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Developing Oral Presentation Competence in Professional Contexts: A Design-Based Collaborative Approach

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ABSTRACT

The need to develop oral presentation skills with reference to students' specialized professional contexts has been well-recognised. Attempts have also been made to develop collaboration between engineering faculty and language teaching professionals. In this paper, we describe an experiment where students were given an opportunity to demonstrate their technical know-howand integrate it with oral presentation skills. The paper discusses specifics of collaboration between the engineering faculty and the language teachers. Specifications for development of a transparent assessment framework have also been elaborated. It is concluded that such design-based approach is more likely to develop skills required of students to perform in competitive communicative environments.

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1. INTRODUCTION

Viewed as 'high structure tasks [1],[2] oral presentations may range from 'careful' style to 'vernacular' [3]. In engineering education, however, attention is focused more on the careful style where a scripted presentation of carefully selected content is expected for a pre-determined audience making use of verbal and visual modes. In such contexts, it is generally expected that presentations are highly structured, aided by writing and other devices and are socially constructed [4],[5].

This project was driven by the 'Design Research' paradigm which has been considered a major shift in educational pedagogy. It uses an iterative process where the participants are well aware of the target; however the process of achieving the target is by trial and error and requires considerable feedback [6]-[8].The paradigm is driven by a goal to make learning experiences longer lasting so as to make them useful beyond the specific conditions of initial classroom learning [9],[10].In such design experiments, the teacher-researchers typically use a complex artifact and then guide and observe the student's interaction with the artifact. Attention is focused on the impact of this interaction on problem solving in other areas. In the specific case of our experiment, students were actively involved in the development of a potato-cutting machine. Their interaction with this artifact was expected to help them adopt a problem-solving approach to develop their oral presentation skills.

Approaches based on design-based research involve problem solving in real-world contexts and examine the effect of these designs on learning processes and learning products [11],[12].Although some creativity is required, a large part of such projects deals with development of a product according to given specifications. An oral presentation may be required to explain the specifications and to justify the choices made in order to arrive at the product with given specifications [13].Since design experiments emphasize

professional contexts, it was necessary to deconstruct the OP competence in terms of its components for the development of the task. Traditionally, OP competence is considered to consist of the verbal, the non-verbal, and the visual. In professional contexts, however, four other components become relevant from the delivery aspects. They are:

- **Professionalism:** The way a presenter manages the technical content of the presentation
- **Practical aspects**: The way a demonstration is planned and executed
- **Ideas**: Presenting the ideas so as to highlight novelty, ingenuity, and creativity
- **Collaborative effort**: Co-operation among team members and integration of skills and abilities.

Figure 1 provides a schematic representation of the way OP competence is viewed in this project.

Figure 1. A Schematic Representation of the Oral Presentation Competence in Professional Contexts

2. RESEARCH METHOD

2.1. Participants

Forty Engineering students participated in this study. The students typically undergo two core courses: a course in engineering innovation and design and a course in English communication skills. Traditionally, these two courses are taught independently. For the purpose of this project, faculty members teaching these two courses collaborated with each other and developed a teaching-learning sequence that was aimed at developing Oral Presentation Competence (OPC) in professional contexts.

2.2. Description of the Collaborative Task

Elaborate instructions on the task were provided to the students. The focus of the instructions was on designing a fully automatic machine system for cutting potatoes. An important portion of the instructions is produced below.

Instructions

The team (a design company) should produce a first sight prototype Chateau Pomme de Terre potato shaping machine. The aim is to design a fully automatic production standard machine system that starts with raw potatoes and finishes with neatly arranged shaped potatoes on a tray. Here are the specifications:

- A Chateau potato production system that includes pre-processing the potatoes into the shape of a cylinder (diameter 40mm and length 60mm)
- Production rate of one 8-sided Chateau potato not exceeding 10seconds to the geometric specification shown below.
- Ability to produce N-sided Chateau potato where, 3<=N<=8 (where N=3,4,5,6,7,or8)

- Reliable. Low maintenance requirement. No bacteria traps.Washable.

Each team was expected to present their design along with oral explanation and demonstration. The Oral Presentation flow consisted of four stages:

1. Product Presentation
2. Product Demonstration (Practical)
3. Interaction with the Audience
4. Debrief

Each team was expected to write a project proposal and submit it a week before the actual presentation. At the product presentation stage, the product was shown to the audience. Features of the product were described using engineering drawings. Students were expected to describe product attributes as well as narrate the challenges faced at the stage of product development. In this part of the OP, cohesiveness of the team in terms of their collaborative effort could be seen by the audience.

At the second stage, a practical demonstration of the product was given by the project team. The emphasis here was on providing concrete evidence regarding the functionality and ability of the machine. Students also used diagrams and drawings to explain the way different parts of the machine function. At this stage, students were expected to develop the ability to be accountable and answerable for their innovations, which is an important part of engineering ethics.

A short audience-interaction session was conducted at the third stage. It was expected that the presenters would be able to handle questions related to the accuracy and efficiency of their product. Once again, the teams were given an opportunity to demonstrate the team spirit and team synergy while answering the questions and responding to the feedback comments.

An important stage after the oral presentations was debriefing. Debriefing has been successfully used as a learning strategy in a variety of settings[14].In our experiment, debriefing provided an opportunity for the students to interact with the board of instructors. The board then provided a comprehensive evaluation where students got to know how they as well as other groups fared. Grades were explained in detail and focus was placed on strengthening the skills further.

2.3. Assessment

Since the OP competence was visualized differently for the purpose of this project (See Figure 1), it was decided to use an evaluation scheme that closely follows the visualized components of OP competence. What was more challenging was to decide on the weight of each component. A mini-conference involving the engineering faculty and the language faculty proved to be useful for this purpose. It was agreed that the professional aspects that are characteristic of an engineering presentation (such as Professionalism, Demonstration, and Ingenuity as well as Creativity) should be given about seventy per cent of weight in the evaluation scheme. Skills that are traditionally viewed as 'Communication Skills' (Verbal and Visual communication, Credence and Confidence, Team work and Collaborative Effort) should be given about 30 per cent of weight [15].The scheme that emerged from this discussion is presented in Table 1.

Table 1. Assessment Components

Professionalism (Technical Aspects)	30%
Demonstration	30%
Ingenuity and Creativity	10%
Verbal Communication	10%
Visual Communication	10%
Credence and Confidence	5%
Collaborative effort	5%

3. RESULTS AND ANALYSIS

To assess the effectiveness of the design-based approach, a survey was administered to check students' perceptions of improvement. Figure 2 represents how students perceived their improvement across the different assessment components at the end of the instructional phase. As was expected, the highest improvement is seen in terms of Collaborative Effort. Total ratings for the 'Excellent' and 'Good' categories taken together amounted to 91%. Since the design-based approach a great deal of problem-solving and collaboration, students seem to find this approach highly rewarding in order to improve their collaboration skills and collaborative effort.

Improvement in terms of *Demonstration skills* (84%) as well as *Ingenuity/Creativity* (83%) seems to follow next. Informal interactions with the students revealed that the assignment provided them an authentic

mode of using their demonstration skills. It was also one of the rare occasions where their ingenuity and creativity were challenged as well as appreciated by the assessors and the audience.It helps students establish an emotional connection with their project as well as with their audience. Second, it includes students as actors rather than passive recipients. This is done by providing the students an insider view of the presentation process. The presentations followed by interaction sessions and debriefingexposes the students the realities of an industry-oriented presentation where the interruptions, disruptions, challenges, miscommunication, and communication failures form an integral part of the communication process.

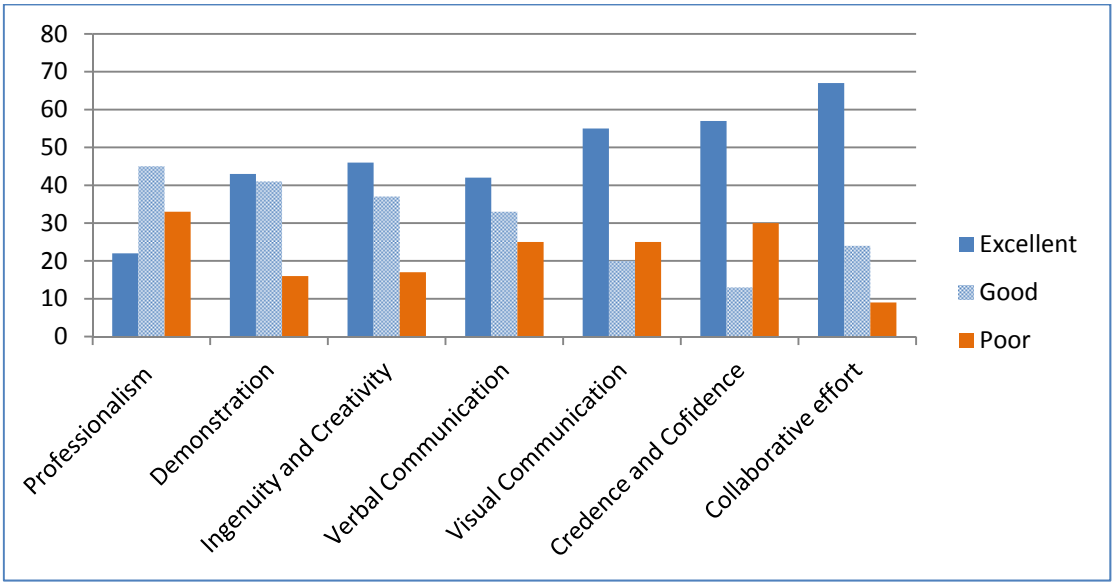

Figure 2. Improvement across the Assessment Components: Students' Perception

Their Verbal and Visual communication saw only moderate (75% each) improvement. However, our interactions with the students indicated that the Design-based approach helps students focus on the elements of their professional self. The activity presented in the paper helps students focus more on their perceptions and on their attribution behaviour. This focus should probably help them adapt their communication behaviour internally. Its manifestation in external overt behaviour may probably take some time.

Finally, a relatively low (70%) improvement was observed in terms of Credence and Confidence. This may be partly due to the fact that in Design-based approaches risk-taking and even meaningful failure are encouraged at all stages of instruction. Some students may avoid facing questions at the end of their presentation since they are afraid of facing the unknown. However, questioning- based classrooms are known to develop thinking skills where questions are used as a tool for teaching and learning. In this project, students had to face audience interactions and debriefing sessions which might have negatively affected confidence of some students. However, the exposure provided in the deign-based approach is seen significant in terms of development in long term. It may be seen from these results that a number of factors related to the student psychology, needs, mindset, and context play an important part in the successful use of Design-based approach. As educators, we need to analyse the context and the setting before deciding to set up an assignment task and formulate the parameters for the collaborative work. It is also clear from this experiment that the patterns of collaborative work vary considerably across student groups. Further research is needed in the area of the formulation of developmental stages in collaborative group work.

4. CONCLUSION

Two particular characterisitcs of this teaching approach were:

- It is design-based, and
- It is collaborative.

The design-based aspects allow the particpants to focus on the enginnering content of the presentation. Although communication skills are emphasised during oreintation and evaluation, the skills are

specifically aimed at successful communication of the technical content. Earlier research has shown that focus on task (rather than on form) helps reduce commuication anxiety and thus leads to improved commuication effciency[16]-[18].Hence, a design-based appraoch is likely to lead to better presetnations. This reduction of anxiety and an improved level of confidence were actually observed during the debriefing stage by the observer panel.

The approach described here is collaborative and inclusive. It relies on the collaboration between the engineering faculty and the communication professionals. It also tries to include aspects such as design, demonstration, and debreifing. Such collaborative and inclusive approach is pedagogically rewarding, although substantially resource-intensive. Other approaches to OP proficiency development are specialised and exclusive [19].Such exclusive approaches may not effectively lead to skill improvement, although institutions seem to prefer them since they are more cost-effective.

Lastly, we believe that a design-based collaborative appraoch allows us to be more industry-focused. Industrial presentations typically involve demonstrations and explanations and place a demand on ingenuity and creativity. Similarly, the post-presentation discussions are considered vitally important in industrial circles. The extensive briefing used in our development cycle can develop this ability optimally. In conclusion, such approach can relate the university education more closely to the community and can achieve a better Work-Learning balance.

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