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Enriching the Undergraduate Experience Through a Technology Learning Community

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This article describes the implementation of a learning community as a model for enriching the undergraduate experience in the Industrial Technology curriculum at Iowa State University (ISU). The authors sought to incorporate effective practices learned from a variety of sources and to increase both achievement and retention. From this three-year project, the authors then provide recommendations for other industrial technology faculty interested in establishing learning communities within their programs.

Teaching and learning are at the heart of the undergraduate experience. Educators and researchers have expounded on the benefits of alternatives to straight lecture-based university education (e.g., Finkel, 2000; Freeman & Field, 1999; Hull, 1995; Johnson, Johnson, & Smith, 1998; McKeachie, 1999; Perlman, 1997; Thomas & Rohwer, 1993). This body of research stresses the importance of methodologies such as cooperative learning, peer learning, experiential learning, and contextual learning. The avowed goal is to develop in students what Thomas and Rohwer (1993) called "proficient autonomous learning." Collaborative interactions have been shown to increase student academic performance, student retention, structured thinking, and improved ability to work together (American Association for Higher Education, 1998). The authors' position is that students' out-of-class experiences can benefit from this approach as well. While many of the ideas incorporated into learning communities are not new, the advent of structured learning communities yields a unique new framework for combining and institutionalizing these concepts within current curricula and the constraints imposed by university culture.

Learning Communities

Cross (1998) defined learning communities broadly as "groups of people engaged in intellectual interaction for the purpose of learning" (p. 4). Shapiro and Levine (1999) categorized learning community models as paired/clustered courses, freshman interest groups, team-taught programs, and/or residential learning communities. Lenning and Ebbers (1999) considered learning community models to be curricular, classroom, residential, and student-type. Regardless of the classification scheme used, learning community models can be grouped by the types of activities and students involved. A generic categorization may be as follows:

1. *Collateral course-based learning communities* occur when students take two or more courses together as a cohort group. There is, however, an endless variety of ways in which to structure cohort types of learning communities. They may involve only two classes or the students' entire schedule for one or more semesters. The classes may be traditionally taught courses or team taught across disciplines. The courses may be discipline based or cross- disciplinary theme based.
2. *Residential learning communities* occur when students live together, often in a dormitory. They may or may not take common classes. This type of learning community strives to integrate the students' living and academic environments (Shapiro & Levine, 1999).
3. *Freshman interest groups* are learning communities where entering freshman with a particular subject interest, and not necessarily in the same major, take grouped or linked courses around that area of interest.
4. *Student type learning communities* are designed for special sub- populations (e.g., honor students, students with disabilities), and they may or may not involve common courses or living arrangements.

Learning communities may be structured following one of the described generic models, or any combination of the models, or an entirely different model. Clearly there is more than one correct way to implement a learning community. Rasmussen and Skinner (1997) offered the following advice:

> The best design will depend on institutional environment and the specific disciplines to be integrated as well as the characteristics of the faculty and students who will participate. The goal is to provide a richer range of learning experiences to our students and contribute to a more vibrant and supportive campus environment for students and faculty alike. (p. 15)

The essence of learning communities is, however, clear. They are collaborative learning environments designed to increase student interaction with peers and faculty. Because of this, many colleges and universities across the country are turning to learning communities as one way to increase retention and student satisfaction with their programs (Lenning & Ebbers, 1999). There is also correlational evidence that students who participate in learning communities show more intellectual growth and get more out of their college education than less involved students (Cross, 1998). Although the literature evidenced no articles pertaining specifically to learning communities in a technological program setting, the benefits ascribed to them suggest that they have potential for positive impact on industrial technology programs.

The ISU Experience

Because of a university wide belief in the value of learning communities, since 1995 approximately 40 learning communities have been implemented across the university. At first, the possibility of a learning community in industrial technology was discussed but not pursued because the student population in industrial technology did not easily fit into any of the standard learning community models. Faculty observations indicate that most incoming ISU industrial technology students are transfers with few remaining general education requirements. Few are traditional freshmen. ISU's entering industrial technology students tend to be older, with previous work experience, living off campus, commuters, married, and with an established networks of friends. These characteristics prevented use of either of the two most common learning community models: collateral course- based learning communities or residential learning communities.

After reconsidering the possibilities, and with partial funding from the university, the authors began an initiative in 1999 to develop and implement a nonresidential, non- collateral course-based technology learning community model. This Technology Learning Community (TLC) is designed to function as an induction and support activity for freshmen and transfer students in the Department of Industrial Education and Technology (ITEC). The TLC helps entering students maximize their educational experience, regardless of their academic stage, and it systematically begins their professional acculturation within the discipline of industrial technology. TLC participants are grouped into small clusters of four to eight students. Each student cluster works with a peer mentor, an industrial mentor, a graduate assistant, the academic advisor, and industrial technology faculty members. Specific goals of the TLC initiative include (a) orienting freshman and transfer students to the discipline and profession of industrial technology; (b) connecting new students to each other using cooperative learning groups; (c) connecting new students with faculty, upper-class students, and professionals in industrial technology; (d) introducing the variety of professional roles available through an industrial technology degree; and (e) assisting students in developing realistic self-assessments, career goals, and academic goals.

Credit Coursework and Out-of-Class Activities

During their first semester of participation in the TLC, all students take a 1-credit Introduction to Industrial Technology course. TLC students participating in a second semester are able to again participate in a TLC group and may also choose to register for the Introduction to Industrial Technology course again (although only one counts toward graduation requirements). Each semester TLC students also enroll in an appropriate selection of collateral courses to maximize their progress and success in the Industrial Technology program. It should be noted, however, that the selection of collateral courses is not common to all TLC students due to the typically wide variety of previous academic experiences of these students. In any case, full-time students participating in the TLC are expected to enroll in courses each semester that are balanced between departmental courses and the completion of required general education courses.

Out-of-class activities are systematically incorporated as part of the TLC because of their impact on students. Each TLC cluster is assigned an industrial mentor who is an integral member of the TLC. Students initiate and maintain contact with their industrial mentor through phone, on- line, or face-to-face communications. These mentors work with students to help them get a realistic view of the professional life of an industrial technologist. The students submit resumes and portfolios to industrial mentors and receive comments and counseling on the documents. Students are expected to set up and attend at least one industrial tour (independent of any tour taken as part of a course) and at least one social activity of interest to their TLC cluster. TLC members are also introduced to student chapter activities of honorary and professional societies, such as Epsilon Pi Tau, the Society of Manufacturing Engineers, Society of Plastics Engineers, and the American Society of Safety Engineers.

Peer, Faculty, and Industrial Mentors and Graduate Assistants

Peer mentors are a key component to the success of the TLC. The peer mentors have the most direct (i.e., weekly) contact with the TLC participants. Their role is part tutor, part group facilitator, part social director, part ITEC and campus master, and full- time friend. They facilitate all TLC cluster activities and are the first link to the rest of the TLC mentoring team. They are expected to actively participate in the planning and operation of the TLC initiative.

Three faculty members serve as mentors and as secondary resources and advisors for the TLC students and for the peer mentors. They also handle administrative tasks and provide direction and supervision to the TLC graduate assistant. The responsibilities and duties of the faculty mentors include providing long-term strategic direction regarding the TLC initiative; recruiting and selecting peer and industrial mentors for the TLC; designing, developing, and administering learning community assessment and evaluation initiatives; and actively pursuing funding possibilities for TLC activities.

Industrial mentors are a unique component of the TLC. The primary purpose of including industrial mentors in the TLC is to help students understand the relevance of their experiences at ISU to their future success on the job and to communicate a sense of industry's expectations. Industrial mentors help to bridge the gap between students' perceptions of what they need to do to be successful on the job and the expectations of future employers. The responsibilities and duties of the industrial mentors include providing realistic, credible feedback to students in a number of areas (e.g., resumes, portfolios, what employers look for in prospective employees, program of study and course selection, career options) and suggesting appropriate activities for TLC students to enrich their education at ISU.

A graduate assistant handles the day-to-day management and activities of the TLC and serves as the first line of contact and assistance to the peer mentors. Among other things, the graduate assistant provides direct supervision to the peer mentors; assists the peer mentors and the TLC students in accomplishing their goals and objectives; assists in the preparation and presentation of the Introduction to Industrial Technology course; maintains TLC records; and assists faculty with assessment and evaluation components of the TLC.

Assessment

The goal of the assessment process within the TLC initiative is to document student growth in a holistic manner and to evaluate the initiative's performance. To this end, pilot studies using a variety of assessment tools (e.g., The Productivity Environmental Preference Survey (PEPS), a learning styles assessment [Price, 1996]; peer and student evaluations; Technology Literacy Instrument [Dyrenfurth, 1990]; the ACT Work Keys system from American College Testing, Inc. [ACT, 1999]; and ISU's Undergraduate Education Survey [Epperson, Huba, & McFadden, 2000]) have been initiated. Clearly student and TLC assessment is a long-term process. Currently the initiative is in a developmental and benchmarking stage, and during the next academic year it will transition to a more summative assessment. Questions of particular interest to faculty include:

- Did the TLC activities take place as planned? If not, what were the reasons?
- Did the peer mentors, industrial mentors, and faculty-scholars communicate effectively with TLC students and work toward an appropriate supportive environment?
- Did TLC students have the opportunity to engage in inquiry- based activities?
- Was there an appropriate balance of academic and social support?
- To what extent did the TLC students benefit because of their participation in the TLC? Which activities and information were most often incorporated in the TLC program?
- To what extent did TLC students share their acquired knowledge and skills with other

TLC students? Which topics were frequently discussed? Which ones were not?

- To what extent was there an impact on the TLC students? Had they become more (or less) positive about their discipline and departmental choice?
- Did changes occur in the overall program of instruction offered to Industrial Technology students? What were the obstacles to the introduction of changes?

Reflections, Conclusions, and Recommendations

The authors have been imple- menting and evaluating the TLC model for semesters since 1999. During this time, student feedback and faculty reflection yielded the following observations. Through interaction with peer mentors and industrial mentors, TLC participants begin to place their educational experiences in the context of an industrial technologist's role. This interaction aids students in developing awareness of the dimensions of their future professional role and the associated expectations. Through their interaction with industrial mentors, TLC students have continual opportunities to discuss the importance of coursework and receive feedback and positive reinforcement regarding the relevance of academic topics.

Student reactions, both peer mentor and participants, were cool at first. After all, this was something outside of their academic experience. They seemed to be saying: "What is the TLC anyway? What is a learning organization? You mean those professors still have to work at learning? I thought they knew it all already!"

The peer mentors seemed to focus on the process and having fun with the TLC students, while the industrial mentors seemed to be more outcome oriented. Both, however, were uncomfortable with the initial lack of structure for the TLC. They certainly reacted positively as their roles and associated expectations became clearer. Peer mentors discovered what responsibility for others was-especially while facing their own pressures.

The TLC's graduate assistant attributed the students' increased appreciation for the importance of intergroup communication to their weekly peer group meetings. Students also found out that self-awareness came at the price of time. They discovered that they cannot really know where they are regarding any knowledge curve without testing, analysis, and reflection. One setting remembered by the authors was particularly powerful in establishing this. At an informal group meal, about 30 students, peer mentors, industrial mentors, and faculty began reflectively sharing things that had been important to their advancement. Looking around the room, everyone was focused, attentive, and reflecting-no blank or glazed eyes here!

Overall, the authors deemed the experience a positive one. However, the challenges turned out to be far more significant than what was envisioned. Far more time was required, often in surprising directions. For example, getting other faculty colleagues to value what the authors thought to be self- evident and desirable was surprisingly difficult. Similarly, the task of detailing a holistic assessment plan and instrument set has required considerably more time than anticipated.

Significant institutional support was available, but because the TLC did not fit into conventional learning community models, the institution occasionally overlooked TLC activities. The communication requirements, both internal and external, to initiate and sustain the TLC initiative were larger than expected. Effective learning communities clearly demand both joint activity and individually discrete activities done in collaboration.

After completing several semesters with the TLC, the following conclusions can be shared:

- Learning communities can become worthwhile, but they require significant commitment of time and resources beyond those assigned to normal course instruction. However, the responsibility to encourage learning that transcends the traditional bounds of class-based courses will make the investment worthwhile.

- Since suitable holistic measures for assessing the overall development of technology majors have not been located, it is incumbent on the profession to meet this need. To this end, the ACT Work Keys (ACT, 1999) and the Technology Literacy Instrument (Dyrenfurth, 1990) are undergoing evaluation.
- Student response to the TLC seems to be favorable although voiced with the reserve that is typical of today's students.
- The development of a learning community is clearly a long-term effort. The entrenched notion that learning should be packaged primarily into conventional courses delivered by faculty is hard to dislodge. The selling of the concept of "not letting one's coursework interfere with one's learning" is a challenge-but not an insurmountable one.

For readers interested in initiating a learning community of their own, or in enhancing an existing one, the following recommendations are transportable to other settings:

- Get the learning community's overarching goals on paper and then interactively refine them with the active participation of the department faculty, industrial mentors, and peer mentors.
- Lay out the expectations for peer and industrial mentors carefully and explicitly, and then develop a monitoring mechanism that operates on a weekly basis.
- Develop a plan of work that operationalizes each goal with activities planned throughout the duration of the experience (typically a semester). Additionally, it seems important, particularly in the early stages of implementation, to include a structured and shared community time block so that a natural event exists where all parties come together.
- Implement a viable reward system for all participants. Each person (student, mentor, faculty) has to be able to derive satisfaction from his or her participation. This system must transcend "credits"-it must provide other rewards (e.g., psychological) as well. For example, students must perceive value in their activity, mentors must believe they are helping, and such work should be of value when faculty document their teaching for promotion and tenure decisions.
- Faculty and staff should consider the various learning community models described in the literature. More important, they should visit and interact with the staff of existing learning communities. These initiatives are all about people and the sharing of their experience, insights, and, above all, caring. Such dimensions typically do not communicate as well in print as in person.
- Existing introduction/orientation courses and experiences should be evolved into structured learning communities. A learning community integrated into a department's programs in this way has the advantage of being institutionalized and yet it offers the opportunity for the personal interaction and collaborative aspects that are at the heart of learning communities.

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