Issues of Accreditation in Higher Education Vol. II

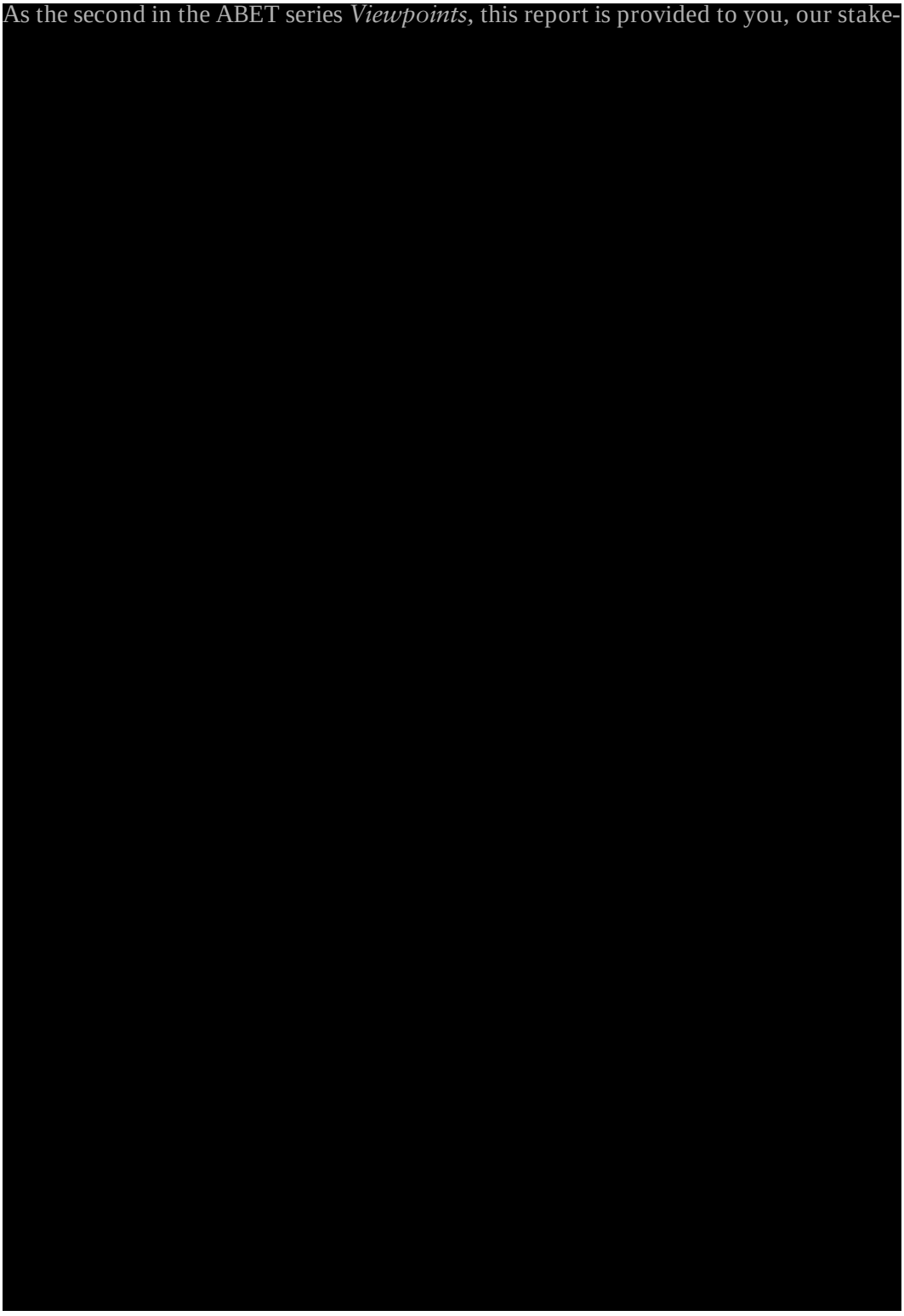
Continuing Education

Foreword

There is an increasing demand for continuing education, lifelong learning as it is often called, especially among technical workers. This demand is bolstered by both employers and employees themselves, each understanding the need to stay as up-to-date as possible in these rapidly changing technological times. Because ABET is responsible for providing quality assurance in technical higher education, it is not unreasonable to think that it may, too, have a hand in quality assurance of lifelong learning in the not-so-distant future.

In light of this possibility, this report has been filed by ABET's Industry Advisory Council, based on the outcomes of its August 2001 meeting to address the issue. This group of industry leaders, often called upon to advise or direct ABET's efforts in conjunction with educational leaders, examined the scope of continuing education in engineering, its quality and its quantity, in an effort to foresee the role ABET should eventually play in this arena.

As the second in the ABET series *Viewpoints*, this report is provided to you, our stake-



Continuing Education in Engineering

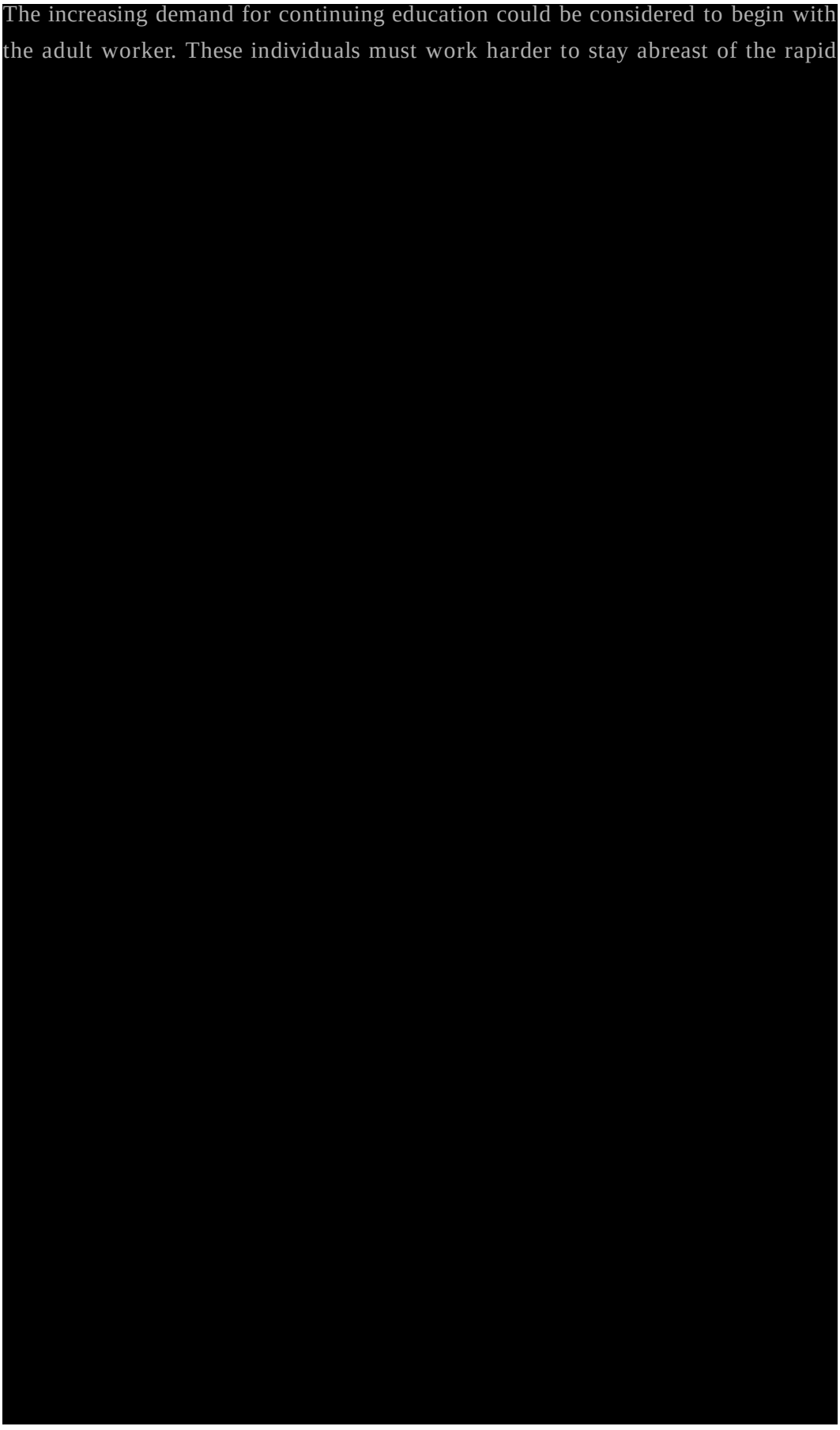
Background

"We recognize that workforce learning is already receiving widespread attention from business, organized labor, educators, and others…. Employers spend an estimated $60 billion annually on education, training, and upgrading skills of their employees. Unions are working with employers to expand education benefits for workers and their families through collective bargaining. Public institutions and government programs invest billions. Individuals are investing in skills for lifelong employability. But as changes accelerate and require ever-higher skill levels, continuous workforce learning is becoming a more critical priority."

- Skills for a New Century: A Blueprint for Lifelong Learning

Continuing education is growing by leaps and bounds in this country. In August 2000, the National Center for Education Statistics (NCES) reported that an estimated 90 million adults participated in some kind of formal lifelong learning in the previous year. This number is up from 58 million in 1991 and includes ESL and GED classes, as well as courses designed for professional and personal development.

The increasing demand for continuing education could be considered to begin with the adult worker. These individuals must work harder to stay abreast of the rapid



As corporations began establishing their own universities and training centers to meet continuing education needs, higher education began responding, perceiving the potential boon in income for the institution. Today, a growing number of universities and colleges are branching out into the continuing education arena to try to satisfy the growing demands of industry and the individual. A New Model for Education-Online Universities Empower Students states:

- New York University's School of Continuing and Professional Studies now brings in about $92 million per year in revenue, up from about $3 million in the early 1970s. The school has 107 certificate programs, which range in length from four to eight courses, and allow students to learn skills in specialized areas such as financial planning or computer programming.
- Harvard takes in about $150 million per year from continuing-education classes—roughly 10 percent of the university's $1.5-billion annual budget. A study conducted a few years ago found that 60,000 students per year were taking part-time continuing-education classes at Harvard—more than three times the number then in full-time undergraduate, graduate, and professional programs.
- More than half of the 16,000 students at Johns Hopkins, which has four continuing education centers in the Baltimore-Washington region, are in part-time post-baccalaureate programs. Two-thirds of all the master's degrees awarded by Johns Hopkins are earned by part-time students.
- At the University of California at San Diego, continuing education classes generate about $25 million in annual revenue, and programs that certify a specific set of skills are proving far more popular than traditional graduate degrees. For example, some 7,000 students are studying for a certificate of some sort in engineering.
- Berkeley Worldwide, a continuing-education program for foreign students run by the University of California at Berkeley accounted for about 40 percent of the $45 million in revenue generated during 1997 by Berkeley Extension, the university's continuing education unit.

The growth in continuing education is expected to continue. Numerous adults are pursuing educational activities in one form or another to increase their knowledge, information, or skills in an effort to either ensure greater success in the workplace, expand their basic skills, or receive credentials—but ultimately to enrich the quality of their lives.

Continuing Education in Engineering

For the purposes of this report, "continuing education in engineering" refers to activities beyond the first degree obtained by a graduate to include both degree and non-degree-granting educational opportunities. Types of activities include traditional classroom courses, distance learning courses, evening courses, weekend seminars and workshops, web-based courses, CD-ROM courses, video courses, and graduate degree programs, offered by professional societies, universities and colleges, or other types of providers.

Engineers are not exceptions to this growth trend in continuing education. Graduation with a degree in engineering is no longer considered the end of the education process. A B.S. degree in engineering has been estimated to have a life of about seven years. Engineers are continuously challenged to keep up with the rapid changes in technology and stay abreast of current global and societal issues. Engineers engage in lifelong learning—the process of acquiring the skills and knowledge necessary to remain current in a chosen field—for a variety of reasons, including career advancement, licensure requirement, and self-fulfillment.

In September 2000, The National Society of Professional Engineers (NSPE) posted the following question on the Forum Online portion of its website: "Many Professional Engineers find it critical to expand their range of non-technical skills for their continued

professional and business development. Do you agree? What would be the value of a non-technical skills certification program?" Provided below are some responses:

> *"Continuing education is a necessity! However, certification programs do nothing more than provide money-making opportunities for the businesses providing the courses/seminars, and do very little in increasing the non-technical and technical skills of Professional Engineers."*
>
> *"The plethora of certification programs that have started in the past 10 years have increased the cost of continuing ed. to astronomical prices (even for courses/seminars that used to be free)!!!"*
>
> *"I agree that it is critical for Professional Engineers to continue their development of non-technical skills for career development and success in the business world."*

NSPE's question respondents raise concerns over the value, both professionally and monetarily, of non-technical skills certification programs. Their responses could perhaps be considered a backlash against the proliferation of technical-skills-based continuing education programs and certifications that use "engineer" in the title. Such programs have had a significant impact on the traditional engineering workforce, resulting in concern over who is evaluating course content and whether some certification programs are enabling unqualified individuals to call themselves "engineers."

Industry

To stay current in their field, many engineering graduates continue to pursue their education after college. For some, this focuses on technical aspects; for others, it may involve increasing their business acumen by pursuing an MBA. These same benefits are issues for industry as they too try to keep their companies, through their employees, abreast of changes in the field.

Offering tuition reimbursement is a great benefit to both the employee and the company, but the current plethora of continuing education opportunities can be confusing to both entities. Rapid technology changes have made it possible for education to be offered anytime, anywhere and to anyone. The rapid growth of Internet and other offerings, both at universities and other organizations, has left industry leaders struggling to evaluate the quality of lifelong learning opportunities for their employees.

Robert E. Spitzer, Vice President, Technical Affiliations at the Boeing Company, which offers all employees a tuition reimbursement benefit, estimates that 30,000 of their employees take advantage of this opportunity. Approximately half of this number are taking courses specifically designed to help them in their current job or on a specific project. Thirty percent of this group are specifically involved in engineering and engineering technology courses. The other half are pursuing higher degree opportunities.

Boeing has a department that reviews tuition reimbursement applications. Basic requirements are that degree-seeking courses be provided by an institution that is regionally accredited. Professional development courses are subject to an initial review by an employee's supervisor. Boeing's basic policy is that employees should be supported in the professional development opportunities they wish to pursue. Boeing also operates an internal training education center, which provides numerous training opportunities for its employees.

Isadore Davis, Manager, Engineering University Relations/Missile Systems-Raytheon

requiring Professional Engineers (P.E.s) to meet CPC requirements. CPC requirements, also referred to as “continuing professional development” or “continuing education requirements,” mandate that professional licensees demonstrate to the licensing authority the satisfactory completion of specified activities as a condition for renewal of the individual’s professional license.

The National Society of Professional Engineer’s (NSPE) website maintains the following

Nina Weber, Director of Educational Services, American Institute of Chemical Engineers (AIChE), is directing the society's continuing education program into a very customer-focused and revenue-generating enterprise. Before, the program operated more as a service to members. The new direction is to increase the quality of the offerings and rid the program "of the bottom 10 percent that's not performing and bring in new courses in the top 10 percent, the performers." The society currently has 62 course titles and is slowly growing. Based on past course evaluations by attendees, success depends on keeping the information offered in the courses current, state-of-the-art, and more industry-focused, including increasing the number of instructors who are from industry rather than academia.

John Casazza, Senior Director of Continuing Education, ASCE, states that his society currently offers approximately 250 seminars per year throughout the U.S. He estimates that three to four years ago this number was only 120 to 130 course offerings per year. He projects the expected growth in the next fiscal year will raise the number to 300 courses per year. Online course offerings have increased from none two years ago to a current offering of 15. The number is expected to grow to 20 to 25 courses online in the next fiscal year.

Tom Perry, Director of Engineering Education, ASME, comments that over the last three years, the number of "live" short courses offered by his society has been reduced from 131 to 101. The demand for more courses is there, but the society decided to focus on a greater yield in revenue in its continuing education offerings. Class size has increased to 22 people per course, a 31 percent increase, which has resulted in a 20

The article Engineers Gain Option in Continuing Education discusses the establishment of a joint effort between Stevens Institute of Technology and the Institute of Electrical and Electronics Engineers (IEEE) to offer online degree programs to engineers in telecommunications management and wireless communications. "The quick pace of technological change has prompted trade organizations like the institute to look beyond traditional educational resources like journals and meetings for continuing education for their members…. Many societies are now trying to upgrade the skills of their members…. Stevens has received approximately 100 inquiries about the programs from members of the institute, and has 30 students enrolled in the first three courses…. Member response to the course offerings has exceeded expectations."

Evaluation

"The regulated professions are moving increasingly toward requirement of continuing professional development as a means of assuring professional competency. Already, there is a commercial and competitive zoo of courses that purport to satisfy this need."

- Lee Saperstein, *ABET's 68th Annual Report 2000*

Statistical and anecdotal evidence supports that the growth of continuing education is on the rise and a veritable "zoo of courses" exists. As this growth continues, concerns exist over the quality of some continuing education opportunities. Earlier in this report, individual concerns over the proliferation of courses were cited in quotes from the NSPE website. Approximately 20 percent of the information inquiries to ABET's Accreditation Department from individuals regard continuing education. ABET headquarters has received multiple inquires from both state chapters and national headquarters of professional engineering societies relating to its plans for quality assurance of continuing education in the U.S. Discussion at last year's Board meeting and the resulting establishment of a sub-team of the IAC to review the issue is evidence that industry members have concerns regarding quality assurance in continuing education.

In a June 2001 brief, the National Governors Association, Commission on Technology and Adult Learning, presented the following commentary on continuing education in the U.S.:

> *"Create the highest-quality e-learning experiences possible. Rapid growth in such areas as distance learning, technology-enabled assessment, and the increasingly diversified and expanded public-private adult learning marketplace requires us to develop new strategies for assuring quality and protecting consumers. Important priorities for the public and private sectors include providing reliable and universally accessible quality information for consumers; developing quality assurance mechanisms; ensuring that learners have the support they need to make the right decisions about their e-learning options; and developing policies and practices to ensure privacy."*

Currently, the International Association for Continuing Education and Training (IACET) exists as the main national organization that evaluates providers of continuing education courses in professions and is not limited to engineering. IACET-registered

ABET

ABET is a recognized leader in the accreditation process. Since l932 it has carved the path of the accreditation process in the United States and in the last 10 years has gained national leadership in assessing the quality of engineering, technology, computing, and applied science education through its accreditation practices. Through its

References

National Center for Education Statistics (NCES).

Leadership Group on 21st Century Skills, *Skills for a New Century: A Blueprint for Lifelong Learning*, http://novel.nifl.gov/nifl/skills.htm, 2000.

Kwang Kim and Sean Creighton, *Participation in Adult Education in the United States: 1998-99*, http://nces.ed.gov/pubs2000/qrtlyspring/6life/6-esq21-toc.html, 2000.

Nancy S. Nash and Elizabeth M. Hawthorne, *Corporate Education.ERIC.Digest*, http://www.ed.gov/databases/ERIC_Digests/, 1988.

Elsa Schelin, A New Model for Education - Online Universities Empower Students, http://www.elearningmag.com/may01/onlineuniversity.asp, May 2001.

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