

**Session 1150: Serving Needs of Engineering Technology and
Engineering Educators**

**NATIONAL ENGINEERING TECHNOLOGY EDUCATION
CLEARINGHOUSE
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NJCATE: A National Center for Advanced Technological Education**

Abstract

NJCATE, a National Center for Advanced Technological Education dedicated to advancing the state of Engineering Technology education, has been a catalyst and a resource for technological education since its inception in 1995. Most recently it was funded by the National Science Foundation Advanced Technological Education program to implement the National Engineering Technology Education Clearinghouse, or NETEC, to serve as a resource center for dissemination of engineering technology program models, materials and pedagogical strategies.

Through NETEC, NJCATE and partners, in cooperation with other experts in engineering technology, broaden the scope of resources available to the engineering technology education community. NETEC, as it continues to grow, will contain an integrated, searchable database, and provide users with ready access to an extensive body of engineering technology education-related literature. This paper serves to introduce the Clearinghouse and to encourage its use.

Background

Since 1993, the National Science Foundation Advanced Technical Education program (ATE) has brought needed and welcome resources to foster improvement of technician education at community colleges, secondary schools and four-year institutions throughout the country. Because of ATE funding, some 500 projects and centers have implemented a wealth of exemplary curricula and instructional materials and practices, and technician education programs have been able to forge strong partnerships with business and industry, professional associations and other educational institutions. Taken together, these activities are designed to lead to comprehensive, system-wide improvements in technician education.

ATE funding has strengthened technician education, increased the visibility of technician education programs and led to a heightened awareness of the role that technicians play in our national economy. Despite these efforts, comprehensive, system-wide improvement of engineering technology has not been fully realized.

“Undergraduate education in science, mathematics, engineering and technology has seen many successful reforms in recent years. Yet, these successes also highlight the difficulties associated with broader change. Innovations that could make a difference in other settings remain confined to a single institution, department or instructor.” (From Analysis to Action, 1996)¹⁻¹⁰

Change involves risk, often inhibiting individuals from attempting new curricula or methodologies because they are unsure or uneasy as to how exactly to go about it. To ensure that the innovations in the forefront of engineering technology are more widely known and adopted, NETEC provides a combination of risk-free, electronic on-demand information, personal assistance through linking institutions and individuals with experts and mentors to assist with adaptation, and face to face technical assistance via institutes, conferences and workshops.

NJCATE has made substantial progress in reshaping technology education, broadening awareness of the roles technicians play in the global economy and expanding partnership in Center activities. NJCATE has developed an innovative curriculum model that provides a process and the procedures for the development of integrated, interdisciplinary engineering technology programs.

The NJCATE curriculum model, as well as effective pedagogy, use of technology-based instructional materials, recruitment and retention strategies, and mechanisms for integration of ethics into instruction, have been widely disseminated via the NJCATE web site, intensive summer institutes, and national and regional conferences. Over the years, more than 900 secondary and postsecondary faculty and administrators have participated in NJCATE events. Through complementary NSF ATE projects, NJCATE has been able to expand the range and intensity of professional development and technical assistance available to the educational community.

NETEC expands services provided by NJCATE to serve the needs of various sectors of the engineering technology community, including: post-secondary and secondary educators, students and potential students, business and industry as well as government.

NETEC Components

NETEC has two primary components: an on-line digital library for rapid, accessible dissemination of print and electronic resources and in-person assistance delivered via individual mentoring and group professional development. The combination of electronic, on-demand information, discussion, and links to resources with the opportunity for in-person assistance, either through meetings or individually, encourage individuals and institutions to participate more fully in the improvement of engineering technology education.

At the heart of the NETEC is a dynamic, interactive electronic database that provides users with on line access to electronic tools to reach and organize information. The NETEC database utilizes MySQL open source database software. This free software is designed for speed, precision and heavy load use. The software is housed on a designated server in the Middlesex County College IT Center.

The Educational Resources Information Center (ERIC) is a model for this nationwide information network that provides ready, 24-7 access to education literature and materials. As with ERIC, NETEC collects, abstracts, and indexes engineering technology education materials for the NETEC database, and responds to requests for information related to engineering technology education.

Via the NETEC electronic database, users are able to access a rich array of curricula and materials developed. Resources include:

- Bibliographies
- Curriculum Materials, Syllabi
- Evaluation Studies
- Feasibility Studies
- Strategies and programs for recruitment and retention of students, with an emphasis on students from underrepresented populations
- Instructional Materials, Teaching Guides
- Manuals, Resource guides
- Conference papers, position papers, monographs, etc.
- Research/technical reports
- Technical and employability skills standards
- Degree and Certificate program listings, articulation data

Some of the materials are directly available at the NETEC site. In some cases, links are provided to the projects themselves, and in other cases, materials may be purchased for a fee. The method of distribution is determined through negotiation with the creators.

Clearinghouse users are also provided with linkages to a wealth of other ATE and engineering technology education resources. Links are established with the resources center at other ATE centers and projects and with resources available through industry and professional associations.

Using NETEC Online

1. Digital Library

The first step in using the NETEC website is to become a registered user, which allows access to all of the site's features. Once a user is registered, this person may participate in the forums, submit resources for the digital library, and more.

Submissions to the digital library are the most important factor in the success of NETEC. The NETEC submission process and hosting are completely flexible – able to host entire bodies of

work on our web server, or to simply link to submitter's own services. A NETEC member may submit his or her material to the library via an online form, providing relevant information about the resource (known as "metadata"), and choosing one of several options for the resource itself – uploading the resource to the NETEC server, pasting the body of the resource into the form, or including a link to the resource on his or her own web server.

Upon submission, the resource will be reviewed within 30 days by a NETEC subject matter expert. If the resource is approved, it is immediately added to the "live" NETEC database. If for any reason the resource submission is declined, the submitter is notified and can appeal the decision if desired. Materials submitted are evaluated based on these criteria:

- Relevance to the field of engineering technology education
- Contribution to knowledge
- Significance
- Thoroughness and Accuracy
- Effectiveness of presentation
- Timeliness

When the resource is added to the NETEC database, all visitors and registered users will be able to find the resource in their searches and access the information provided. Of course, all copyrights and credit will be retained by the submitter.

2. Forum

The NETEC forum is a place where all NETEC users may come together and become a true virtual community. Discussions in the forum will be opportunities for the ET community to communicate, collaborate, or simply exchange ideas. All discussions will be moderated by ET experts, who can help to steer the conversations in productive directions, as well as guard the forum against spam and other abuse.

3. Careers

The NETEC careers section allows registered users to submit job and/or internship opportunities, skill sets, etc. Users may then search these listings to find opportunities that suit them. All postings are removed after 30 days, ensuring that the opportunities are up-to-date and current.

4. Additional Resources

This section of the NETEC website highlights outside resources that are relevant to engineering technology but are not held within our clearinghouse itself. These could be websites, degree programs and educational facilities, journals, etc. Registered users may submit resources for consideration, and they go through a similar process to that described above in the clearinghouse section.

In-Person Assistance

While the richness of electronic resources provides an ideal vehicle for broad dissemination, for effective adaptation, it is often necessary to provide more personal and direct assistance. For this reason, NETEC also includes face-to-face professional development for the engineering

technology community. NJCATE and its partners provide a rich and broad spectrum of expertise in engineering technology education. NETEC will host workshops and institutes nationally at NJCATE and partner sites on specific topics of interest and will match institutions and individuals with experts and mentors who can assist with adaptation of program innovations.

This more intensive in person dissemination will be accomplished via several pathways:

- National and Regional Conferences – in partnership with professional associations and other postsecondary institutions, NJCATE, will continue to organize conferences around topics of particular interest to the engineering technology community, highlighting the work of ATE projects. Specific topics might include recruitment of students from underrepresented populations, planning and management of successful ATE projects, and integrating core disciplines into technical instruction.
- Summer institutes – provide members of the engineering technology education community, as well as secondary school educators, with hands-on, in-depth experience in adapting curricula, materials and concepts developed by ATE engineering technology projects
- Workshops and seminars – on emerging technologies and technical innovations to inform secondary and postsecondary educators of new knowledge and skills students will need to acquire
- Individual Technical Assistance – NETEC will serve as broker, bringing together staff from successful ATE engineering technology projects with individuals and institutions wishing to adapt the findings and products from successful projects for implementation at their own institutions

Conclusion

NETEC helps to foster the comprehensive, system-wide improvement of engineering technology that is needed to create broad and sweeping change. The clearinghouse creates a path of reform to follow where best practices can more effectively be replicated. Individuals and their institutions are able to rely upon risk-free, electronic on-demand information, and personal assistance through linking institutions. Innovations that in the past, might have been confined to a single institution, are now available to all.

Publication on NETEC is of particular use to those with smaller funded projects or who have made innovations with the assistance of external funding. A national clearinghouse will enable them to reach a far broader audience than they could on their own. To reach the widest audience of potential contributors, the Clearinghouse is publicized through professional publications, presentations at conferences and workshops, and the list serves.

By linking faculty with appropriate consultants and/or mentors, NETEC created a technical assistance communication network of engineering technology educators nationwide, and serves as a national resource on educational programs. Faculty can find on the website-clearinghouse, engineering technology education curricula, instructional materials, program models and structures, and instructional strategies. Additionally, career and employment information to business and industry, engineering technology students and potential students, secondary and

postsecondary educators, government and professional associations will be available. Please visit the website, www.neteconline.org, frequently to find out more information and to get involved!

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Biographical Information

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LANCE MILLER is the Web Applications Manager in charge of developing and maintaining the new NETEC (National Engineering Technology Education Clearinghouse) website and overall internet presence. A graduate of the College of NJ with a B.S. in Computer Science, Lance previously developed online training applications, and has spearheaded technical, educational, and entertainment web projects for a variety of clients.