

A Collaborative Effort at Program Development

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Background:

The Regional Information Technology Training Collaborative Project is an outgrowth of the Charlotte Region Workforce Development Partnership and Advantage Carolina Information Technology Council (ITC). The Charlotte Region Workforce Development Partnership is a joint effort of ten community colleges in the Charlotte region for workforce development. The ITC is an effort of the Charlotte Chamber of Commerce, business, industry, government, and the educational community in the Charlotte Region to promote cooperation and collaboration in the development of a highly skilled IT workforce. The participants of this collaborative project include:

- The Charlotte Chamber's Information Technology Business and Education Council, a sub-committee of the Information Technology Council
- Three local public and private universities:
 - The University of North Carolina at Charlotte (UNC Charlotte)
 - Johnson C. Smith University (JCSU)
 - Queen's College
- The Charlotte-Mecklenburg Public School System
- The college partners of the Charlotte Region Workforce Development Partnership:
 - Central Piedmont Community College (lead institution)
 - Catawba Valley Community College
 - Cleveland Community College
 - Gaston College
 - The North Carolina Center for Applied Textile Technology
 - Mitchell Community College
 - Rowan-Cabarrus Community College
 - South Piedmont Community College
 - Stanly Community College
 - York Technical College in South Carolina

The Regional Information Technology Training Collaborative:

The Regional Information Technology Training Collaborative is an effort of business, industry, government, and the educational community in the Charlotte Region to promote a spirit of cooperation and collaboration for the development of a highly skilled Information Technology workforce. Twelve counties and nine community colleges in North Carolina and three counties and one community college in South Carolina have joined forces for this project: The member counties are shown below.

Member Counties



Objectives:

The goals of this project were:

1. Research the current and future Information Technology training needs of business and industry in the Charlotte Region,
2. Using the results of this research, develop a set of "Skills Standards" required by business and industry for specific Information Technology jobs in the Charlotte Region, and
3. Integrate the "Skills Standards" into courses and curricula at the partner colleges.

In November 1999, Central Piedmont Community College received the funding from a state appropriations bill to begin the Regional Information Technology Training Collaborative Project, and a project director was named. A meeting was scheduled in November 1999 with the primary representatives from each of the member colleges in the Charlotte Region Workforce Development Partnership to create the Regional Information Technology Consortium (RITC). Discussion among RITC members began immediately, reviewing the project's goals and the most efficient methods of achieving those goals given the short timeline involved. Because the project focused on the curriculum side of instruction as opposed to continuing education, each college representative was asked to name a curriculum faculty member or academic administrator to participate in this project. By mid-December 1999, faculty members from each member-college had been identified to represent their respective colleges for the project. The initial meeting was

scheduled for January 2000.

Results:

The newly formed RITC prioritized its activities as follows:

1. Complete the initial research begun by the project director to determine current training needs in the Charlotte Region, but continue research activities to ensure the project stayed on target,
2. Develop a plan to integrate the IT Skills Standards into curricula at member colleges by developing a new model for IT curricula,
3. Begin integration of IT Skills Standards into IT curricula at member colleges, and
4. Develop strategies to secure funding for the continuation of the project.

Research:

The RITC adopted a model for researching new occupational markets [1]. Using this model, the researchers conducted national scans, regional monitoring, and local surveys. National Science Foundation-funded institutions and national Information Technology professional organizations were the primary targets of this research. The national scans sought information from existing studies about new and emerging occupations and investigated activities occurring at colleges around the nation. Regional monitoring included observing classified employment advertisements for IT positions and analyzing employer requests from job fairs and college career centers. Local surveys included employer surveys, student surveys, and advisory committee meetings.

National Research Results:

The results showed that the fastest growing IT fields are web development and administration, e-commerce, and computer networking. The National Council for Occupational Education, the Information Technology Association of America, and the National Workforce Center for Emerging Technologies all agreed that the fastest growing career cluster is Web Development and Administration. Additional findings include:

- The southern US has the largest number of IT workers.
- The demand for IT workers with web-related talents is now almost 13 percent of all IT jobs.
- Fifty percent of IT managers ranked industry certification as important or very important.
- The largest skills gaps are for enterprise system integration and web development positions.
- More than one-third of the skills identified by managers as important are the non-technical, employability (or foundation) skills.
- Companies clearly indicate that they prefer OJT as the most effective and single best means of providing workers with the necessary IT skills.

This research also indicated that, although community colleges received high marks for providing a high level of instruction by “field-tested” instructors, most managers suggested that community colleges need to provide more hands-on training, focus on specific skills, use more internships, and use more up-to-date curriculum.

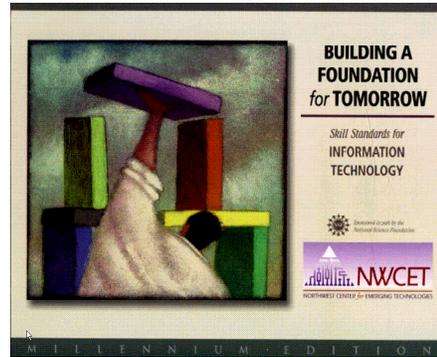
A thorough search of nationally recognized community colleges showed that three nationally recognized Advanced Technology Education Centers are leading the charge on these three fronts:

1. The National Workforce Center for Emerging Technologies (NWCET)
2. The Northeast Center for Telecommunications Technology (NCTT)
3. The Maricopa Advanced Technology Education Center (MATEC)

The NWCET provides information that is the most relevant to this project: a nationally recognized set of Skill Standards for job clusters in Information Technology. The

NWCET's publication [2], was used extensively in developing the set of IT skills standards for the RITC.

In May 2000, a partnership agreement was signed with the National Workforce Center for Emerging Technologies and Central Piedmont Community College (acting for the RITC) that formed the basis of a working relationship between the two entities. The benefits to the RITC of this partnership include assistance in working toward an NSF Grant, assistance in course and curricula development, and national recognition by serving as the East Coast Representative of the National Workforce Center for Emerging Technologies.



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The NCTT is performing much needed research for the advancement of the Telecommunications industry. CPCC, representing the RITC, is seeking a partnership with the NCTT that will help regional colleges create and develop strong Telecommunications programs.

MATEC is revising educational programs for the semiconductor manufacturing industry and developing new and creative training methods. Shortly, as the RITC representative, CPCC and MATEC will sign a partnership that benefits both entities through a collaborative effort to update the Electronics Engineering Technology Program at CPCC and partnership colleges.

Local Research Results:

Continuing to follow the NCOE model referenced above, the RITC conducted a regional and local scan of industry needs by monitoring local classified job advertisements, recruitment efforts at job fairs, job requests from employers from the career centers at consortium schools and by surveying local businesses. The survey was also a requirement for application to the North Carolina Community College System to request offering the Internet Technologies A.A.S. degree program at member colleges.

The results clearly confirmed the National Scanning results: the fastest growing IT fields in the Charlotte region were web development and administration, e-commerce, and computer networking. A regional scan of four online career sites performed on January 7, 2000,

showed that there were over 900 open web-development and/or administration jobs in this region with job titles such as the following:

- Sr. Internet Application Developer
- Java Developer
- Web Developer
- Web Administration
- Java/Web Developer
- Sr. Web Developer
- Web Programmer
- E-Commerce Sr. Consultant
- Internet Developer
- E-Commerce Web Configuration Engineer
- E-Commerce Solutions Architect.

The RITC decided that it would focus its efforts on just one of these areas due to time constraints on the project. The Web Development and Administration job clusters and the recently approved Internet Technologies Program of Study were chosen for three reasons:

1. The demand for highly trained web developers, graphic designers, web- designers, Internet programmers, and project managers is very strong in the Charlotte Region and shows evidence of continued long-term growth.
2. The largest skills gaps are for enterprise system integration and web development positions.
3. Most of the member colleges currently had very successful A.A.S. or certificate programs in computer networking but no programs in Internet Technologies.

Skills Standards:

Once the RITC agreed upon the Internet Technologies Program of Study as an area of focus by the RITC, the skills standards were developed for this career cluster. To accomplish this task the RITC developed this strategy:

1. Review and adopt, where appropriate, the skills sets found in the NWCET publication: [Building a Foundation for Tomorrow: Skills Standards for Information Technology.](#)
2. Integrate the Foundation Skill Set developed at the National Workforce Center for Emerging Technologies.
3. Validate the Skills Standards by surveying local businesses and forming an advisory committee made up of a representative group of business and industry participants.
4. Conduct a DACUM analysis to develop a list of specific skills necessary for success in the region's Internet Technologies career clusters.

The results obtained through each of the above activities were then integrated to form a complete set of IT Skills Standards necessary for a quality and successful IT workforce in the Charlotte Region.

The Curriculum Model:

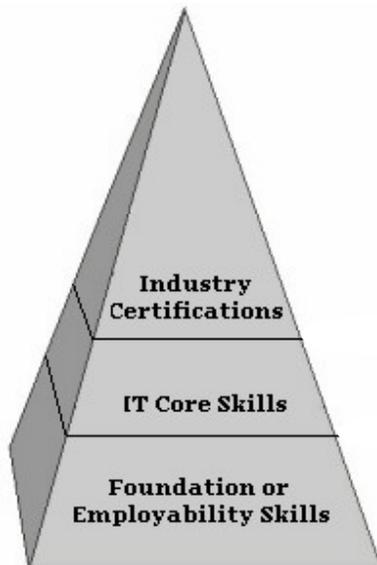
Based on the research, the RITC concluded, that to compete in today's training market place and

to create a successful IT curriculum, a new model for IT education must be developed and adopted and should include the following:

1. Adopt and integrate three levels of skills standards,
2. Provide more hands-on, competency-based training with more emphasis on On-The-Job-Training experiences through internships and cooperative experiences,
3. Align curricula with local public high-school systems and universities to provide a pathway for continued professional development and growth,
4. Package degree programs into clearly defined steps that translate into certificate and diploma programs that are aligned with industry certifications and continuing education programs, and
5. Develop articulation agreements with continuing education programs, local high schools, and universities and credit-by-portfolio scenarios that allow credit for both formal and informal education.

Levels of Skills Standards:

To begin, three levels of Skills Standards must be integrated into the program so that it meets the needs and expectations of IT Managers, the IT workforce, and the community. The High Level must include professional certifications and industry-specific technical skills, and knowledge and abilities unique to individual industries and organizations, such as A+, CCNA, MCSE, etc. The Mid Level must include technical skills, knowledge, and abilities common to all jobs within a career cluster, such as the core IT skills. The Low Level skills are those foundation skills, knowledge, abilities, and personal behaviors required to be successful in today's workplace [3, 4].



High Level:

Industry- specific technical skills, knowledge and abilities unique to specific industry and organizations, such as A+, CCNA, MCSE, WOW, etc.

Mid Level:

Technical skills, knowledge, and abilities common to all jobs within a career cluster.

Low Level:

A set of foundation skills, knowledge, abilities, and personal behaviors required to be successful in today's workplace.

Competency-Based/On-the-Job-Training:

Research showed that companies unmistakably indicated that they prefer OJT as the most effective and single best means of providing workers with the necessary IT skills [5]. To meet this challenge the RITC developed the Internet Technologies curriculum as a Competency-

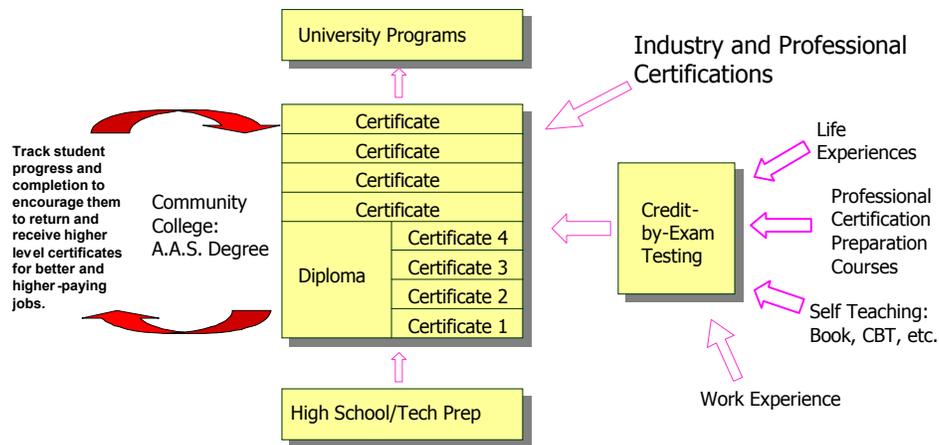
Based curriculum that included cooperative education classes as a part of the curriculum. The RITC representatives also indicated that training would be needed to lead faculty through the process of developing a competency-based curriculum. This need was met through a Skills Integration Workshop discussed later in this report.

Pathways for Continued Professional Growth:

The community colleges in the RITC acknowledge the following facts:

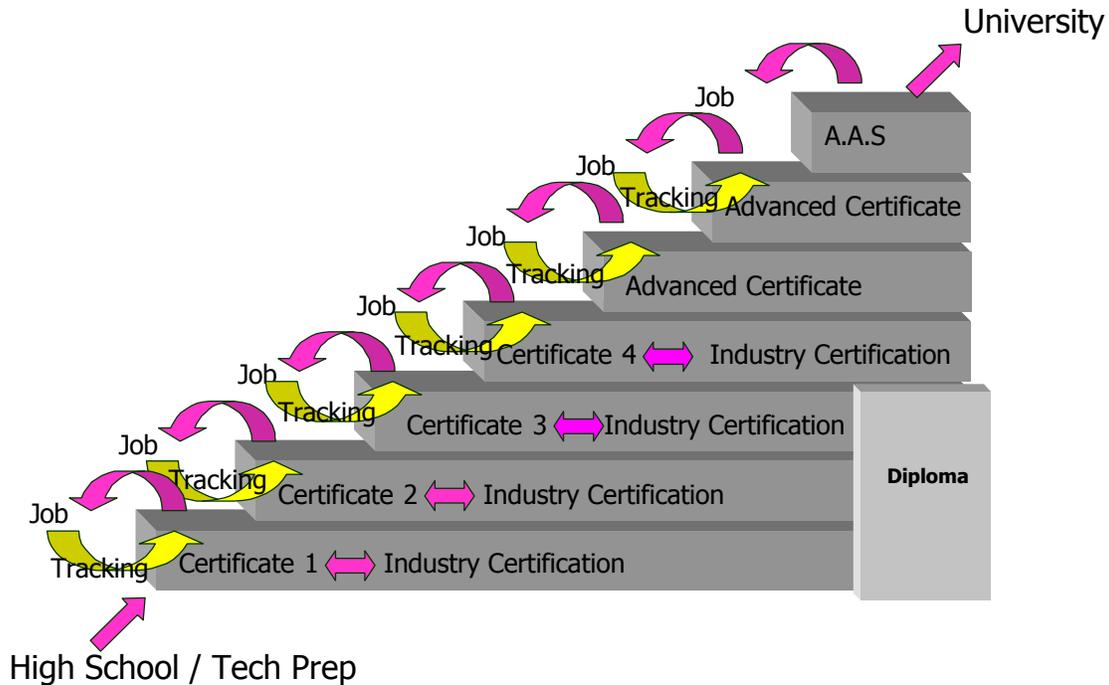
1. Industry certification is very important in today’s IT workforce.
2. Students are ignoring the opportunities available to them when they complete a college degree because they believe that the quickest path to success is through the acquisition of industry certifications.
3. More than one third of IT managers ranked the non-technical, employability skills as very important.

The RITC also acknowledged the validity of industry certifications and provide opportunities for students to receive credit for their knowledge and experience. Additionally, IT curricula must be clearly aligned with the local public high-school systems and universities so that students have a pathway for continued education and growth. Integrating this into IT curricula requires a model in which students have many opportunities to acquire the industry certifications and technical skills as they work toward the completion of a college degree. The diagram below shows the new model accepted by the RITC:



Certificates/Industry Certifications:

The RITC packaged its degree programs into clearly defined steps that translate into certificate programs that are clearly aligned with industry certifications. This provides students an additional incentive to complete a degree program (in smaller steps) and also provides a built-in pathway for professional development and personal growth.



Internet Technologies Curriculum:

The RITC initiated the process of completing the Internet Technologies curriculum with all participating colleges contributing to its philosophical foundation and to the specific needs of each school's mission. The consortium chose this program due to the high demand for web developers and web administrators. Each RITC member college received a \$5,000 stipend to participate in the development of the Internet Technologies curriculum and courses. The official North Carolina Community College System Program Description listed below:

The Internet Technologies curriculum is designed to prepare graduates for employment with organizations that use computers to disseminate information via the Internet internally, externally, and/or globally. The curriculum will prepare students to create and implement these services.

Course work includes computer and Internet terminology and operations, logic, operating systems, database and data communications/networking, and related topics. Studies will provide opportunities for students to implement, support, and customize industry-standard Internet technologies.

Graduates should qualify for career opportunities as webmasters, Internet and Intranet administrators, Internet applications specialists, Internet programmers and Internet technicians. Government institutions, industries, and other organizations employ individuals who possess the skills taught in this curriculum.

Skills Integration Workshop:

In May 2000, three people from CPCC attended a Train-the-Trainer workshop for the integration of skills standards into competency-based curricula at the National Workforce Center for

Emerging Technologies. The workshop led faculty through the process of identifying the **Major Learning Components** (both technical and foundation skills), **Learner Outcomes**, and **Key Competencies** of a competency-based curriculum. When completed, the information was placed in a database so that faculty had a list of all the Technical and Foundation Learning Components, Learner Outcomes, and Key Competencies developed by the consortium members. The RITC ensured that the course activities and course content in the curriculum address all of these competencies and that all of these competencies are properly assessed.

The first workshop for RITC members was held in early June of 2000. During this pilot workshop, participants developed a complete set of Major Learning Components along with several Learner Outcomes and Key Competencies. An additional workshop produced the complete package. Using this information, the RITC colleges developed the individual courses for the **Internet Technologies** curriculum.

Course Development:

To make this a truly collaborative effort and to speed up the process of curriculum development RITC members worked as a team to develop courses in the **Internet Technologies** Program. Each college adopted one or two courses to develop as online courses for its use and to share with other member colleges. The RITC members, acting as a peer review team, reviewed the courses. When the peer review team approved a course, all materials for that course was shared with other member colleges to be used as they saw fit. In May of 2002 all course development was complete and the Internet Technology program was offered 7 of the ten RITC community colleges.

Course Sharing:

RITC members agreed to share resources. Under this plan **Internet Technologies** courses will be offered as online courses that allow two things:

1. Students take online courses from other member colleges when the course cannot be offered at a member college due to low enrollment
2. Member colleges share qualified faculty by hiring faculty to teach online courses at partner schools for extra pay

Summary:

The RITC has accomplished much over the life of this project. We have developed a collaborative group of 10 community colleges in the Charlotte Region with representatives who are dedicated to the mission of this consortium. Representatives from the ten community colleges have worked collaboratively with representatives from nationally recognized institutions, local business and industry leaders, and government officials to develop a set of skills standards needed for highly qualified IT professionals in the Charlotte Region. The RITC verified the validity of the national skills standards produced by the NWCET and adapted that skill set so that it is aligned with the needs of this community.

The RITC developed a very effective curriculum model that addresses vertical and horizontal alignment among academic institutions and allows students to receive credit for both formal and

informal education and training. In response to industry input through this process, the partner colleges decided that to be truly effective, curricula needed to be competency based with more emphasis on hands-on training and internships. With the help of industry new internship opportunities are available to students in these programs.

The most significant accomplishment of the RITC was the implementation of the plan to share the course/curriculum development among the 10 community colleges in this partnership. Faculty participated in workshops that demonstrated the process for integrating the skills standards into new and existing courses so that the ten community colleges could share in the development of a new, much needed IT program in Internet Technologies. Not only did the faculty collaboratively develop the courses and curriculum, the ten community colleges share resources, such as faculty, to ensure that students may get the courses they need when they need it.

Bibliography:

- [1]. National Council for Occupational Education's Special Report: "*A Model for Identifying New Occupational Markets for Community and Technical Colleges*", October, 1999
- [2]. National Workforce Center for Emerging Technologies, *Building a Foundation for Tomorrow: Skills Standards for Information Technology*, 1998
- [3]. Secretary's Commission on Achieving Necessary Skills, "*What Work Requires of Schools*", Washington, DC: SCANS Department of Labor, 1991
- [4]. Secretary's Commission on Achieving Necessary Skills, "*Learning a Living: A Blueprint for High Performance*", Washington, DC: SCANS Department of Labor, 1992
- [5]. Information Technology Association of America Report: "*Bridging the Gap: Information Technology Skills for the New Millennium*", April 2000