Bringing Members of Industry into the Teaching Profession

Sean A. Falkowski

University of Dayton

When coming from industry a new faculty member of engineering technology has many challenges. The learning environment is enhanced by the faculty member's experience gained in the engineering field. Examples from industry can be used in the classroom to bring about a feel for the applications necessary in engineering and technology. Also brought by this new faculty member are techniques used in professional practice as well as skills needed to survive in the workplace. But this change of careers can bring new challenges as well. The work to develop a class and look at teaching methods is different than what a person may face outside of academia. Trying to make sense of teaching, scholarship and community service in a university setting can be a daunting task. Selling yourself for promotion and tenure can be challenging. This paper will look at the advantages brought by a faculty member from industry entering the teaching profession and what they will bring to the students. It will also discuss what mindsets need to be altered and obstacles overcome in this career change.

Introduction

One resource that can be used to recruit faculty into engineering technology is industry. A person from an industrial background can bring experience and real case studies into an engineering technology classroom. Students appreciate the ability of theses faculty members to develop current practices and bring them into the classroom, allowing students to gain the latest

knowledge in engineering techniques. These techniques extend from the current technical expertise to engineering ethics and finally to communications in the workplace.

Not having formal teaching education, these new faculty can be at a disadvantage in the classroom. There is a lot to learn about how to teach that was not part of the former employment. These skills can be obtained through various sources in the academic environment.

Benefits of Industrial Experience

The basis of some engineering technology curriculums today is real world examples. What better way to introduce them then to have people who experienced these examples develop the discussions in the classroom. Intimate details of the actual problem as well as discussions about various solutions can be facilitated by someone who actually lived or witnessed the events. Guidance can then be given in how the final solution was developed. The students gain an appreciation of the parameters and variables in the problem as the faculty member describes the problem. The advantage to this process is that there is not a misunderstanding of written words as the problem is described. Students can also ask questions that can be answered even if the problem has not been well defined. Finally students appreciate that this is a real problem and can put a face on it as its being developed in the classroom.

Another benefit is the ability to convey good engineering practices in solving problems. Solving these problems is only a part of teaching engineering technology. The process by which these problems get solved must also be conveyed. This can not always be taught out of a textbook. The process by which engineers go about the solutions to these problems can sometimes best be

explained by one who uses these techniques in practice. They can then convey to the student up to date practices that work in industry today. This information used in industry will strengthen the student's portfolio as well as lend credibility to the faculty member's teachings.

Recently being in the field also gives the faculty member an avenue to go back to industry for these case studies or for part time employment to stay current in the field. Most colleges encourage faculty to seek part time employment through consulting or through summer work. This sharpens the skills of the faculty as well as improves their teamwork and communication skills. A side benefit is the stature of the faculty among students who see them as someone who is applying the knowledge they are trying to obtain.

Faculty from industry also brings skills in communications and dealing with people in the workplace that is not necessarily part of a class. This can be how to handle dealing with engineering problems to how do you communicate a good idea. Also sales presentations that are given to and critiqued by people that were performing this task recently will give invaluable feedback to students ready to enter the workforce. Format of presentation can be given in many communications classes. But conveying what the boss actually wants and how to order the presentation for impact is very important. An example of this is in the University of Dayton's Manufacturing Design class. The final project is presenting a manufacturing plan for a specific product to a fictitious manager. Not only is the technical content taught and graded, but also the ability to sell the idea to a manager. Cost, safety, and ergonomics among other items not developed in the technical aspect are introduced and evaluated. This includes what to include in the presentation and what order to present it in. Not everything required in a technical report is

important to a manager. So having a person teaching the class that gave and received these reports has been very beneficial to the students. They get a perspective in college that usually is reserved for their first project with their new employer.

Challenges

One of the largest challenges for new faculty, especially ones from industry with no teaching experience, is the ability to teach ideas in the classroom. Teaching and training are very different items. A member of industry may have been involved in training at some point, but teaching a semester on a topic can be a daunting task. This involves not telling someone how to do a task, but trying to convey an understanding of a particular subject. In the CNC programming class at the University of Dayton students are taught programming from a textbook. But they are also taught techniques and shortcuts from industry today. These include tool pathing and simple steps to a program that may not be taught to a toolmaker or operator with little or no understanding of engineering practices. Forces involved and the ability to purchase tooling is also developed. This is not simply taught through lecturing and following the textbook. The faculty member works with small groups on individual projects and allows the students to make mistakes as well as find their own preferences through some standard industry practices. A combination of the textbook, design software, and individual time culminates in a final project that has restraints of cycle time and memory content as well as selection of proper fixturing and tooling. This is not always taught in a training class. The design process and the thoughts behind what is supposed to be done is very difficult to convey. The judgement is the difficult part and what a person from industry can bring.

Also there is a sense of freedom in the classroom that is not experienced in industry. It is not always known immediately the fruit of a person's labor like it is in industry. Immediate feedback is rare. This can be very good for a new faculty but it is different and needs to be realized.

A difference in academia versus an industry environment is the application of scholarship and service to the job requirement. For tenure track employees this can be a large part of their portfolio. In industry it is not usually a large part of the promotion process what is performed outside of the confines of the work environment. This change in philosophy can be very confusing to a new faculty member. The key to this process is documenting service activities and looking for ways to increase scholarship activity. This can be performed in a number of ways. A joint activity with fellow faculty is a very nice way to begin. Literature searches and involvement in academic committees can also be of a benefit. At the University of Dayton a Teaching Fellows program is set up to share ideas amongst faculty with limited experience. The ideas shared are what may work in the teaching environment and what may not work. It is encouraged to develop and try new ideas and this forum gives a safe place to share them without risk of being criticized. This entire process of research and publishing is also a daunting task for someone from industry with little experience in this arena. Societies are a very good place to look for publication opportunities.

The promotion and tenure process at first can be very confusing. In industry it is not usually necessary to sell yourself for a promotion. Usually you are competing amongst many other employees and the process has no definite time attached to it. In academia this can be different.

The process itself at the University of Dayton is explained to a new faculty member and they must then complete a series of items for promotion. This must be sold to the committees that evaluate them.

Transition

As a new professor starts to make this transition there are some things a university can adopt to help in this transition. A program in which the professor is placed with more experienced faculty such as the Teaching Fellows Program would help in giving the faculty a source for asking questions in a smaller environment that would breed familiarity. Questions can be asked without the professor being lost for an outlet. The questions would generally be surrounding teaching methods, so a program structured to this end would help.

Universities do not treat industry experience with a lot of attention in the promotion and tenure process. When the faculty member brings this experience, they should receive consideration, similar to if they were coming from another university setting. A formalized way of presenting experience from industry in the promotion and tenure process should be adopted by universities. This can be a document in which you list experience as well as specific talents and job functions from the previous industry. An example of this is a person who used geometric tolerancing in their previous job. This can be listed as a skill set on a standardized from and placed in the promotion and tenure file.

A formalized training program can be adopted by a department specific to the needs of this new faculty member. Most universities have a new professor orientation that helps in the transition

on campus. But items such as syllabi preparation, textbook selection, test developing, project

preparation, etc. can be developed in the department. This will help in the fact that books on the

subject do not take into consideration the trends and habits of the individual university in

question. This will make the new professor more comfortable in this particular setting.

Conclusion

Bringing a faculty member to your college from industry can be very beneficial. The experience

from industry that they bring to the classroom is something that can not be duplicated through a

series of textbooks or videos. Students appreciate the intangibles that may not be part of a

standard curriculum. They also give a certain stature to someone who is known to be current in

their field.

Colleges must understand though that these people have not been trained in education.

Mentoring and training must be set up to guide them through the classroom process. Doing

service activities and scholarship work can be encouraged from the beginning through this

mentoring also. New faculty should find a niche or interest and develop that into activities.

They must also avoid the risk of trying to do too much. Limit the activities especially early in

the teaching to allow time to develop teaching styles.

Bibliography

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Sean Falkowski is an assistant professor of Manufacturing Engineering Technology at the University of Dayton. He recently worked for Delphi Automotive as a manufacturing engineering supervisor and project engineer. He earned a MS in Engineering Management from the University of Dayton and a BSME from GMI Engineering and Management Institute.