

# **Methodology in Seeking Stakeholder Perceptions of Effective Technical Oral Presentations: An Exploratory Pilot Study**

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*Engineering communication studies indicate the importance of oral presentations as an indispensable component of workplace oral communication activities; however, since there is limited literature regarding stakeholder perceptions of effective presentation skills and attributes in technical oral presentations or final year engineering project presentations, the authors conducted a mixed method to seek the perceptions of selected members of the academic and professional engineering community involved in technical oral presentations regarding effective presentation skills and attributes required in these technical oral presentations. The paper describes the quantitative and qualitative research methods employed to seek participant feedback involved in the study. Key Words: Technical Oral Presentation, Communication Skills, Academic Community, Professional Engineering Community, and Research Methodology*

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## **Introduction**

Research, defined as “an organized, systematic, data-based, critical, objective, scientific inquiry or investigation into a specific problem, undertaken with the purpose of finding answers or solutions to a definite inquiry” (Sekaran, 2003, p. 5), requires the use of a specific methodology (or methodologies) to meet a study’s objective. This paper reviews the mixed methodology utilized in this study to elicit feedback from selected respondents on presentation skills and attributes required in a communicative event (the technical oral presentation). Technical oral presentation is “a prepared formal presentation on any topic such as communication, scientific, engineering, technological, business, regulatory, legal, managerial, or social scientific information topics to a non-expert audience” (DiSanza & Legge, 2002, p. 198).

An effective technical oral presentation includes the presenter’s mastery and skill in “technical content, organization, presentation criteria and visual/graphics” and practice of the “group criteria” element (Pappas & Hendricks, 2000, p. 13). The “group criteria” element refers to the speaker’s ability to deliver content matter effectively as a team member. The speaker must be able “to synthesize reading material, grasp a consistent

level of detail on the subject matter and possess overall group dynamics” (Pappas & Hendricks, p. 13). In other words, he or she must be able to work and contribute effectively as a team member.

Hence, an effective presenter is one who is able to “articulate communication and presentation skills in his professional workplace, environment and future development” (Engineering Professional Council, 2001, p. 2). The importance for engineers to communicate effectively and be equipped with communication skill is emphasized in other engineering communication studies (Dannels, 2002; Nguyen, 1998; Patil, 2005; Patil, Nair, & Codner, 2008; Schnell, 2006). Recent headlines continue to express concern over graduates’ unemployment and lack of communication skills (Bernama, 2010; Tan, 2008; Tay, 2008). In addition, communication skill is also recognized as an essential learner outcome by the Engineering Criteria (EC) 2000 of the Accreditation Board of Engineering and Technology (ABET), a leading accreditation organization in the world. One of the EC outcomes is that engineers of the 21st century need to “demonstrate effective engineering communication skills” (Hovde, 2005, p. 1). Despite the importance of this communication skill requirement, there is limited research available on the perception of stakeholders involved in workplace communication events such as technical oral presentations.

Stakeholder perceptions on effective presenter skills and attributes needs to be properly explored so that effective teaching, learning and development of communication skills in engineering curriculum programs can be further enhanced and developed by curriculum specialists and developers. In addition, assessing observables (behavior) in oral communication activities is challenging and complex because “what constitutes effective communication in one setting may be ineffective in another” (Schirmer, Mauksch, Lang, Marvel, Zoppi, Epstein, et al., 2005, p. 185). The global concern for excellent communication skills propelled the researchers to conduct the present study to identify the presentation and communication skills requirements of various stakeholders involved in technical oral presentations to lessen the “academia-practitioner competency divide” (Dunbar, Brooks, & Miller, 2006; Thomas, 2007; Ziegler, 2007).

For the purpose of this study, academic community refers to final year engineering students, engineering lecturers and non-engineering lecturers of the university. The professional engineering community includes engineering professionals or specialists working in the engineering industry. The findings provide feedback on perceptions of effective presentation and communication skills of participants who are involved directly or indirectly in technical oral presentations.

In this study, a mixed method approach was employed to obtain quantitative and qualitative data from selected participants using a set of questionnaires and conducting semi-structured interviews. The Statistical Package for Social Sciences (SPSS) was used to analyse the quantitative data listed in the survey questionnaire. Cronbach alpha values determined the reliability and validity of the items tested in the questionnaire. Quantitative feedback by means of a developed questionnaire provides reliability and validity to the items in a questionnaire via reliability tests such as the “internal reliability test” (Creswell, 2008, p. 170).

Qualitative data provides interpretations of “lived experiences of the participants” involved in the study (Creswell, 2008, p. 567). In this study, clarification and interpretations of what constitutes effective communication skills are elicited from

selected participants of the academic and engineering professional community. Interpretations provided by the participants provide the researchers with various themes that emerge from the qualitative data (Creswell, 2008, p. 269).

The mixed method research design is an appropriate research approach “for collecting, analyzing, and ‘mixing’ both quantitative and qualitative research and methods in a single study to understand a research problem” (Creswell & Plano Clark, 2007 as cited in Creswell, 2008, p. 552). Although the mixed method approach is considered to be “time consuming and requiring extensive data collection and analysis” (Bryman, 1988 as cited in Creswell, 2008, p. 552), the benefit of “merging, integrating, linking or embedding” of both types data provides “a better understanding of a research problem” rather than either type of research method by itself (Creswell, 2008, p. 552).

As noted by Miles and Huberman (1994, p. 42) and cited by Creswell (2008, p. 552), “when one combines quantitative and qualitative data, one gets a very powerful mix” where “one type of research (qualitative or quantitative) is not enough to address the research problem or answer the research questions” (Creswell, 2008, p. 552). A mixed method is appropriate when “more data is needed to extend, elaborate on, or explain the first type of data collected” (Creswell, 2008, p. 552). A researcher may first “want to explore the data qualitatively and to develop an instrument... or follow up a quantitative study with a qualitative one to obtain more specific details than can be gained from the results of statistical tests” (Creswell, 2008, p. 552).

The mixed method design was utilized for the present study as the researchers wanted to corroborate quantitative findings from a survey and obtain “actual words of people in the study” for “more detailed, specific information than can be gained from the results of statistical tests” (Creswell, 2008, p. 552). The type of mixed method design used in this study is the explanatory design method which will be explained in the methodology section.

### **Literature Review**

This exploratory study looks into respondents’ perceptions of effective presentation skills and attributes in technical oral presentations. A mixed method is employed to elicit quantitative and qualitative feedback from selected members of the academic and professional engineering community.

Mixed method implies “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). The assumption put forth in support of a mixed method is that the use of both the quantitative and qualitative methods provides “a better understanding of the research problem and questions than either method by itself” (Creswell, 2008, p. 552). Literature support for a mixed method approach indicates that “the goal of the mixed method is not to replace either quantitative or qualitative approach but rather draw from the strengths and minimize the weaknesses of both in single research studies and across studies” (Johnson & Onwuegbuzie, p. 15).

Quantitative research enables the researcher to “establish the overall tendency of responses from individuals and note how this tendency varies among people” (Creswell, 2008, p. 51). One of the strengths cited for quantitative research is its usefulness in

“making generalizations about populations” (Johnson & Christensen, 2004, p. 412). However, quantitative research is limited in “exploring a new phenomena or documenting internal perspectives and personal meanings of a phenomena in the respondents’ lives” (Johnson & Christensen, p. 412). In other words, quantitative data provides generalizations of a sample population but lacks the “qualitative interpretation” of individual respondents involved in a study. Qualitative interpretation refers to “the data collection of respondents’ experiences, attitudes, and knowledge of a certain phenomena via researcher enquiry through interviews, observations, diaries, journals and other forms of non-numeric data analysis” (Creswell, 2003, p. 17).

Qualitative research allows the researcher to “listen to the views of participants” and obtain “a detailed understanding of the phenomenon” (Creswell, 2008, p. 51). However, quantitative proponents argue over the reliability and validity of data obtained from the “naturalistic inquiry or constructivist approach” used in qualitative research due to “researcher biasness” or “ethical issues” when collecting and interpreting data (Creswell, 2008, p. 240).

There are various types of mixed method design available for researchers to utilize strategically for a study. Most mixed methods designs commonly used in educational research include “a triangulation of mixed method design, embedded mixed method design, explanatory mixed method design or exploratory mixed method design” (see Appendix 1: Types of Mixed Methods Designs).

At the same time, Johnson and Onwuegbuzie (2004) state that the mixed method is not without its weaknesses. The nature of the research may pose difficulty for a single researcher to carry out both quantitative and qualitative research if two approaches are expected to be used concurrently. In this case, Johnson and Onwuegbuzie mention that a research team may be required for conducting a mixed method approach. The mixed method may require more time and be more expensive as a team maybe involved in the study (Johnson & Onwuegbuzie).

Despite the constraints involved in the mixed method, several studies have subscribed to such a methodology which include Kielhofner’s (2006) *Research in Occupational Therapy for Enhancing Practice*, Goldenberg, Callimore, and Reese’s (2005) *Discovering Successful Pathways in Children's Development: New Methods in the Study of Childhood and Family Life*, and White’s (2007) *Using Mixed Method and Quantitative Research Methodologies to Advise Business Executives*. These studies incorporated the use of quantitative or qualitative research methods at various stages of the study when investigating issues on perceptions, behaviour, and attitudes of specific communities of practice. This implies that in a mixed method approach, various types of mixed method research design can be employed by the researchers to meet the objective of the study. Every research tool used in both quantitative and qualitative research has their own strengths and weaknesses as “no single method is without weakness or bias” (Besculides, Zaveri, Farris, & Will, 2006, p. 2). It remains the prerogative of the researcher to decide the best methodology to befit the objective of a study. In a nutshell, the methodologies selected at various stages of the study are aimed at eliciting relevant feedback required to meet the research objectives.

## **Methodology**

The type of mixed method used in this study is the explanatory design method (called a two-phase model) as the design consists of collecting data sequentially to provide an overall picture of the research problem (Creswell, 2008, p. 560). This research utilized the case study approach to seek in-depth data from the participants involved. Case study refers to an “in-depth exploration of a program, an event, an activity, a process, or one or more individuals” (Creswell, 2003, p. 15). The case(s) are bounded by time and activity and researchers collect detailed information using a variety of data collection procedures over a sustained period of time (Stake, 1995 as cited by Creswell, 2003, p. 15).

This study was bounded by its focus on the technical oral presentation, a single communicative task, in an institution of higher learning located in Perak Darul Ridzuan, Malaysia. The respondents chosen are participants of a technical oral presentation from the technical university and a selected Multinational Corporation (MNC) in Kuala Lumpur, Malaysia. This organization was chosen because the majority of the engineering students were prospective future employees of this organization. In addition, employees of the organization were directly involved as external examiners or assessors for technical oral presentations.

### **Initial Stage of Data Collection**

In the initial data collection stage, survey questionnaires were distributed to 130 final year engineering students. Surveys are useful strategies of quantitative inquiry (Creswell, 2003, p. 14) of “attitudes, opinions, behaviors or characteristics of a population” (Creswell, 2008, p. 647). Such data allows researchers to “generalize or make claims about a population” or “build/test theories that explain a population” (Creswell, 2008, p. 214). In the survey conducted with the 130 final year engineering students, several factors of importance were identified and perceived as essential presentation and communication skills required in technical oral presentations (Bhattacharyya, Sivapalan, & Idrus, 2007).

The quantitative feedback from the survey questionnaire spurred the researchers on to investigate the qualitative feedback and perceptions of effective technical oral presentation requirements from a broader spectrum of stakeholders involved in technical oral presentations. Following the survey, the researchers decided to seek qualitative feedback among stakeholders of the academic and professional engineering community who were directly or indirectly involved in technical oral presentations.

### **Second Stage of Data Collection**

In the second stage of the study, interviews were conducted with respondents from the academic and professional engineering community who were directly or indirectly involved in technical oral presentations. Members of the academic community include final year engineering students randomly sampled from the group of 130 students who participated in the survey. The academic community also includes teaching staff involved directly or indirectly in teaching technical oral presentations at the university.

Engineers from the multinational corporation represented views of the professional engineering community.

This research design enabled the researchers to obtain multiple views of presentation skills and attributes required for workplace participation and communication purposes. Interviews allowed the researchers to “tap into local views, household and community knowledge” (Moll & Greenberg, 1990 as cited in Genzuck, 2003, p. 2) to “identify significant categories of human experience up close” (Genzuck, p. 2).

For the purpose of this study, semi-structured interview sessions were conducted with selected members from the academic and professional engineering community. Semi-structured interviews enable researchers to “ask participants general open-ended questions” which encourages participants “to voice their experiences, unconstrained by any perspectives of the researcher or past research findings” (Creswell, 2008, p. 225). Semi-structured interviews allow interview respondents the flexibility to respond in detail and allow respondents to “qualify and clarify responses” (Neuman, 2006, p. 287).

To elicit feedback from members of the academic community, semi-structured interviews were conducted with four selected student volunteer participants randomly sampled from the initial group of participants involved in the survey questionnaire. In addition, three participant members of the academic teaching community provided their consent to be interviewed and volunteered to share their views. The three included a language teacher, a content subject teacher and an engineering lecturer who were directly or indirectly involved in the teaching of technical oral presentations.

To ensure trustworthiness of the study, semi-structured interviews were also conducted with selected members chosen from a MNC to provide qualitative feedback on their perceptions of effective technical oral presentations. The MNC was selected because firstly, it represents the leading oil and gas player in the country (Mehden & Troner, 2007), and secondly, many student participants are trainees or future employees in this organization.

Although many student participants are trainees in the organization, engineer respondent views are kept neutral as these student trainees are attached for a short stint on a rotational basis within each unit in the organization. In addition, biasness is eliminated as the organization is involved in training numerous other student trainees from other public and private universities at any point in time. The pre-existing relationship does not affect feedback from the engineer respondents as the organization trains several university student trainees every year. The researchers do not have any vested interest or relationship with the organization and student trainees as student selection is conducted by the Student Industrial Internship Unit (SIIU) of the university.

Focal persons from the university and the organization were informed of the purpose of the study. Permission was obtained to conduct the study. The researchers then communicated (written and verbal consent) with the Human Resource Manager, Senior Manager and Head of Departments of the organization to seek permission to conduct the study. Once this was obtained, similar consent was also obtained from selected respondents in the organization. Three willing respondents eventually agreed to share their opinions and perceptions of technical oral presentations. All respondents were assured that all information divulged would be held in confidence and solely utilized for the purposes of the study.

With the mixed method approach conducted in this study, researchers were able to “triangulate” data sources to enhance the accuracy of a study (Creswell, 2008, p. 266). Triangulation facilitates “corroborating evidence from different individuals or participants (e.g., students, teachers), different types of data (e.g., questionnaire, field notes and interviews), or methods of data collection (e.g., documents and interviews) in descriptions and themes in qualitative research” (Creswell, 2008, p. 266). This procedure allows researchers to “validate the accuracy of qualitative findings” as “the study draws on multiple sources of information, individuals, or processes” to ensure both accuracy and credibility of a study (Creswell, 2008, p. 266). Such strategy ensures the trustworthiness of qualitative research.

### **Researcher Backgrounds**

The researchers involved in the study were educators and language communication lecturers or instructors in institutions of higher learning in Malaysia and Australia. The common shared interest among the researchers is the involvement in the teaching and learning of language communication courses and research interest in graduate skills and attributes in higher education.

Researcher 1 specializes in teaching English language degree programs to undergraduates in a local university while Researcher 3 teaches English courses and communication programs to foundation and undergraduate students in a technical university. Researcher 2 is a course coordinator for the Professional Engineering Communication course at an Australian University and has comprehensive research on engineering graduate attributes in global settings. Being involved in the teaching and research in language and professional communication, the researchers were interested in understanding and identifying the views on skills and attribute requirement of various stakeholders on effective technical oral presentations. It is important to state here that, the researchers did not have any previous relationship with any of the stakeholders involved in the study.

The researchers were keen to embark on this study as limited literature is available on addressing the skills and attributes required in workplace oral communication activities such as technical oral presentations. Technical oral presentations are a common workplace oral communicative event that engineers spend time on as indicated in a twelve year research conducted by Tenopir and King (1986-1998) which estimated that “engineers from the industry and government spend 58% of their time communicating” (Tenopir & King, 2004, p. 30).

### **Student Background and Participation**

The respondents selected for this study were 130 final year engineering students from Universiti Teknologi PETRONAS (UTP), Perak Darul Riduan, Malaysia who had undergone an eight month industrial training experience in various Malaysian engineering companies or organizations. The students were enrolled in a business management elective course offered in the university. These engineering students were enrolled in five year engineering degree programs from various engineering disciplines such as Mechanical, Chemical, Civil, Electrical, and Electronic and Petroleum

engineering. At the same time, these engineering students undergo various language and proficiency courses which provide the required language proficiency, writing and communication skills exposure for all the degree programs.

Many of these students involved were scholarship holders of PETRONAS (the parent company of the university and a Malaysian national oil producing company), MARA (local Malaysian scholarship) or other forms of local scholarships during their tenure of studies in the university. During the course of the degree program, all student respondents are required to go through an eight-month industrial internship attachment program at selected Operating Unit (OPU) throughout Malaysia. Input and data from the university's Student Industrial Internship Unit (SIIU) clearly indicate that about 30% of the bulk of the respondents is attached to the said multinational corporation (MNC) for their industrial attachment training.

To gain an initial understanding of essential skills and attributes required in technical oral presentations, written consent was gained from the students and subject lecturers to conduct the survey. Students were then provided with a questionnaire to determine the important communication and presentation skills required in technical oral presentations. Findings from the quantitative analysis of the questionnaire provided the researchers with an initial insight of the students' perceptions of important skills required in technical oral presentations. In addition, qualitative feedback was obtained from selected respondents of the academic and professional engineering community to "help explain or elaborate on the quantitative results" (Creswell, 2008, p. 560).

### **Interviews with Student Respondents**

To gauge a further insight of the students' perceptions of effective presentation and communication skills in technical oral presentations, the researchers obtained consent and permission to interview four final year students from the pool of student respondents who had answered the questionnaire. These four final year students had completed their industrial internship and undergone a communication skills course known as the Professional Communication Skills course in the fifth semester of the engineering degree program. These students were interviewed to provide qualitative feedback on effective presentation and communication skill requirements in technical oral presentations.

The students' qualitative feedback was detailed and useful as it made up for the lack of details in the quantitative questionnaire. The quantitative feedback provided an indication of the significant factors required in technical oral presentation. However, qualitative feedback spoke volumes as it enabled researchers to gain an insight to students' experiences gained in presentations during their industrial training attachment with specific workplace organizations.

### **Feedback from other Selected Participants of the Academic Community**

At this stage of the study, to corroborate quantitative findings provided by the students, a qualitative approach was utilized to seek in-depth feedback from other participants in the academic community. Being an exploratory study, a number of respondents from the academic community were approached to share their experience in technical oral presentation. Three of such respondents responded in their willingness to



be interviewed. For the purpose of this study, qualitative data via means of semi-structured interviews was obtained from one language teacher, one content subject teacher and one engineering lecturer.

### **Feedback from Participants of the Professional Engineering Community**

Qualitative input was further extrapolated from members of the professional engineering community. Three willing personnel were identified and interviewed from the selected MNC to gain insight from the professional engineering community on their perceptions of presentation and communication skill requirements in technical oral presentations. Being an MNC, it is essential that the researchers selected the relevant unit involved in training intern students to provide the relevant employers' perceptions, insights, and views on effective skills and attributes required in technical oral presentations. Table 1 entitled "Flow Chart of the Research Design" indicates the research method employed at various stages of the study.

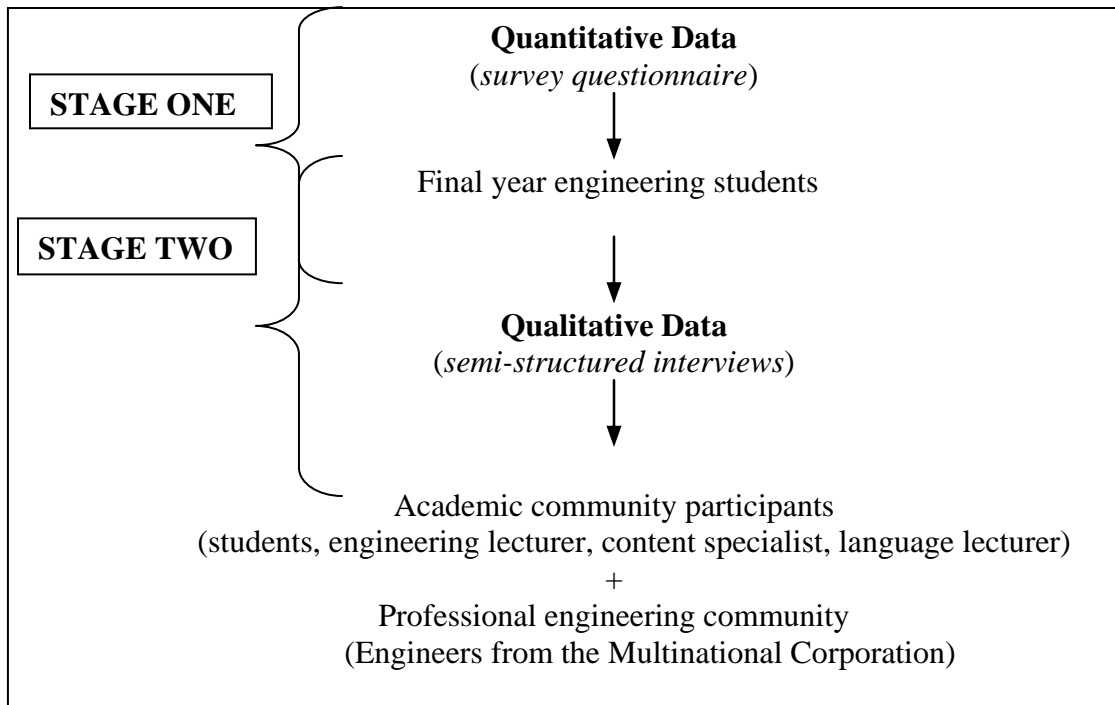
Both participants and researchers involved in the study do not have any prior knowledge of each other which eliminates the issue of biased perception provided by the respondents in the study. As mentioned earlier, the engineering community respondents provided general comments with no specific reference to any particular student as the unit was exposed to working with numerous student trainees. These trainees were placed on rotational duties for short stints in different units within the organization. The organization trained various student trainee intakes from various public and private universities in numerous workplace project presentations.

The professional engineering respondents involved in the study were engineers attached to the Commissioning and Decommissioning Facilities Engineering Department of PETRONAS Carigali Sendirian Berhad (PCSB) at Level 18, Tower one of Kuala Lumpur City Centre (KLCC). These engineer respondents had more than ten years of working experience and were involved in various job scopes which among others include presenting technical papers, feasibility studies, project implementation procedures, development plans, and provided training to young engineers or technicians in the company.

These engineers possessed diverse experience in delivering technical presentations to diverse audiences and clients such as government agencies, local and international clients. The engineers were selected due to their experience and exposure with numerous university students attached to the unit. At any point in time, these engineers were exposed to working with many university students from various public and private universities. As student trainees were attached on short rotational stints to assigned units within the organization, the engineer respondents provided general comments with no specific reference to any student trainees.

At the point of seeking entry to the organization to conduct the interview session, the researchers learnt that there were about 35 university students attached to different departments within the said unit for their industrial attachment. The following flow chart provides an illustration of the research design involved in this study.

Table 1. Flow Chart of Research Design



### Multinational Corporation

The selected organization chosen for this pilot study is the “Operating Unit” or OPU, known as PETRONAS Carigali Sendirian Berhad (PCSB), Kuala Lumpur situated at Level 18, Tower one of Kuala Lumpur Convention City Centre (KLCC) or PETRONAS Twin Towers which trains final year university students (who have completed their required three year engineering program with good academic standing) for the industrial internship attachment for a period of eight months. The majority of the interns from the said technical university undergo industrial training at the said OPU.

### Protocol Analysis of Mixed Method

To gain an insight of student perceptions on effective presentation and communication skills required in technical oral presentations, a 25-item questionnaire adapted from selected literature was administered to the study sample of 130 final year engineering students in the university. The participants were asked to indicate their responses to each statement on a seven-point scale that ranged from strongly agree (7) to strongly disagree (1), with four being neutral.

An internal consistency was conducted on the three factors extracted by factor analysis. Cronbach alpha was used to measure the reliability coefficient that assesses the consistency of the entire scale. Cronbach Alpha values for three factors were recorded. Factor one with six items was found to be valid with an alpha level of 0.87. Factor two with five items was also a valid factor with an alpha level of 0.80. And finally, factor three with three items was also found to be valid with an alpha level of 0.62. According

to literature studies (Hair, Anderson, Tatham, & Black 1998; Malhotra, 2004), alpha values higher than 0.6 can be noted as reliable.

Thus, with alpha values ranging from 0.62 to 0.87, the scales in the study can therefore be considered as reliable. Although this particular factor has only three items, the loadings of all the items are strong (factor loading of 0.45 and above are significant), thus could be considered as one factor. The overall alpha level for all the three factors is 0.81. As such, the scale is reliable and the three factors extracted in this study are therefore relevant.

In addition, to qualify the quantitative findings of participants from the academic community, the researchers requested for volunteers from the group of respondents who participated in the survey questionnaire. From the pool of questionnaire respondents, four students expressed their consent and volunteered to contribute their views and perceptions on effective skills and attributes required in technical oral presentations. The researchers decided to elicit qualitative feedback via semi-structured interviews with other participants of the academic community. The respondents who expressed willingness to share their experiences included a language teacher, one content subject teacher, and one engineering lecturer.

Semi-structured interviews were useful tools to as such qualitative analysis allows the researcher to probe the learner's mind and ascertain what has been discovered from the analysis of the questionnaire (Chandrasegaran, 1981). In the said study, interviews were based on participants' responses to the items in the questionnaire, focusing on the questions addressed by the factors extracted from factor analysis. Participants were also encouraged to discuss additional viewpoints that emerged during their responses to these items.

All interviews were conducted in the English language. All interviews lasted between 30 minutes to an hour for students. Interview sessions with engineers would range from 40 minutes to one and a half hours as the session depended on the experience and expertise of the engineers concerned. All interview questions were audio-taped with permission from the participants and later transcribed for further analysis. Informal discussions and face-to-face interviews were also carried out with selected members of the academic and professional engineering community. Qualitative feedback allows researchers to capture the rich experience/views and notion of skills and attributes required in technical oral presentations.

Initial communication on the purpose, aim, methodology, and eventual benefit of the study was clarified to the Human Resource (HR) manager and selected participants involved in the study. Of the 12 senior management personnel identified by the HR manager, three participants indicated their willingness to be interviewed. Interview questions were sent to the said participants to provide the participants an indication of the researchers' line of questioning.

During interview sessions, participants were asked the same set of questions which dealt with their perceptions on attributes and skills of technical oral presentations. The qualitative feedback reflects the importance and value added information of different types of skill requirements of technical oral communicative events practiced in the workplace. The feedback shared indicated the importance of "content" and "presentation" requirement of a specific communicative event such as technical oral presentations as perceived by members of the engineering community.

Content refers to the availability and effective use of complete technical information for audience needs. The respondents agree that content should be simple, and easily understood by the audience. Presentation refers to the speakers' ability to present information in a clear and concise manner for the benefit of the audience and purpose of the presentation.

The engineers mentioned the importance of "presentation skills" and "confidence level" as essential factors for effective presentation. Presentation skills refers to the way the speaker is able to deliver the content effectively while confidence refer to the conviction and grasp of the content matter by the speaker.

### **Data Analysis and Findings**

The students' quantitative input provided the researchers with an insight of the generalizable understanding of student perception of essential skills and attributes required in technical oral presentations. The survey questionnaire feedback analysed through the SPSS analysis catapulted the researchers to formulating relevant semi-structured interview questions to triangulate data from the questionnaire. Among the factors considered important for effective technical oral presentation delivery include the presenter's mastery of "audience receptivity," "technical competency," and "language proficiency" as essential skills and attributes required for effective presentation.

On the other hand, members of the engineering professional community indicated that other factors such as "presentation skills" and "confidence level" of presenters as equally important attributes and skills required for effective technical oral presentation delivery.

In addition, qualitative feedback gained in relation to the research questions from the participants in the academic community revealed that individuals interviewed had differing views on their definitions and views of effective technical oral presentations. Interviews conducted with the engineers added an in-depth insight to the engineers' perceptions and experiences obtained from the quantitative feedback which also focused on presentation skills and confidence of level of speakers as important elements in technical presentation skills.

Interview findings obtained from the respondents were transcribed and validated with the respondents to ensure trustworthiness of the feedback obtained. Transcribed data were validated by means of member-checking to ensure trustworthiness of data. Member-checks allowed researchers to correct errors if data was incorrectly worded. Member-checking allows participants to proof-read data findings to check for consistency and discrepancy of qualitative data findings.

Interview findings revealed interesting facets of the engineers' perceptions of "effective and impactful" technical oral presentations. Among the findings and themes discussed include "technical competency," "effective delivery skills," "information technology competency," and "cultural awareness."

#### **Finding 1: Technical Competency**

The theme on "technical competency" was reinforced during interviews with engineers who voiced the need for novice engineers to be familiar with technical terms

when entering the profession. Some excerpts that illuminate the said finding are provided below.

Engineer A mentioned:

Engineers need to have sound technical knowledge of his job requirement before he joins the industry.

Engineer B adds,

For engineers to succeed, they must know their technical content very well, otherwise it will be difficult for them, how are they going to survive, it would be impossible.

Engineer C says,

They must know the bolts and nuts, they must know the difference between this object and another type of instrument, otherwise how are they going to instruct the subordinates?

The above statements clearly indicate the need for engineers to acquire technical mastery as all three engineers mention “sound technical knowledge” (Engineer A), “sound technical content” (Engineer B) and Engineer C states the importance of “nuts and bolts” of the profession for effective workplace participation. Sound technical knowledge allows an engineer to perform effectively as indicated by Engineer B’s reference to the lack of technical knowledge would almost “be impossible” to “survive” in the workplace. Engineer C reiterates the importance of technical competency to effective “job delegation” as seen from the need to “instruct subordinates.”

## **Finding 2: Effective Delivery Skills**

In the process of the interviews, many new technical terms were also repeatedly voiced by engineers as daily job requirements that engineers need to be familiar when presenting the company’s findings. Among some mentioned by Engineer C include an engineer’s ability to be able to master the delivery of technical presentations such as “feasibility reports,” “ad-hoc presentations,” “fabrication project management,” “project implementation procedures,” “standards and practices,” “Hazop findings,” and awareness of the “Value Added Process (VAP) procedure” as essential technical knowledge for effective workplace participation. Hazop findings refer to technical reports while VAP procedures are strict compliance procedures that need to be sanctioned at each stage of a project. Such presentations were crucial daily performances expected of engineers. As mentioned by Engineer C,

The engineers are involved in various types of oral presentations in their daily tasks like for example, they have deliver feasibility reports, ad-hoc presentations and “Hazop” findings. They must be aware of the “Value

Added Process” or VAP procedure in this field. So they must have effective delivery for these types of presentation.

These oral presentations form part of an engineer’s daily activities which indicates the importance for engineers to be familiar and confident in presenting various technical presentations to diverse audiences. Engineer B stated,

Engineers have to be confident in their delivery as they are involved in many different types of presentations.

### **Finding 3: Information Technology Competency**

The Engineers also state the importance for presenters to be “technologically competent” as this expertise creates an impact on the audience. As stated by Engineer A who mentioned,

Engineers must be confident in using technology if they wish to deliver impactful presentations.

Engineer C reinforced this view by stating,

Engineers can have the advantage of using 3 Dimension or 3D images when presenting, this gives a very clear and effective visual presentation to the audience.

### **Finding 4: Cultural Awareness**

Engineers stated that “young executives can acquire technical content over time” but were concerned over the issue of “delivery” and “creating an impact to the audience” was of concern. Engineer B was explicit when he mentioned how essential it was for presenters to “thread with culture” to “bring life to their presentations”. Engineer B clarified,

Presenters need to thread with culture to “bring life to their presentations. This will enable audience to be involved. For example, reference to certain matters like depth can be related the size of a pyramid, if one makes a presentation in Egypt for instance.

Engineer A reinforced by stating that,

Presenters must enjoy their presentation with thinking about the end in mind and not look at presentations as a mere task or examination.

These are some of the useful and interesting findings obtained from the face-to-face interview sessions conducted at the MNC following the quantitative findings. Such informative and personal insight with specific technical terminology was useful data for

the purposes of the study. The study provided an insight to the researchers on employer expectations and requirements of technical oral presentations at the workplace. In interviewing Engineer A, the researchers were thrilled to learn added information related to enhancing the presentation skills of the young executives.

Another useful finding obtained through the interview session conducted was the MNC's importance to ensure that young executives be equipped with presentation skills and confidence in presentations. The interview session with the engineers provided the researchers an insight of "Community of Practice" or "COP", a mentoring program, introduced in the MNC a few years ago. In such a mentoring program, young executives or "seedings" were "attached" to senior engineers from the Management or Technical background for a period of two years. During the said program, young executives are given various internal department presentation opportunities within the first six months. Once these "seedings" have gained confidence in presenting, they were required to present to "external parties." The engineers expressed support for the said program as it enhanced the confidence of young engineers to present to diverse audience with confidence.

### **Usefulness and Challenges in the Methodology Used**

In conducting the exploratory study which utilized the mixed method, the researchers found that both methods of eliciting data had its usefulness and challenges. The quantitative method (survey questionnaire), provided the initial data on factors of importance to the stakeholders from both communities. There were differing perceptions on factors of importance in the said communities. The questionnaire provided an impetus to formulating semi-structured interviews to gain further details on the research questions of the study.

The challenge of using the quantitative method is that it limits the researcher from in-depth probing and is rather static in the line of questioning. The quantitative input provided quantifiable data and statistical analysis via reliability tests to validate the questionnaire items of the study. Interpretations of the statistical analysis are primarily supported by previous literature. This method limits the "voice" and "lived experiences of the participants" involved in the study (Creswell, 2008, p. 567).

The qualitative method provided an immensely rich source of detailed data not available through the line of questioning posed in a questionnaire. The interviews provided the researchers with "close upfront" details, experiences, and practices of all stakeholders involved in both communities. The researchers were able to hear for themselves the perceptions of the interviewees. The interview session proved beneficial as it provided an insight into the "culture and practices" of the workplace not at all pictured from a survey questionnaire. Interviewing the selected participants in the non-academic community enabled the researchers to understand the expectations, perceptions and foresight of the stakeholders in the company.

Like any form of methodology chosen for a study, challenges are present in any research study. In the mixed method, the consistency if integrating quantitative and qualitative findings depends on the researchers' abilities to elicit and categorize findings from both approaches to meet the objective of the study. Researchers need to have basic knowledge of statistical analysis to utilize the quantitative findings effectively. In

addition, the researchers' challenge in conducting the semi-structured interview sessions is based on the researchers' discipline and ethics to be detached and yet ensure cordial relations to put the participants at ease in sharing their experiences and insight of a said phenomenon.

Another challenge during the course of the interview sessions with stakeholders from differing communities of practice is the emergence of various themes and patterns from the qualitative feedback. It is essential that the researchers be able to validate the information obtained and not be biased by adding his or her viewpoint during the process of the interview.

The mixed method approach was challenging to the researchers as time was essential to implement, run and analyze feedback from both the survey and interview findings. However, for the purpose of this study, the mixed method approach provided both quantitative and qualitative dimensions to the study.

### Conclusion

This paper has outlined a preliminary exploratory study in which the researchers explored the use of the mixed method approach. Both methods used in this study have provided useful data and information relevant to the research questions. Initial input from the quantitative findings lead the researcher to probe further data by means conducting semi-structured interviews sessions to gain qualitative feedback by the selected participants.

The researchers are of the opinion that a methodology utilized in a study correlates to the researchers' objectives and purposes of the study. The researchers agree that a mixed method approach allows a study to acquire both in-depth analyses of quantitative and qualitative findings. However, depending on the objective and purpose of the research, a research may have "validity" and "reliability" in test items used in surveys for large groups while the qualitative method through the means of interviews, documents, and observations provided "real-life authentic experiences" voiced by the participants in the study.

The feedback obtained from qualitative data enabled researchers to gain an in-depth and personal understanding of the views, beliefs, and perceptions of the participants on presentation and communication skills in technical oral presentations in comparison to statistical data obtained via a quantitative approach. The mixed method approach used provided adequate feedback for the intended objective of this study.

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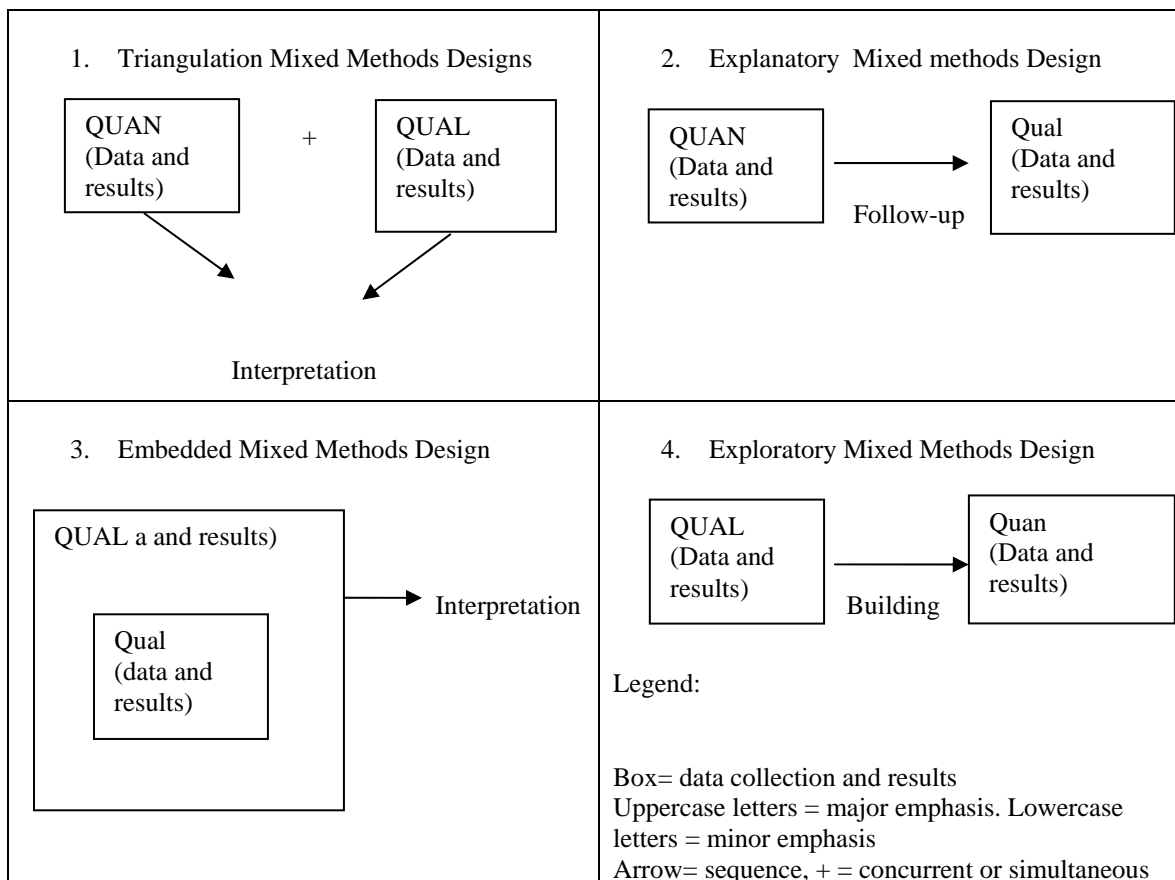


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## Appendix

### Types of Mixed Methods Designs



Source: Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed., p. 557). Upper Saddle River, NJ: Pearson Prentice Hall.

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The researchers also wish to express their gratitude and thanks to all colleagues who provided the access and permission to conduct the survey with their students and participants for their feedback in the survey and interview session.

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#### **Article Citation**

Bhattacharyya, E., Patil, A., & Sargunan, R. A. (2010). Methodology in seeking stakeholder perceptions of effective technical oral presentations: An exploratory pilot study. *The Qualitative Report*, 15(6), 1549-1568. Retrieved from <http://www.nova.edu/ssss/QR/QR15-6/bhattacharyaa.pdf>

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