

Access and Opportunity: An Alternative Delivery of a Baccalaureate of Science Degree in Engineering Technology

**Hamid Y. Eydgahi, Ph.D., Lima Technical College
Richard Bickerstaff, Columbus State Community College
Robert Speckert, Miami University**

Abstract

The engineering technology divisions at Lima Technical College, Columbus and Washington State Community Colleges, North Central State College and the department of engineering technology at Miami University (Ohio) have developed a unique plus two (+2) baccalaureate degree engineering technology degree completion program at instructional hubs in the state of Ohio. These strategic locations serve as access campuses and for students who have already completed an engineering technology associate degree program.

In December 1995, the Ohio Board of Regents approved a ‘Plus 2 Engineering Technology’ program at Miami University. Upon developing articulation agreements between Miami and these two-year community/technical colleges, Miami began offering the plus 2 engineering technology program to students at Columbus State Community College by alternative methods including distance (interactive teleconferencing), internet, e-mail, and on-site in Columbus, Ohio. In fall of 1997, the first group of students enrolled in the Columbus–Miami partnership. By August 2000, five students had already completed the program and graduated. There were twenty-five (25) additional students, as of August 2000, who had enrolled in Columbus-Miami partnership program.

In a joint grant proposal to the Ohio Learning Network, requesting assistance for the distance delivery of the program, during Fall 2000, the partnership was expanded to include Lima Technical College (Lima, OH), North Central State College (Mansfield, OH), and Washington State Community College (Marietta, OH). This paper will focus on that which we have learned, in delivering the BS completion program and the expansion plan that will nearly make the program available statewide including:

- Introduction and background,
 - ET: Building Bridges between 2- and 4-Year Colleges,
 - Assessment, and
 - Conclusion.
- **Introduction and background**

The idea of distance education goes back almost 3000 years, when the monarch of China bridged the hurdles of his country’s vast geography, by sending representatives to teach

governors how to conduct the business of government¹. Later, in the 19th century, Oxford and Cambridge, two well known universities, proffered courses for the first time to the general public who commanded access to higher education². Then, in mid 20th century, the circling airplane brought television to higher education in the heartland³. Finally, today in the 21st century, Miami University (Ohio); in partnership with LTC, CSCC, WSCC and NCSC; has developed and will deliver a unique degree completion program at instructional hubs in the state of Ohio.

Miami University's regional campuses (Hamilton and Middletown) are open-enrollment institutions, each serving approximately six thousand students annually. In December of 1995, the Ohio Board of Regents approved a Bachelor of Science in Applied Science degree program in engineering technology at Miami University, as a '+2' baccalaureate degree designed to articulate with two-year associate degree programs in Electronics, Mechanical, Electro-Mechanical and/or similarly titled engineering technology programs. Most students in the program are graduates of an associate degree program from Miami University and/or other Technical and Community Colleges throughout Ohio. In fall 1996, approximately twenty-five students (25) were admitted to the program and both enrollment and graduate's numbers have steadily grown since inception to one hundred and fifty students and twenty graduates in 1999-00 academic year.

The engineering technology divisions at four technical/community colleges (Lima Technical College, Columbus State Community College, Washington State Community Colleges and North Central State College), and the department of engineering technology at Miami University's regional campuses have developed and will deliver a unique plus 2 engineering technology degree completion program at instructional hubs in the state of Ohio (figure 1). These strategic locations, for the purposes of delivering courses leading to a baccalaureate degree in engineering technology, serve as access campuses and for students who have already completed an engineering technology associate degree program.

- **Engineering Technology: Building Bridges between 2- and 4-Year Colleges**

The hub sites, building bridges between 2- and 4-year colleges, identified are locations for offering the baccalaureate courses through distance education. These sites, 2-year technical and community colleges, are the hub campuses that have associate degree programs in engineering technology, also serve other campuses within an hour drive from each hub. Selection criteria for each hub included:

- at least two additional access campuses located near the hub,
- hubs and access campuses located within an hour drive of each other,
- high level of faculty and administrative support, and
- IVDL facility/capability at the hub site.

Access campuses (marked with an * in Table 1), already have articulation agreements with Miami University, while articulation with other listed campuses are under development to enable students to move from one institution (2-year) to another (4-year). Hub sites for the far Northeast and Northwest corners of the state were not identified, due to close proximity to engineering technology baccalaureate programs at four year universities (Northeast: Cleveland State University, Kent State university, University of Akron, Youngstown

University, and Northwest: University of Toledo). The geographical relationship of hub and access campus locations is presented in Figure 1 and Table 1.

The department of engineering technology, at Miami University, began using distance education in the delivery of courses in 1997 when the department offered the Mechanics I: Statics (ENT-271) course between the Hamilton and Middletown campuses using the IVDL systems. Since that time, the department has delivered other courses between Miami Hamilton, Middletown and/or Columbus State Community College.

The department has delivered the '+2' engineering technology baccalaureate program to students at Columbus State Community College since 1998, and students have expressed a great deal of satisfaction with this type of program. The first graduates, in Miami-Columbus partnership, received their degree in May 2000. Approximately twenty-five students are currently enrolled in this partnership.

Students in these partnerships, take eleven courses from Miami University via IVDL, plus support courses from the 2-year campuses (typically from the access campuses). Miami University incorporates the World Wide Web in all distance courses. Blackboard software is used to provide and collect assignments, provide e-mail and a chat room for students' discussion assignments. Labs and simulations are also conducted over the web. Students use Labview software and the web server is connected to lab equipment at the Miami University campuses. In this manner, data is read live at the hub sites while the lab is being performed.

- **Assessment**

The institutions of higher education across the country, and around the globe, are facing many challenges impacting the nature of their academics. Ever-increasing competition for students and public outcry for access and accountability have driven these institutions to create innovative approaches to different delivery modes.

Delivering courses, and even entire programs, in a non-traditional format has created certain concerns including lack of personal contact, limitation on learning activities, teamwork and cooperative learning, as well as assessment. In addition, faculty development in multiple delivery formats requires a high level of expertise and more importantly administration support. However, multiple delivery modes have produced several positive benefits, most importantly reaching out and increasing access.

Distance education courses in engineering technology, in this partnership, undergo regular assessment and students are regularly polled as to their ability to learn using IVDL and web technology. Last year's students rated the IVDL technology 4 out of 5. Continuous improvement principles are used to add and to upgrade technology to enhance the learning process. As part of a departmental teaching and evaluation policy, lectures, tests, other faculty members, including those from outside engineering technology department evaluate labs and other assignments.

Assessment of these courses, delivery and partnership, has aided efforts to refine the courses delivered by distance technology. This assessment process has disclosed, through comparison of student work, that students at the hub sites have actually performed slightly

better (B+ vs. B), possibly because the students are required to learn on their own during times when instructor is not present.

- **Conclusion**

While educators have been in the forefront of addressing the needs of students, in our views, distance education is a new opportunity in reaching an inaccessible student pool. Prahalad and Hamel, in their book ‘Competing for the Future’ (Cited in Moore⁴) assert that important paradigm shifts in an industry never start with the leaders. Major change comes from the opportunists who are willing to take risk. Members of this partnership, the opportunists, have taken steps in capitalizing and developing their resources in reaching inaccessible students in Ohio.

This partnership will result in:

1. Students benefiting from:
 - The opportunity to work with equipment in a hands-on fashion rather than relying solely on computer simulations for lab work;
 - Accessing a baccalaureate engineering technology degree completion program enhanced by the close geographical relationship of the proposed hub and access campus sites;
 - Beginning an associate degree at a hub or access campus with the opportunity of pursuing the baccalaureate degree in engineering technology through distance delivery; and
 - Lowering financial barriers, as participating students will enroll through a Miami University regional campus as a transfer student, thus paying the lowest level tuition and fees.
2. Hub and Access Campuses:
 - Opening the doors to future program development for other degree completion programs;
 - Making possible the future origination of courses from multiple hub and access campus sites through the standardization of lab equipment and increased connectivity capacity;
 - Enabling the hub and access campuses to offer to current and prospect students the opportunity to pursue associate and baccalaureate degree; and
 - Allowing the hub and access campuses to better serve the needs of business and industry in their services areas.
3. Supporting the goals of the Ohio Board or Regents (OBR) in:
 - Improving the effectiveness of Ohio’s colleges and universities in educating students to become competent and successful throughout their student years, into their chosen endeavors and throughout their lives;
 - Becoming a national leader in economic development within the next three years, using the research and workforce development strength of Ohio’s colleges and universities in concert with business needs; and
 - Eliminating barriers to the provisions of educational services.

4. Supporting the goals of the Ohio Learning Network (OLN) in:
- Promoting statewide development of technology infrastructure;
 - Interconnecting the Ohio education community to ensure widespread knowledge and development of technologies, programs, and pedagogy; and
 - Developing distance education learning programs needed in the state so Ohioans can take full advantage of learning options for college degrees, workforce and professional development.

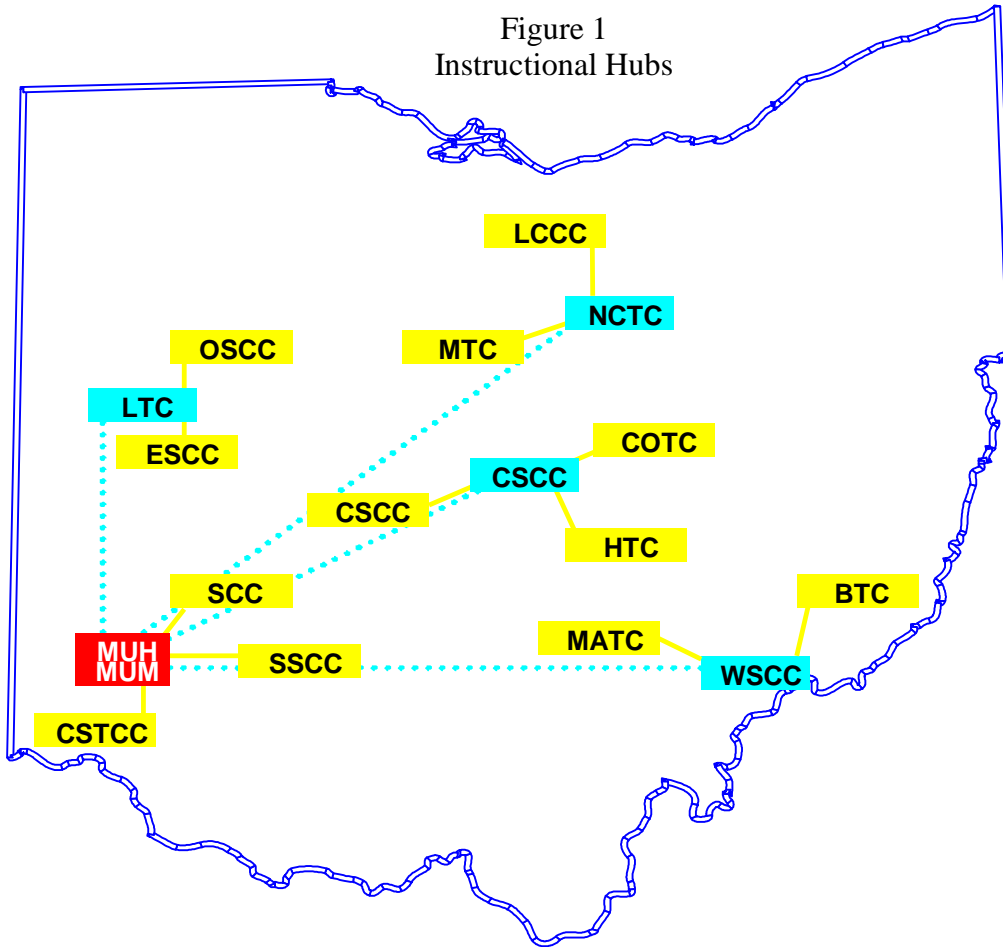


Table 1
Geographical Hub Locations and Access Campuses

Hub Location	Proximate Access Campuses	Location & Approximate Distance to Hub Site
Miami University (MU): Hamilton/Middletown	MU: Hamilton/Middletown	Hamilton/Middletown 0
	Cincinnati State Comm./Tech. College (*)	Cincinnati 25
	Southern State Comm. College (*)	Hillsboro 40
	Sinclair Community College (*)	Dayton 20
Columbus State Community College	Columbus State Com. College (*)	Columbus 0
	Central Ohio Tech. College (*)	Newark 25
	Clark State Comm. College	Springfield 50
	Hocking Technical College	Nelsonville 40
	North Central State College (*)	Mansfield 0

“Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition Copyright © 2001, American Society for Engineering Education”

North Central State College	Lorain County Comm. College	Lorain	40
	Marion Technical College	Marion	30
Lima Technical College	Lima Tech. College (*)	Lima	0
	Edison Com. College	Piqua	40
	Owens Comm. College (Findlay)	Findlay	30
Washington State Community College	Washington State Comm. College	Marietta	0
	Belmont Tech. College	St. Clairsville	60
	Muskingum Area Tech. College	Zanesville	50

Bibliography

1. Wedemeyer, C. (1981). *Learning at the back door: Reflections on non-traditional learning in the lifespan*. Madison, WI: The University of Wisconsin Press.
2. Jepson, N. (1973). *The beginning of English university adult education – policy and problems*. London: Michael Joseph.
3. Brown, J.; Lewis, R.; and Harclerod, F. (1969). *AV instruction: Media and Methods*. New York: McGraw-Hill.
4. Moore, T. E. (1997). *The Corporate University: Transforming Management Education*. American Accounting Association. Accounting Horizons, Vol. 11 No. 1, March 1997, pp. 77-85.

Bibliography

HAMID Y. EYDGAHI

Dr. Eydgahi is the Dean and Associate Professor of Engineering and Industrial Technologies at Lima Technical College (Ohio). He holds an undergraduate degree in Mechanical Engineering Technology, an MBA, and Ph.D. in Operations and Information Management. He held a number of engineering and project management positions for more than ten years before joining education. Dr. Eydgahi's previous accomplishments have included such areas as professional development and educational technologies in instruction.

ROBERT SPECKERT

Mr. Speckert is the Chair and Professor of Engineering Technology at Miami University (Ohio). He holds an MBA from University of Cincinnati and a BS in Applied Science from Miami University – Oxford. He is a Certified Manufacturing Engineers and has presented at such national conferences as the League for Innovation in the Community College and Society of Manufacturing Engineers.

RICHARD BICKERSTAFF

Mr. Bickerstaff is the Chair of Engineering Technologies at Columbus State Community College (Ohio). He holds an MA in Technology from Ohio State University, and BA in Mathematics from Youngstown State University. He is a member of the Society for Manufacturing Engineers, and was nominated for the Technologist of the Year at 1996 ITC Conference.