

RESULTS OF THE 2009-10 KENAN FELLOWS PROGRAM EVALUATION

PREPARED FOR:

Kenan Fellows Program for Curriculum and Leadership Development
Kenan Institute for Engineering, Technology & Science
Campus Box 7006
North Carolina State University
Raleigh, NC 27695

PREPARED BY:

Amy A. Germuth, Ph.D.
EvalWorks, LLC
150 Solterra Way
Durham, NC 27705



TABLE OF CONTENTS

Executive Summary..... 1

Overview.....3

Evaluation Methods..... 6

Profile of Kenan Fellows..... 7

 Selection Process.....7

 Characteristics of Program Participants..... 7

Professional Development Program Activities for 2009-2010.....9

Attainment of Key Program Goals..... 11

 Identify, develop and retain teacher leaders in the
 classrooms across North Carolina..... 11

 Advance effective teaching that prepares students
 for success in the 21st Century..... 15

 Create synergy among teachers, researchers and
 industry to ensure STEM is relevant and that best
 practices are infused across the spectrum..... 19

 Develop innovative and relevant curricular tools and
 resources for teachers and students across North
 Carolina to enhance student learning..... 21

Mentor Survey Results..... 22

Summary and Discussion..... 25

EXECUTIVE SUMMARY

The Kenan Fellows Program for Curriculum and Leadership Development is a teacher professional development program that seeks to identify, develop and retain teacher leaders in North Carolina; advance effective practices and the use of technology in preparing students for the 21st Century; and create synergy among teachers, researchers and industry that supports the development of innovative curriculum resources and relevant STEM instruction to enhance teaching and learning. The program works to advance teacher professionalism in a program of sustained professional development and research externships conducted in collaboration with the private sector, public schools, and institutions of higher learning. Evaluation of the 2009-2010 program suggests that the Kenan Fellowship provides multiple experiences to teachers that have significant and positive impacts on their teaching, leading, and learning. Consider the following:

For 2009-2010 two cohorts of Fellows were active but on different stages of their Fellowship. 2010 Fellows were halfway through their two year fellowships. In the summer of 2009 they spent one week of professional development at the North Carolina Center for the Advancement of Teaching (NCCAT) where they explored ethical issues in light of scientific complexity, and the remainder of their time engaged in externships. 2011 Fellows began their fellowships in the summer of 2010. They spent two weeks in a Summer Institute for Professional Development in Raleigh and four weeks in a research externship with their mentors.

Evaluation of the 2009-2010 program suggests that the professional development provided by the Kenan Fellowship is of high quality (mean rating = 4.14 on a scale of 1 to 5) and is provided by presenters who are highly knowledgeable of their subject matter (mean rating = 4.64 on a scale of 1 to 5). Furthermore, evaluative data suggest that the Kenan Fellowship provides multiple experiences to teachers that have significant and positive impacts on their teaching, leading, and learning. Consider the following:

Retaining effective teacher leaders

- Retention data indicate that 93% of Kenan Fellows are either classroom teachers or remain in education in other positions. This percentage is much greater than would be predicted by North Carolina's average attrition rate of 14% annually.
- 2010 Fellows' average rates of agreement to the following items regarding being a teacher leader range from 4.6 - 4.7 on a scale of 1 to 5:
 - I have the knowledge and skills needed to serve as a mentor for new teachers;
 - I have the knowledge and skills needed to reflect on my teaching practices in order to improve my performance; and
 - I have the knowledge and skills needed to write curriculum for my content area so that most students learn at high levels.
- 2011 Fellows also report gains in some of these same areas and skills, including understanding what it means to be a teacher leader, taking on leadership roles, how to discuss educational policy, and how to develop curriculum and share it with other teachers, as a result of their participation in the Kenan Fellowship.

Advancing instructional practices

- Additional data suggest that the Kenan Fellows program advances Fellows' content knowledge, research skills, and ability to use inquiry-guided classroom instruction. For example, 2010 Fellows indicate a strong sense of self-efficacy as a teacher, rating the following items above 7.5 on a scale of 1 (Nothing at all) to 8 (Quite a lot):
 - How much can you do to adjust your lessons to meet the needs of diverse learners?;
 - How much can you do to gauge student comprehension of what you have taught?;
 - How much can you do to get children to follow classroom rules?;
 - How much can you do to implement inquiry-guided teaching strategies within your lessons?; and
 - How much can you do to control disruptive behavior in the classroom?
- 2011 Fellows also responded positively to many of the teacher self-efficacy questions, although not as high as 2010 Fellows. However, already they have made gains in relationship to some of these items as part of their experiences as a Kenan Fellow. For example, many 2011 Fellows are changing their opinions of what they should and can do in the classroom such as sparking interest and enthusiasm for STEM content when teaching high-needs students, getting needed instructional materials and equipment, and getting children to follow classroom rules.
- Results from the 2010 Fellows of their ratings of agreement to items on the inquiry survey further underscore how the Kenan Fellows program is helping teachers advance best practices to better prepare students in 21st century skills. On a scale of 1 to 6, Fellows' average rates of agreement range from 5.19 (I know the content standards for the science/math course students take after my course) to 5.46 (I can effectively assess my students' progress during inquiry). Notable, Fellows indicate that they can effectively use inquiry to engage all students, manage student behavior, and formatively assess students' progress.
- 2011 Fellows' rates of agreement also increased over the year to positively worded items on the survey about use of inquiry (In my content area, I use resources other than textbooks; it is important to help students see the connections between science/math and other subjects; and Teaching content is more important than teaching inquiry.). Pre-post changes in their ratings of these three items are statistically significant.

Networking

- Additional findings are that a substantial majority (84%) of 2010 Fellows report that the program has enabled them to build relationships/partnerships with the broader community, and all (100%) agree or strongly agree that opportunities to network with other Fellows benefits their teaching and leadership skills. Among 2011 Fellows all but two agree or strongly agree that being a Kenan Fellow has enabled them to build relationships/partnerships with the broader community, and all but one agree or strongly agree that it has benefitted their teaching and leadership skills.
- Most mentors appear to agree or strongly agree that they have developed close and lasting relationships with their mentees, that these relationships have enhanced their professional

knowledge and teaching (where applicable), and that they have increased their understanding and respect for the K-12 classroom environment. Additionally, most responding Mentors agree or strongly agree that being a mentor has had a great impact on them professionally including fostering their own work, helping them translate their work to the K-12 setting, making them more reflective of their own teaching practices (where applicable). In terms of their perceived impact on their Fellow, most mentors agree or strongly agree that they have helped their mentor become a teacher leader, helped him or her improve their leadership skills, helped increase the Fellow's content knowledge, and positively impacted his or her research skills. Last Mentors provided their own assessment of the Kenan Fellows Program with most agreeing or strongly agreeing to positive statements about its impact on curriculum, other teachers, and use of technology in instruction.

OVERVIEW

Recent national reports on the state of education in the United States suggest that there is cause for concern regarding the educational preparation of students to compete in the new global economy. The emerging workforce will necessarily consist of highly trained and educated workers with sophisticated skills in science, mathematics, engineering and technology, as scientific and engineering occupations are expected to continue to grow more quickly than other occupations.¹ Unfortunately evidence continues to show that while there has been improvement in math scores since the 1990's, performance in science has not improved, and the performance of disadvantaged populations continues to lag far behind their peers. Recent international assessment results show that the United States continues to trail other nations in terms of science and mathematics literacy; in fact, more than half (55%) have significantly higher science literacy scores and 79% have significantly higher mathematics scores than the U.S.²

North Carolina student performance tends to reflect national trends. National Assessment of Educational Progress (NAEP) results from 2005 showed that one-fourth (25%) of North Carolina's fourth grade students and just 22% of eighth graders were considered proficient or advanced in science.³ Contributing to this problem is the fact that many North Carolina students do not take science coursework that may lead to science proficiency: slightly less than one-quarter (24%) of NC high school students enroll in advanced science courses (e.g., chemistry or physics) compared with 31% nationally, and percentages have declined since 1996.⁴

Attracting and retaining qualified science and math teachers, as well as those who weave science and math into their subjects, is of paramount importance to improving student achievement in science and math coursework. Many teachers in North Carolina and nationally lack the qualifications necessary to teach science and mathematics, and this likely contributes to the achievement problem. The most recent state indicators available from 2006 show some improvement in the percentages of North Carolina middle school science and math teachers

¹ National Science Board (2006). *America's Pressing Challenge – Building a Stronger Foundation*.

² National Center for Education Statistics, U.S. Department of Education and Institute of Education Sciences, *Highlights from PISA (Programme for International Student Assessment) 2006, 2007*.

³ National Assessment of Educational Progress (2005).

⁴ State Indicators of Science and Mathematics Education: 2007.

who are certified to teach in their area.⁵ However, more than a quarter are still not certified to teach math (26%) or science (29%), and more than half of the states reporting these data had higher percentages of certified teachers. At the high school level, more than 85% of North Carolina science and math teachers are certified to teach these subjects, and these percentages slightly exceed those seen nationally.

Research has consistently shown that teacher training in math and science education is of critical importance to student achievement. For example, recent NAEP reports suggest that achievement in eighth grade science is directly related to whether the student's teacher majored in science education.⁶ Additionally, algebra is now becoming recognized as a gateway course to future high school success and graduation.⁷ It would appear important for North Carolina to continue to address ways to increase certification rates for middle school science and math teachers.

Compounding the issue is the problem of retention of high quality teachers in North Carolina and nationwide. While the attrition rate in North Carolina is somewhat lower than that seen nationally (approximately 13% versus 17%), nearly a quarter of the turnover rate can be considered to be "turnover that might be reduced."⁸ Data on teachers' perceptions of working conditions inform the development of strategies targeted towards reducing this aspect of the teacher turnover rate. The most recent survey on teacher working conditions showed that school leadership, teacher engagement in decision-making, and teachers' sense of empowerment were strongly related to teacher attrition.⁹ Teachers who were more likely to feel empowered within their school and supported by administration were less likely to leave. Investment in targeted funding for professional development in teacher leaders who can lead the way towards improving the teaching and working conditions for all teachers is critical to keeping teachers in the profession.

Unfortunately, whereas most states have professional development policies to require teacher training, most teachers spend significantly less time than is generally recommended to invoke significant change. School districts typically allocate only approximately one percent of their budgets to professional development, and less than half of teachers surveyed report that they received release time to attend training sessions. Many professional development efforts involve one-shot workshops that lack a connection to the real-world challenges teachers face in the classroom. The need for ongoing and sustained quality professional development may be even more critical in the fields of science and technology.

In order to address the problem of quality in professional development of teachers, the National Staff Development Council recently provided revised standards for staff development that improves the learning of all students.¹⁰ These standards encourage staff development efforts that:

⁵ State Departments of Education, Data on Public Schools, 2005-06. Council of Chief State School Officers, State Services and Technical Assistance, Washington, DC, 2007.

⁶ National Assessment of Educational Progress. Op.cit.

⁷ Middle School Predictors of High School Achievement in Three California School Districts
Kurlaender, M., Reardon, S., and Jackson, J., California Dropout Research Project

⁸ Public Schools of North Carolina, Department of Public Instruction (2008). Teacher Turnover Report: Annual Report on the Reasons Teachers Leave, 2007-2008.

⁹ Hirsch, E. & Church, K. (2009). North Carolina Teacher Working Conditions Survey Brief: Working Conditions Influence Teacher Retention (Research Brief #09-07). Retrieved from North Carolina's Teacher Working Conditions Initiative: http://ncteachingconditions.org/sites/default/files/attachments/NC_teacher_retention.pdf

¹⁰ National Staff Development Council. (2001). NSDC Standards for Staff Development.

- are organized based on learning communities;
- provide appropriate leadership and resources for continuous instructional improvement;
- allow teachers to apply research to classroom decision making and collaborate with other teachers in their knowledge development; and,
- encourage equity and family involvement in their improvement efforts.

To this end, one new professional development model that is gaining favor is that of master teacher academies whereby certified tenured teachers are nominated to participate in professional development around their content area and leadership development as a means to empower teachers to become master teacher leaders who work with their colleagues locally and nationally to improve teaching practices and students' achievement. Examples of such academies include the Urban Teacher Academy and Chicago Teacher Academy as well as ones being newly developed based on passages of bills in Minnesota and Ohio.

The Kenan Fellows Program for Curriculum and Leadership Development is similar to an academy in that seeks to enhance teacher professionalism and leadership by encouraging teachers to develop novel curricular resources that incorporate relevant examples and content in curriculum and instruction via externships in collaboration with the private sector, public schools, and institutions of higher learning. Fellows are encouraged to develop curriculum and instructional practices that emphasize inquiry-based learning and help students apply academic knowledge to authentic, real-world problems. The program was established in 2000 as a result of a community effort to address teacher retention and recruitment and specifically to address the need for Environmental Science teachers. Currently, in addition, the program works to nurture a networked cohort of educators who have advanced skills, are attuned to significant issues in STEM, and see themselves as effective participants in efforts to improve education.

The Kenan Fellows Program is an initiative of the Kenan Institute for Engineering, Technology & Science at North Carolina State University, whose goal is to seek out partners who share its vision and who have the capacity to help transform the results of university scholarship into an improved quality of life. The program is supported by grants from foundations, government organizations, corporations and individual partners.

The program places great emphasis on leadership development through ongoing professional growth based on national standards for staff development, and nurtures the art of teaching by providing opportunities for teachers to explore creative and innovative instructional practices while remaining in the classroom. The program allows teachers to experience contemporary research in academic and industry settings.

Kenan Fellows program goals include:

- Identify, develop and retain teacher leaders in classrooms across North Carolina.
- Advance effective teaching that prepares students for success in the 21st Century.
- Create synergy among teachers, researchers and industry to ensure STEM education is relevant and that best practices are adopted by all stakeholders.
- Develop innovative and relevant tools and resources for North Carolina teachers and students to enhance teaching and learning.

Outstanding classroom teachers selected as Kenan Fellows engage in a two-year fellowship in partnership with university and industry research scientists. Fellows participate in

a research externship for a total of 9 weeks during two summers, and in three weeks of professional development, well as special seminars and events throughout the school year to foster their professional growth. A product of their month-long summer collaboration with their university or business/industry Mentor is a curriculum project that results from the externship experience. This project is disseminated through the Kenan Fellows Program website, presentations at state and national conferences, and professional development for their school colleagues. They also earn six graduate credits from NC State University through their participation as a Fellow.

To date, eight classes of Fellows have been selected; two classes are active at present (Classes of 2010 and 2011). 66 Kenan Fellows have successfully completed the program; the program currently includes 26 and 14 Fellows from the Classes of 2010 and 2011, respectively. In order to accommodate Fellows from across the state, the program has added a residential component.

EVALUATION METHODS

An external evaluation consulting firm, EvalWorks, LLC evaluates the Kenan Fellows Program based on an evaluation plan developed in conjunction with program staff. Much of the data for this report are provided for Fellows from the class of 2010, most whom have recently completed their Fellowship, and 2011 Fellows who have recently completed their first year of the Fellowship. The following instruments and procedures were used to assess the program:

- Professional Development Evaluations from the 2009 summer internship sessions provide data on whether Fellows find sessions challenging and useful for application to the classroom;
- Impact Surveys completed by Fellows in spring 2010 gauge Fellows' perceptions of program impact related to key goals, including teaching/leadership ability, comfort levels in developing and maintaining partnerships with the community, and relationships with Mentors;
- Leadership Data on National Board Certification Rates, Presentations at Conferences, and Grants obtained by Fellows provide information on how the program has enhanced Fellows' leadership skills and how curriculum have been disseminated;
- Teacher Retention Data provided by Fellows is an indicator of how successful the program has been at encouraging participants to remain in teaching;
- Teacher Leadership Survey¹¹ data are used to detect changes to Fellows' perceived teacher leadership skills from the beginning to the end of the fellowship;
- Professional Efficacy Survey¹² data are used to determine whether Fellows' self-efficacy in teaching changed from the beginning to the end of the fellowship;

¹¹ Survey adapted from a Teacher Leader Survey developed by Barnes, N. & Dozier, T., Center for Teacher Leadership, Virginia Commonwealth University, 2003. As of the writing of this report, only baseline data were available for this instrument, final results will be provided in a subsequent report.

¹² Survey adapted from the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001) and Teacher Self-Efficacy Scale (Bandura, undated). As of the writing of this report, only baseline data were available for this instrument, final results will be provided in a subsequent report.

- Teachers' Beliefs About and Use of Inquiry Survey¹³ data are used to document changes to Fellows' perceptions and use of inquiry in the classroom; and
- Student Learning Data involves examining Fellows' students' achievement through a value-added analysis of test data.¹⁴

PROFILE OF KENAN FELLOWS

Selection Process

Kenan Fellows are selected through a competitive application process that targets outstanding K-12 teachers within North Carolina. Fellowships are available for teachers across all content areas; for example an NSF-funded BioMusic project consists of both a music and science teacher from the same school working together to develop curriculum that integrates the two disciplines. Announcements soliciting applications are made via a variety of methods including print notification, email, calls, and radio. The program targets school and district administrators as well as a broad range of business, state, county/community and education leaders statewide. Applicants must be nominated and must complete an online application that provides information about professional achievement, the nature of their commitment to teaching, and a statement about how they propose to address the specific Fellowship opportunity for which they are applying.

From the applications received, a Kenan Fellows selection team composed of university faculty, Kenan Fellows staff, NCDPI representatives, and industry partners selects candidates for personal interviews. The rubric used for the Kenan Fellows selection process ranks the teachers on their leadership potential, content knowledge, initiatives taken to grow professionally, and recommendations from principals and colleagues.

Characteristics of Program Participants

Kenan Fellows constitute a group of teachers with recognized teaching and leadership skills; the Kenan Fellows program seeks to further enhance these teachers' skills and disseminate the products of their work to other teachers in North Carolina.

Whereas the Kenan Fellows program has primarily attracted secondary teachers, some elementary teachers participate. Some are regular elementary classroom teachers, while others have included science specialists, academically gifted and arts specialists. Most middle and high school Fellows teach science, but other areas have included math and English/Language Arts.

¹³ Adapted from Marshall, J.C., Horton, R. M., Igo, B. L., & Switzer, D. M. (In Press). K-12 Science and Mathematics Teachers' Beliefs About and Use of Inquiry in the Classroom. *International Journal of Science and Mathematics Education*. As of the writing of this report, only baseline data were available for this instrument, final results will be provided in a subsequent report.

¹⁴ Statistical analyses of this data are being conducted by SAS staff under separate contract using the EVAAS (Education Value Added Assessment System) software. Data entry is underway and results from these analyses will be included in a future report.

Table 1. Fellow Demographics

	2010 (n=26)	2011 (n=15)
Gender		
Female	19	8
Male	7	7
Race/Ethnicity		
Caucasian	22	11
African-American	3	4
Hispanic/Latino	1	---
Asian/Pacific islander	---	---
Native American	---	---
Bi/Multi-racial	---	---
Current School Level		
Elementary	3	3
Middle	7	1
High	13	10
Other	3	1
Current Subject Area		
Elementary/General	1	3
Math	3	---
Science	16	7
Special Education	---	---
English/Language Arts	---	1
History/Social Studies	---	---
Second Languages	---	---
Other	6	4

Increasingly, in recent years, Fellows have represented more districts within North Carolina, including some to the far west. This is shown in the associated map showing the number of Fellows by district.

Figure 1. Map of Counties Represented by 2010 and 2011 Kenan Fellows

2011 Fellows

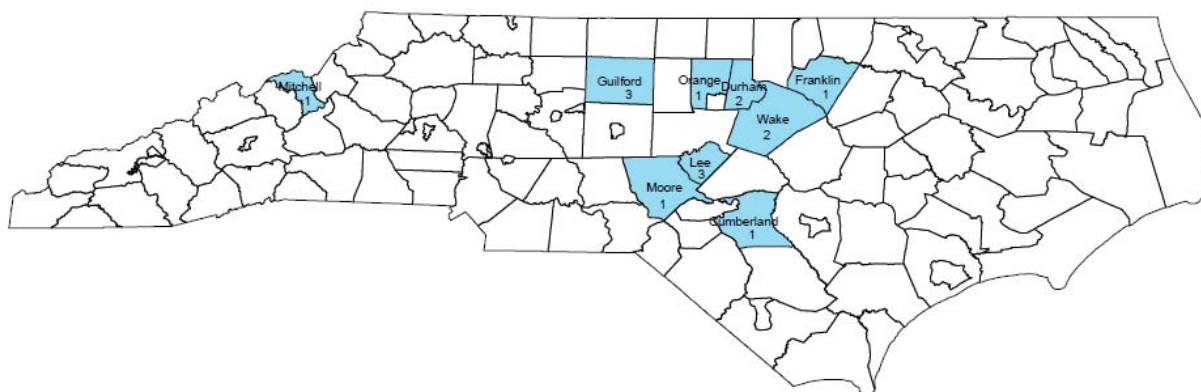
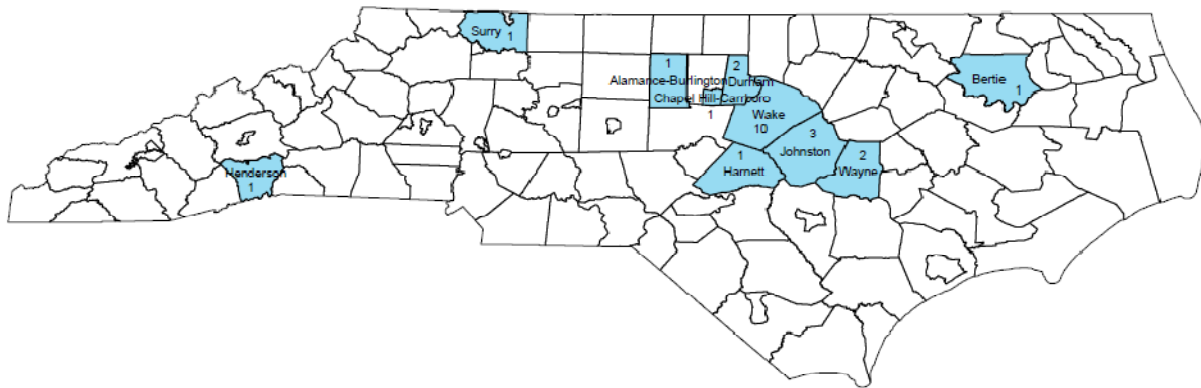


Figure 1. Map of Counties Represented by 2010 and 2011 Kenan Fellows (cont'd)

2010 Fellows



PROFESSIONAL DEVELOPMENT PROGRAM ACTIVITIES

As part of the Kenan Fellowship, Fellows engage in Summer Institutes for professional development as well as a research externship that spans two summers. A full two-thirds of summer program for 2010 and 2011 Fellows was spent on this Fellow-Mentor collaboration. In October 2009, 2010 Fellows (along with their Mentors) presented the curriculum projects that resulted from their externships in a poster session as part of the Kenan Fellows Showcase. This event was attended by university faculty, NCDPI personnel, representatives from the National Science Foundation, KFP Board of Advisors, the Chancellor from NC State University, and other dignitaries and interested members of the community, along with the class of incoming Fellows and Mentors (2011 Fellows/Mentors).

2010 Fellows spent one week of the Summer Institute at the North Carolina Center for the Advancement of Teaching (NCCAT). There they explored ethical issues in light of scientific complexity, participating in sessions such as:

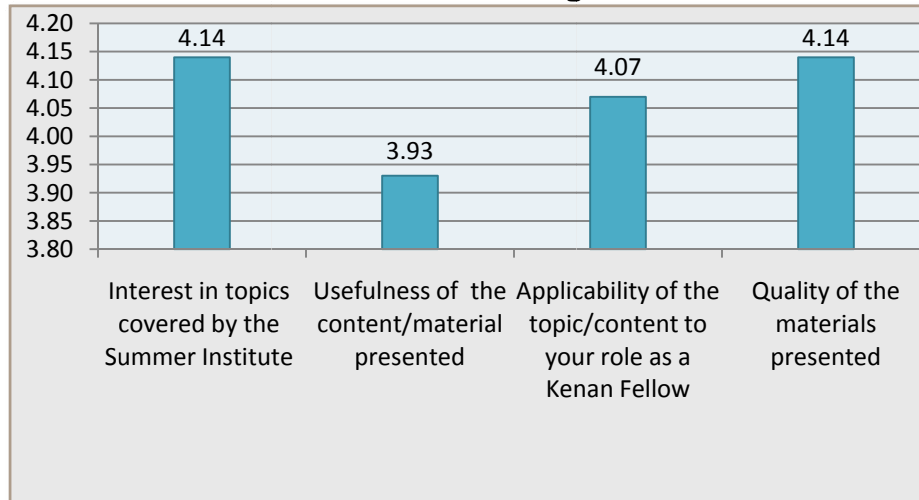
- Introduction to Ethics
- Ethical Questions and Perspectives
- Ethical Complexity
- Ethical Inquiry

For 2011 Fellows, the Summer Institute held in Raleigh included professional development in the following:

- 21st Century Skills
- Effective Communication
- Creating a Lesson: Copyright and Authenticity
- e-learning Environments
- 21st Century e-teacher Training and Using Technology in the Classroom
- Inquiry and Lesson Development
- Engaging Lessons
- Teacher Working Conditions
- Globalization
- New Assessment and Science Standards

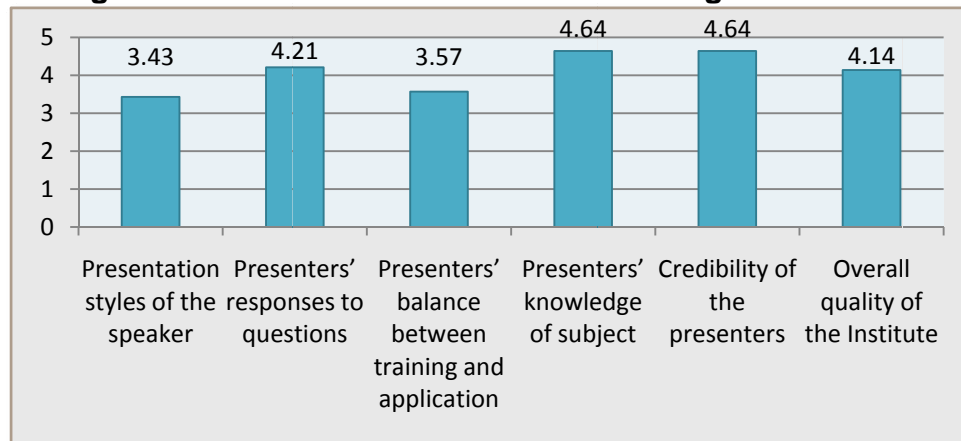
2011 Fellows completed evaluation forms via the secure website for each professional development session provided. These surveys asked for Fellows' perceptions of session quality as well as relevancy to their teaching. Overall Fellows rated the professional development sessions very favorably, at or above 3.9 on a scale of 1 to 5 in all areas, including overall quality of the institute (4.14), applicability of the content/topic (4.07), and usefulness of the content/material (3.93).

Figure 2. 2011 Kenan Fellows' Mean Rating of Professional Development



The facilitators who provided the sessions were also rated positively as average ratings ranged from 4.64 (credibility of the presenter and presenter's knowledge of subject) to 3.43 (presentation styles of the speaker). Overall quality of the institute was rated 4.14.

Figure 3. 2011 Kenan Fellows' Mean Rating of Presenters



When asked to further reflect at the end of the summer about the impact of the summer professional development, 2011 Kenan Fellows were very positive:

- *I enjoyed working with Michael creating movies because I actually did what he was describing and can immediately use it in my classroom.*
- *I really enjoyed hearing from Jean Beagle-Ristaino and Rebecca Hite because it allowed me to see exactly where I can go with my research. I also really liked the panel discussion with the Kenan Fellows. I felt much better about my research after I talked with them.*

- *The ropes course and the opportunity to get to know a new set of people in North Carolina who are excited about teaching and learning [had the greatest impact on me]. [I liked having] the opportunity to hear from 2010 Kenan Fellows about their work [and] the opportunity to see ways to use technologies the kids already use as educational tools. I enjoyed reading Daniel Pink's book.*
- *I think that all of the information presented during the Summer Institute will be useful in working on my project and for use within my own classroom. I really appreciated the presentations that allowed me to reflect on how I was engaging students in my classroom and how I engaged others in becoming teacher leaders. I learned a lot about moving education towards reform for the 21st Century and information on educational policy and how North Carolina is gathering information to produce students who demonstrate the higher order thinking skills and can obtain careers in our changing society.*
- *The panel of former and current Kenan Fellows was very helpful in illuminating their experiences and answering our questions. The communication session was difficult but also useful for me. I was extremely interested in the discussion of rural counties in North Carolina. The DISC assessment was interesting in helping me understand my coworkers, parents, and students.*

Although Fellows participate in extensive professional development during their summer institute experience, additional program activities continue to take place during the school year. For example, two "Fireside Chats" provided an arena for Fellows to ask questions of and network with state leaders in education. Fireside Chats are informal dialogues held with local, state or national leaders in government, education, or business. These meetings provide an opportunity for Kenan Fellows to discuss their ideas and experiences with individuals who can influence public policy and help advance the teaching profession. During 2009-10 the Fireside Chats included sessions with Rob Dunn, Assistant Professor of Biology at NCSU and Oliver Smithies, UNC geneticist & Nobel Laureate.

ATTAINMENT OF KEY PROGRAM GOALS

Identify, develop and retain teacher leaders in the classrooms across North Carolina

As part of the evaluation of this program, multiple data were collected and measures used to assess attainment of the goal of identifying, developing, and retaining teacher leaders in classrooms across North Carolina. All Fellows responded to a survey about their leadership behaviors both before they entered they became a Fellow, after their first year in the program, and then upon their completion of the program (2010 Fellows only) to assess program impact on leadership behavior. Fellows also reported on leadership behaviors including obtaining grants, presenting at conferences, and working with others in their own school or district.

As is shown below, 2010 Fellows' post -surveys reveal their ideas of what a teacher leader must be able to do and where they stand as a teacher leader. As can be seen, on a scale of 1 to 5, Fellows' average rates of agreement to the following items ranged from 4.6 - 4.7: "I have the knowledge and skills needed to serve as a mentor for new teachers"; "I have the knowledge and skills needed to reflect on my teaching practices in order to improve my performance"; and "I have the knowledge and skills needed to write curriculum for my content area so that most students learn at high levels".

**Table 2. Post Leadership Survey Ratings:
Top 10 Rated Items - 2010 Fellows**

2010 Fellows		
	n	Post - Mean
1. Teacher leaders explore new concepts and methodologies.	25	4.88
2. Teacher leaders must be advocates for students and the teaching profession.	25	4.80
3. Teacher leaders must have strong communication and listening skills.	25	4.80
4. Teacher leaders are intellectually curious.	25	4.76
5. Teacher leaders are creative and engage in multidisciplinary approaches to learning and thinking.	25	4.76
6. I have the knowledge and skills needed to serve as a mentor for new teachers.	25	4.72
7. Teacher leaders must be articulate about their teaching practice.	25	4.72
8. I have the knowledge and skills needed to reflect on my teaching practices in order to improve my performance.	25	4.68
9. Teacher leaders must understand the needs of adult learners and how to work with colleagues as mentors and coaches.	25	4.64
10. I have the knowledge and skills needed to write curriculum for my content area so that most students learn at high levels.	25	4.60

2011 Fellows also reported gains in some areas and skills, including understanding what it means to be a teacher leader and taking on leadership roles, how to discuss educational policy, and how to develop curriculum and share it with other teachers.

**Table 3. Pre-Post Leadership Survey Ratings:
Items with Gains of .20 or Greater - 2011 Fellows**

2011 Fellows				
	n	Pre-Mean	Post-Mean	Gain
1. I have the knowledge and skills needed to provide effective professional development for teachers.	15	4.33	4.67	.34
2. I have a clear definition of a teacher leader.	15	4.4	4.73	.33
3. I take on STEM leadership roles within my school.	15	4.2	4.47	.27
4. I am knowledgeable of the needs of educational policymakers and skilled at discussing educational policy with them.	15	3.67	3.93	.26
5. I have the knowledge and skills needed to write curriculum for my content area so that most students learn at high levels.	15	4.33	4.53	.20
6. Teacher leaders must be articulate about their teaching practice.	15	4.60	4.80	.20
7. Teacher leaders must be excellent teachers.	15	4.40	4.60	.20
8. I have the knowledge and skills to work with adult learners.	15	4.47	4.67	.20
9. I am knowledgeable of the No Child Left Behind Act.	15	4.07	4.27	.20

As part of the Impact Survey, Fellows were asked to identify the elements of Kenan Fellowship program that they believed most significantly impacted teacher leadership. Fellows from the class of 2010 reported the following:

- *The strongest element of this program was the networking to other professional science teachers. Most importantly (without this program) I would not have pursued greater leadership roles at the state level.*
- *Despite the comments from coworkers and past teachers, I would not have had this courage if it weren't for the support of the Kenan Fellows program to further women in science and I felt none of this disparity while I was a participant in the Kenan Fellows; actually quite the opposite of my day to day experience.*
- *Working with scientists who are on the cutting edge of research and then writing curriculum that is used in the classroom [had the greatest impact on my development as a teacher leader]. Getting together for the "night shift" when we all were together, it was a time to pick each other's brains and to bounce ideas off of others to see what might work in your classroom.*
- *Providing them with access to new information about policy and instructional technology gives KFs the confidence to find new leadership positions and/or to be better leaders in their already existing positions.*
- *First of all, I think the teachers [Fellows] have a changed perception about themselves and their importance while involved in the program. Other teachers looked up to me in a different way because I was involved with education outside of my job. During the first summer I felt very excited about what I was learning and the people I was meeting. I felt knowledgeable and important because I had been introduced to things that others had not yet heard of.*

2011 Fellows also responded to this question:

- *The interaction of Kenan Fellows with state policy-makers is one of the most significant elements for teacher leadership. Conversing with political leaders gives teachers a sense of empowerment which is especially important in this economy. Teacher morale is steadily declining as our jobs and funding continue to suffer the effects of an unbalanced state budget. Most teachers feel they have no voice as to what happens at the state level, and their only choice is to deal with it or leave the profession. Kenan Fellows have the opportunity to bring the tough questions to state leaders who have the power to affect change in educational policies.*
- *The Kenan Fellows program has helped me advocate for inquiry-based teaching. Due to my Kenan Fellow contacts, I was featured on Learn NC. I will be hosting workshops and publishing lesson plans. Teachers come to me now to ask my advice and I have elementary education students at a local college coming in May to observe my inquiry based science teaching and problem-solving math instruction.*
- *The training and confidence that I have received over the past year has definitely helped me to become a stronger teacher leader. I am more anxious to share with other teachers and with the administration in my school. I formed a grant writing committee this year and was selected as my school's Teacher of the Year. I know that I was able to do this because of the confidence that I have gained through this program.*

- *The interaction with other superior teachers in North Carolina [had the greatest impact on my development as a teacher leader]. The program provides me access to leaders in various fields. I value the interaction with working scientists and engineers.*

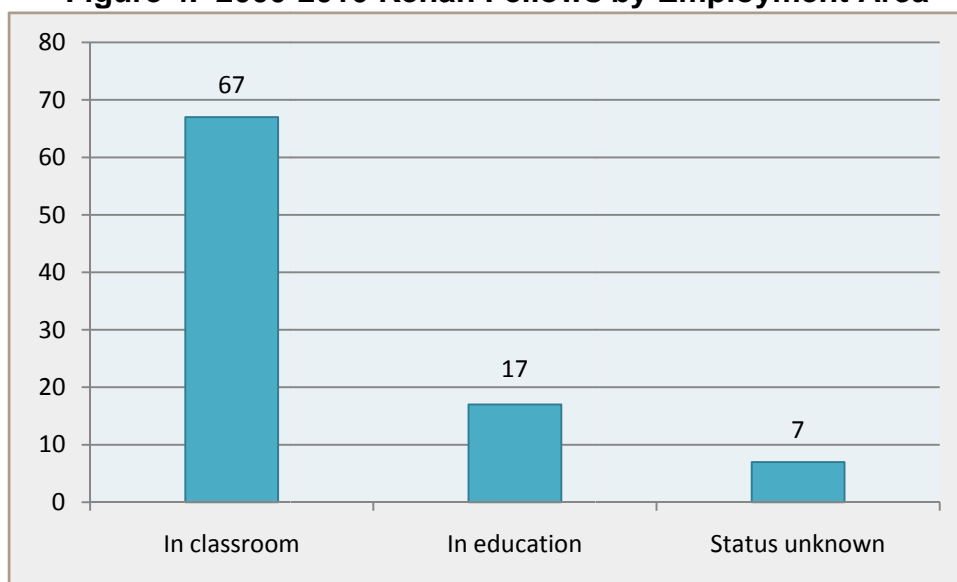
Many Kenan Fellows receive awards and recognition as teacher leaders while engaged in their Fellowship. Recognition of 2010 and 2011 Fellows over the course of this year include the following:

- Kishia Moore (Class of 2011), a first grade teacher at Greenlee Primary School in Mitchell County, was featured in an online article by Learn NC. Ms. Moore shared some of the strategies she uses to bring inquiry-based instruction into the elementary classroom.
- Jennifer Li, a student of Celia Rowland (Class of 2010), won 1st place in the Biology Division of the North Carolina Central Regional Science Fair. Ms. Rowland shared data analysis techniques from her Kenan Fellowship with her AP Statistics class last year. Jennifer states, "This was extremely beneficial to my research project (which was about how the "Sensitivity of Human Glioblastoma Cells to Temozolomide is Mediated by Glutathione S-transferase P1")." Both student and Fellow are at Enloe High School in Raleigh.
- Harold Mackin (Class of 2010) has accepted the position of Education Consultant for Agriculture and Natural Resources, Connecticut Department of Education. Harold has long been a leader in Agricultural and Natural Resources education in the state of Washington.
- Karin Colon (Class of 2010) was named Teacher of the Year at her school (Glendale-Kenly Elementary School) and received a grant from the Johnston County Education Foundation.
- Rebecca Hite (Class of 2010) was selected as the 2009 Science Ambassador for the Centers for Disease Control and Prevention's Career Paths to Public Health Program as well as to the Board of Directors of the North Carolina Science Leadership Association.

One of the emphases of the Kenan Fellows Program is retaining classroom teachers. Recent statistics for the cohort of teachers who began teaching in North Carolina during 2000-01 show that only approximately half of teachers with previous teaching experience, one-third of new teachers with no experience and fewer than half of lateral entry teachers were retained beyond their third year.¹⁵ North Carolina's average attrition rate is approximately 14% each year over the past 7 years. Given this, one would only expect 67% or 62 Kenan Fellows to remain in education. However, as is shown below, through the 2011 Fellows, 67 of 91 or 74% of Kenan Fellows have remained as classroom teachers, with an additional 17 or 19% remaining in education. Thus, currently 93% of Kenan Fellows from 2000-2010 remain active in education. This may be due to the fact that the Kenan Fellowship promotes teacher leadership and development, potentially providing new opportunities to teachers to rejuvenate their practice and foci. It is hoped that a renewed interest in teaching will influence other teachers within Fellows' schools and districts.

¹⁵ Report and Recommendations from the NC State Board of Education Teacher Retention Task Force, February, 2005.

Figure 4. 2000-2010 Kenan Fellows by Employment Area



Advance effective teaching that prepares students for success in the 21st Century

The Kenan Fellows program seeks to contribute to students' 21st century success by advancing Fellows' content knowledge, research skills, and ability to use inquiry-guided classroom instruction. Data are collected to address program effectiveness in the following areas:

- Fellows' self-reports of teaching skills, professional efficacy, and use of inquiry practices, and
- Value-added student academic achievement data.

Student achievement data are currently being collected/analyzed and will be available in a future report. However, other data indicate that Fellows are better able to prepare students for the 21st Century due to the professional development they have received. As is shown in Table 4, 2010 Fellows indicated a strong sense of self-efficacy as a teacher, rating the following items high on a scale of 1 to 8, in terms of their ability to address them.

**Table 4. Post Personal Efficacy Survey Ratings:
Top 10 Rated Items - 2010 Fellows**

2010 Fellows		
	n	Post - Mean
1. How much can you do to adjust your lessons to meet the needs of diverse learners?	25	7.96
2. How much can you do to gauge student comprehension of what you have taught?	25	7.76
3. How much can you do to get children to follow classroom rules?	25	7.76
4. How much can you do to implement inquiry-guided teaching strategies within your lessons?	25	7.76
5. How much can you do to control disruptive behavior in the classroom?	25	7.72
6. How much can you do to provide appropriate challenges for very capable students?	25	7.40
7. How much can you do to get students to work together?	25	7.32
8. How much can you do to foster student creativity?	25	7.24
9. How much can you do to teach STEM (Science, Technology, Engineering, Mathematics) content effectively to high-needs students?	25	7.16
10. How much can you do to spark interest and enthusiasm for STEM content when teaching your high-needs students?	25	7.16

2011 Fellows also rated many of these items high, although not as high as 2010 Fellows. However, already they have made gains in relationship to some of these items as part of their experiences as a Kenan Fellow. For example, many 2011 Fellows are changing their opinions of what they should and can do in the classroom such as sparking interest and enthusiasm for STEM content when teaching high-needs students, getting needed instructional materials and equipment, and getting children to follow classroom rules.

**Table 5. Pre-Post Personal Efficacy Survey Ratings:
Items with Gains of .20 or Greater - 2011 Fellows**

2011 Fellows				
	n	Pre-Mean	Post-Mean	Gain
1. How much can you do to spark interest and enthusiasm for STEM content when teaching your high-needs students?	15	7.47	7.87	.40
2. How much can you express your views freely on important school matters?	15	6.67	7.00	.33
3. How much can you do to get the instructional materials and equipment you need?	15	6.00	6.27	.27
4. How much can you do to get children to follow classroom rules?	15	7.87	8.13	.26

Interestingly, Kenan Fellows from the class of 2011 provided lower post ratings for some of the items, suggesting that they do find being a teacher leader harder than they may have perceived before they became a Fellow and learned what it really means to be a teacher leader. Thus these ratings may represent a more accurate self-assessment.

**Table 6. Pre-Post Personal Efficacy Survey Ratings:
Items with Negative Gains - 2011 Fellows**

2011 Fellows				
	n	Pre-Mean	Post-Mean	Loss
1. How much can you do to influence policymakers about educational issues?	15	5.67	5.00	-.67
2. How much can you do to help other teachers enhance their teaching skills?	15	7.20	6.53	-.67
3. How much can you do to improve the understanding of a student who is failing?	15	7.40	6.87	-.53
4. How much can you do to influence fellow teachers to advocate for the teaching profession?	15	6.73	6.27	-.46
5. How much can you do to influence decisions that are made in the school?	15	6.80	6.40	-.40
6. How much can you do to motivate students who show low interest in school work?	15	7.27	7.00	-.27
7. How much can you do to promote learning when there is a lack of support from home	15	6.73	6.47	-.26

Results from the 2010 Fellows of their ratings of agreement with items on the inquiry survey further underscore how the Kenan Fellows program is helping teachers advance best practices to better prepare students in 21st century skills. On a scale of 1 to 6, Fellows' average rates of agreement ranged from 5.19 (I know the content standards for the science/math course students take after my course) to 5.46 (I can effectively assess my students' progress during inquiry). Notable, Fellows indicate that they can effectively use inquiry to engage all students, manage student behavior, and formatively assess students' progress.

**Table 7. Post Inquiry Survey Ratings:
Top 10 Rated Items - 2010 Fellows**

2010 Fellows		
	n	Post - Mean
1. I can effectively assess my students' progress during inquiry.	26	5.46
2. I can effectively lead students in inquiry.	25	5.44
3. Using inquiry teaching methods increases students' enjoyment of science/math.	24	5.33
4. During inquiry, I can manage student behavior.	26	5.31
5. I can effectively teach students how to participate in inquiry.	26	5.31
6. I understand the process standards (skills) in my discipline.	26	5.27
7. It is important to help students see the connections between science/math and other subjects.	26	5.27
8. My school's administration is supportive of inquiry instruction.	26	5.27
9. In my content area, I use resources other than textbooks.	26	5.23
10. I know the content standards for the science/math course students take after my course.	26	5.19

2011 Fellows' rates of agreement also increased over the year to positively worded items on the survey about use of inquiry. As is show in Table 8, some of these changes are statistically significant.

**Table 8. Pre-Post Inquiry Survey Ratings:
Items with Gains of .20 or Greater - 2011 Fellows**

2011 Fellows				
	n	Pre-Mean	Post-Mean	Gain
1. In my content area, I use resources other than textbooks.	16	5.27	5.93	.66*
2. It is important to help students see the connections between science/math and other subjects.	16	5.07	5.57	.50*
3. Teaching content is more important than teaching inquiry.	16	3.47	3.00	-.47*
4. I understand the process standards (skills) in my discipline.	16	5.40	5.67	.27
5. Using inquiry teaching methods increases students' enjoyment of science/math.	16	5.13	5.33	.20

* = difference is statistically significant at the .05 level.

Impact Survey comments from 2010 and 2011 Fellows describe how their participation has impacted their teaching including enhancing their confidence and skills with content knowledge, inquiry-based instruction, technology and ability to make STEM relevant to students, which are central goals of the Kenan Fellows program.

2010 Fellows

- *My most significant change has been in the area of technology. I have integrated far more technology in the classroom. Additionally, I have taken the initiative to make major changes in how my Professional Learning Team plans and assesses students in each classroom. We now have a cohesive set of course notes, formative and summative assessments and activities for our course.*
- *I now look at each lesson and try to infuse more inquiry; more math; more career information while still meeting state standards. I have changed about 60% of my lesson plans since beginning as a Kenan Fellow and I am working on the other 40%, while still improving the ones I changed.*
- *The biggest impact the Kenan Fellowship has had on me as a teacher is that it has re-sparked my enthusiasm for teaching. After teaching for thirteen years, I felt like I was in a bit of a rut. I was ready to learn new things and update the activities in my classroom. Working with my mentor and learning something me new put me back in the role of the student. I feel like this relationship helped me to appreciate better what my students go through on a day to day basis. Experimenting with new lessons and ideas has been inspiring and invigorating. My goal is to spread that enthusiasm to my students so they are just as excited to try out these lessons and learn more about Biotechnology and Biomanufacturing in the process.*
- *Prior to becoming a Kenan Fellow, I did not believe that I could become a teacher leader. After the Summer Institutes, I understood what leadership meant and how I could take steps to assume leadership roles in my school. This growth has significantly impacted my career.*

- *The most profound effect on my participation as Kenan Fellow has been on my knowledge of STEM content and how I apply it to developing more effective and meaningful lessons for my students rather than rely on a textbook and teacher's manual in dictating what and how I teach. In addition, in my work with other teachers, this knowledge helps me to coach them in doing the same for their students.*
- *What I do in my classroom is good education. I have a larger professional community to draw from and have gotten insightful ideas from fellows in the program. I have needed a group of top notch teachers so that I could keep growing as an educator.*

2011 Fellows

- *Working with a university mentor has provided the opportunity for me to develop lesson plans with greater depth and a greater real world connection.*
- *After completing the summer workshop, I realized that I do not allow my students to use technology in the classroom. I use an Interwrite Tablet everyday to teach class, but my students do not often use technology to complete projects and assignments. Since the workshop, I changed two of my major projects during the school year to incorporate more technology. I also included a video as a requirement for the project I developed for the Kenan Fellows program. The workshops encouraged me to reflect on my typical class projects. I realized that I could enhance these projects by incorporating technology, and my students have enjoyed this change.*
- *It has made me feel proud, for the first time in many, to be a teacher and has reenergized my career.*
- *My research was on inquiry-based teaching, specifically how to get students to get the most out of inquiry-based teaching. The effect of this research has been profound on my teaching. My students now use thinking routines to make connections and increase critical thinking skills to solve problems.*
- *My involvement as a KF has impacted my teaching specifically by causing me to be more critically aware of the effectiveness of the learning opportunities I provide to my students.*

Create synergy among teachers, researchers and industry to ensure STEM is relevant and that best practices are infused across the spectrum

In order to ensure STEM instruction is based on best practices and relevant to students, the Kenan Fellows program seeks to help Fellows build and maintain synergistic relationships and partnerships with others in the community, including university faculty, community agencies/industries and businesses, and the NC Department of Public Instruction. The program also provides an arena for Fellows to form partnerships/relationships with one another, thus giving them a chance to interact with other teacher leaders with similar interests and skills. Kenan Fellows spend extensive amounts of time with their mentor during the summer and school year as they develop, refine and evaluate their curriculum projects. As noted previously, Fellows also participate in summer programming on forming and sustaining school/business partnerships, and attend "Fireside Chats" throughout the year with industry, business and educational leaders.

A substantial majority (84%) of 2010 Fellows reported on the Impact Survey that the program has enabled them to build relationships/partnerships with the broader community, and all (100%) agreed or strongly agreed that opportunities to network with other Fellows benefits their teaching and leadership skills. Among 2011 Fellows, all but two agreed or strongly agreed that being a Kenan Fellow has enabled them to build relationships/partnerships with the broader community, and all but one agreed or strongly agreed that it has benefitted their teaching and leadership skills.

Comments from the Impact Survey illustrate how Fellows from both classes believe these relationships and partnerships have broadened their interests and concerns, contributed to their leadership and teaching skills, and enhanced their ability to work with others in business/industry:

2010 Fellows

- *I have gone beyond the relationships with other Kenan Fellows and built new relationships with other teacher leaders across the country. This has benefited me by giving me other opportunities to participate in other content areas within my discipline. For example, since beginning the program, I have been asked to edit/review 3 university-level textbooks in one content area.*
- *With his help, I received a \$17,000 grant to improve instruction materials in my program. I now have an individual who is capable and willing to listen to ideas for student learning and he has been a great role model, guest speaker within the classroom and the high school.*
- *The relationship I have developed with my mentor has been a huge benefit of the Kenan Fellows Program. With his assistance, I have made contacts with local industry leaders that have served as guest speakers in my classroom. In addition, with his guidance, another Kenan Fellow and I were awarded a grant from the North Carolina Biotechnology Center to host a four day summer workshop for middle grades teachers.*
- *The professional relationships that I have acquired with other Fellows throughout the state are valuable. I would not have had the opportunity to meet these individuals and discuss curriculum and educational policy with such a diverse group of individuals without the Kenan Fellow program.*
- *I have built relationships with people and organizations that I would not have had access to before. Being a Kenan Fellow is having a certain level of clout which people respect and makes them want to listen to what you have to say. It has also opened doors to other professional development opportunities that have helped to further expand my teaching repertoire and content knowledge. I have gained long-lasting friendships and professional relationships that will serve me for a lifetime.*

2011 Fellows

- *I have presented my work at a number of conferences and taught professional development courses within the county and other organizations (LEARN NC) to share resources and strategies.*
- *My students have had several opportunities to visit NC A&T University and even made a presentation of their work from my Kenan Fellows project at a conference in February. Senator Kay Hagan was there and spoke with my students about the work they did. This partnership with NC A&T University benefits me as well because my mentor*

always contacts me to solicit help with different projects he is developing. Having a good relationship with NC A&T University provides opportunities for me and my students to develop a deeper knowledge in our content area.

- *Teaching in a rural area in the Blue Ridge Mountains, the ability to network has been one of the biggest benefits of the Kenan Fellows program for me. Before I was accepted as a Kenan Fellow, I was not able to collaborate and advocate for inquiry-based teaching. Now I have been featured in Learn NC, will be presenting my research to five counties in NC, and publishing lesson plans online.*
- *I have been able to meet so many professionals through this program. My fellow Kenan Fellows and those I have met through our training and my mentor. I am much more comfortable handing out my card now and discussing what I do with others. I never did this before, but I find I am able to meet many people now who have various skills that I can learn from and often my students can learn from as well. My mentor has been amazing. I have met others who are working through this program and I have been able to observe much of the process of lesson development used by other groups of teachers. I have been able to take this back to my own school and request we use something similar for next year.*

Develop innovative and relevant curricular tools and resources for teachers and students across North Carolina to enhance student learning

While a major goal of the Kenan Fellows Program is to foster teaching and curriculum development, an equally important goal is to disseminate the innovative curricula developed by Fellows to other teachers. Each Fellow is expected to create web-based curricula with the support of Kenan Fellow staff, including key components of their curriculum project and how the project is aligned with national and state standards. LEARN NC provides guidance on web site development and on other statewide dissemination strategies as well. Curriculum developed by Fellows are posted on the Kenan Fellows Program website at <http://www.ncsu.edu/kenanfellows/>, at LEARN NC's website, www.LEARNNC.org, and on a national curricular platform at Curriki.org. In addition, each Fellow presents at conferences such as the NC Science Teachers Association Conference, National Science Teachers Association conference, or other relevant conferences. (See previous discussion of conference presentations).

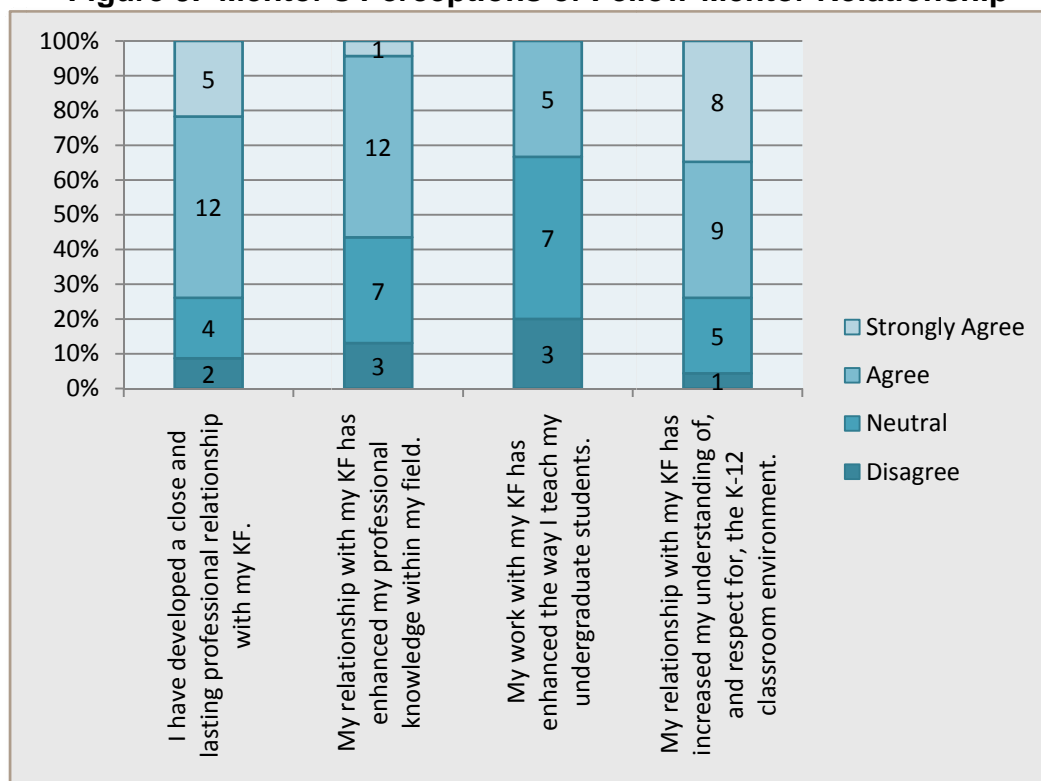
Beginning with the class of 2010 Fellows, the evaluation of the curriculum projects involves ongoing formative assessment as projects are developed. Fellows develop a Project Plan with their Mentor that includes documentation of their projects' impact on students learning and attitudes towards STEM topics. In addition, Quality Assurance Teams monitor the curricula developed by Fellows in the fall and spring of each year, and provide formative feedback to enable improvements to ensure that projects are of the highest quality possible.

MENTOR SURVEY RESULTS

A key partner to each Kenan Fellow is the university or business/industry Mentor who serves as a research partner and host for the externship experience. Each Fellow/Mentor team develops a plan for the externship, and a project plan that details their methods for ongoing work on a curriculum project that will translate the research externship for the benefit of students. The mentor provides input on the development of the curriculum project. During the summer, Fellows work extensively with their Mentors or a research team in the lab, and Mentors occasionally attend parts of the summer professional development program with their Fellow. Fellows continue to communicate with their Mentors throughout the school year. Some Fellows bring Mentors into their classrooms to talk with students, attend university classes taught by Mentors to enrich their content knowledge, and make joint presentations at conferences.

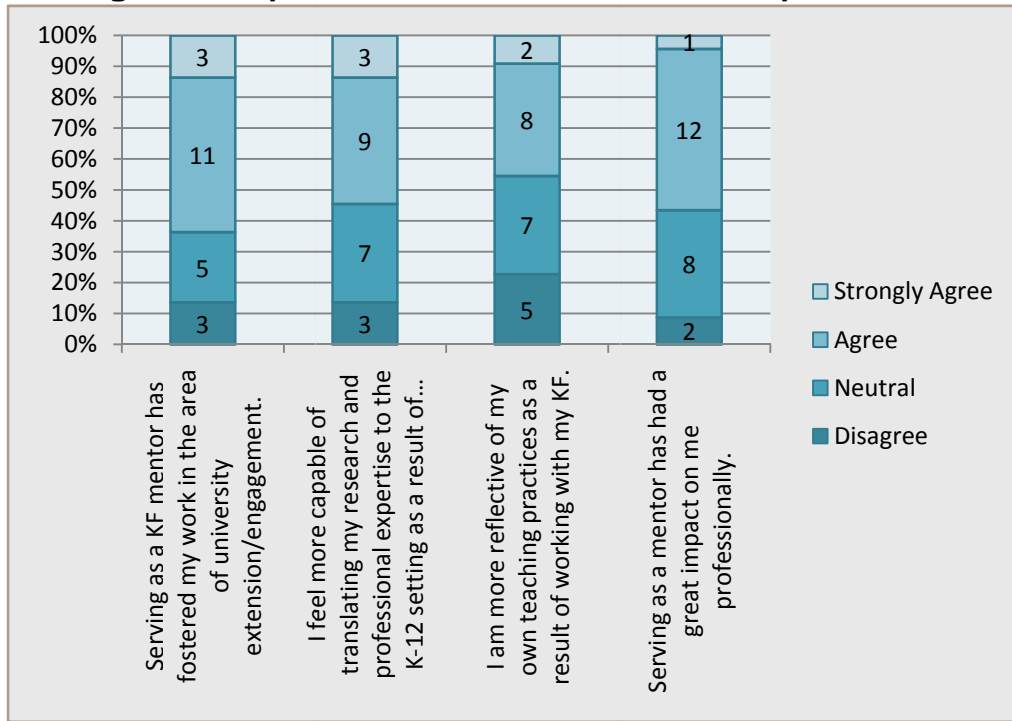
All 183 current and former Mentors (not just Mentors of 2010 and 2011 Fellows) were surveyed in spring 2010 to assess their views of their mentee and the Kenan Fellow Program with 23 responding (response rate = 12.5%). As is shown in the figure below, most respondents agree or strongly agree that they have developed close and lasting relationships with their mentees, that this relationship has enhanced their professional knowledge and teaching (where applicable), and that it has increased their understanding and respect for the K-12 classroom environment.

Figure 5. Mentor's Perceptions of Fellow-Mentor Relationship



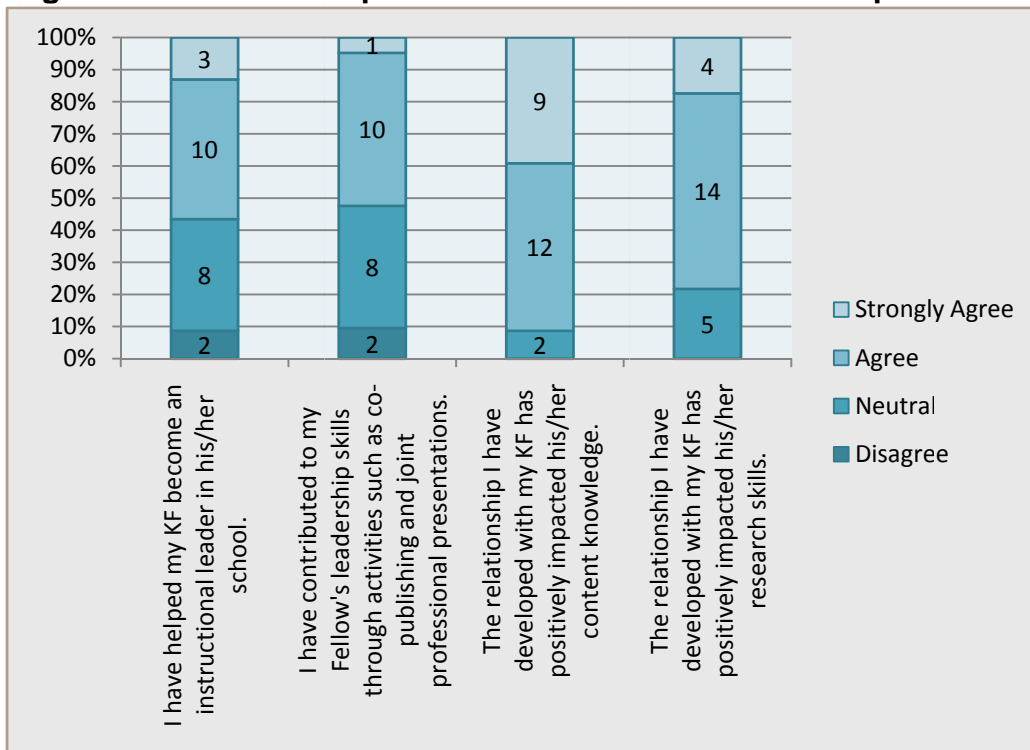
Additionally, most responding Mentors agree or strongly agree that being a mentor has had a great impact on them professionally including having fostered their own work, helped them translate their work to the K-12 setting, made them more reflective of their own teaching practices (where applicable).

Figure 6. Impact of Fellow-Mentor Relationship on Mentor



In terms of their perceived impact on their Fellow, most mentors agree or strongly agree that they have helped their mentor become a teacher leader, helped him or her improve their leadership skills, helped increase the Fellow's content knowledge, and positively impacted his or her research skills.

Figure 7. Perceived Impact of Fellow-Mentor Relationship on Fellow

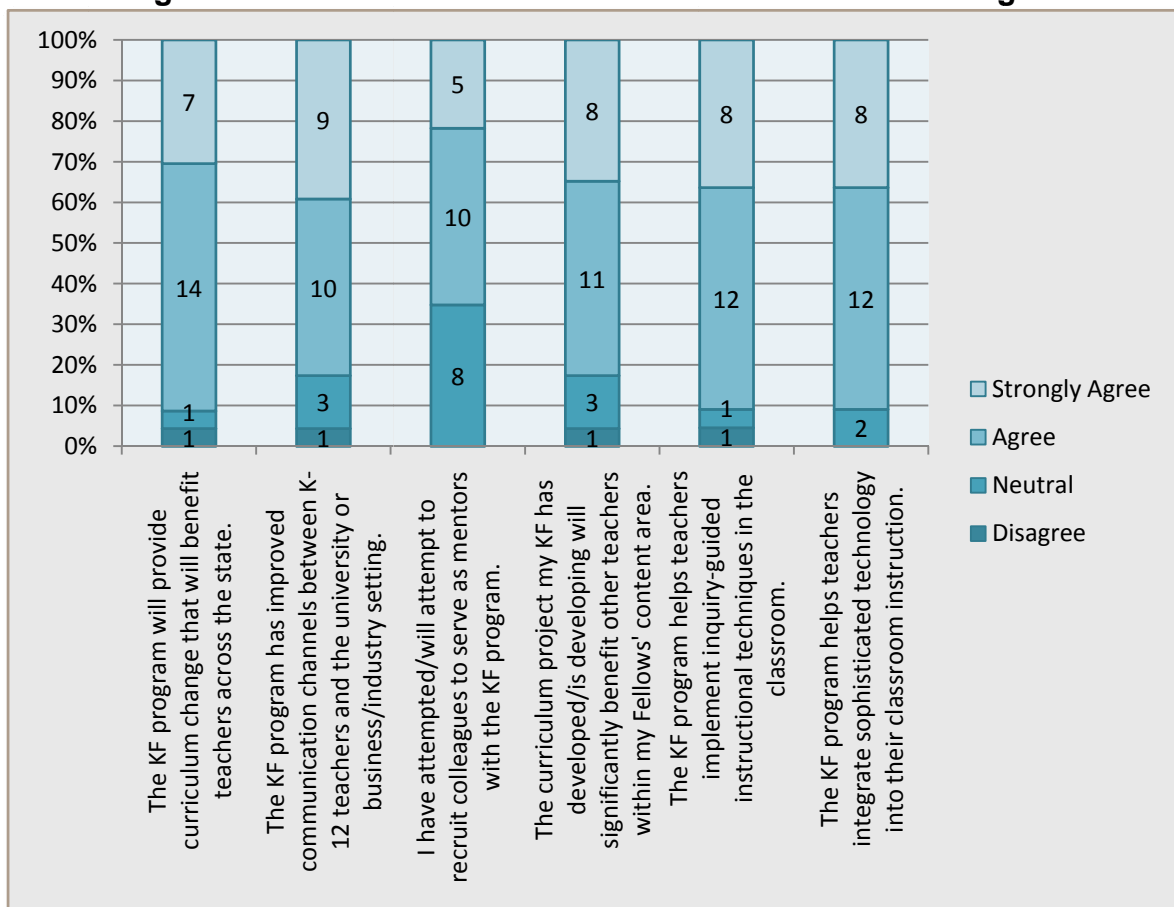


Comments from Mentors include the following:

- *I have learned how to make my curricula more flexible, e.g. write it so that others can use it and add more material or skip some. This is usually not done at universities - faculty are very protective of their curricula, even if it isn't good.*
- *My relationship with my KF has impacted me through revealing more of the day-to-day realities of the classroom teacher's life and the classroom environment. On a recent visit to her school, I observed and interacted with three classes of students working on the same project. I gained a greater sense of the reality of lesson plan implementation by seeing the range of abilities and understanding that students brought with them to the project. While the project allowed for differentiation and students to take on roles according to their abilities, the varying depths at which the students understood the task and were able to conduct research revealed a lot about all of the factors a teacher must take into consideration when planning and implementing a lesson. As someone who provides professional development and lesson planning advice to teachers, it was great to be reminded of how it all unfolds in the classroom.*
- *Working with the Kenan Fellows has pushed me to reach into to new areas to help make connections for either the information for the project, or dispersing the information to new groups and partners.*

Finally, Mentors provided their own assessment of the Kenan Fellows Program with most agreeing or strongly agreeing to positive statements about its impact on curriculum, other teachers, and use of technology in instruction.

Figure 8. Mentors' Assessments of the Kenan Fellow Program



SUMMARY AND DISCUSSION

Results of the evaluation of the Kenan Fellows Program for 2009-2010 program provide evidence that this program is meeting its goals of 1) identifying, developing and retaining teacher leaders in the classrooms across North Carolina, 2) advancing effective teaching that prepares students for success in the 21st Century, 3) creating synergy among teachers, researchers and industry to ensure STEM is relevant and that best practices are infused across the spectrum, and 4) developing innovative and relevant curricular tools and resources for teachers and students across North Carolina to enhance student learning.

Fellows are provided high quality professional development via workshops and fireside chats by those knowledgeable in their fields. These gatherings focus on teaching, leading, and learning. These opportunities, combined with their externship experiences, appears to improve Fellows' leadership skills as is shown by Fellows' high rates of agreement (mean rating 4.6-4.7 on a scale of 1 to 5) to items about leadership abilities including "I have the knowledge and skills needed to serve as a mentor for new teachers"; "I have the knowledge and skills needed to reflect on my teaching practices in order to improve my performance"; and "I have the knowledge and skills needed to write curriculum for my content area so that most students learn at high levels". 2011 Fellows also report gains in some of these same areas and skills, including understanding what it means to be a teacher leader, taking on leadership roles, how to discuss educational policy, and how to develop curriculum and share it with other teachers, as a result of their participation in the Kenan Fellowship.

These opportunities also appear to impact Fellows' content knowledge, research skills, and ability to use inquiry-guided classroom instruction. As noted, both 2010 and 2011 Fellows indicate a strong sense of self-efficacy as a teacher, providing mean ratings above 7.5 on a scale of 1 (Nothing at all) to 8 (Quite a lot) to items assessing their ability to motivate and meet the needs of multiple learners and students.

Results from both 2010 and 2011 Fellows of their ratings of agreement to items on the inquiry survey further underscore how the Kenan Fellows program is helping teachers advance best practices to better prepare students in 21st century skills. On a scale of 1 to 6, Fellows' average rates of agreement range from 5.19 (I know the content standards for the science/math course students take after my course) to 5.46 (I can effectively assess my students' progress during inquiry). Notably, Fellows indicate that they can effectively use inquiry to engage all students, manage student behavior, and formatively assess students' progress. 2011 Fellows' rates of agreement also increased over the year to positively worded items on the survey about use of inquiry. Pre-post changes in their ratings of three items are statistically significant. Future quantitative analyses will utilize post-Fellowship data with the hopes of discovering that more gains are statistically significant across all surveys.

As compelling as the quantitative findings are the qualitative reports by Fellows of the changes they have experienced related to their self and their roles because of their participation in the Kenan Fellowship Program. For example, a substantial majority (84%) of 2010 Fellows report that the program has enabled them to build relationships/partnerships with the broader community, and all (100%) agree or strongly agree that opportunities to network with other Fellows benefits their teaching and leadership skills. Among 2011 Fellows all but two agree or strongly agree that being a Kenan Fellow has enabled them to build relationships/partnerships with the broader community, and all but one agree or strongly agree

that it has benefitted their teaching and leadership skills. Comments provided by Fellows further underscore the impact of the Kenan Fellowship Program on them and evidence such as the grants and awards received suggest that Fellows are being recognized for these changes by others.

Comments by Kenan Fellows often reflect the quality of the externships they have experienced. These experiences are a critical aspect of Fellows' development and truly place great reliance upon a mentor to make the experience rich and fulfilling. Perhaps most positive is the fact that mentors both believe in the Kenan Fellows Program and have benefitted from their participation. For example, data gathered as part of this evaluation indicate that most mentors agree or strongly agree that they have developed close and lasting relationships with their mentees, that these relationships have enhanced their professional knowledge and teaching (where applicable), and that they have increased their understanding and respect for the K-12 classroom environment. Additionally, most responding Mentors agree or strongly agree that being a mentor has had a great impact on them professionally including fostering their own work, helping them translate their work to the K-12 setting, making them more reflective of their own teaching practices (where applicable). In terms of their perceived impact on their Fellow, most mentors agree or strongly agree that they have helped their mentor become a teacher leader, helped him or her improve their leadership skills, helped increase the Fellow's content knowledge, and positively impacted his or her research skills. Understanding the components of what makes some mentorships so rewarding for both the Fellow and mentor may be useful for developing future externships.

Finally, not only does the Kenan Fellow Program develop teacher leaders, it retains them as well. In fact, given that the state average turnover rate for teachers over the past 7 years has been 14%, the fact that so few Fellows have left the classroom and far fewer have left education is remarkable. For many, the Kenan Fellowship has rejuvenated their enthusiasm in teaching and has kept more than one active in the classroom instead of choosing retirement. Retaining teachers is hard, even in this economy, and retaining high quality teachers such as Kenan Fellows is even harder. Given the success of the Kenan Fellow Program in retaining teachers, more research should be done on why Kenan Fellows tend to remain as classroom teachers or educators.