mathematics educators and mathematicians to work with universities from across the country to consider what changes might be made in middle

grades mathematics teacher education. The first year of the grant, the group learned about newly developed standards-based middle school mathematics curricula and discussed what would need to change to prepare teachers to teach these curricula. During the second year, teams made changes at their universities and reported to other members of the group when the group met at the end of the year. During the period of the grant, the ECU Department of Mathematics established a mathematics advisory board to oversee the redesign of the middle grades mathematics courses. A teacher-in-residence was part of that group, as were mathematicians and mathematics educators. The Department of Mathematics chair supported the work of the grant by providing a room that was equipped to allow the development teams to view (1) interviews with individual students as they worked on problems and (2) the use of problems with classes of candidates. The department chair also served as a member of the development team for one of the courses. In his opinion, one important role he played was providing moral support.

One of the mathematics education faculty members involved in developing the courses explained that the course development process was uncommon, not only because it involved mathematics education faculty and mathematics faculty members, but also because it was guided by a research model. The process began with a thorough review of the research in the particular field (e.g., how algebra is learned). The course was then structured around a set of problems, or tasks, designed to address the learning goals for the course. Each task was tried out with one or more students to determine if the task made sense to the student and if it evoked the kinds of mathematics thinking that were desired (e.g., making connections among mathematics topics, learning a new topic in mathematics, understanding a topic in a deeper way). If the task accomplished what was intended, then it was used as it was originally written. If not, it was revised.

By trying out the task with a few students before presenting it to the whole class, faculty received information that helped them determine the kinds of questions that might help prompt students' thinking. They also got a sense of how much time should be spent on a task. A problem set often has six to eight problems. The interviews helped determine which tasks in the set were worth discussing in class because they brought out the key content. Students played a key role in the development process by agreeing to be interviewed as they thought through the problems. Sometimes they also suggested additional problems.

After trying the problems with individual candidates, faculty members tried the problems with a class of candidates. The class was videotaped, and the image was piped live to other members of the development team who were in another room. After class, the development team met to discuss whether any revisions or additional problems were needed to help students learn the content. The revised or additional problems were used with the next section of the class and subsequently revised again if necessary. This

process was viewed as a way to ensure that mathematics courses for middle grades candidates help them acquire the content knowledge and skills they need to successfully teach middle school students.

The dean said that it's important for the entire faculty to focus on collecting and using data for program improvement. However, she noted, at a large institution such as East Carolina University, it is a challenge to have everyone adopt these new habits at the same time. She suggested that working with a small group of faculty members initially and then using them as a model for others is one way to more effectively increase the number of people who are using the new practices. She emphasized that it is important to be able to show people how data can be used to determine a program's effectiveness. Another strategy the dean uses to encourage faculty members to focus on program improvement is to purposefully seek out opportunities to learn what other universities are doing. Then she encourages people who have the expertise and willingness to find ways to adapt these approaches to fit the ECU context.

Barriers to Evaluation. Not surprisingly, time was mentioned as a barrier by all those interviewed. The dean noted that it is often difficult for faculty members who spend a great deal of time in schools that are located at a distance from the university, and who also have a heavy teaching load, to “get to” data collection. She suggested that if there were more graduate students in doctoral programs, they could help with data collection and ease some of the burden. One member of the Clinical Schools Network (CSN) said that it is sometimes hard to find the time to provide the data that are requested, even if the data are already collected.

Another member of the CSN said that initially a barrier to evaluation was the different agendas of the 15 districts in the network, but over time, that barrier has disappeared as the districts have learned more about one another and have had shared training sessions and other opportunities to collaborate. They have learned how to come to consensus and have made some agreements about how they will work together. One of those agreements is that no member gets an unfair advantage over the others in terms of access to candidates and graduates.

Other barriers to evaluation, mentioned by a mathematics education professor, were money and level of interest. In his opinion, if resources are not made available to conduct activities on a regular basis or if conducting the activities is not regularly rewarded, it is more difficult to convince people to participate. He added that often there are competing priorities that capture the interest of faculty members more than evaluation activities, especially if there is no pressure to conduct evaluation activities or if the benefits to doing so seem limited. For example, he and others in the department thought that conducting a focus group with graduates did not provide much new information about revising the

program. It did, however, affirm that mathematics concentration graduates were pleased with their preparation. His perception is that there is not an emphasis on data collection about program effectiveness in most of the university's schools and colleges. If the practice of collecting data about program effectiveness was more widespread, then people would think of it as part of doing business rather than as something they had to do on their own initiative.

The middle grades mathematics courses are taught by a number of people who teach at other levels in addition to the middle grades (e.g., faculty members are likely to teach courses for middle school candidates as well as early childhood candidates or high school candidates). This situation both detracts from and contributes to examination of data across courses. On one hand, faculty members do not have a common focus and therefore are less likely to have the same level of investment in the middle school mathematics program as a whole. On the other hand, the number of faculty members is larger than it would be if faculty members devoted their time strictly to the middle grades program. Having more faculty members involved in the program means there are many more thoughts about the evaluation of the mathematics concentration.

The inefficiency of the system for tracking graduates was seen as a barrier to data collection by two professors in the Department of Mathematics. The department does not have the personnel to do this, and neither does the small alumni office. These professors remarked that there isn't an efficient mechanism in the department or the university to track alumni.

According to the chair of the Department of Mathematics, a barrier to participation in evaluation activities for some mathematics faculty members is that such work does not count toward tenure unless the results of the work are published. The department chair supported mathematics faculty members' participation in the development of the middle grades mathematics courses by not specifying which journals the work had to be published in, although he did require that the journal be nationally recognized. According to the department chair, some mathematics faculty members may not have participated because they may have thought that such activities were not really research, at least not for a mathematician.

Limited information sharing was a barrier early in the development of the evaluation system. Three clinical coordinators commented that the dean has increased the amount of information sharing and established a very open atmosphere in which people feel like partners. These coordinators also mentioned that the dean is extremely talented in building on people's strengths, pairing people whose strengths complement each other, and helping people develop strengths in other areas.

A final barrier to evaluation is the limited sharing of evaluation data from the School of Education to the Department of Mathematics and vice versa. Sharing of data tends to happen informally between middle grades faculty members and those who teach the mathematics methods course, but is minimal otherwise.

Confirming Data. Graduates of ECU teacher preparation programs are surveyed every other year beginning in their second year after graduation. A questionnaire also is sent to each graduate's employer. (The questionnaire sent to the principal includes the graduate's name to ensure that the principal responds about that graduate in particular rather than in general terms.) The return rate is about 70 percent for both groups but somewhat higher for employers. A difficulty is locating graduates. The university uses payroll data from the state department of education and university alumni records to locate graduates. Between the undergraduate and graduate programs, ECU graduates between 800 and 900 individuals. Two years after graduation, ECU is able to track about half of the graduates. The primary goal for the survey is to determine how successful graduates have been and to track retention rates, which tend to be high (90% remain in teaching for three years or more) for those who return the surveys.

Members of the Clinical Schools Network who were interviewed agreed that because the end-of-course and end-of-grade data available through the state assessment system for K–12 students are a matter of public record, they should be easy for the university to obtain. For grades three through eight, data are available about how many students met the proficient level and how much growth they made. Assessments for grades K–2 have now been implemented, and there are end-of-course assessments at the high school level.

Another member reported that principals and/or assistant principals conduct four observations of first-year teachers using a specific evaluation instrument. It would not be a burden for principals to provide those data to the university as confirming evidence. Another member mentioned that graduates' lesson plans also reflect their level of knowledge and skill through the activities — and the technology — they incorporate. Other members said that the product portfolio that is developed for licensure also could be a source of data. These network members thought it would be easy for the state (or the districts) to keep records by teacher education program of how many graduates passed on their first attempt, second attempt, and so on. As part of the process, beginning teachers produce a videotape of a unit of study that they taught and provide samples of student work that show growth. Evidence in the portfolio must relate to the INTASC standards and demonstrate that the teacher can address the learning needs of all types of learners.

The middle school mathematics program periodically collects data on its graduates by interviewing principals about graduates' effectiveness. Principals base their answers on their observations of the teacher in the classroom and on the scores teacher's students

earn on state assessments. Some of the interview questions ask the principals to compare the ECU teacher's performance to that of graduates from other programs. According to the teacher-in-residence, time is a possible barrier to collecting confirming evidence from principals in this way. It is difficult to reach them by phone and to get much of their time to collect data. She remarked that when she was collecting data about graduates, she had to call back several times before she could reach many of the principals.

Three mathematics education faculty members talked about their observations of graduates' performance in the field as a source of confirming data. They mentioned that program graduates seem mature in terms of knowing how students think about and learn mathematics and what is appropriate in the classroom, especially in terms of teaching problem solving and using technology to teach mathematics. In their first year, graduates seem to have the skills and understanding of someone who has been teaching two or three years. These three faculty members agreed that the number of graduates who are hired by schools indicates that program graduates are highly sought after and that they are seen as well prepared. Members of the Clinical Schools Network also mentioned that they have such confidence in how well prepared ECU candidates are that they hire them before they finish student teaching.

A mathematics education faculty member said that one way that confirming data are collected formally is through focus group interviews with graduates. Graduates who participated in these interviews reported that they were confident in their mathematical preparation and were even more confident after teaching a few months. Confirming data are collected informally through conversations with graduates at meetings of the North Carolina Council of Teachers of Mathematics, since many graduates belong to that organization. As a result of talking with the graduates and with people with whom the graduates work, faculty members are able to get a sense of graduates' effectiveness as teachers.

Members of the Clinical Schools Network also have some informal ways of determining the effectiveness of ECU graduates based on their observations of the skills graduates employ and based on their interactions with graduates. For example, members of the CSN interviewed for this study said they thought that ECU graduates' understanding of the INTASC standards and the portfolio process required by the state were confirming evidence of their ability to teach. One member of the Network stressed that ECU graduates are analytical and "coachable," meaning that they know how to reflect on their work and they seek feedback that goes well beyond the "this went well" variety. They want specific feedback about how to improve the lesson. Other members said that ECU graduates seem to be more comfortable in the role of teacher and more confident than graduates of other programs. They attributed this to the fact that candidates begin their field work in the freshman year and are in the classroom part time during the first

semester of the senior year and all of the second semester. “They know what to expect. They know what they are supposed to do.”

Efforts to determine how well graduates are able to help their K–12 students learn are likely to increase and improve in the coming years because there is pressure from NCATE and the state to do so. The director of teacher education noted that although K–12 student assessment data are available, the university must often do “a lot of begging and pleading” to get this information. (Members of the Clinical Schools Network interviewed for the study said they would be willing to provide these data, which may indicate that the situation is already improving.) The director also thought that the university shouldn’t rely just on state assessment data. To help faculty members and candidates think beyond state assessment data, she suggested that faculty model for candidates the use of pre- and post-testing within their courses. The faculty member would use the data from the pre- and post-tests to determine his or her effectiveness in helping candidates acquire the expected knowledge and skills. Further, candidates should be explicitly taught to pre- and post-test as a way of gathering evidence of their effectiveness in order to improve instruction. In her opinion, the Council for Teacher Education needs to lead and monitor this effort to ensure that it becomes common practice across all teacher education programs at the university.

Similarly, the dean stressed the importance of building a culture that is focused on student outcomes — starting with teacher candidates. She remarked:

If we want to be sure that candidates have the knowledge and skills we want them to acquire, then we will have to assess at every point in the program. For example, if the goal of a class is that students know how to manage a classroom, then it isn’t sufficient to determine that they know six models of management.

One barrier the dean sees to collecting confirming evidence is that university faculty members may be afraid to have their work looked at too closely. This isn’t surprising to her because most faculty members have not been explicitly taught how to set up criteria for evaluating students. She cautioned that opening the conversation about determining whether students are achieving must be done carefully and in a supportive, non-threatening way, but if the conversation doesn’t get to that level of examination, then nothing is going to change.

Institutional Participants in Program Evaluation. Faculty members in the Department of Mathematics and the School of Education are primary players in the evaluation of the middle grades mathematics program. They are assisted by the dean of the School of Education, the Office of Teacher Education, clinical coordinators, adjunct

supervisors, and candidates in the teacher education program. The contributions of each of these groups are described in this section.

Role of the Middle Grades Faculty. Middle grades faculty members meet formally with mathematics education faculty members at the beginning of the fall semester to develop joint assignments and to discuss how well program components are addressing candidates' needs. These meetings provide a structure for examining formative data and making necessary changes. For example, a few years ago, middle school faculty members and mathematics education faculty members reviewed comments from candidates and their own observations about the Senior One field experience and determined that candidates should have more opportunities to teach during that semester. The course was redesigned to require nine teaching experiences over the semester. After reviewing data on the redesigned course, the requirement was scaled back to seven teaching experiences, which appears to be working well for candidates. There also are periodic "check-ins" among faculty members of the two departments throughout the semester and other conversations if problems or concerns arise with particular students.

Role of the Department of Mathematics. The Department of Mathematics collects data for program evaluation through the Student Opinion of Instruction Survey, individuals who do their own end-of-course assessments, individuals who include writing assignments that provide course feedback, and information about prerequisite courses from later courses. Additional information for evaluation of the mathematics concentration comes from the capstone course, the mathematics methods course, individual interviews, focus group interviews of graduates in the field, numerous formal and informal discussions among faculty members, and informal discussions with students and with graduates.

Role of the Dean of the School of Education. The dean views her role as a monitor of quality — of curriculum, partnerships, and everything else that the School of Education does. Equally important, she sees herself as a facilitator of the improvement process. Her role includes taking responsibility for "getting things going" and following up to see if what was planned was completed and, if something was not completed, determining where the process broke down. She stressed that presenting valid and reliable data to faculty members is the way to help them focus on areas that need to be improved. Simply telling the faculty that a change is needed isn't sufficient.

In fulfilling her role as facilitator of improvement, the dean talks with and involves other key players. She and the two middle school faculty members interviewed commented on her practice of knowing people's strengths and building on those to accomplish tasks that will improve the program. She encourages involvement by providing financial rewards

and opportunities to have other special experiences, such as travel to conferences or participation in projects that will contribute to faculty members' status in their fields.

As part of her role in program evaluation, the dean meets periodically with the superintendents in the Clinical Schools Network. These meetings allow her to gather data informally about various aspects of the field experience portion of the teacher education program.

The dean's belief that the program should constantly assess and improve its practices supports her role in monitoring program quality. As a result, the dean created a position for an assessment coordinator. The dean explained that the assessment coordinator's role over the next five years will be to begin and sustain the conversation about the standards and processes that will guide the ongoing improvement of teacher preparation at ECU as well as how the faculty will work together to improve the program. The dean will assist the assessment coordinator by beginning this dialogue with the Advisory Council in the School of Education, which is comprised of the department chairs and representatives from all departments. She will discuss with the council the importance of ongoing program assessment and provide articles for chairs to read, opportunities for them to look at data, and resources (time, money, and personnel) to conduct studies to examine the issues raised by data. She also will meet with the faculty to determine how to act on the results of studies.

Role of Clinical Coordinators. Clinical coordinators interviewed and the middle school program coordinator said that the clinical coordinators' primary role is to serve as a communicator. Clinical coordinators gather data formally, using specific forms, from clinical teachers, candidates, and university supervisors about implementation of program elements, such as whether candidates have taught the required number of times, candidates' views of how well university supervisors carried out their role, and university supervisors' comments about clinical teachers. They also informally gather and act on data from clinical teachers through regularly scheduled meetings, phone calls, and e-mails.

By collecting data, the clinical coordinators are able to anticipate needs of the clinical teachers and provide the teacher education faculty with ideas for changes that should be made to the program. The clinical coordinators supervise interns, serve as liaisons between clinical teachers and methods professors, organize workshops, and provide training for clinical teachers and members of the Clinical Schools Network. One of the clinical coordinators coordinates the adjunct university supervisors; another coordinates the professional development school (PDS) program. Each clinical coordinator also serves as the primary point of contact for particular school districts in the network.

Members of the network, the clinical coordinators, and the director of the middle grades program emphasized the importance of this role.

Role of Adjunct University Supervisors. The adjunct university supervisors meet twice a year. As described by one of the clinical coordinators, these meetings provide opportunities for the adjunct supervisors to suggest changes to the program. For example, a task force was established to study interns' use of technology during their senior-year field experience. As a result of the task force's findings, changes were made to encourage candidates to use technology with their K–12 students and to encourage supervisors to use technology as a way to increase communication with candidates. Adjunct supervisors also provide input and feedback about the “course pack,” or candidate guide, to the senior-year experience. There are parallel guides for university supervisors and clinical teachers, which are reviewed by Clinical Schools Network members.

Role of Candidates. Candidates contribute to evaluation of the middle school mathematics program in a number of ways. One way is by evaluating their student teaching placements. These evaluations provide information about the appropriateness of the school context in which the placement occurs. Candidates also complete an evaluation of their university experience at the end of their senior year. This information is distributed to each program. The data also are broken out by specific aspects of the program, such as reading, technology, and learning theory.

Candidates provide information about the quality of instruction by completing end-of-course evaluations, which are used to assess professors, not courses. The data are provided to the individual professor and that person's department chair to make decisions about professional growth, tenure, and promotion. Two mathematics education faculty members and two middle grades faculty members mentioned that in addition to the standard university survey, they also obtain feedback from candidates about the content of their courses. The director of teacher education did not think this practice was common across ECU teacher education programs, however.

Sometimes candidates indirectly provide information for program evaluation. For example, a mathematics education faculty member said that she uses interviews with candidates seeking admission to the upper division of the teacher education program as opportunities to collect data about the program. Some of the questions she poses to candidates in the interviews deal with where candidates think they are in terms of their mathematics development. They discuss the courses they have taken and their strengths and weaknesses in mathematics. The faculty member has made changes in her courses based on candidates' comments about what was valuable and not valuable.

Role of the Office of Teacher Education. The Office of Teacher Education (OTE) tracks how many graduates were accepted and not accepted to graduate programs and the amount of time it took graduates to complete the teacher education program. Another important way that staff members of OTE contribute to program evaluation is by generating federal and state report cards for the undergraduate and graduate teacher education programs at ECU.

Role of the Council for Teacher Education. The Council for Teacher Education is the governance structure for teacher education at ECU. The director of teacher education chairs the Council. Two of four standing committees of the council are of particular importance to program evaluation: the Admission and Retention Committee, which develops the guidebook for candidates in the teacher education program, and the Evaluation and Planning Committee, which develops evaluation instruments such as the graduate survey. Staff members from the university's Institutional Planning and Research Office are assigned to the Evaluation and Planning Committee. They handle the logistics of gathering survey data from graduates and work with members of the Council to report and distribute the results to department chairs and program coordinators.

The Curriculum Committee of the Council for Teacher Education makes recommendations about how content is addressed in the teacher education program. For example, as the director of Teacher Education noted, since there was strong feedback from candidates that they needed to know more about working with English language learners, various departments are working on different ways to incorporate this content. The Curriculum Committee will study the results of these various approaches and make recommendations to the Council for Teacher Education on ways to address the issue.

Funding. Answering the question of how evaluation is funded is not straightforward. In the dean's view, evaluation and assessment are embedded in the teaching and learning process and are an implicit part of every course and program. For that reason, she finds it difficult to say exactly how much evaluation costs. The dean also recognizes the need to more explicitly emphasize assessment of all aspects of the teacher education program. As a result, she created a position for an assessment coordinator, which has added a specific cost to evaluation that can be easily identified.

Evaluation activities also may be financially supported in a number of ways, including foundation funds and grants. According to a mathematics education faculty member, specific evaluation activities, such as bringing together a focus group of graduates of the middle school mathematics program, may be supported through department foundation funds. Requests for these funds are submitted to the department chair. Grant monies also may be used to support evaluation activities. For example, graduate students funded under a National Science Foundation (NSF) grant contacted graduates to invite them to

be part of the focus group. The teacher-in-residence, whose time is covered under department funds, assisted with a follow-up study of graduates by contacting graduates and their principals.

Sometimes funding supports program improvement in a more indirect way. For example, ECU supported teacher preparation at the institutional level by committing more than \$500,000 toward in-kind support of two NSF-funded projects that focused on the improvement of undergraduate preparation of middle school mathematics teachers. Such support often is not counted as part of evaluation expenses.

Quality Assurance of Evaluation. Monitoring of various aspects of evaluation occurs in a number of ways. For example, subject-matter content of mathematics courses and its delivery continue to be evaluated by mathematics and mathematics education faculty members. As described previously, the middle grades mathematics courses were developed collaboratively by mathematics education faculty members and mathematics faculty members. After these faculty members taught the courses a number of times, they decided to examine the effectiveness of the courses when they are taught by someone who was not involved in the development of the courses. These faculty members will compare performance in the field of candidates who were taught by course developers to performance of those candidates not taught by course developers to determine whether the course materials can be used effectively as designed.

A quality control check on determining candidates' content knowledge is the use of the state's instrument for evaluating beginning teachers. One portion of this instrument addresses content knowledge. Both the university supervisor and the clinical teacher use this form to evaluate candidates' content knowledge. Another quality control check on candidates' mathematical knowledge is the Praxis II exam for licensure. Although middle grades majors may choose to take their Praxis II content test in either area of their licensure, almost all candidates choose mathematics. To this point, all of them have passed the Praxis II.

To ensure that first-time clinical teachers know what kind of data to collect on candidates and how to collect this information appropriately, the teacher education program provides training for clinical teachers. Those who are not first-time clinical teachers for ECU are provided with a "refresher" session at the beginning of each school year. The mathematics teacher-in-residence, who has attended the training, noted that, among other things, the training provides a great deal of information about how to evaluate candidates and provide feedback to them. A clinical teacher interviewed for the study also described the training as outstanding. In her words, it was one of the most rewarding experiences she's ever had.

The clinical teacher interviewed discussed the various ways that she and other clinical teachers receive feedback about their performance as clinical teachers. One avenue for feedback is the evaluation forms that candidates complete about their clinical teachers. These forms are returned to the clinical teachers so they can use them to change how they work with candidates. Several times throughout the semester, candidates also meet as a group with the university supervisor and have opportunities to provide feedback about the clinical teachers and other aspects of the program. This information is informally shared with the clinical teachers as appropriate.

Sites where candidates are placed are informally monitored because program staff are frequently in the schools and are able to observe how school conditions are affecting candidates' experiences. For example, as described by the coordinator of the middle grades program, one school had three principals in two years. These frequent changes in leadership led to high stress levels and low morale among teachers. Having student teachers and candidates in classrooms for various field experiences added to teachers' stress. The decision was made to stop using the school for field experiences.

The dean of the School of Education assists with program monitoring by raising issues that she observes when she looks across all the teacher education programs in the School of Education. For example, the dean raised some concerns about the process that candidates must undergo for admission to the upper division of the School of Education. The process, which requires candidates to write an essay and participate in an interview with a group of faculty members, is primarily a diagnostic assessment. According to the coordinator of the middle grades program, those who show deficiencies are provided with assistance and monitored closely by professors. As part of program monitoring, the dean asked the faculty to think about the elements of this process, what it is meant to do, and how it can be made more meaningful.

The dean has contributed to the quality assurance of program evaluation in other ways as well. For example, a few years ago, the dean formed an ad hoc committee to refine the faculty evaluation process. The committee developed rubrics for faculty evaluation that made expectations clear and common. Previously, there was no common set of criteria that department chairs used to evaluate faculty members. People tell the dean that they have a sense that "pieces are lining up better." They see more consistency between what they do as a faculty and what they are teaching candidates to do in the K–12 schools.

The coordinator of the middle grades program suggested that the quality of program evaluation could be improved by seeking more feedback from others within the university about various components of program evaluation. For example, program faculty members could ask others to critique the forms used for gathering data on candidate knowledge and skills.

The Influence of Stakeholders on Evaluation

East Carolina's Stakeholders. ECU's primary stakeholders are the members of the Clinical Schools Network. These districts serve as places where ECU candidates experience their fieldwork, including student teaching.

How Stakeholders Influence Evaluation. One of the key ways in which K–12 partners contribute to program evaluation is through the Clinical Schools Network. The Network is funded through money (approximately \$500,000) provided by the North Carolina legislature, which reflects the legislature's recognition of the importance of such partnerships. The funds are used to pay salaries for the clinical coordinators and the director of the partnership, meeting costs, and other expenses of running the network.

There are both formal and informal ways to gather information from members of the network. According to 10 members of the network who were interviewed, members have an opportunity at each meeting to express concerns and ask questions about the program. Subcommittee meetings of the network provide additional opportunities to give feedback about the program. The members stressed that ECU staff are always open and receptive to any feedback that they give. "There is an open line of communication. . . . We can pick up the phone and call them at any time. We can e-mail them. We can fax them."

One member stressed that the university is willing to listen when members talk about what clinical teachers or interns need. For example, according to this person, members of the network told the university that candidates needed to know more about technology and more about diversity. The university responded by making changes to the program to address these needs. According to one of the clinical coordinators, another example is the university's response to clinical teachers who asked for help in learning more about the writing process. These teachers recognized that they needed to know more in order to help their students perform well on the North Carolina writing assessment. The university worked with the members of the network to plan and offer professional development on the topic for university faculty members and for clinical teachers. As a result, the middle grades department incorporated many of the strategies from the workshop into their teaching of writing to ensure that ECU teacher candidates had the skills they needed to teach effectively in the public schools. Many of the network schools already were using the strategies emphasized in the workshop. Given that many of the people trained at ECU stay in North Carolina and in the area covered by the network, ECU faculty members think that it is important to be knowledgeable about those initiatives and curricular approaches being used by most network members.

Each district has an assigned clinical coordinator who serves as a liaison between the university and the partnership. The districts can contact the liaison at any time if they

have concerns. Those interviewed agreed that the key is that there is a specific person for them to call, they know who that person is, and, most important, the person responds. The dean also mentioned that she has heard comments about how much the K–12 partners appreciate the responsiveness. For example, according to the dean, a former principal who now works at the university told the dean that the tone at the university has changed over time. The principal said:

There was a tone a while back where they [K–12 practitioners] could call but the responsiveness wasn't there. I feel really good when they tell me now that they called this office and they made this inquiry and people got back and they really tried to do something.

According to the network members in the group interviewed, the teacher education program is constantly asking for their feedback. Sometimes it is to support grant applications; sometimes it is because ECU is conducting a specific assessment of their program. Interviewees from the network said that they have a great deal of influence in the quality of the teacher preparation program. They attribute this influence to the level of comfort they have in talking with the dean and others in the teacher education program about needed changes and how the program is working. They think they are influential because they serve as sites where the university places its candidates. As one member of the network said, “Obviously they want to know what we think about their programs because they need our schools for their teachers to go out and learn their craft. So I don't think they are going to ignore us.” Another member cited the dean's presence at their meeting as an indicator that the group is influential. (The dean was seeking network members' comments on an issue she was bringing to a group of deans in the state.) The member remarked, “You don't start a meeting asking for comments like that if the folks you're asking don't really have some influence.”

In the early days of gathering formative data to make changes to the program, relationships had to be built with clinical teachers in the PDS and other sites where candidates would have their field experiences. One member of the middle school program emphasized that she was able to build relationships by respecting K–12 teachers' time and the way they wanted to provide input about how the program should be designed. For example, if they agreed to talk with her for 15 minutes, she kept the conversation to 15 minutes. If someone wanted to respond in writing rather than meeting face-to-face, she supported that approach. She also assured people that comments, both positive and negative, were welcome and that the intention was to work with teachers to design the program. Teachers were in on the planning from the beginning and helped make decisions about what candidates would do during various phases of the program, including teaching the intended curriculum. Program faculty members also showed their appreciation for teachers and encouraged candidates to do likewise. For example,

candidates brought their clinical teachers flowers and cards at the end of the semester. Because program faculty members were often in K–12 schools, teachers felt comfortable stopping them in the hall or calling them at home to provide feedback.

Relationships with clinical teachers are maintained by keeping lines of communication open. The coordinator of the middle school program described a letter that she sends to clinical teachers at the beginning of the semester as one way to do this. The letter thanks the clinical teacher for having an intern, describes the kind of assignments interns will have to do, and provides the coordinator’s phone number so teachers can call with questions or comments. Encouraging communication in this way provides another avenue for informal data collection. It should be noted that the clinical teacher interviewed mentioned the importance of this letter.

Both the principal and the clinical teacher interviewed mentioned that middle school program faculty members talk with clinical teachers frequently and solicit their feedback about program components. The clinical teacher and the principal stressed that there are many opportunities to talk informally with program faculty members because they are frequently in the building and intentionally ask teachers and the principal about how things are going. One of the clinical coordinators noted that clinical teachers have a more formal opportunity to provide feedback about the program when they meet as a group with the clinical coordinators twice a year.

There are also more formal ways for the principal and clinical teachers to participate in the evaluation of the program. For example, principals complete an annual survey about graduates. Clinical teachers provide feedback about candidates’ performance during practicum experiences by completing a checklist and giving feedback about candidates’ lesson planning and teaching based on elements of the state’s Teacher Performance and Appraisal Instrument. For example, the clinical teacher might check that the candidate accomplished the objective he or she was trying to achieve with the lesson, or if the teaching was at a level the students could understand. During the year-long internship, referred to as Senior One and Senior Two, clinical teachers complete a check-off list and provide a description of activities the candidate participated in or completed during the semester (e.g., checked papers, prepared a bulletin board, tutored students), including the nine lessons that were presented. During the Senior One experience, candidates are in a school for the whole semester. They teach nine lessons and spend one day a week at the school. During the Senior Two experience, they teach one class to start and then add classes until they have a full schedule. After a few weeks with a full schedule, they drop classes until they are down to one at the end of the semester. The university supervisor visits four times during the semester and completes an evaluation form each time. The supervisor and clinical teacher meet to discuss and compare their impressions of the candidate’s performance. At the end of the semester, the clinical teacher evaluates the

candidate, the university supervisor, and the program in terms of how well it prepared the candidate to teach. The evaluation of the intern is a narrative one; that of the supervisor and program is close ended. Clinical teachers' assessment of candidates is highly valued. Although the university supervisor issues the grade for student teaching, if the clinical teacher thinks that the candidate should not be licensed, the university does not forward the candidate's name to the state for licensure.

The teacher-in-residence position is an opportunity for K–12 teachers to contribute to monitoring the effectiveness of the teacher education program in unique ways. The position is tailored to the person filling the position and is designed to use the person's strengths. The Department of Mathematics teacher-in-residence interviewed for this study worked with mathematics education and mathematics faculty members to teach courses, providing ideas and strategies for teaching particular content. She also served as a resource for candidates, answering their questions about teaching middle school students or providing feedback about their lesson plans. In addition, she helped to collect data from principals of graduates of the middle grades mathematics program. Previous teachers-in-residence in the Department of Mathematics worked with the course development teams to provide "school" insight.

There are a number of other ways that K–12 practitioners contribute to program evaluation. One way is by assisting with course development. For example, a team of mathematics teachers and supervisors met with the middle mathematics team as they prepared to revise the concentration. Their input was vital to the initial setting of goals for the concentration. After the initial development of the introductory course, a team of five middle grades mathematics teachers met over the course of a semester to analyze the course and make recommendations for its revision. K–12 practitioners also helped develop the technology courses that candidates take. They also serve on curriculum revision committees. In addition, according to the dean, there are some occasions when she includes K–12 practitioners on task forces that gather data about particular aspects of the program. For example, as one of the clinical coordinators explained, a great deal of informal feedback gathered from clinical teachers and candidates indicated that the reading program was not well received. The dean assigned a faculty member to lead a study that included formal collection of data about the program from graduates and K–12 educators. As a result of the study, significant changes were made to the reading program.

The relationship with K–12 partners has grown broader and deeper over the years, in part because the university recognizes that the relationship must be carefully nurtured. As the dean mentioned, it is very easy for higher education people to take over a group unless someone in the group is skilled at eliciting responses from all members of the group. The dean thinks the network is influential in the ongoing monitoring of the program and that

the relationship would be improved if the university did a better job of informing its K–12 partners about changes that have been made. She described the approach as “completing the circle,” which includes inviting K–12 practitioners to comment on a program’s strengths and weaknesses, making changes based on the feedback, and informing the K–12 partners about the resultant changes, whether they are large or small, and the next steps.

External Influences on Program Evaluation

State Influences. The state influences the evaluation of ECU’s teacher education program because the program must be in compliance with state regulations. For example, the state has a limitation of 128 semester hours for undergraduate programs. As explained by the director of teacher education, in order to provide candidates with more experience working with English language learners (which formal and informal data collection and analysis have identified as a need), the teacher education program will have to eliminate or reorganize existing courses. If the state adds this skill to its list of teacher competencies, then this issue will become a priority and faculty members will have to work together to modify the program.

The director of teacher education added that the state has influenced the curriculum of the teacher education program over the years by instituting a new teacher performance evaluation system in 1985 and by requiring a performance-based portfolio for certification. In both cases, ECU made changes to its teacher education program to ensure that its graduates would be able to do what the state required. The director anticipates that there will be increased emphasis on providing evidence that ECU teacher education graduates are able to affect the performance of K–12 students in positive ways. She thinks that the state end-of-grade and end-of-course assessments will not provide sufficient data and that the teacher education program will have to find ways to provide additional data.

According to the coordinator of the middle grades program, the state influenced the development of the program and its evaluation in several ways. One way the state influenced the program was by requiring that middle school candidates be certified in two areas. Some universities in the state determine the combination (math/science or language arts/social studies). The coordinator of the middle grades program said that data indicated that candidates were more likely to choose mathematics or science if the two were not paired. Consequently, ECU allows candidates to choose any combination of the four. A state requirement that candidates have experiences in multiple settings led ECU to provide candidates with a number of field experiences that give them opportunities to work with students who are racially and economically diverse. The state has exerted a

strong influence on ECU's program in a more indirect way by providing funding for the Clinical Schools Network, which as mentioned previously, plays an important role in program evaluation.

One other way the state influences the teacher education program is by requiring an annual report about the program. The annual performance report is keyed to various state requirements for teacher education, such as PRAXIS scores, work with K–12 schools, and induction programs. The program provides an external review panel with documentation and a narrative that address the various areas. The scores for all schools in the state are posted on a web site.

The state also has influenced the mathematics concentration by mandating mathematics competencies for teacher preparation. The program addresses the state's Standard Course of Study for grades 6–8 and end-of-course testing for those grades in its curriculum. The revision of the mathematics concentration was funded in part by the state systemic initiative, an NSF grant the state received to improve mathematics and science education.

National Influences. Program evaluation also is influenced by national groups. For example, the dean mentioned that ECU compares its goals for teacher education to those of the Renaissance Group and collaborates with other members of the group in projects or grants that advance the goals.

ECU's program also is influenced by North Carolina's standards for teacher education, as well as NCATE's standards for teacher preparation and professional development schools. The dean mentioned that the program is aligned with INTASC and National Board standards but will need to align its program with the new North Carolina professional teaching standards. To guide evaluation of alignment with standards, ECU has developed an assessment framework that includes goals, how progress toward goals will be documented, current status, and other components. The dean acknowledged that although the middle grades mathematics program collects such data, it is still a struggle to convince all members of the faculty of the importance of doing so. The expectation is there, however.

The mathematics concentration also is influenced by activities at the national level. The program is built around the National Council of Teachers of Mathematics standards both for curriculum and instruction. The standards for teacher preparation established by the Mathematical Association of America permeate the concentration. In addition, conferences such as the Association of Mathematics Teacher Educators and the Association for Research in Undergraduate Mathematics Education both influence and are influenced by the ECU mathematics concentration. The first Middle Math grant brought in universities from across the nation to collaborate on improving mathematics

teacher preparation at the middle level. Since then, ECU's program has been recognized by universities seeking to revise their programs. Several universities have adopted courses or parts of the ECU mathematics concentration.

Local Influences. The primary local influences are the K–12 districts that are members of the Clinical Schools Network. Their involvement in the evaluation of the program is described in the previous section.

Other External Influences. A mathematics faculty member mentioned that the Southern Association of Colleges and Schools (SACS), an organization that certifies schools and colleges in the area, also exerts an influence on program evaluation. According to this faculty member, SACS is pushing its member organizations to think in terms of continuous improvement. The cycle includes setting goals, determining ways to meet the goals, identifying indicators of success, gathering data to determine success, and making necessary changes as a result. Although some individual departments or programs, such as the teacher education program, have been using this process for several years, others have not been doing so. The pressure from SACS has prompted university-wide attention to the process. As part of its focus on program evaluation, SACS is asking programs to provide evidence that program graduates can apply their knowledge and skills outside the classroom (i.e., in the work world). Having a university-wide emphasis on collecting confirming data may make it easier for the teacher education program to increase its efforts in this area.

The Culture for Program Evaluation

Incentives. According to one member of the middle grades faculty, part of the incentive for participating in program evaluation is that faculty evaluation is based on research, teaching, and service. Key faculty members in the program conduct research on their work in the field, integrating the three areas. He added, “The culture we create is that everything is data directed.” This means that middle grades faculty members collect both quantitative and qualitative data and look at the “story behind the data” to capture elements that are difficult to measure, such as the moral context of the classroom.

According to a middle grades faculty member, many faculty members are willing to participate in activities that lead to program improvement because they feel they are valued as members of a learning community that is strongly committed to improving K–12 schools. Participation in data collection and use of data also gives them opportunities to fulfill the creative activity requirement for evaluation. This faculty member added that some faculty members are motivated to evaluate the program's effectiveness because they want to increase the program's recognition. There is a sense of excitement about making changes to improve the program so that it will be highly

regarded. In his opinion, only a few faculty members each year don't participate in the process because they already have tenure or because they are bound to their own set of beliefs or content area and don't agree with the more integrated direction the program is taking.

According to one mathematics education faculty member, the primary incentive for mathematics education and mathematics faculty members to participate in the improvement of the teacher education program is a personal one. He explained that sometimes it's the personal satisfaction that derives from making something better. Other times, it's the recognition that comes from publishing or presenting the work. He added that evaluating program effectiveness is not a "burning issue" in the Department of Mathematics as a whole, but some individuals value it highly and design their own course evaluations to obtain more specific information for course improvement than is provided by the university-wide course evaluations. He thinks that the university evaluations are taken seriously by all faculty members since the course evaluations are used in the faculty evaluation process. According to this faculty member, neither the mathematics educators nor the mathematicians in the Department of Mathematics meet as a group to review evaluations across the department. Reasons for this include lack of time and competing priorities. He noted that a great deal of energy went into developing and evaluating the mathematics courses for candidates in the middle grades teacher education program, and many faculty members in the Department of Mathematics think that other areas now need their attention.

One mathematics educator mentioned that an incentive for participating in course development and evaluation for the teacher education program is that it can lead to other opportunities. In her case, she has been able to use her experience in the course development for the middle grades program to secure a grant from the National Science Foundation to develop a discrete mathematics course for K–8 teachers.

Another mathematics education faculty member mentioned the university's emphasis on research and said there is an incentive for people to participate in evaluation activities as long as some of what is done for evaluation counts as research. In his opinion, the emphasis may some day swing from research toward teaching, but until the swing occurs, collecting data to improve the teacher education program may not be highly valued by members of the Department of Mathematics.

The dean made it clear that she values evaluation activities, which she thinks encourages faculty members to participate in such activities. She noted that she also is a strong supporter of valuing people's strengths and supporting them in efforts that use their strengths and improve the program. For example, she has created an assessment coordinator position that capitalizes on a particular faculty member's strengths — her

ability and dedication to assess and improve what the teacher education program is doing in the K–12 schools. Both of the middle grades faculty members interviewed mentioned the dean’s ability and willingness to recognize and build on the strengths of others as something that contributes to the improvement of the program.

Attitudes. Part of the culture of the School of Education that is promoted by its leaders is that all people have potential. According to the dean, this attitude is supported by the work of the diversity task force, which emphasizes that diversity extends beyond culture, language, and ethnicity to the way people process information and approach their work. The dean described this latter type of diversity as sometimes more challenging to respect in the workplace, but noted that respect for this type of diversity is important when people need to work together to accomplish goals.

Consistent with the attitude of recognizing potential, the dean sees it as her role to know individual faculty members’ strengths, so when she has a job to get done, she knows whom to tap. This approach values individuals and increases the likelihood that tasks will be accomplished. To guard against the perception that the same individuals are always tapped for new opportunities, the dean asks department chairs to identify individuals in their departments who could be involved in particular tasks. Identifying the appropriate individuals requires the chairs to know the strengths of faculty members and be willing to provide the support and encouragement faculty members need to get the job done.

The dean considers herself a learner. She said that she isn’t “there” yet, but is continually seeking to learn more about a variety of topics. In this way she models learning and openness to new input and makes it “safe” for others to take on new tasks and responsibilities. She thinks that she could be accused of setting expectations too high, but she balances that by letting the faculty know that she is aware of the difficulties they may have and the support they may need to accomplish the task.

One middle grades faculty member and the dean mentioned that there is a sense of excitement and passion about the work, which the dean said makes the work fun and interesting. The dean speculated that this sense of excitement is partly the result of having many new tenure-track faculty members who were hired because they agree with the agenda the dean and other leaders are pushing — for example, partnership work with K–12 schools. When individuals apply for positions, the dean and others give them a sense that they are coming into an environment where they will be mentored and supported to do things that interest them and they’ll like working with the faculty members who are already there. Support and belief in an individual’s potential are the watchwords.

The dean acknowledged that the commitment to program evaluation varies across teacher education programs at the university. To help foster positive attitudes about program monitoring throughout the system, the dean is working with the department chairs. She recognizes the need to continually ask to what degree all members of the faculty are addressing accountability. According to the dean, there is a desire to get better and a continuous improvement stance is beginning to permeate the system. It's not fully there, but that's the goal. She tries to encourage an attitude of continuous improvement by continually asking the faculty what is working and what isn't working and emphasizing the role of data in determining the answers.

Training. None of the interviewees mentioned specific training that addresses the collection and use of data for evaluating program effectiveness. The coordinator of the middle grades program and one mathematics education professor specifically mentioned their interest and experience with assessment, however. The mathematics education professor noted that he and others in the Department of Mathematics who had been involved in the development of the middle grades mathematics courses also had a disposition to question and evaluate.

Faculty Research. Over the last few years, the dean has increased the emphasis on research and raised the expectation that faculty members will conduct and publish research. In the opinion of one middle grades faculty member, this expectation has strengthened the teacher education program because research conducted in the field is used to make changes in the program. He described the work as “servant leadership” because teacher education faculty members are serving as change agents as they help schools improve, conducting research as part of the process. The dean rewards faculty members for receiving grants and conducting research through merit pay and opportunities to travel. The dean thinks that these rewards act as incentives that increase faculty members' willingness to participate in activities that evaluate the effectiveness of the teacher education program.

One of the middle grades program faculty members described how his research provides formative data for program evaluation. He has developed a program that is an organizational leadership and curriculum framework for middle schools and has been collecting data for a number of years in several middle schools that are implementing the framework — some fully, some partially. Information from these studies informs the courses that are taught in the middle grades program. Based on his experiences in middle schools, he wrote a book on adolescent development, which is used in the program. The basic approach is to be in K–12 schools, continually gather data about how elements of the program are working in practice and make changes based on data collected in the field.

Research also played a role in the mathematics concentration. Several of the courses were developed with a curriculum research and development model. This allowed the important and very time-consuming work of developing the courses to take place while continuing a research agenda. The chair of the Department of Mathematics provided the resources and equipment (e.g., research room, cameras, mixer) to carry out the data collection, and mathematicians worked with the two mathematics education researchers to support the study. In addition to the curriculum, a product of the research was increased knowledge about the abilities and dispositions of preservice teachers.

Institutionalization. Indicators of institutionalization mentioned by clinical coordinators include course packs for candidates that describe requirements for courses and how candidates will be evaluated. Handbooks for supervisors also have guidelines for data collection, including definitions of data collection strategies and descriptions of performance levels for grading interns. The handbook includes the INTASC standards, which candidates are to address in their portfolios. Examples of evidence for each standard also are provided in the handbook.

Middle grades faculty members collaboratively develop and refine rubrics for scoring candidates' performance. This practice leads to a common understanding of performance expectations across the program, another sign of institutionalization of program evaluation. Similarly, there is a common understanding among mathematics and mathematics education faculty members about what candidates should know and be able to do as a result of completing each course in the middle grades mathematics concentration.

Another indicator of institutionalization is the routine timelines for collecting various data. For example, candidates provide feedback at the end of each field experience, principals and graduates respond to surveys each year, clinical teachers meet as a group with the clinical coordinators twice a year, and middle grades faculty members hold a retreat twice a year.

In the director of teacher education's opinion, one mark of institutionalization may be the extent to which other institutions and agencies seek your advice. She mentioned that the North Carolina Department of Public Instruction often turns to ECU for advice or to see how ECU is approaching an issue, which indicates to her that the state highly regards ECU's teacher education program. A mathematics education professor mentioned that other mathematics programs across the nation have turned to ECU for mathematics course materials, course ideas, and program ideas. Faculty members from the program have been on assessment teams at other universities.

Another indicator of institutionalization may be the amount of support the program receives from leaders at various levels of the institution. The director of teacher education noted that the chancellor of the university seems to be showing increased support for teacher education. One mathematics education professor noted that the dean of the School of Education supports the program by bringing people together from different backgrounds and having them interact. He cautioned that such interactions will not be sustained, however, unless the dean supports and maintains the work as an initiative.

Advice About Program Evaluation

There were seven interviewees who gave advice about using systematic evaluation to guide continuous improvement of teacher preparation. These included the dean of the School of Education, a mathematics education faculty member, the coordinator of the middle grades program, a principal, and three members of the Clinical Schools Network. Their advice, provided in the bulleted list that follows, addresses a number of topics, including specific questions to ask graduates, relationships with K–12 partners, and actions leaders can take to encourage changes that are needed to develop a culture for data collection and use.

- Build a sense of joint ownership of the teacher education program between content-area faculty and teacher education faculty members. This type of relationship can be built by engaging in joint development of courses or by physically placing education faculty members in the same department as content-area faculty members. Sometimes an external force, such as K–12 content standards, can be the catalyst for the two groups coming together. Other times, it may occur because one person or a small group champions the effort.
- Foster a sense of “we’re in this together” with K–12 partners by seeking their input and providing them with feedback about how their input was used to make changes to the program. Recognize the ways in which all parties benefit from being members of the partnership. Find meaningful ways to involve K–12 partners at the university (e.g., a teacher-in-residence program where a K–12 teacher works with faculty members to teach classes).
- Keep the lines of communication open and two-way. Consider all partners as having equal status, and be willing to give and receive information from them.
- Evaluate the extent to which the topics that the teacher education program focuses on are appropriately balanced between content knowledge and

teaching skills. Determine how the teacher preparation program mirrors professional responsibilities and requirements (e.g., If beginning teachers will be asked to prepare a teaching portfolio during their first two years of teaching, are they required to prepare a portfolio in the teacher education program?).

- Ask, “Do we provide candidates with classroom experiences early in the teacher education program to ensure that they have a realistic understanding of what it takes to be a teacher before they get to the student teaching semester?” Also ask whether candidates are required to formally reflect and build on what they learned from each classroom experience.
- Ask how well your program provides candidates with subject-area knowledge, classroom management skills, and the ability to accept and build on their K–12 students’ knowledge, skills, and cultural background. Candidates should have to demonstrate that they have classroom management skills, not just theoretical knowledge of such skills.
- When asking graduates about the value of the teacher education program in terms of content and pedagogy, provide scenarios/questions such as the following:
 - The state has developed a new set of regulations that will change the number of required credit hours in the content-area concentration (or teacher education program) from 24 to 18. What two courses would you eliminate, and why?
 - The state has changed the requirement for the teacher education program (or the content-area concentration) from 24 credit hours to 30 credit hours. What two courses would you add, and why?
 - What did you expect when you came into the program? To what degree was the program like what you expected and how it was different?
- Tap into the expertise in your own system. Ask faculty members from other departments to help you brainstorm and critique what you have done. Using internal staff is more productive than using external experts because those internal to the system can more readily take the context into consideration when offering solutions and advice.
- Prepare an annual report that documents changes to the program. Use the report in all teacher education programs at the institution and with K–12 partners as a basis for conversations about how the program is evolving.

The report can serve as an historical record that helps the program build on the past rather than repeat mistakes.

- Those in leadership positions should know the level of knowledge and expertise of faculty members, particularly with regard to assessment. Leaders should create prerequisite cultural supports such as trust and open dialogue and listen carefully to what faculty currently are doing before pushing changes. They should think about what will indicate that faculty members are ready to try something new. Leaders should make a commitment to stay with the changes they are advocating to support data collection and use. A strong commitment is important because this work is time consuming and “messy” and there may be little clear guidance. Among other things, leaders should be willing to attend meetings to show support for the people directly leading the change and facilitate conversations between key players.
- Because it is difficult to implement new ideas throughout a large university all at once, identify small groups that are willing to try out new ideas. Carefully document what worked and what didn't. Move the innovation to a bigger scale by sharing and building on the experiences of the pilot group.

East Carolina Case Summary

Structures. Evaluation of the middle grades mathematics teacher education program at ECU is supported by various data collection tools, mandates and guidelines, regularly scheduled meetings, and positions and organized groups — which are referred to in this study as “structures.” Among these specific data collection structures are the principal and graduate surveys, course evaluations, rubrics for course assignments, forms for collecting information from clinical teachers and supervisors about candidates’ performance, and forms for collecting information from candidates about field experiences. State mandates and guidelines and NCATE, INTASC, and NCTM standards provide structures for designing and evaluating the program.

The offices, committees, and groups that support teacher education at ECU include the Council for Teacher Education (CTE) and its curriculum subcommittee, the Office of Teacher Education, the Institutional Planning and Research Office, the School of Education Advisory Council, and the Clinical Schools Network.

A key position that supports program evaluation is the director of teacher education. Others include the dean of the School of Education, the director of the Clinical Schools

Network who serves as a direct link between K–12 partners and the CTE, clinical coordinators, and university supervisors.

Another structure that supports data collection and use is regularly scheduled time for faculty members to meet. For example, there are about two hours on Tuesday and Thursday afternoons when departments or other groups of faculty members can meet. (There are no classes scheduled during these times.) There are also four meetings each year of the whole School of Education faculty and staff. They meet twice each semester — at the beginning and the midpoint. There is also a leadership team comprised of department chairs and directors, which meets on a regular basis with the dean.

The middle grades “team” (middle grades faculty members and faculty members from the College of Arts and Sciences who teach content-specific methods courses) meets as needed, sometimes as often as every other week. Mathematics educators meet regularly to discuss program concerns, including the mathematics concentration. Almost all of the mathematics education faculty members teach at least one course in the concentration.

Processes. Communication is the most important process for evaluation of the middle grades mathematics program at ECU. Other processes that contribute to program evaluation are piloting new approaches before implementing them program-wide and using a common rubric for faculty members that includes an emphasis on teaching, research, and service in ways that encourage participation in program evaluation. Extensive use of performance assessment, such as analysis of K–12 student work samples, also supports program evaluation.

The importance of communication — especially careful listening to K–12 partners and candidates — was mentioned many times throughout the interviews. One way in which communication with K–12 partners occurs is through the formal structure of the Clinical Schools Network. Through Network activities, clinical coordinators collect information from members formally and informally at regularly scheduled meetings and through phone calls and e-mails. University supervisors also play an important role in communicating with principals and clinical teachers. They strategically use their frequent visits to schools to supervise candidates or conduct research as opportunities to gather data about candidates’ field experiences and clinical teachers’ views about the program.

Communication with candidates also is important for monitoring the effectiveness of the program. Candidates provide both summative and formative data. They complete forms at the end of each field experience and at the end of the program. In addition, middle grades faculty members frequently interview candidates during the semester to obtain feedback about class and other aspects of the program.

Communication among middle grades program faculty members contributes significantly to program evaluation. Middle grades faculty members meet almost daily to discuss day-to-day aspects of the program; they also meet twice annually to examine program evaluation data in depth. Middle grades faculty members and mathematics education faculty members meet formally at least once a year to discuss changes to the program; they also meet whenever either group thinks there is a need to talk about particular aspects of the program.

Issues. Although many elements of strong program evaluation exist in the middle grades mathematics teacher education program at ECU, program faculty members think there are a few aspects of evaluation that could be strengthened. For example, reviews of evaluation instruments by colleagues outside the program (e.g., assessment forms used to collect data on candidates) could be increased. Another aspect that could be strengthened is more systematically sharing with K–12 partners how their input has been used.

The definition and collection of confirming data is another issue that should be more fully addressed. Although state assessments are a ready source of data, some interviewees questioned whether they would be sufficient to demonstrate the effects graduates have on K–12 student learning. There seems to be a range of data that K–12 practitioners and university faculty members consider appropriate indicators of teacher effectiveness. It wasn't clear from interviews that there is agreement about appropriate sources. What was clear is that the topic of evidence of program effectiveness is becoming more prominent both in terms of the effects of faculty members' teaching at the university and graduates' teaching in K–12 schools.

Another aspect of evaluation that needs more attention is how levels of proficiency are determined. Although middle grades faculty members have experience with performance assessment and rubrics, other university faculty members are less familiar with these tools. As the dean remarked, "Most faculty haven't been taught how to set up criteria." The university will need to address this issue in a number of ways, in particular, through training opportunities for faculty. The dean also is encouraging conversation about the issue by asking faculty members to answer the question of how they know what students are learning.

Although some interviewees mentioned some incentives for participating in program evaluation, there wasn't consensus that incentives were strong. Many faculty members may be reluctant to participate. As one mathematics professor noted, it's important that people don't feel forced into data collection or sharing. "It has to emerge as a natural thing to do or it won't fly. It will just seem like an extra piece of something." He suggested that faculty members can be encouraged to move in this direction through reward systems or other forms of recognition. Some faculty members may be motivated

to change because there is increasing pressure from the university's accrediting agency for programs to demonstrate the effectiveness of their graduates in the world of work.

Collaboration was evident within the middle grades mathematics program, but collaboration could be expanded within the School of Education and between the College of Arts and Sciences and the School of Education. There are a number of ways in which collaboration could be strengthened. For example, a middle grades faculty member could team-teach a new mathematics or mathematics methods class and the mathematics education faculty member could co-supervise some mathematics interns.

The dean has taken some steps to increase collaboration within the School of Education. These steps include setting aside regular times for faculty to meet and providing training for the leadership team in Total Quality Management and Stephen Covey's principles. She acknowledges that there is more to do, however. She plans to draw from her experiences with the Center for Creative Leadership to think more about ways to foster collaboration and help people learn the skills they need to collaborate successfully.