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Using the Dialogic Communication Model to Teach Students to Write a Report Introduction

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Abstract - This paper presented the use of the dialogic communication model to teach students how to write a report introduction. In the case study presented, the students engaged in discussions and reflections regarding the contextual complexities in the writers' and readers' organizational environments, which helped them adapt their writing to their readers' needs and flow of thought. The thinking process that students go through in making their writing more reader-centered using this model could be a useful springboard to help students adopt the thinking processes of professional engineers.

Index Terms – Contextual complexities, dialogic communication model, reader-centered, recommendation report, quasi-rational, writing.

Undergraduate engineering students' writing is not reader-centered as they do not adapt it to their readers' information needs [1] – [6]. For example, Paretti finds that students write to display their knowledge of the subject rather than to make meaning of that knowledge to their readers because the students have problems moving from academic writing to workplace writing [2]. In academic writing, students write to exhibit their mastery of the knowledge taught to their more knowledgeable lecturers while in workplace writing, writers are writing to less knowledgeable readers who have real information needs and have to make decisions based on the information provided. Cooke and Mings also find that when writing, students tend to offer criticisms of the product rather than highlight the value of the information to their readers [3], possibly because of what Winsor calls the “arhetorical view of knowledge” [4, p. 7], a view emphasizing objectivity in engineering discourse and devaluing the rhetorical and persuasive nature of engineering writing. As such, students do not see writing and reading in these situations as real and having consequences [5], [6].

Rhetorical analysis and problem-based learning have often been used to teach students audience awareness. Research has shown that rhetorical analysis is useful to help students understand how different rhetorical strategies can be used to change readers' perceptions about something or someone [7], fulfill writing requirements in different genres [8], [9] and in different channels [10]. Similarly, problem-based learning encourages students to build a deeper understanding of concepts taught when the learning is scaffolded by expert tutors [11] – [13], consider reader needs when composing [2], develop their interpersonal and pragmatic project-management skills [14] – [16], understand the complexity of decision-making [17] – [18], switch their focus from gathering information to networking information [19], and to write in a collective, professional voice [16].

Although research has shown that rhetorical analysis and problem-based learning are useful in teaching students audience awareness, the teaching of writing itself is often neglected as the teaching of writing happens after the analysis of the text or problem. This situation often disadvantages students because the analysis often takes up so much time in the classroom that teachers often leave students to write

“following the model discussed” or expect students to be able to structure their writing coherently based on what has been discussed in class.

I would like to approach the teaching of technical writing using the dialogic communication model. The main elements of this model are discussion, reflection and adaptation, following Laurillard’s [20] conversational framework. In this case study, students had to develop a workplace problem-solving scenario in groups. As they developed the scenario via discussions, students discovered the contextual complexities affecting both the writers’ and readers’ organizational environments, tested out the logic and flow of their writing with real readers (their group members, peers in the class and teacher), and adapted their writing so that their mind flowed in the same way as their readers’ in relation to the problem discussed. Thus, students’ discoveries and reflections on the contextual complexities of the situation become the subject of discussion for their writing.

This paper first presents the theoretical framework for the dialogic communication model and then proceeds to outline how it was used to teach students to write the introduction section of a recommendation report.

THEORETICAL FRAMEWORK

Communication models have evolved over time. The communication-as-information transfer model views communication as a linear one-way process where information is transferred from a sender to a receiver via a channel [21]. If the intended message is distorted when it reaches the receiver, the distortion is attributed to noise in the communication. This noise could be due to differences in the participants’ mental set such as their beliefs, feelings and attitudes. The communication-as-interaction model is also a linear model but with two additional components: feedback and context [22]. In this model, communication is seen as a two-way process where the sender and receiver provide feedback to each other’s messages because they have a specific and meaningful purpose for doing so (the context of the communication). Aspects of the context that influence communication include the social (nature of the relationships between and among participants), historical (previous communication that have taken place), physical (location, environmental conditions, and time of the communication), psychological (the mood and feelings of the participants) and cultural aspects (the beliefs, values, attitudes, social hierarchies of the participants) of the communication [23].

The transactional model moves away from a linear view of the communication process to a simultaneous one where participants are both speaker and listener at the same time [24]. In this model, communication is seen as a shared responsibility among the participants which involves not just rational (content) but also quasi-rational (relationship) elements [25].

A major move from an interpersonal perspective of communication to a group or organizational perspective can be seen in the communication networks model [26]. Within an organization, workers hold overlapping, informal roles such as liaison (people who link cliques), gatekeeper (people who control access to members and resources) and opinion leader (influential people who interact a lot with others).

These roles provide workers with different levels of influence (usually via dialogue) in different networks.

The dialogic communication model is based on Laurillard's [20] conversational framework, of which the main elements are discussion, reflection and adaptation. In applying her framework to a learning organization where experimentation and system-wide thinking are encouraged [27], Laurillard feels that learning is facilitated if employees participate in discussions and reflection, and are willing to adapt their current concept of things as a result of that participation [28]. Goodall, Goodall and Schiefelbein [29] agree that discussions, reflections and adaptation are very important in communication as they are the main elements that differentiate phatic communication from mindful communication. In their communication continuum, phatic communication consists of routine, ritualized social talk and is more akin to mindless communication. Dialogue, which is on the other end of the continuum, is mindful communication and requires

the participants to analyze communication situations, think actively about possible communication choices available, adapt the message to inform, amuse, persuade or influence the listener or reader and evaluate the feedback received as an indication of how successful they were in accomplishing their purpose. [29, p. 46].

The dialogic communication model can also be applied in the teaching of technical writing. This model could be a useful springboard to help students adopt the thinking processes of professional engineers as mindful discussions with their readers (peers and teacher) about the contextual complexities in the writers' and readers' organizational environments provide students with the opportunity to discover both the rational and quasi-rational factors affecting decision-making in the workplace and help them to develop their identity as professional engineers [30] – [32].

METHOD

Technical Communication is a core subject taught to second-year engineering undergraduates. The recommendation report is the first of three assignments, and is taught over a period of three tutorials. In each tutorial, I explained the relevant rhetorical principles and provided sample contextual problems to the students. After the explanation, the students engaged in discussions with their group members, class and/or me.

This paper describes how the dialogic communication model was used to teach students to write the introduction section of a recommendation report. The recommendation report is often taught in technical communication courses [17], [33]. This paper only presents the application of the model in the introduction section of the report as different fields of engineering require different information elements in their recommendation reports and are organized differently (see examples at [34]). However, all recommendation reports, regardless of their field, have two similar information elements for the introduction of the report: the background and objective. In the background, students have to identify a problem or demand that gave rise to the need to write the report. Based on the problem or demand, students need to identify the

objective of their recommendation. The scope of the report is an optional information element depending on the engineering field. Many technical writing courses however, include the scope as an information element in the introduction [17], [33], [35] and this study does likewise.

THE INSTRUCTIONAL FRAMEWORK

Providing an Overview on what is Technical Writing The focus in the first tutorial was to help students understand what technical writing and audience analysis was. I introduced them to the communication spectrum which differentiated creative and academic writing from technical writing in terms of purpose, genre and the way texts are read [36]. I highlighted that technical writing is text that is read as needed, where needed, to solve problems and to gain specific data. I also introduced them to the information elements for the recommendation, research and experimental reports as listed by Finklestein [37] as they would be writing these reports in their second, third and fourth years of study respectively. Based on the differences in the information elements for each report, I discussed with the class who could be the readers for the three reports and their respective information needs. I then briefed them on their recommendation report assignment and showed them past years' report topics to provide them with an idea about topics they could write on for their own report.

Writing the Objective of the Report The students chose their own group members (five to a group) and proceeded to find a topic for their group. In order to help them focus their search in the Internet, they were given the following formula which represents the objective of their report. The formula was:
The objective of this report was to compare (product or process A) and (product or process B) to determine (what's the purpose for the comparison) [17].

I highlighted that they had to decide on a purpose that could make a significant difference to a company for example, savings or improvements in efficiency of about 20% - 30% rather than incremental improvements of 1 – 2% as it would not justify the resources (manpower, materials and time) used to write a recommendation report and ultimately might not be important enough to be read by the readers identified.

Determining the Participants of the Communication After deciding on the objective of the report, the students had to determine the participants in their communication (their role as writers and their readers'/client's role). I explained that recommendation reports could be written to solve problems in the writer's company (internal reports) or client's company (external reports). I discussed with the class possible circumstances for the report to be initiated by them or their client and how an internal report and an external report differed in terms of organization. Generally, internal reports would require less explanation to establish common ground as compared to external reports as the writer and reader work in the same company.

An example was given about light bulbs. The students were asked what type of readers would want to read about light bulbs and possible reasons as to why these readers would want to know about light bulbs. The students would usually

identify the reader as the estate department in the university and the most significant reason for their concern was to save cost. I highlighted that they could also write to the National Environmental Agency (NEA) regarding the light bulbs used in the parks (too dim) or the Land Transport Authority (LTA) regarding the light bulbs used in traffic lights (low visibility/colour contrast). In order to consolidate their learning, I asked them how they would write the objectives for these three scenarios. The objectives were written as:

The objective of this report was to compare light bulb A and B to determine which light bulb would

- 1) be more cost-saving (readers are from the estate department in the university)
- 2) ensure brighter lighting in the parks (readers are from the NEA)
- 3) improve the colour contrast in traffic lights (readers are from the LTA)

I highlighted that these three objectives reflected that the significant problem they wanted to solve would differ depending on who their readers were.

The students were then encouraged to develop a problem-based scenario based on the objective of their report and the writer and reader roles they have identified.

Determining the Context of the Communication In the second tutorial, the students did a short presentation on the scenarios they have developed. In the presentations, the students usually mentioned that they would write to the Chief Technology Officer in the client's company and take on the role of Sales Manager or Technical Manager. In addition, the objectives of their report showed that the students usually focused on the cost-effective or environmental-friendly aspects of the problem. The students explained that the reason was because these problems had significant effects on a company's operations or product. Their scenario however was underdeveloped, often just about two sentences long. I then proceeded to teach them how to develop their scenario based on their analysis of the social, cultural, historical, psychological and physical aspects of the writer's and client's organizational contexts.

I discussed the following scenario with the students, prompting them as to what were the implications for each aspect of the context. In the scenario, a student wrote an email to his tutor requesting an extension to the deadline for his assignment. In his email, he also asked the tutor to go through his assignment for him in order to highlight to him the mistakes in his assignment (there was no provision for drafts in the assignment). In terms of social context, the participants had a teacher-student relationship. In terms of historical context, the student had missed the deadline for his assignment and thus would have his assignment penalized in terms of marks. The student was now writing to his tutor to request an extension and also for the tutor to go through his assignment for him.

In terms of the psychological context of the participants, the tutor might not take kindly to his request for an extension unless he had valid reasons to support his request. The student might also be desperate to get the extension as he did not want to be penalized in terms of marks. In terms of cultural context, the student's request for the tutor to go through the assignment for him rather than with him

might not support the beliefs and values the tutor had regarding the teaching-learning process. In terms of physical context, the student's use of email as the channel for his communication might not be appropriate because emails do not provide opportunities for immediate feedback or clarification, thus increasing the chances for misunderstandings to occur.

After this exercise, the students were asked to discuss the context for their own report and improve on the scenario they have presented earlier based on their context analysis. In terms of social context, the students had to take on their role in the company and think of appropriate ways to approach their clients regarding their product. Knowledge on the client's values, beliefs and attitudes (cultural context) would also help them understand the client's psychological mood. In developing the historical context, the students needed to elaborate on the situation, highlighting the problems with the product or changes in market trends that prompted the need for the product. They also needed to show that they were objective in their recommendation by identifying alternative products that might serve the client's purpose and reasons why these alternatives might not be the best solution as compared to their product. I also reminded the students about the physical context of their communication. They were not writing as undergraduates but as representatives of a company [4]. Thus, they needed to follow the conventions of a formal technical report.

Organizing the Background Deductively Once the students have conceptually grasped the objective of the report and the contextual information which triggered the writing of the report, I modeled to them how to use the deductive organization to structure the flow of their writing so that the information in their background section would lead on to the objective of their report. The students were first given two examples to help them understand this deductive organization. In the first example, the students were given an objective and asked to fill in the blanks (underlined below) in the background section (Fig. 1). Their answers in the blanks have to be in line with the given objective.

[Insert Fig. 1 about here]

In the second example (Fig. 2), the focus was to highlight to the students that they should write the background section with the objective of the report as their target. In other words, the background section starts with a broad statement and must lead on to the objective of their report. In Figure 2, the background starts with a broad statement of a problem that is the use of wires and cables to transfer electricity in the campus. This broad statement was narrowed down to stating specific problems that occurred with the use of wires and cables to transfer electricity. Next, the students had to establish options available to solve the problems specified. The last step was to propose a solution to the problem, a statement which is similar to that of the objective of the report.

[Insert Fig. 2 about here]

After going through these two examples, the students were asked to outline the background for their own report. Although the outlines in Figures 1 and 2 look like a template, the students went through intensive discussions to arrive at the content for the outline. This is because they often discover that changes in one part of the outline would require revisions in other parts of the outline so as to maintain a consistent story in the background and objective sections and which meet their client's needs. Thus, the students are reminded to be open to changes in their outline during their discussions and revisions.

Determining the Scope of the Report The students then proceeded to establish the scope of their report. The scope or criteria for their comparison could be compiled from the websites that promoted or reviewed the products recommended. The students then chose criteria which were relevant to their client's needs as identified in the background of the report and ranked them in terms of importance to those needs. An example is shown here:

This report compared Red Hat Enterprise Linux and Microsoft Windows as operating systems (OS) in terms of cost, security, performance, user-friendliness and technical support to determine which operating system was a better option for Bingtel Corp.

The students then proceeded to give a short presentation on the objective, background and scope of their report to the class, after which they answered questions from the class and me. The students were then asked to write the first draft of their introduction and bring it to class next week.

Writing the Introduction of the Report In the third tutorial, I gave them feedback on their first draft. An example of the first (Fig. 3) and second drafts (Fig. 4) of the introduction of one group's report is shown below.

[Insert Fig. 3 about here]

In the first draft, the students had a clear deductive organization. The students identified that the problem affecting the profit margin of the company was the high cost of licensing the company's computer operating system. They then compared the alternative operating systems in the market, that is, UNIX, Mac OS X, Solaris and Red Hat Enterprise Linux (Red Hat). The students also found cases where the use of Red Hat helped these companies to greatly reduce their licensing cost. However, they seem to be presenting some findings of their comparison and concluding that Red Hat was the best option for the company in terms of cost-saving in the background section. I clarified that the purpose of the background section was to highlight to the client that they understood and empathized with their client's situation and to state explicitly the benefits to their client's operations if the client accepted their recommendation. Thus, any findings for the report should be presented in the findings section and not in the background section. These lapses were rectified in their second draft (in bold).

[Insert Fig. 4 about here]

In the second draft, the students included an explanation about their client company's operations and how their client could benefit from adopting the recommendation proposed. They explained that Bingtel was a multinational corporation with many branches and offices all over the world using an extensive range of computers and thus incurring a very high licensing fee for all its computers. They further identified the alternative options available in the market and highlighted two major benefits of Red Hat over other operating systems. They also highlighted the cost-savings enjoyed by two other multinational companies to endorse their recommendation. Thus, the second draft was more persuasive as they managed to highlight the benefits of their product to their client and made it obvious that they had engaged in a discussion with their client as part of the report preparation.

ASSESSING STUDENT USE OF THE DIALOGIC COMMUNICATION MODEL

Teachers could use the following description to assess the students' use of the dialogic communication model for the report introduction. The following description identifies the information elements that a good student sample should have.

Background of the Report In terms of the social context, students should be able to state by implication the roles played by the readers (client) and writers in their respective companies. In terms of the psychological and cultural contexts, the explanation should be convincing and persuasive in nature, appropriate to the client's attitudes and beliefs with regard to the issue. In terms of the historical context, a clear explanation should be given about the scenario in the client's company from the client's perspective and how the company could benefit by accepting the recommendation proposed. Students should be able to point out the salient benefits of the recommendation proposed taking into account the alternative solutions available in the market. Students should also acknowledge the client's possible misgivings about the recommendation proposed especially if the product or process proposed is new. Thus, they should cite cases (if available) where the product or process recommended have been used successfully. In terms of the physical context, the report should follow the conventions of a formal technical report.

The organization for the background section should be deductive in nature and lead on to the objective of the report.

Objective of the Report A specific statement of the objective of the report should flow from the situation previously elaborated on in the background section. The objective should not only state what products or processes are being compared but also the reason(s) for the comparison. This reason(s) should be in line with the salient points presented in the background of the report.

Scope of the Report Students must identify the criteria to compare the products or processes in the scope of the report. The ranking of the criteria should be in line with the salient points stated in the background of the report.

BENEFITS TO THE STUDENTS

In the course of interacting with my students during the tutorials, I find that my students appreciated the use of the dialogic communication model to teach them how to write the introduction of the report. This was because they could immerse themselves in their future professional role as engineers; discuss, debate and analyze the contextual implications of their scenario as they developed the scenario; gain insights on the rational and the quasi-rational aspects of their readers, and lastly use knowledge gained from the prior discussions to write an informed introduction, knowing with confidence that they have aligned their writing to their readers' flow of thought and addressed their readers' information needs. In addition, the students were able to establish the criteria to compare the products or processes in a meaningful manner. As they could understand the contextual complexities that governed the readers' decision-making process, they could rank the criteria in order of relevance to their readers' needs more meaningfully.

BENEFITS TO THE TEACHER

The use of the dialogic communication model provided the students with an engaging environment to learn about the logical and contextual complexities involved in report writing. This environment increased the students' motivation to work on the report even though it required a lot of work. In addition, workplace scenarios change all the time. Therefore, it is important to teach students the thinking processes of professional engineers rather than just to focus on the product (the report) alone. If students can adopt these advanced thinking processes, they would become critical learners who are able to transfer these thinking skills to other situations in their studies or workplace.

CONCLUSION

This paper presented the use of the dialogic communication model to teach students how to write the introduction section of a recommendation report. The main elements of the model are discussion, reflection and adaptation. In the case study presented, the students worked in groups to solve workplace scenarios which they researched and developed aided by dialogic activities. Having engaged in discussions with their readers, the students could adapt their writing more easily to their readers' needs and flow of thought. The thinking process that students go through in making their writing more reader-centered using this model could be a useful springboard to help students adopt the thinking processes of professional engineers even when they are still undergraduates.

APPENDICES

Objective

- Our objective is to compare the incandescent and Light Emitting Diode (LED) for use in traffic light bulbs to determine the light bulb that offers better clarity and cost efficiency.

Background

- Currently, traffic lights use incandescent light bulbs
- Problems: most of the power consumed by this bulb is wasted in producing infra red heat rather than light leading to high cost; poor colour contrast between the orange and red colours in the traffic lights leading to an increase in accident rate due to poor visibility
- Many countries have replaced the incandescent light bulb with LED light bulbs – lower power consumption, higher cost efficiency; better clarity, decrease in accident rate
- Is it feasible to use LED light bulbs for traffic lights in our country?

Fig. 1. Filling in the blanks in the background section in line with the objective of the report.

Objective

- Our objective was to compare radio wave, electromagnetic induction resonance and laser to determine the best wireless electricity transfer method to be used in a university campus environment.

Background

- Currently, the university is using wires and cables to transfer electricity
- Problems: overheating of wires, insufficient power plugs, messy use of cables
- Options available are: radio wave, electromagnetic induction resonance and laser
- Which is the best method for wireless electricity transfer in the university?

Fig. 2. Using the objective of the report to structure the background of the report.

Background

High cost of licensing Windows operating system (OS) led companies to seek for a cheaper alternative. There are many OS alternatives in the market for business customers to replace Windows, such as UNIX, Mac OS X, Solaris and Red Hat Enterprise Linux. Among all these alternatives, Red Hat Enterprise Linux stands out to be the best OS to replace Windows. The problems of other OS are listed below:

Table 1: Operating System Alternatives with Related Problems.

OS alternatives	Problems
UNIX	Different processor environment making it difficult for conversion from Windows. Costs about 45-80% more compare to Linux.
Mac OS X	Inability to run on non Apple computers forces companies to replace all computers.
Solaris	Different processor environment making it difficult for conversion from Windows. Costs about 80% more compare to Linux.

As the best alternative, Red Hat costs much lesser in total ownership cost compared to Windows with other benefits that would be discussed later. A study by NetProject claims that there is a noteworthy cost reduction of up to 65% when using Linux for computer desktop. In addition, Robert Francis Group reports that Linux only cost 40% of Windows. These reports showed that Red Hat is the best alternative to replace Windows.

Report shows that big companies, which used Red Hat Linux, achieved significant cost savings on licensing fees. Some of the cases:

- a. Timzon.com, a giant online retailer company, saved \$17 million quarterly after switching to Linux.
- b. Intel's decision to convert to Linux cut cost by up to \$200 million.

Hence, it is clear that Red Hat Linux reduced cost of licensing fees.

Hence, evidences support that Red Hat reduces cost significantly.

Another study shows that Red Hat is a better OS than Windows when it comes to cost. Forrester Research, Inc surveyed 85 companies, which use open source software, and 88% of respondents experience or expect to experience low acquisition cost. In addition, 77% get low total ownership cost. The study strengthens the claim that Red Hat helps companies to reduce costs.

Objective

This report compares Red Hat and Microsoft Windows as operating systems to determine which is a better option for Bingtel Corp.

Scope

The comparison between the two OS is made in terms of cost, security, performance, user-friendliness and technical support.

Fig. 3. First draft of one group's introduction of the report.

1.1 Background

The problem of high licensing fee of operating system (OS), particularly Microsoft Windows, for companies has been in the spotlight in recent years. It is essential for most companies to purchase computers with Microsoft Windows to improve productivity. In 2007-2008, AMR Research found that, on average, large companies spent more than a million of dollars to license Microsoft Windows. **As a multinational corporation, Bingtel Corp. has many branches and offices all over the world, which require the extensive use of computers. It spends a huge sum of money to acquire licenses of Microsoft Windows for computers. In order to improve cost efficiency, one of the ways is to seek for an alternative and low-cost OS.** There are many OS alternatives in the market for business customers to replace Windows, such as UNIX, Mac OS X, Solaris and Red Hat Enterprise Linux. Among all these alternatives, Red Hat stands out to be the best OS to replace Windows. **The other OS alternatives pose problems when compared to Red Hat. Firstly, these OS alternatives cost 40-80% more than Red Hat. Secondly, unlike Red Hat, proprietary nature of these OS alternatives requires companies to replace all the computers in order to use that particular OS.** It is recommended for Bingtel Corp. to use Red Hat for their preferred OS as some big companies had enjoyed saving and increased cost of efficiency after switching to Red Hat. Timzon.com, a giant online retailer company, saved \$17 million quarterly after switching to Linux. Hintel's decision to convert to Linux cut cost by up to \$200 million.

1.2 Objective

This report compares Red Hat Enterprise Linux and Microsoft Windows as operating systems (OS) to determine which operating system is a better option for Bingtel Corp.

1.3 Scope

The comparison between the two OS is made in terms of cost, security, performance, user-friendliness and technical support.

Fig. 4. Second draft of one group's introduction of the report.

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