

MAJOR TRENDS FACING NORTH CAROLINA: IMPLICATIONS FOR OUR STATE AND FOR THE UNIVERSITY OF NORTH CAROLINA



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The Impact of "Soft Skills" in the Information – Knowledge
Management Economy and the UNC System Dr. Deborah S. Bosley,
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Introduction

We live in an information and knowledge management economy in which the production, dissemination, and critique of information requires new intellectual, technical, global, and interpersonal skills. As a direct response to the global challenge to produce more engineers, scientists, and technologists, our universities have increased the numbers of information technology departments and degrees and continue to focus on increasing the numbers of students (particularly minorities and women) in the STEM areas (Science, Technology, Engineering, and Math). Federal and state grants continue to favor offering resources to engineers, scientists, and computer specialists.

However, despite this focus on the development of these “hard skills,” research from the private and the public sector indicates that we face another, perhaps more serious, crisis: the lack of “soft skills” among our graduates. Both the public and private sectors seek and require these “soft skills” in their current employees and new hires, yet both find these skills to be sorely lacking and that deficit costs them (and taxpayers) billions of dollars annually.

“Soft skills” primarily are defined as interpersonal, intellectual, and communication skills. In a recent report from the *UNC GA Academic Planning* document, an emphasis was placed on measuring the “soft skills” of critical thinking, analytic reasoning, problem solving, and written communication.¹ Additional studies, both public and private, have described other “soft skills.” In general, however, such skills include the following:

- *Interpersonal*: diplomacy, leadership, ethics (philosophical and behavioral), teamwork, collaboration, understanding diverse cultures
- *Intellectual*: problem-solving, decision-making, critical thinking, analytic reasoning
- *Communication*: writing, speaking, listening, reading (literacy), cross-cultural communication,

Five Misconceptions about “Soft Skills”:

One of the biggest misconceptions about many of these “soft skills” is that students can learn them once and have them at their disposal. However, all of these interpersonal, intellectual, and communication skills are learned through practice over time. For example, Writing-Across-the-Curriculum (WAC) and/or Communication-Across-the-Curriculum (CAC) is an educational reform movement that is more than 25 years old and that seeks to improve students' critical

¹ *UNC GA Academic Planning: UNC Voluntary Accountability Plan and Performance Measure*, May 2007.

thinking, analytical, and writing skills by integrating writing instruction throughout all departments and courses, and throughout a college student's entire college career. WAC and CAC programs have evidence to show that 1) students improve their writing and communication skills by practicing throughout all four years of college and even into their professional lives, 2) many students have few written or oral communication assignments once they complete freshmen composition, or these assignments are only given in their writing courses, and 3) communication instruction and practice are means by which students learn many of the other "soft skills" discussed above.

A second misconception is that students by osmosis should know how to write for the workplace because they have learned to write in school. In fact, most of the writing instruction in universities is geared toward teaching students to write in academic environments. Academic writing is not the same as professional writing. The skills one learns by writing *academic papers do not necessarily transfer to the ability to write workplace documents*. Issues of purpose, audience, context, politics, diversity, and ethics change significantly from academia to the workplace. Students often enter the workplace without any significant sense of the communication, interpersonal, and intellectual demands of this new environment. We have very few "bridge" courses that help students learn to transfer their academic skills into workplace skills.

A third misconception is that these "soft skills" are defined the same from culture to culture. In fact, the high influx of ESL and international students and the lack of knowledge of cultural differences compounds the difficulty of students learning all these "soft skills." For example, the ways in which other cultures exhibit these "soft skills" is much different than our Western culture's definitions of effective teamwork, leadership, communication, decision-making, etc.

A fourth misconception is that if someone understands something intellectually through reading, discussing, and testing, they should be able to apply that understanding to their own behavior. But as an analogy, learning about playing the piano does not teach one to be a pianist. Additionally, the manner in which students are taught may be antithetical to learning these "soft skills." Many of these skills are most easily learned and practiced in active learning environments that blend both individual and team responsibilities and assignments. However, the vast majority of teaching at the undergraduate level still occurs through lecturing (passive learning) where students have little to no opportunities to practice these "soft skills."

A fifth misconception that students hold is that to become successful in one's career, they need only learn the techniques, strategies, etc. of their major. They do not understand that these "soft skills" often are what make the difference between being hired, being promoted, and being successful in any profession. Therefore, they tend to avoid (unless required) courses in the liberal arts. Reading literature, studying philosophy, understanding history, and exploring art all are opportunities to develop critical thinking, ethics, cultural understanding, etc. Unfortunately, although faculty support the idea of students in all majors taking courses in the humanities, the curricula of many professional schools do not require such coursework beyond General Education requirements.

This brief examines the need for such “soft skills” (though focuses primarily on writing and communication skills), both nationally and at the state level, and makes recommendations for how the UNC system could enhance these skills in our students.

1. What are major trends impacting North Carolina in the development of student and workplace “soft skills” development?

- The emphasis on the STEM areas within the state and the UNC system, thereby moving resources away from courses and major that develop “soft skills”
- The globalization of America in both the private and public sectors, which has increased the numbers of recent immigrants, as well as international students and employees for whom English is a second language (This social change has had an enormous impact in the state of North Carolina.)
- The influx of students attending college who, in the past, might have completed only a high school education and who may, therefore, be less prepared for college requirements
- The disparities in academic preparation among high schools in N.C. predicated on the economic wealth and commitment of the community in which the high school resides

Many U.S. and North Carolina studies particularly indicate the need to focus on the development of “soft skills” in our global economy. S. Devarajan, managing director of Cisco Systems Global Development Center in India, noted

*"Managing in a global environment means you manage people who are separated not only by time and distance but also by cultural, social, and language differences."*²

National Studies on the Need for “Soft Skills”

Study 1:

The Public Forum Institute (a non-partisan, non-profit group) created a series of forums designed to gather feedback from citizens on the challenges and initiatives surrounding workforce development in the information age. In 2001, five forums were held and chaired by members of Congress. These forums involved more than 1,000 people from across the nation and provided feedback on local, regional, and national workforce issues.

Key Finding:

- Respondents to a Forum survey concluded there is a skills shortage in “soft skills” such as problem solving, decision-making, and interpersonal communication and that profound, long-term change needs to occur to resolve the issue.

Study 2:

The 2003 study conducted by the National Assessment on Adult Literacy (NAAL) measured

² Rifkin, Glenn. (2006), The Soft Skills of Global Managers. *Harvard Business School Working Knowledge Archive*. Retrieved at <http://hbswk.hbs.edu/archive/5370.html>

prose, document, and quantitative literacy directly through tasks completed by adults.³ (The data for quantitative literacy is omitted here because it is not considered a “soft skill.”) For the purposes of this study, an “adult” was defined as anyone over the age of 16. (See Appendix A for descriptions of the specific skills required at each level of proficiency).

- *Prose literacy.* The knowledge and skills needed to search, comprehend, and use information from a variety of texts such as editorials, news stories, brochures, and instructions.
- *Document literacy.* The knowledge and skills needed to search, understand, and use information from documents such as job applications, payroll forms, transportation schedules, maps, tables, and drug and food labels.

Key Findings:

- Although there were no measurable changes in literacy for the total population between 1992 and 2003, there were statistically *significant declines on the prose and document literacy for adults achieving levels of higher education.*
- On all three literacy scales, a higher percentage of adults with *Proficient* literacy were employed in professional and related occupations and management, business, and financial occupations than in other occupations. (See Appendix A for descriptions of literacy levels.)

Prose and Document Literacy

- Between 1992 and 2003, prose literacy declined for adults with a high school diploma, and *prose and document literacy declined for adults with some college or with higher levels of education.* (See Table 1 below)
- White adults had higher average prose literacy scores than Black and Hispanic adults for all levels of educational attainment.
- Between 1992 and 2003, the average prose and quantitative literacy scores increased for Black adults with a high school diploma, a GED, or some vocational classes taken after high school.
- The average prose literacy remained steady among Hispanic adults for those who were still in high school or who had a college degree or higher.
- The average document literacy decreased among Hispanic adults who had completed some college or obtained an associate’s degree or whose highest educational level was less than high school or some high school.

³ (2005) *Literacy in Everyday Life: Results From the 2003 National Assessment of Adult Literacy*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 1992 National Adult Literacy Survey and 2003 National Assessment of Adult Literacy.

Table 1. Average prose and literacy scores of adults, by highest educational attainment: 1992 and 2003
PROSE DOCUMENT Educational attainment 1992 2003 1992

2003

High school graduate 268 262* 261 258 Vocational/trade/business school 278 268* 273

267 Some college 292 287* 288 280* Associate's/2-year degree 306 298* 301 291*

Bachelor's degree 325 314* 317 303* Graduate studies/degree 340 327* 328 311*

*Denotes statistical significance.

The Effect of Low Literacy on Employment

- In 2003, adults with higher literacy levels were more likely to be employed full-time and less likely to be out of the labor force than adults with lower literacy levels.
- Adults with lower literacy levels also generally earned lower incomes.
- Many individuals with lower literacy levels were employed in service occupations:

--30 percent to 35 percent of adults with *Below Basic* and 22 percent to 24 percent of adults with *Basic* prose, document, and quantitative literacy worked in service jobs.

--7 percent to 10 percent of adults with *Proficient* prose, document, and quantitative literacy worked in service jobs.

- Women with higher levels of literacy were less likely to have received public assistance than women with low levels of literacy. If they had received public assistance, they did so for a shorter amount of time than women with lower literacy levels.
- Most adults who thought their reading, mathematics, or computer skills limited their job opportunities *had not participated in any job training in the past year.*

Study 3: Three studies from the National Commission on Writing in America's Families, Schools, and Colleges focus on the national crisis in writing instruction and skills-building among school and college students, and the impact of the lack of these skills on professional and nonprofessional employees.

3.1. The National Commission determined that writing is an essential skill for all Americans. The first report, issued in 2003, "called for a writing agenda for the nation, promising to lead such a national agenda around writing."⁴ Three subsequent reports have been presented to Congress about the state of writing in U.S. schools, colleges, and workplaces. Senator Bob Kerry, President of the New School University in New York, and Chair of the National Commission stated

⁴(April 2003), *The Neglected "R": The Need for a Writing Revolution and Writing and School Reform*. Retrieved at <http://www.writingcommission.org/>.

"In a very real way neither our democracy nor our personal freedoms will survive unless we as citizens take the time and make the effort needed to learn how to write."

Key Findings:

- most fourth-grade students spend fewer than three hours a week writing (approximately 15 percent of the time they spend watching television)
- 66 percent of high school seniors write less than one, three-page paper once a month in English classes
- 75 percent of seniors never receive writing assignments in history or social studies

Citing the National Assessment of Educational Progress (NAEP), at grades 12

- 20 percent of students write completely unsatisfactory prose
- 50 percent of students meet "basic" requirements
- 20 percent of students can be called "proficient"

These statistics for 12th graders are particularly important for colleges and universities because in three short months after graduation, these students become college freshmen.

3.2. A survey (with a response rate of 53.5 percent) of 120 human resources directors in major American corporations, whose CEOs belong to the Business Roundtable and who employ nearly 8 million people, concludes that in today's workplace *writing* is a "threshold skill" for hiring and promotion among salaried (i.e., professional) employees.⁵

Key Findings:

- 50 percent of the responding companies report that they take writing into consideration when hiring and promoting professional employees.
- 66 percent of salaried employees in large American companies have some writing responsibility. "All employees must have writing ability...Manufacturing documentation, operating procedures, reporting problems, lab safety, waste-disposal operations—all have to be crystal clear," said one human resource director.
- 80 percent or more of the companies in the service and finance, insurance, and real estate (FIRE) sectors, the corporations with the greatest employment growth potential, assess writing during hiring.
- 50 percent+ of responding companies report that they "frequently" or "almost always" produce technical reports (59 percent), formal reports (62 percent), and memos and correspondence (70 percent). Communication through e-mail and PowerPoint presentations is almost universal.

- 40 percent of responding firms offer or require training for salaried employees with writing deficiencies.

⁵ (September 2004), *Report of the National Commission on Writing: A Ticket to Work or a Ticket Out – a Survey of Business Leaders*. Retrieved at <http://www.writingcommission.org/>.

3.3. Forty-nine of 50 state human resources offices (including the state of North Carolina) participated in a survey conducted by the National Commission in partnership with the National Governors' Association. The report concluded *that writing is considered an even more important job requirement for the states' nearly 2.7 million employees than it is for the private-sector employees.*⁶ Bob Kerry emphasizes the importance of writing in the public sector:

"Beginning with the United States Constitution, this country has always relied on clear and compelling writing to connect government with its citizens in matters both large and small."

Key Findings:

- All 49 respondents reported that more than 66 percent of their professional employees are responsible for writing public documents. One respondent stated "If there are tax policy directives or guidelines that the filers don't quite get—and the tax staff reviewers don't get right either—that creates a financial mess."
- State employees are required to write in multiple genres: memos, letters, and e-mail. More than 50 percent reported that policy alerts, legislative analyses, formal and technical reports, and oral presentations are "frequently" or "almost always" required.
- 91 percent of respondents "almost always" take writing into account and require a writing sample from prospective "professional" employees.
- *30 percent of professionals are below standard in writing*, and most states provide remedial writing training or instruction. ("Below standard" could be defined as "Basic" in terms of the NAAL study) (See Appendix A for descriptions of the specific skills required at each level in the NAAL study.)

North Carolina Studies

In June 2007, the Institute for Emerging Issues' Business Committee on Higher Education surveyed its members to determine the skills needed for the workplace of the 21st century.⁷

Key Findings:

- 95 percent of respondents recruit their workforce from within North Carolina.
- Improvement is needed in skills such as writing, reading, math, judgment, and creative and critical thinking.

⁶ (July 2005), *The National Commission on Writing: A Powerful Message from State Government*. Retrieved at <http://www.writingcommission.org/> ⁷ *The Institute for Emerging Issues Working Group on Economic and Community Development*, February 1-2, 2007. Retrieved at <http://www.ncsu.edu/iei/2007percent20Forum/Resources/1pager/priority.economic.pdf>.

- Soft skills are more lacking than hard skills in the current labor pool.
- 55 percent of the labor pool lacks soft skills such as communication, leadership/initiative, analytical thinking, teamwork, and basic office etiquette.
- 32 percent of the labor pool lacks hard skills such as knowledge of technology, applied math, and science.
- 55 percent indicated that additional on-site training is necessary due to ill-prepared entry-level employees.

2. What are the potential impacts of these trends on North Carolina (regionally also, if appropriate)?

If we accept the problems of the lack of “soft skills” in college graduates and in new hires in the public and private sector, and couple that with the explosion of college applications from immigrant populations and international students, we are faced with a crisis in communication instruction beginning at the elementary level, through high school and college, and continuing into the workplace. The loss of billions of dollars because business must now train college graduates to have the skills that they assume students have when they are hired, means that our universities may be blamed for not preparing our graduates to enter the world of work.

A recent study from NC State’s Institute for Emerging Issues Working Group on Economic and Community Development established several priorities to respond to two statewide developments. Two of these priorities illustrate the impact of these trends: 1) the citizens of North Carolina are looking to our state universities to provide solutions to and support for state-wide problems, and 2) higher education institutions are recommitting themselves as “stewards of the public welfare and embracing community engagement and economic development as part of their core mission.”⁸ A third priority identified by The Working Group includes the need to develop college students’ interpersonal skills, which are essential to achievement in the workplace. The report states that

To enhance the productivity of North Carolina’s workers, institutions of higher education must seek to develop the ‘whole person’ — individuals with the personal attributes (soft skills) needed to thrive and contribute to a rapidly changing environment that is characteristic of today’s 21st century economy.... [which] entails equipping the present and potential workforce to engage in critical thinking, creative visioning, leadership, team play, and civic responsibilities, and with the capability to choose and act with foresight and wisdom — all within a moral and ethical framework. It is essential that all components of higher education in the state continue to approach this responsibility as basic to the realization of their mission.

⁸ *Transforming Higher Education: A Competitive Advantage For North Carolina, The Emerging Issues Forum.* Retrieved at <http://www.ncsu.edu/iei/2007EIF.html>

3. What does it cost business to have workers that do not possess these skills?

Based on the survey responses in the April 2003 Report of The National Commission on Writing: *The Neglected "R": The Need for a Writing Revolution and Writing and School Reform*

- *The writing weaknesses of incoming college students cost our campuses up to \$1 billion annually. Based on the survey responses in the September 2005 Report of the National Commission on Writing: A Ticket to Work or a Ticket Out – a Survey of Business Leaders survey responses,*
- *Training professionals to write more effectively may cost American firms as much as \$3.1 billion annually.*

Based on the survey responses in the July 2005 Report of *The National Commission on Writing: A Powerful Message from State Government* despite the high value that state employers put on writing skills, significant numbers of their employees do not meet states' expectations.

- *These writing deficiencies cost taxpayers nearly a quarter of a billion dollars annually: about \$400 per employee for 8 hours of training.*

4. What are the potential impacts of these trends on the University of North Carolina?

- 1 Without change, we will continue to create a N.C. workforce that is ill-prepared for the non-technical aspects of employment and life.
- 2 North Carolina businesses will continue to pour millions of dollars into training our graduates --dollars that could have fed the universities in other ways.
- 3 The University system will be held accountable for graduating students who are not prepared for the world of work.
- 4 We will have failed our students by not preparing them for many of the realities of work.
- 5 We cannot serve the communication needs of our students unless our universities commit to developing programs and pedagogies that support the development of "soft skills."

Within the UNC system, many universities have tackled these problems through a variety of programs. For example, universities may offer Writing-Across-the Curriculum or Communication Across-the-Curriculum programs (see Table 2 below), although many do not. Many have developed Writing Centers and/or supported Learning Centers (where students may be tutored or take workshops in conflict management, teamwork, literacy, etc.), although many do not.

Table 2: Universities in the UNC System with Writing or Communicating Across the Curriculum Programs

Universities	WAC	CAC	Plan/Approved	None	Writing Center	Learning Center	Teaching C
Appalachian State			Planning WAC		X		X
East Carolina	X				X		X
Elizabeth City State				X		X	
Fayetteville State			Approved WAC			X	X
NC A & T State				X		X	
NC Central				X	X	X	X
NC School of the Arts				X			
NC State		X			X	X	X
UNC Asheville	X				X		X
UNC Chapel Hill	X				X		X
UNC Charlotte				X	X	X	X
UNC Greensboro	X					X	X
UNC Pembroke	X				X		X
UNC Wilmington	X					X	X
Western Carolina				X	X	X	X
Winston-Salem State				X	X	X	X

5. *Within these trends, what specific issues or areas should the Commission focus on indetermining how UNC should respond to these trends?*

Key Strategic Issues:

1. Priorities: *The UNC system must make the development of “soft skills” (communicationskills in particular) one of its top priorities if we are to make substantive changes. The Long-Range Planning document for GA mentions “soft skills,” but it is not listed as a high priority. The UNC system must develop, in partnership with business, a strategic plan for integrating theseskills more fully into the curriculum. These skills develop with time, feedback, encouragement, and practice. In fact, many of these “soft skills” are attained only through years of practice. Some of our curriculum is still focused primarily on content learning rather than on skills development; that is “learning about” rather than “learning to do.” In addition, the influx of ESL students and the literacy issues that our minorities’ students face make it a necessity to focus more resources on building communication skills. Writing and speaking abilities, in particular, are crucial to student success.*

Key Recommendations:

- *Develop a strategic plan to propose how the UNC system can integrate the “soft skills” more fully throughout all curricula, including humanities, science and the socialsciences, and the professional schools.*
- *Increase the support given to all ESL enculturation and language programs. Both students and faculty need increased instruction in the cultural norms of the students who populate our classes.*

2. Participation: *The liberal arts are intended to be perceived as full participants in the university system, but resources (start-up money for research and travel, salaries commensurate with other colleges and departments, etc.) more fully support “professional schools” – medical, engineering, business, architecture, education, etc. Granted, many professional schools required higher overhead (labs, design studios, etc.), but financial resources are much lower in the liberal arts than in most other areas. However, the liberal arts often are the courses that provide students with practice in many of these “soft skills.” Students write, engage in intellectual discussions, are involved in ethical analysis, explore diverse cultures, and learn about human behavior through literature, history, religious studies, etc.*

Most undergraduates in the UNC system are required through General Education to take some coursework in the humanities during their freshman and sophomore years. However, in general, after General Education requirements are met, those courses tend to be populated primarily with students who are majoring in the Colleges of Arts & Sciences. It is rare to have an accounting major, for example, take a literature course. Although many professors in the professional schools acknowledge and support the importance of the humanities, few develop curricula that require students to take additional courses beyond those required by General Education.

Key Recommendations:

- *Increase focus on and support for the humanities, where many of these interpersonal and cultural issues are taught and learned (literature, philosophy, history, etc.).*
- *Require that all UNC universities offer Writing-Across-the Curriculum (WAC) or Communication-Across-the Curriculum (CAC) programs and support these programs through additional hiring and resources. (See Table for a list of UNC universities that have such programs). These programs have proven records of success when communication skills are integrated throughout a student’s four years of undergraduate work.*
- *Develop a plan for integrating “soft skills” into graduate programs particularly at the Master’s level. Our graduate students are just as lacking in “soft skills” as our undergraduates, yet few WAC programs extend into graduate curricula. Students at the doctoral level often become professors, but students with Master’s degrees most frequently leave the university and enter the workforce. Therefore, we need to continue a focus on developing “soft skills” through the graduate programs, too.*
- *Strengthen existing business and technical communication curricula currently offered at many UNC universities. These courses are often required of certain majors (business and engineering, for example), but one course is not enough to develop the communication skills required in the workplace.*
- *Require that all graduating seniors take at least one course that teaches them the writing thinking, and analytical skills that they will need in the workplace. Some majors, for example, require a business or a technical writing and/or a communications’ course, but not all.*

- *Require that courses in the humanities are integrated throughout the curricula of the “professional schools” so that students continue to understand the relationship between their technical skills and the “soft skills.”* For example, NYU integrates the humanities into their medical school (Medical Humanities): <http://medhum.med.nyu.edu/>

3. Partnerships: *The University system must work more closely with business and government to ensure that students possess the soft skills necessary for our state to compete in the global economy.* Many of the studies cited in this brief indicate that employers believe it is easier to teach students technical skills on the job than it is to teach them the soft skills. Students (and faculty) need more opportunities to develop ‘real world’ skills. Most of the soft skills developed in college tend to be more appropriate for classroom discussion and activity than for real world complexity. Partnerships between employers through internships, faculty internships, client-based projects for class assignments, in-class lectures, cooperatives, and other means should better align the skills taught in academia with those skills needed in the workplace. As stated earlier in this report, business currently spends billions of dollars each year training their employees in “soft skills.” A much less costly method might be to support strategic efforts at the college level.

Key Recommendations:

- *Work more closely with business and alumni to provide or bequeath resources appropriate for developing “soft skills.”* For example, in 2006, the Writing Center at Miami of Ohio University received a \$10.5 **million dollar endowment** from Roger Howe, retired chairman and CEO of U.S. Precision Lens and former chair of Miami’s board of trustees, and his wife, Joyce, an artist. The couple, both of whom are 1957 Miami graduates, have a history of supporting efforts to enhance writing, including a previous \$1.8 million gift that established the Roger and Joyce Howe Professorship in Written Communication. <http://www.forloveandhonor.org/pages/GivingTributeFall20064.htm>
- *Increase attention and resources to experiential learning (internships, cooperatives, etc.) where students gain many of these “soft skills” by working in professional environments.*
- *Train faculty in these “soft skills.”* For example, for the past three years, MIT’s engineering faculty have completed a workshop to gain significant insight into being effective leaders, dealing with conflict, fostering creativity, etc. The intention behind this effort is that faculty must have these skills themselves they are to impart them to their students. <http://web.mit.edu/fnl/volume/185/workshop.html>

4. Pedagogy: *The University system must encourage faculty to use non-traditional, pedagogical approaches.* “Soft skills” are most easily learned and reinforced through non-traditional pedagogy, which include active-learning, problem-based learning, and collaborative learning (with real clients and/or projects based in non-academic settings), and yet 89% of faculty still use lectures (passive learning) as their primary mode of instruction. Students who are engaged in

⁹ Leiserson, C. and C. Avril (May/June 2006) “Soft Skills” to Help Avoid the “Hard Knocks”: Dealing with the tough (but nonacademic, nonscientific) issues. MIT Faculty Newsletter, Vol. XVIII No. 5.

active learning are more involved in dialogue, debate, writing, problem-solving, analysis, synthesis, and evaluation.¹⁰ Particularly in the technical courses (engineering, for example), problem-based learning is much more effective in recruiting, retaining, and integrating women and minorities into classroom environments.¹¹ Students come to our classrooms with a variety of learning styles “by seeing and hearing, reflecting and acting, reasoning logically and intuitively, analyzing and visualizing, steadily and in fits and starts.”¹² *Many faculty teach in a manner that is antithetical to how students learn.*

Key Recommendations:

- *Provide training, support, and rewards for faculty who use non-traditional teaching methods.*
- *Establish Teaching Centers on all UNC system campuses. (See Table 2 for those UNC universities with teaching centers.)*

¹⁰ Prince, M. (2004) “Does Active Learning Work? A Review of the Research,” Journal of Engineering Education, 93:3, 223-231.

Busch-Vishniac, I. J. and J. P. Jarosz. *Can Diversity in the Undergraduate Engineering Population be Enhanced Through Curricular Change?* Journal of Women and Minorities in Science and Engineering, Vol 10, pp. 255-281, 2004.

Felder, R.M. and R. Brent, (2005), *Understanding Student Differences: An exploration of differences in student learning styles, approaches to learning (deep, surface, and strategic), and levels of intellectual development.* Journal of Engineering Education, 94(1), 57-72.

Appendix A Table 3: NAAL: Assessment of Writing

Skills for Grade 12 (Range 0-300)¹³

<p>Basic Level: Scores -- 122/300</p>	<p>Students performing at the Basic level should be able to:</p> <ul style="list-style-type: none"> • demonstrate appropriate response to the task in form, content, and language • demonstrate reflection & insight & evidence of analytical, critical, or evaluative thinking • show evidence of conscious organization • use supporting details • reveal developing personal style or voice • demonstrate sufficient command of spelling, grammar, punctuation, & capitalization to communicate to the reader.
<p>Proficient Level: Scores -- 178/300</p>	<p>Students performing at the Proficient level should be able to:</p> <ul style="list-style-type: none"> • create an effective response to the task in form, content, & language • demonstrate reflection & insight & evidence of analytical, critical, or evaluative thinking • use convincing elaboration and development to clarify and enhance the central idea • have logical and observable organization appropriate to the task • show effective use of transitional elements • reveal personal style or voice • use language appropriate to the task & intended audience • have few errors in spelling, grammar, punctuation, & capitalization that interfere with communication.
<p>Advanced Level: Score 230/300</p>	<p>Students performing at the Advanced level should be able to:</p> <ul style="list-style-type: none"> • create an effective & elaborated response to the task in form, content, & language • show maturity & sophistication in analytical, critical, and creative thinking • have well-crafted, cohesive organization appropriate to the task • show sophisticated use of transitional elements • use illustrative & varied supportive details; • use rich, compelling language; • show evidence of a personal style or voice; • display a variety of strategies such as anecdotes, repetition, & literary devices to support and develop ideas • enhance meaning through control of spelling, grammar, punctuation, and capitalization.

¹³ (2005) *Literacy in Everyday Life: Results From the 2003 National Assessment of Adult Literacy*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 1992 National Adult Literacy Survey and 2003 National Assessment of Adult Literacy.