

Meeting the Challenges of Technical Communication for Future Workforce Demands

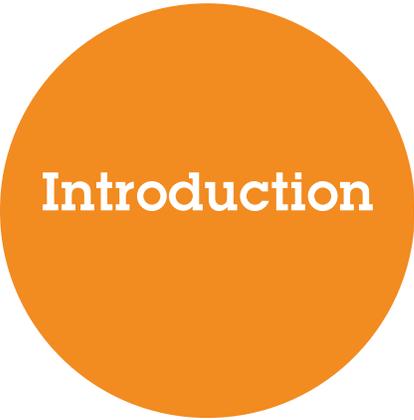
DEVELOPING THE 21ST CENTURY WORKFORCE

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The Association of
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Introduction

Introduction and Need

The ability of students to transition from a student to a professional in the workforce requires technical content skills and technical communication skills. Engineers and technology managers are sometimes criticized for being poor communicators and writers, hence, technical communication is becoming increasingly important for engineering and technology students. Yet, many students do not see the relevance of taking technical communication and writing courses. Therefore, engineering and technology graduates are not adequately prepared to meet industry's need for proficient technical communicators. The Society for Manufacturing Engineers states that being able to communicate technical information is a gap in engineering education programs (Rogers, Stratton, & King, 1999). Sageev and Romanowski (2001) conducted a survey of recent graduates from a technical communication program in the School of Engineering and Applied Sciences at State University of New York at Buffalo and discovered that 64% of engineers' time is spent on some form of communication with 11-20% on written communication and 32% in teaming. This finding has implications for engineering and technology programs preparing students to be effective in communicating technical information beyond just technical content. Additionally, employers agree that technical communication skills are vital for success in the workplace stating that technical communication courses should be required in engineering and technology curriculums.

Technical communication can be defined as interpreting and communicating technical information that is clear and informative to high-tech and low-tech people. Whiteside (2003) asserted that today's technical communicator lacks the needed skills in technical aptitude and multicultural communication including project management, problem solving, operations knowledge, and cultural communication. Technical communication is evolving to include technical communicators who can develop and produce technical information in design teams and advocate continual training to keep their skills up-to-date (Catania & Catania, 2010).

Challenges for Academia and Industry

Whiteside (2003) acknowledged that technical communicators must possess technical aptitude, as well as, the ability to communicate with a global audience. Engineers and technologists are expected to bridge the communication gap between the subject matter expert (SME) and the end user. Whiteside concluded that academia should partner with industry to address these lack of skills. Many engineers and technologists feel comfortable with the technical content aspects of their jobs, but many are uncomfortable with the communication aspects of their job. To address this problem, engineering and technology programs have increased the focus on communication skills like teamwork, management, ethics, and both written and oral communication (Williams, 2002).

Professionals, faculty, and students graduating from engineering and technology programs have differing views of the needed skills for technical communication. Steiner (2011) found students were apprehensive of the writing required in technical communication classes. This apprehension sometimes motivates students to delay enrolling in writing classes, specifically technical writing courses. One of the reasons for this apprehension was that many college students believed that little writing was required in their future careers and were then surprised by the amount of writing in their profession. Students enter the profession thinking that they will use all of their technical content skills, but soon realize that engineering and technology fields require a variety of communication skills like technical communication and collaboration in teams. Most of the writing in these classes tend to focus on lab reports which may not mirror writing found within the profession. In addition, Smith (2003) acknowledged that students do not successfully transfer skills from a writing class to their technical content classes. Engineering and technology graduates need a mix of technical content and technical communication skills. These graduates perceived strengths in their preparation for industry,

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which was consistent with their technical content background and problem solving skills. They perceived their weaknesses were working with multi-level teams, leading, writing, and communicating with others (Martin, Maytham, Case, & Fraser, 2005).

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Writing can be a powerful tool inside and outside of the classroom. Wheeler and McDonald (2000) concede that writing in the engineering and technology classroom allows students to think comprehensively, deepen their understanding of technical topics, and enhance cooperative learning. Additionally, writing can enhance collaboration through peer review. The profession of engineering and technology goes beyond technical writing and includes working in small teams and communicating interpersonally on a daily basis. Individuals in the profession are asked to present their ideas to high-tech and low-tech individuals. Moreover, English composition classes are not enough to prepare students with the ability to write and present technical information with clarity. The technical aptitude of students can be improved by integrating technical communication into engineering and technology courses. Williams (2001) found that when engineering and technology faculty introduce technical communication concepts into their courses students were more prepared for the workforce.

Possible Solutions

The researchers highlight four possible solutions. One solution to increase technical communication in the engineering and technology curriculum is to require a technical communication course to be taught within the department. Consequently, often technical communication courses are offered through the English department. This one course is typically taken at the beginning of an engineering and technology program and is not practiced throughout the curriculum. Whiteside (2003) asserted most technical communication programs originate in English, Communication, Language & Literature, Humanities, Rhetoric or General Studies departments. Few are within the engineering and technology departments. Although many engineering and technology programs require courses like technical writing, report writing, and scientific and technical communication, the courses are taught typically by

English faculty who may focus on grammar, rather than technical content. However, many technical communication courses taught in engineering and technology programs focus on a combination of technical content writing and oral communication (Kedrowicz, Watanabe, Hall & Furse, 2006). Often writing courses that are taken in the English department do not help with technical writing. Brammer (1999) found that many engineering and technology programs have students take an English class and one technical writing class both taught by the English department, as a remedy to help students with their technical writing. He adds that this remedy is not sufficient and a possible solution is to offer technical communication courses within the engineering and technology department instead of outside of it. He believes that faculty need to reclaim the technical writing courses with individuals who speak the engineering and technology language instead of literature.

Another solution is to implement writing across the engineering and technology curriculum. Although this can help technical writing to be incorporated into many content courses, faculty members tend to focus on teaching content for which they are SMEs, rather than teaching students how to write technical documents using technical content. In addition, increasing technical writing in engineering and technology courses prepares students for the type of writing expected in their profession. Despite the many advantages, many faculty members find that increasing the technical writing and communication in their courses is time consuming and they are often disappointed in the students' writing abilities. Also, many faculty members feel that the focus on writing and communication in their courses takes away from the technical content. English and writing faculty are concerned that engineering and technology faculty members may not be skilled in technical communication pedagogy when incorporating technical writing and presentations in their courses (Williams, 2001). Additionally, the extra grading can be seen as a burden.

A third solution is to partner with other departments to accomplish accreditation standards. These partnerships can help with load sharing and balance the technical communication in all four years of the program. Faculty who teach technical communication courses to engineering and technology students should understand the accreditation standards to meet the needs of these students. For example, engineering and technology faculty should partner with technical communication faculty to accomplish the student outcomes needed to fulfill accreditation requirements. Walker (2000) found that in order to help prepare students for the workforce, their university created a writing center in their Electrical & Computer Engineering department. This partnership works well because the faculty doing accreditation see the connection between technical communication and workplace communication. In addition, Kedrowicz, Watanabe, Hall, and Furse (2006) looked at improving technical communication skills by partnering with English and engineering faculty for integrated technical communication classes. The partnership helped students to be active lifelong learners and increase their communication competence.

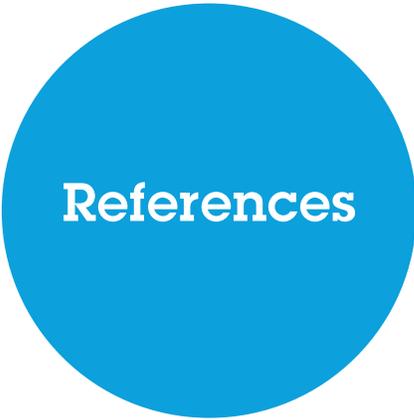
A final solution is to connect academia and industry through technical communication internships. Research has shown that internships are an effective way to help students integrate theory into practice. In addition, Crabtree and Zhang (2009) suggest that internships may lead to quicker employment and the ability to compete in the workforce. Bourelle (2014) piloted a technical communication course with service learning involving an internship. During these internships, students struggled with organizing content and communicating the technical document to high-tech and low-tech audiences. Students had to learn to collaborate. Organizational internship coordinators felt that students lacked the ability to communicate effectively and professionally (integrity and excellence in quality of work), but said that the student experience was beneficial. Although this class was based in the English department, it can be transferred to engineering or technology curriculum.

Recommendations and Further Research

The significance of the proposed paper benefits faculty members, industry personnel and graduates of engineering and technology programs by providing empirical evidence on the need to have proficient technical communicators. Faculty members benefit from an accreditation standpoint and by providing skills to graduates for success in the future workforce. In addition, collaborating with industry personnel prospers organizations with potential employees. Students benefit from being prepared to thrive in their future careers. The importance of technical communication will continue to be recognized in the workplace as essential through the engineering and technology education community. Academia should explore partnering with industry to close the skill gap and prepare graduates for the workplace. In addition, the possible solutions may help to transition students from academia to the workforce. This white paper could lead to a more effective curriculum in technical communication for engineering and technology programs.



Recommendations
and Further
Research



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