

## Challenges Faced by Technical Communication Educators in the Field of ICT- A Systemic Study

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### ABSTRACT

The article examines ways and means of using computers in technical communication classrooms, including the ways in which we address literacy and humanistic issues through our current instruction. Over the next decade and through the next century, we will face three pedagogical challenges as we use computer technology to support our teaching initiatives.

A knowledge-based and globalized society would not be possible without ICTs (Information and Communications Technologies). The 21st century workforce and the institutions that prepare them for it must adapt to as much change as there is in ICT itself. As a global phenomenon, ICT is posed as a major challenge and an opportunity for television education. As well as the issues and potential solutions to their effective integration in TVET, the chapter describes TVET's meaning, philosophy, objectives, types of ICT, and role in TVET.

**Keywords-** challenge, engineering, English teaching, innovation, technical communication, pedagogical challenges, computer technology, computer.

### I. INTRODUCTION

Communication skills are essential for students in all disciplines. Particularly for students in STEM fields, it becomes among the most challenging skills for college students and university students to acquire. Students in STEM programs may have fewer opportunities to write than their counterparts in arts and humanities due to program design, instructional approaches, and assessment methods [1]. The skill of communication is crucial for success in STEM, especially speaking and writing. It gives students a better chance at getting hired and for advancement.

The project-based instruction (PBI) method was used to design, implement, and evaluate a technical writing course for engineering graduate students. Researchers examined literature and industry criteria to examine the increasing demand for engineering students with strong communication skills [1][2]. This section describes why PBI is an effective pedagogy for teaching technical writing to engineering students. There was

discussion about participants, time line, designed units, rationale, and assessment of the holistic course in addition to explaining its design and purpose. It was discussed whether the methods used in the course were effective.

Furthermore, this paper discussed how to implement and assess the PBI method and how to improve curriculum development for this engineering course [3].

During the past forty years, the English Department at Illinois State University has offered a course in technical communication [4][5]. There have been multiple technology classes each semester throughout these years. Now, the program serves the whole University, including public relations, editing, and publishing students preparing for careers in these professions. The program is now available both as a master's degree and as a doctoral degree [5].

Adding to the English Department's graduate curriculum was the course "Teaching Technical Writing" in 1990. Its purpose was twofold:

1. To prepare graduate teaching assistants for teaching technical communication courses that have high student demand and low faculty availability; and,
2. Enhance the academic credentials of graduate students seeking academic careers.

## **II. TECHNICAL COMMUNICATION FOR ENGINEERING STUDENTS**

Since the 1990s, the Accreditation Board for Engineering and Technology (ABET) has recommended that engineering students should be assessed for and acquire technical communication skills. The engineering program and major assessment criteria of ABET consistently rank technical communication highly [6]. As stated in the Criteria for Accrediting Computing Programs 2019-2020, computing engineering students need to be able to "communicate effectively" across various professional contexts. In its Vision for Civil Engineers in 2025 (the Vision), the American Society of Civil Engineers (ASCE) suggests civil engineers by that time should be proficient in talking, listening, writing, math, and visual communications. As much as possible, educators should embed communications knowledge and skills throughout the educational process and enhance them continuously throughout a civil engineer's career in order to achieve the Vision published by ASCE in 2009. The survey of academic, industrial, and early career engineers conducted by Kirkpatrick (2013) determined that interpersonal skills, negotiation skills, conflict management, and innovation were among the weakest attributes of graduate students in engineering [8].

As part of teaching technical communication or graduate writing seminars, instructors had to devise a curriculum that was appropriate for the program outcomes and also select a teaching method that was suitable for the curriculum [5][7]. Incorporating PBI into the design of the curriculum was tentatively chosen by the instructor.

## **III. PEDAGOGICAL RESEARCH IN TECHNICAL COMMUNICATION**

### ***The Origins***

For many years, there has been extensive research in the field of technical communication pedagogy. Technical communication education has been advanced by two professional organizations. Technical communication education was first advanced by the Association of Teachers of Technical Communication in 1973 [8].

Both organizations hold annual meetings because they are still active. In 1974, ATTW published *The Technical Writing Teacher*. *Technical Communication Quarterly* is published by Association for Technical Communication since 1993 [9]. Since 1974, the CPTSC has published conference proceedings;

however, *Programmatic Perspectives* is the organization's first online journal. Several other professional journals have published articles on technical communication in the past. A second journal, *The Journal of Business and Technical Communication*, was founded in 1987 after *The Journal of Technical Writing and Communication* was first published in 1971. *Technical Communication* is the oldest journal in the field, published by the Society for Technical Communication since 1954. These journals have published articles about curriculum and teaching. *The Journal on College Composition and Communication* published periodic articles on technical writing even earlier. The first technical writing article was published in *College Composition and Communication* in 1950 [9].

### ***Development***

Today, English teachers face a number of challenges that require them to use tools that will enable them to be effective and efficient in their work. Here are some strategies that can be used for this purpose. It is crucial in the first instance to organize English teachers within engineering contexts; as a consequence, numerous classroom activities are required [10][11]. As a second step, students must create an optimal classroom scenario, whether they conduct English classes in person or online. Lastly, they must explain exactly how they plan to implement the classroom activities. The teachers are also responsible for developing in their students a system of reflective thinking so that students can reflect on what they experienced in the classroom during the pedagogical activity as well as the reality they face in the university environment, where they are being trained to be engineers [11].

It is reasonable to assume that teachers had access to the majority of scholarly literature on the subject, prior to the field becoming more like an academic discipline. I think it's fair to say that textbooks, at least in mature fields, follow published research rather than leading it, both in terms of subject matter and teaching method [12].

In 1975, Donald H. Cunningham and Herman A. Estrin published *The Teaching of Technical Writing*, a book on pedagogy for technical communication. It was composed of 24 articles, which had previously appeared in books and conference papers dating back to 1960 [14]. The next step was the publication of *Technical and Professional Communication: Teaching in the Two-Year College, the Four-Year College, the Professional School* by Thomas M. Sawyer [13][14]. The majority of the essays in the collection appeared originally as conference papers, and they were all written no earlier than 1976. This book clearly predates the publishing of pedagogical scholarship by technical communication teachers or the discussion of pedagogical scholarship at professional conferences [12].

The move to technical communication in American engineering programs 1850-1950 is evident in several histories of engineering in the United States,

notably Robert Connors' [15] "The Rise of Technical Writing in America." and Teresa Kynell's "Writing in a Milieu of Utility: The Move to Technical Communication in American Engineering Programs 18,50-1950." [16]. This paper studies how pedagogy was involved in the expansion of engineering programs at American universities, resulting in rapid industrialization.

#### **IV. CHALLENGES IN TECHNICAL EDUCATION**

We often recognize that situations like this can lead to misunderstandings, especially when a professor is teaching a foreign language, since the instructions will often be given in a foreign language, increasing the risk of learners not understanding the instructions [16]. The engineering students should also be able to establish the relationship between the new and old knowledge by matching the knowledge to reality. Teacher selection of the materials that will be used in the classroom is suggested as a method for achieving this goal. They should consider the students' ages, their number, and their educational needs and expectations. In this way, it will be possible to put the apprentices' perceptions, experiences, and knowledge in the context of the materials used in the English class in order to convey it during their professional lives, with different relationships between engineering, language, and knowledge [16][17].

Further, by encouraging creativity and imagination among the students, the English teacher facilitates the exploration of both the world of learning a foreign language and the environment offered by it; this enables them to become aware of the various methods of learning a foreign language by participating in the many scenarios they encounter [15].

The materials in the course should also reflect the authentic culture of English, so students from engineering programs will be able to understand the culture of English more deeply. The time for each session to be developed is also crucial in this situation. A L2 curriculum can be completed in as little as 50 hours per semester, which is extremely limited. In addition, the English curriculum is divided up into five levels [18].

#### **V. INTERNATIONALIZATION AND STRATEGIC ALLIANCES**

Businesses looking to expand internationally often develop strategic alliances with firms in countries where they plan to expand. As well as commitment, internationalization is defined by the creation of knowledge and trust. Similarly, other firms seek to expand beyond their borders in order to provide their clients with a wide range of goods and services, as well

as reach new clients abroad. Due to this intra-industry competition, firms are trying to find partners outside of their own industry to form alliances so that they can provide more choices to their consumers and, in turn, meet their expectations of better service or greater variety [18]. Performance and prospects will continue to generate value as long as the venture remains profitable. Universities and other higher education institutions (HEIs) apply the same internationalization strategy for providing more opportunities for international exchange for students and professors (semesters or years abroad; dual-degree programs; professor exchanges) [18].

It is obvious that internationalizing higher education institutions (HEIs) is one of the easiest ways to answer this call [19][20]. The objective is for young people to possess the requisite intercultural skills and qualifications as soon as they are ready for work, so that they can function in a globalized world and enhance their job prospects [21].

In the last 30 years, globalization has been primarily driven by market forces, which has resulted in international trade agreements at the regional and international level progressing at an unprecedented rate, allowing consumers international choice [22]. In order for a global economy to function effectively and to allow citizens to contribute not only to the well-being of their immediate surroundings, but also to the well-being of the world, international human resources with the necessary skills must be provided [22][23]. Therefore, the simplest and most efficient way to achieve this is to internationalize people, that is to say, to provide a person with the opportunity and opportunity to get and receive an "internationalization process". How can this be done? Education seems to be the easiest way to educate everyone since every child should, in theory, go to school [24].

In nations that aspire to greatness, self-sufficiency, political and economic freedom, technical vocational education and training plays a vital role in national development. TVET has become so integral to society, according to Mulemwa (2020) [25] that any nation without it will be excluded from the global village, because of the rapid rate of technological change and the global dependence on its products and processes. There can be no ignoring the fundamental importance of television and video education and training in economic and social development [28]. Television and Video Engineering & Technology (TVET) can also contribute to the expansion of human resources in industries like agriculture, forestry, health, engineering, architecture, and business. In addition to academic skills, ILO and UNESCO (2012) state that schooling should also include workplace skills to boost students' flexibility and productivity, that schools need to provide students with both academic and workplace skills to increase their flexibility and job mobility so that they are able to face challenges both now and in the future [26].

In recent years, TVE has been emphasized in Nigeria mostly because of its importance in helping to reduce unemployment, poverty, and to stimulate the economy. TVE is considered essential to the development of Nigeria. Television and vocational training (TVET) is essential for the development of any country [27][29]. Against this backdrop, Onyemachi, Olaitan, Nwachukwu, Onyemachi and Ekong (2018) argue that the purpose of technical education is to provide students with skills, knowledge, and values found in the workplace and in the workplace environment. When faced with global competition, TVET systems are expected to develop competent workers capable of competing in a dynamic environment and enhancing the country's economy.

As technology advances, TVET is continuing to contribute most to human resource development. The United Nations Educational, Scientific and Cultural Organization (UNESCO) (2019) indicates that TVET includes formal, non-formal, and informal education and training for the workplace [30]. Knowledge and skills are acquired by men, women, and youth at all ages, and in a range of institutional settings and workplaces [28].

## VI. CONCLUSION

As part of the Engineering Faculty's training program, students are exposed to cultural contexts and times that constantly change, so that they can prepare for their lessons by staying informed about contemporary events. The university's educational processes emphasize accepting diversity, tolerance, and fostering peace in order to create a just, cooperative, and equitable society. It is crucial for all participants to communicate with each other and interact in order to create a just society. English teachers need to adapt their pedagogical practices in order to meet the set of demands and needs of a globalized society in order to create new knowledge that is founded on continuous reflection, creativity, and research.

It is also essential that English teachers today have the ability to adapt to the variety of situations found at American universities. Teachers must therefore address different ways of thinking outside traditional thinking to meet the needs of a global society. It is also crucial that major reforms are proposed that aim to change the way foreign language teachers teach, effectively implementing new methods based on the use of media tools. Through these kinds of learning environments, students will see what is happening in the educational context in which they are immersed, as well as how technological advancements and social events are impacting it. With a different learning environment from the one they are in now, students will be able to make their own judgments and reconcile different viewpoints that pertain to social issues within their local

communities, instead of global perspectives.

Professors of English in Colombia must possess the knowledge, methodological and attitudinal concepts that allow them to grasp the changing nature of Colombian society and to make appropriate decisions in unexpected scenarios.

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