

Experiences in Organizing and Managing Engineering Education Coalitions

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Summary

This paper is about the author's experience in helping to organize and manage one of the Technology Reinvestment Project (TRP) engineering education coalitions. The Manufacturing Engineering Education Project (MEEP) has been an effort among Penn State, the University of Puerto Rico, the University of Washington and Sandia National Laboratory. It has involved over a thousand students, nearly one hundred industry partners and dozens of faculty. This paper describes some of our experiences in trying to make it work and important lessons which we learned.

Teaming for a Joint Proposal

Getting two faculty from the same department to effectively collaborate on a project is oftentimes difficult. Getting dozens of faculty from several different institutions to effectively collaborate can be a monumental, if not impossible, task. How is it done? How do you get started? How do you communicate? Who is really in charge?

The Manufacturing Engineering Education (MEEP) project team was organized in Spring of 1993 to address the opportunities afforded by the Technology Reinvestment Program (TRP) of ARPA. Because of previous relationships, the team involved faculty/scientists from Penn State, University of Washington, University of Puerto Rico and Sandia National Laboratory. **Without the existence of these previous relationships (developed through scholarly and professional activities), it is doubtful that this coalition could have been initially formed and a proposal generated.** Hence, from the beginning there was a sense of trust among the participants. Secondly, the preliminary discussions resulted in consistent agreement that there was both a need and a commitment to provide a revised curriculum with a hands-on focus for design/manufacturing innovations. To be sure, the prospect of significant external resources from the federal government was a major motivation for our early consideration. However, the realization and understanding that we had a "shared destiny" in providing curricular innovation to our respective institutions, transcended all of our initial planning and strategizing.

But there was one other concern which needed to be addressed before a decision to proceed with a proposal for this project. The guidelines required that at least 50% of the total project funding be acquired from industry, and the project would be in the millions. Not only was a partnership proposed across academic institutions, industry must be intimately and financially committed. With only a few months of proposal planning and preparation available, there was little time to "market and sell" our ideas to our respective, local industries. Almost without exception, the industry partners who joined our coalition had been previously involved with our universities in some fashion.

Without substantial earlier involvement, the probability of obtaining substantial support from industry in such a short time period is extremely low.

In summary, the following ingredients were necessary for the MEEP proposal to become a reality:

- Prior working relationships with other academic partner
- Financial incentive of the TRP
- Agreement and commitment for a shared destiny for curriculum innovation
- Already existing involvement with local industry

Getting Started

After the proposal is submitted, site visit completed and a start date for the project negotiated, how do you get started? How do you leverage the talents of the participants across all the coalition? What keeps the project from separating into individual programs at each school? How do you keep the interest and participation of industry?

In our case, two important needs emerged:

- Effective organizational strategy
- Team-building and sharing

From an organizational viewpoint, the MEEP project includes four (4) fundamental tasks. These are:

- Curriculum
- Learning Factory (laboratory facilities)
- Industry Partnership
- Outreach

Each of the four PIs (one from each institution) assumed partnership-wide responsibility for one of the four tasks. Local teams at each institution coordinated their efforts through these PIs. In addition, a Management/Finance Committee was formed and was comprised of all the participating Engineering Department Heads from the various institutions. The integration of the Engineering Heads into a leadership role for any effort involving curriculum change and space allocation is absolutely essential. **Without the support of line management, curriculum projects such as this have an extremely difficult challenge.**

A second factor in successfully launching a partnership project like MEEP, most likely the most important, was the special care exercised in developing friendships and mutual respect among the various team members across the universities. Several meetings were held in the beginning stages of the project at each other's institutions so that the "grass-roots faculty" could meet face to face. Nearly 40 faculty were involved altogether so such a strategy is rather costly. Our partnership meetings always involved industry representatives as well. In a recent assessment survey (of industry, faculty and

students involved with MEEP), the following three comments from faculty resonate an important theme:

"I am very proud of what we have accomplished over the past few years. . . The greatest benefit that I received from participating in MEEP was the great number of friends that I established. . ."

"I think MEEP is successful primarily because of the kind of people involved. . . who care about what education the student should get, and what will make them more successful once they graduate. But unique is the "Puerto Rico factor" - the team who showed the rest of us how new heights can be achieved by cooperating and teamwork. This has spilled over the rest of the partnership and hopefully we can pass some of it to our students!"

"I think we worked well together because we had similar goals. Perhaps more importantly, we developed a friendship that began in our first meeting in Seattle. . . (In my institution, it was) recommended that everyone involved attend that meeting. (Our chairman and PI for the project) felt that it would be much easier to accomplish our goals if we met face to face and learned something more about the people and institutions with which we were going to work. Having everyone, from students to administrators participate and contribute in that first meeting helped jump-start our partnership."

Meeting Expectations

The MEEP project involved hundreds of students, dozens of faculty, major space needs and nearly 100 industry partners. Keeping the various tasks and timelines on course is a serious challenge. **This is especially true in academe where such projects are usually done in parallel with other institutional responsibilities and where failure to meet a milestone on time does not result in any (immediate) loss of revenue!** The MEEP experience suggests that there are two principal ingredients required to meet expectations:

Persistent communications and relentless follow-up
Empowerment of team members

These characteristics, most likely, are covered in Chapter #1 of Management 101. Nonetheless, for partnerships such as MEEP, they are critical. In the early going, conference calls were held, at least, bi-weekly. Task leaders were continuously in contact with their team members at the various institutions. Agenda and minutes would accompany all meetings and discussions. Industry meetings would be held quarterly at each institution. The adjectives "persistent and relentless" are accurate characterizations of our commitment to effective communications.

The second item, empowerment of team members, is particularly important. The MEEP project included many different individuals: faculty taught and developed new courses, industry came to campus to experience our new courses and provide a stream of senior design projects, graduate students developed software and supervised undergraduates, laboratory technicians kept everything running and our students typically responded with high quality work. What makes this happen? Is there some special "silver bullet?" We think not. The MEEP project simply put certain resources in place. The success of the project is due, in our view, to the collective responsibility and ownership everyone assumed. The technical staff had the opportunity to work one on one with student design teams in the Learning Factory. Our faculty developed courses they wanted (Concurrent Engineering, Product Dissection, Process Quality). Industry members provided challenging student projects and listened carefully to the student results. The MEEP environment simply asked everyone to take ownership for what they did best and provided the resources and tools to make it happen.