

## Potential Roles for ASEE-EMD in Distance Education

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### Abstract

This paper is written to propose a new role for ASEE-EMD in an effort to support the growth and survival of Engineering Management (EM). This proposal can then become a stimulus for dialogue within our division focusing on ways that the division can become more valuable. Our EM programs are currently doing well, but perhaps not up to our expectations. There is growing competition for our students as technical MBA programs address a very similar market need in the graduate level and distance education enables the entry of other competitors. At the same time, it is difficult to develop new Engineering Management programs. Because the scope of the discipline is so broad, a large number of faculty are often needed in order to provide the critical mass necessary. However, distance education represents an opportunity to enable programs to start in new schools and grow in others. Distance education can become a media to produce and provide a broad line of quality Engineering Management courses and learning modules, creating a dynamic new growth potential for the discipline. This paper proposes the consideration of the development of an integrated program of distance EM classes and modules.. It discusses current conditions and opportunities in order to identify some of the requirements, potential roadblocks and roles that ASEE-EMD might play to support this development.

### Current Situation

Engineering Management (EM) continues to grow steadily. Data collected by Engineering Trends<sup>1</sup> shows that the number of EM graduates has grown from 1990 to 2000 at a rate of approximately 4%. The undergraduate programs have grown by approximately 2%, while master's degrees has grown at a 4% rate and Ph.D. at a 6% rate. To put this in context, Table 1 provides a comparison of similar growth rates for engineering and business programs. Even though EM bachelor's degrees grew only at a 2% it was considerably higher than the rest of the engineering field, where the number of graduates actually shrank by an average of 2% per year. Engineering Management also grew faster than the undergraduate business programs, which had minimal growth over this period. This documents the perceived value in the EM degree by the market. The

growth rates of the last 25 years shows that the graduation rate for both business and engineering undergraduates had been higher before the current slowdown.

**Table 1.** Growth rates for Engineering, EM and Business graduates

	10 year growth rate			25 year growth rate	
	Engr.	Business	EM *	Engr.	Business
Bachelor	-2.1%	0.1%	2.2%	1.32%	2.90%
Masters	3.1%	3.5%	3.8%	2.27%	5.27%
Doctor	6.0%	5.3%	6.4%	2.10%	2.47%

\* - sources EM: Engineering Trends 2002

- others: NCES 1999

The master's degree graduation rates for EM is also higher than for engineering and business programs, but the differences here are very slight. They are all in the 3.1% to 3.8% range. This shows that there is a definite interest in master's degrees in all of these areas. The twenty-five year growth data shows that the MBA boom has slowed down, while the interest in the engineering master's programs has increased.

If the integration of engineering and management are in high demand by firms that hire engineers, higher growth rates should be achievable. There are numerous studies showing that employers are seeking engineers that not only solve technical problems but also effectively integrate within their business environment. Many engineers reflect on their education and wish they had learned more about business. On the other hand EM alumni do appreciate their education<sup>2</sup>. If the education that is provided in the EM programs is so valuable, why hasn't there been a faster growth of our programs? One reason has been the introduction of technical MBA programs. In the master's arena, they have provided an alternative means to gain this educational combination.

Another reason for the slow growth might be the difficulty for universities to start up or grow EM programs. Since the scope of the discipline is so broad, it takes considerable resources to start a new program. A viable program would want to have a variety of courses that could include technology management, project management, e-commerce, marketing, finance, information systems, leadership and management, quality, operations research, strategic planning, manufacturing, organizational behavior, entrepreneurship and business law. This diversity requires that the organization have appropriate resources available from other organizations, such as a local business school, or they must hire their own professors in these fields.

Distance education (DE) is quickly transforming higher education. One of the reasons that there has been such a high level of acceptance is that much of current engineering education is based on lectures. It is estimated that lecture is the prime instructional method<sup>3</sup> in 66% of the courses. Since distance education has the most potential in situations in which it replaces live lectures, it is being applied in a large number of courses. It is estimated that there were approximately 1.7 million students enrolled in

distance programs in 1998<sup>4</sup>. This level reflects a doubling over three years, or a 26% annual growth rate. The growth is being generated through four types of organizational structures and educational activities<sup>5</sup>.

- Public colleges are providing many of these classes, as shown in Table 2. A large majority of them are offering distance classes and more are planning to start soon.
- Corporate university joint ventures are providing a wide range of educational services. These include providers of course management systems such as Web CT with 2600 college and university clients and Blackboard with 1900. There are package and distribution systems such as: Fathom, Columbia's for profit spin-off with 75,000 registered users; and Michael Milken's Cardean University, a fully accredited, online, graduate business school.
- Full virtual universities, such as the University of Phoenix Online and Western Governors University, are experiencing very high growth.
- There are over 2,000 corporate universities that focus on training courses and address a growing demand. The average corporate university is four years old, has an annual budget of \$15 million, employs 79 full-time employees and delivers 23% of the training via DE.

**Table 2.** Percentage of public universities that offer distance education

	2-year	4-year
Offer distance education	62%	78%
Plan to offer within 3 years	20%	12%
Remainder of the schools	18%	10%

(NCES 1999)

There are many motivators for this growth in DE. These include the ability to provide an education to non-traditional students, increased student demand, improvement to the value provided, and opportunity to compensate for shrinking public funding. However, another motivator is the perceived potential for profit. This is a large and growing market that is making use of technology and telecommunication improvements. The size of the distance education market in 2003 is projected to range from \$7 to \$25 billion. When Cisco Systems CEO John Chambers pronounced in 1999 that education is “the next killer application on the Internet”, investment money poured in<sup>5</sup>. With the meltdown of the dot.com's, the feverish level of investment has cooled down, but ultimately, it will likely bring a new level of competition into the education market.

## Opportunity

Within EM, distance education provides a particular opportunity for growth. The expansion of distance education raises many questions and concerns<sup>5</sup> that are not

completely resolved. It is difficult for distance programs to provide the learning from live interactive discussions and hands-on activities. However, DE programs are developing new ways to address some of these limitations and new technologies and communication infrastructures continue to provide better solutions. Also, these DE classes can also provide new ways to enable schools to provide EM education. Through distance channels, schools can begin to provide EM classes to their students without having to hire the EM specialist faculty. Current EM programs will also be able to provide a broader set of classes for their students and provide an improved program. At the same time, current EM programs can generate benefit from the creation and distribution of these classes.

EM course material can be generated systematically for distance use. However, there are a number of functions that need to be provided. The first is the creation of the courses or modules. EM faculty from current programs would be the **content providers**. In order to facilitate the development and production, a central organization would be the **development support provider**. They would standardize some of the material and processes, and provide services to the content providers to facilitate their work and avoid duplication of resources. They would provide adequate quality control to improve customer satisfaction and make this system sustainable. A **channel provider** is needed to run the business, influence the creation of courses that would appeal to the prospective customers, provide services for the customers, ensure that the receiving institution has the capability to properly utilize the courses, run the operations that link to the customers, collect appropriate fees and share it with the development support providers and content providers. Finally the **user institutions** provide advising for the students to choose the appropriate distance courses, and facilitation to provide the personal interaction with the students.

There is no clear business plan at this time that can put these functions together in a way that will provide sustainable performance. However, as we all gain more experience in distance education, it is becoming clear that DE can revolutionize the educational industry. As educators in EM we can look at these activities as growth opportunities, but we can also look at them as a means of survival. Business schools, coalitions of business schools and other corporate university joint ventures can perform these same functions. If they develop a broad set of quality courses and modules that focus on the EM discipline, students that could have enrolled in EM programs might enroll in these programs because of their cost, convenience and perhaps reputation. These programs might be associated with prestigious schools and have developed successful brand reputation. Their products might offer excellent quality based on major investment and application of new technologies. In that environment, EM programs might have a hard time competing and might force our programs to become more focused on the tactical, analytical parts of our discipline, greatly reducing our value.

Instead of allowing other groups to take the leadership in this area, a group of EM programs could form a coalition to develop an integrated program of distance classes and modules. They could perform some of the development support and channel provider functions themselves and use external resources for other functions. Current EM

programs could more easily grow due to their improved course selection. New EM programs could be established in many engineering schools since they would be more viable. In addition, many engineering programs could utilize EM courses to make their students more effective in industry. Even business schools could use some of the classes and modules in some of their programs as EM builds greater recognition through distance education.

We are not within the grasp of developing this program. However, we can begin to address the major unresolved questions:

- Identification of the **key roadblocks**. Unless we understand how these solutions might be structured, we might not be able to identify critical roadblocks.
- Assessment of **market needs**. Without adequate assessment of market needs, it is unlikely that any organization would make the investments necessary to perform any of the needed functions.
- **Assessment of resources** available. There are many service providers that could perform some of the needed functions, such as development support provider and channel provider, but we would need to understand what alternatives are available. These functions can be performed by one of our current EMD member organizations, a coalition of several EM organizations. They could also be performed by external organizations with a larger scope that could provide this service to other engineering disciplines. They can also be provided by a corporate university joint venture, or combination of solutions.
- **Organizational structure**. Leadership to manage the program is required to ensure that this endeavor has a reasonable chance of success. How are all the stakeholders and service providers organized to provide a valuable and sustainable educational product.

The intent of this paper is not to design this program, but to identify unresolved questions and begin a dialogue within the division whether these or other developmental activities are appropriate for ASEE-EMD. If so what can the division do to try to identify action items that can facilitate its progress.

### **Roles for ASEE-EMD**

If this program were to be developed, it would need the joint action of educators and organizations within EM. There are only a few organizations that can currently provide this connection to develop a consensus and structure for joint action, and ASEE-EMD is one of them. Is it appropriate for the division to become involved in such an endeavor? What are some of the roles that ASEE-EMD could play to foster this activity?

- Encourage articles and presentations that identify viable scenarios for growth of EM, key roadblocks, resources for collaboration, market needs, and viable organizational structures.

- Create internal organizations to identify academic needs for current programs. Within our members we can identify the courses or modules that current programs could use to enhance their programs.
- Create internal organizations to identify academic needs for potential users of our content. We are in a good position to help develop virtual EM programs that would help prioritize the development of new classes and modules, and also facilitate the start of new programs.
- Provide negotiating power with development support and channel providers. If we group our resources it will be easier to find service providers that would be interested in collaborating with our distance education program. We would also be able to obtain better terms.
- Provide some of the channel functions. It would be relatively easy to develop a basic clearinghouse of EM courses and modules for the service of the discipline and its members.
- Become a catalyst to influence ASEE to provide some of these functions for all the engineering disciplines. There would be considerable synergy in the development of one central distance education support organization instead of separate operations by the different divisions.
- Become a resource to the faculty in the defense of their Intellectual Property Rights. Faculty will be affected by these activities and the division could get involved.
- Identify other organizations that should be involved and their roles.

Is there a need for our division to get involved in distance education solutions such as this one? Are there activities that we should be performing to make ASEE-EMD more valuable to the members and the discipline? Are we organized to identify and act on some of these opportunities? It is the intent of this paper to encourage dialogue within the EMD to spur action that can answer these questions.

### **Acknowledgement**

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## Biographical Information

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