

Intercultural communication in engineering: a research programme to investigate the cultural influences in the negotiation of engineering projects

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ABSTRACT: Intercultural communication is strongly increasing as a consequence of the continuing globalisation of politics, education and private industry. Within private industry, engineering-related companies, and hence engineers, are at the forefront of such globalisation processes. All forms of globalisation require communication and successful communication requires an understanding of the cultural dimension involved in communication. In order to understand the cultural influences within intercultural communication in general, and intercultural negotiation in particular, the UNESCO International Centre for Engineering Education (UICEE), based at Monash University, Melbourne, Australia, is undertaking an extensive research study into this area. The paper presents the structure and contents of the study with a particular focus on the realised research methodology.

INTRODUCTION

New communication technologies (such as the Internet, e-mail, cable TV, satellites, etc), the increasing speed and reduced costs of international transport, migration flows, and last, but not least, the internationalisation of business have resulted in an ever-increasing number of people engaged in intercultural communication. Representatives of politics, universities and private industry emphasise that internationalising curricula is not only important to remain competitive in a global world economy, but even indispensable in a world that can only survive through global cooperation. A prerequisite for successful global cooperation is the development of intercultural competence. Korhonen states that:

A professional successful in the home environment will not necessarily be equally successful when working in a new environment with a different culture. Organizations often emphasize expatriates' technical competence and experience, and ignore the non-technical knowledge and skills [1].

However, according to Kealey, there is a *substantial consensus* on the non-technical criteria required for inter-cultural competence and professional success in another culture [2]. The link of intercultural competence and professional success is also supported by a number of other researchers [3-5]. In this case, the concept of intercultural competence refers to a mixture of cognitive, affective and behavioural components [6]. In addition to linguistic skills, intercultural competence integrates a wide range of human relations skills.

A major part of intercultural competence is understanding the mechanisms underlying intercultural communication. One method of intercultural communication is that one person learns the other's language. This is, for example, when a native

English speaker communicates with a non-native English speaker using the English language. This field of non-native/native discourse has already attracted interest from researchers. However, a much bigger percentage of intercultural communication occurs between non-native English speakers in non-native/non-native discourse where English is used as a *lingua franca*. Researchers state that there has been only little empirical investigation into this field and that the little existing research has only been into general discourse.

According to Clyne, there are three main ways in which the role of culture in discourse can be, and has been, studied:

- By comparing native discourse across cultures (contrastive approach).
- By examining the discourse of non-native speakers in a second language (interlanguage approach).
- By examining and comparing the discourse of people of different cultural and linguistic backgrounds interacting either in a *lingua franca* or in one of the interlocutors' languages (interactive inter-cultural approach) [7].

Clyne contends that, although the three approaches are not always clearly differentiated, the third approach is the one that so far has been the least developed and investigated, especially interaction in a *lingua franca*.

This article presents the objectives of a research project, which aims to investigate the non-native/non-native communication in a scenario of business communication. The term business communication covers a large number of verbal and written communicative acts ranging from short written memos up to presentations in board meetings. Within this wide field of communicative acts, negotiation represents a speech event highly relevant to globally communicating engineers.

According to Hofstede, intercultural communication skills can contribute to the success of negotiations on whose results depend the solutions for crucial global problems [8]. The centre of this research will be business communication in the form of sales negotiations in an engineering environment between two parties from different cultures using English as a lingua franca. The intercultural negotiation shall, in this research, not be limited to the linguistic speech event negotiation. Instead negotiation shall in this study be seen as a holistic process integrating the verbal, non-verbal, relationship and behavioural dimensions of intercultural negotiation.

How can intercultural communication be defined? A number of researchers such as Gudykunst and Ting-Toomey, Brislin and Brislin and Yoshida, define it as communication between people from different cultures [9-11]. Gudykunst and Kim define it as a transactional, symbolic process involving the attribution of meaning between people from different cultures [12]. For the purpose of the coming study, it shall be defined as the field of study dealing with verbal and non-verbal interaction between individuals possessing different culturally influenced values, expectations and behaviours.

REASONS FOR RESEARCH

Due to increasing globalisation, not only large corporations but also medium and smaller-sized companies are forced to engage in international business. Engineering-based companies (ie manufacturers of engineering products like machinery, as well as suppliers of engineering services) make up a large percentage of the companies engaged in international business.

In the year 2000, the order volume of German engineering companies grew by 17%. In this total increase, the domestic order volume grew by 7%, compared to a 24% order increase in foreign markets (VDMA statistics) [13]. This figure emphasises that the export orientation already prevalent in most European countries will become even more dominant.

In order to conduct business, not only sales managers, but also upper general management have to communicate and negotiate with people from different cultures. This process either occurs abroad in a foreign country that belongs to a particular cultural sphere, or at home through a visiting party (delegation or a single person). Herbig and Kramer state that

...in a cross cultural context, besides the usual rules of negotiation, one has to be wary of fine nuances in relationships and practices and how they are perceived and executed by members of the other culture. The two business negotiators are separated from each other not only by physical features, a totally different way of perceiving the world, defining business goals, expressing thinking and feeling, showing or hiding motivation and interests [14].

A high percentage of the people engaged in such communication are engineers. These engineers, as well as the non-engineers, often feel confronted with a task for which they are insufficiently prepared. As a consequence, there is a strong demand for further education and training for these people. Indeed, a growing number of management coaches and private training companies offer seminars and training that target people facing intercultural deployments. There is a variety of

training available, ranging from English for Specific Purposes (ESP) training to general intercultural communication courses. However, to date, there is little empirical field data about negotiations available that can be used as a basis for these trainings.

Another reason underlining the importance of intercultural communication competence for engineers lies outside the commercial arena. In technical communication, it is of utmost importance that the communicating parties understand each other. However, clear and unambiguous communication is only possible if people understand the underlying principles. There have probably been more collapsed structures or other engineering catastrophes as a consequence of engineers talking past each other than due to actual engineering errors (such as miscalculations or making wrong technical assumptions).

Linell categorises misunderstandings from overt misunderstanding and covert misunderstandings up to the latent misunderstandings [15]. This latter type, the latent misunderstandings, is most dangerous as the communicating parties are not aware that miscommunication has occurred.

Hinnenkamp states that, although rare in face-to-face interactions communication, breakdowns can result in tragic accidents and intercultural literature is full of such cases [16] (also see Cushing for aircraft crashes [17]).

Since the development of increased global business, and hence increased intercultural communication, is expected to continue, there will be an even stronger demand for academic research into this field.

OBJECTIVES OF THE RESEARCH

According to McGee, very little research has been carried out in relation to the field of business English within a socio-linguistics framework. He states that:

The work that has been done has tended to be related to gender or advertising, and focused on language more than context. However, socio-linguistics concerns both language and context and views them as an interaction to bring about good communication [18].

The major objective of this research is to develop a model that aids in finding a strategy for successful negotiation. This model should cover the verbal dimension of intercultural communication as well as the non-verbal and behaviour-oriented dimensions. Based on the results, it should be possible to better train and prepare engineers working in a sales engineering function or in upper management for intercultural communication encounters.

STRUCTURE OF THE RESEARCH PROGRAMME

The proposed structure for implementing the project will be as follows:

Introduction

In this first part of the study, a general introduction into the field and into the coming sections will be given.

Conceptual Framework

In this section of the study, the structural members holding together the framework of the study will be articulated. It is the system of concepts, assumptions, expectations, beliefs and theories that supports and informs the research [19]. Miles and Huberman state that a conceptual framework explains, either graphically or in narrative form, the main things to be studied - the key factors, concepts or variables - and the presumed relationship between them [20].

This part of the study will provide definitions, the author's thoughts on the phenomena being studied (what is happening and why) and a literature review of the studies and theories particularly relevant to the research.

Methodology

The research part of this project will be divided into two categories. The first part will examine the existing state of research in the field of intercultural business communication with particular emphasis on intercultural negotiation in an engineering environment. The main purpose of this research is to determine the status quo and to see what work has already been conducted. The following instruments will be used to achieve this objective:

- Literature searches;
- Internet searches;
- Interviews with leading researchers;
- Interviews with engineering managers;
- Interviews with communication consultants;
- Case studies.

The second part of the project involves investigations into the field of practical intercultural engineering negotiations. The research methodology chosen for this part of the study is neither purely quantitative nor purely qualitative. Instead, it is a combination of both. Quantitative research is complemented by qualitative research. Figure 1 shows the proposed methodology.

The following sections will describe the methodology used for the qualitative research as well as for the quantitative research.

The centre of the research programme will be a corpus of field data. As an instrument to gather the field data, a questionnaire will be developed. The questionnaire will consist of two parts. The first part will cover aspects of verbal communication in general. This part will cover such aspects as:

- Opening and closing phases;
- Expressions of politeness;
- Turn lengths;
- Interruptions;
- Communication breakdowns.

The second part of the questionnaire will investigate the mechanisms supporting the negotiation process. This will cover such aspects as behavioural patterns (eg rituals and etiquette), expectations, values, beliefs and attitudes. This part of the questionnaire could cover such items as:

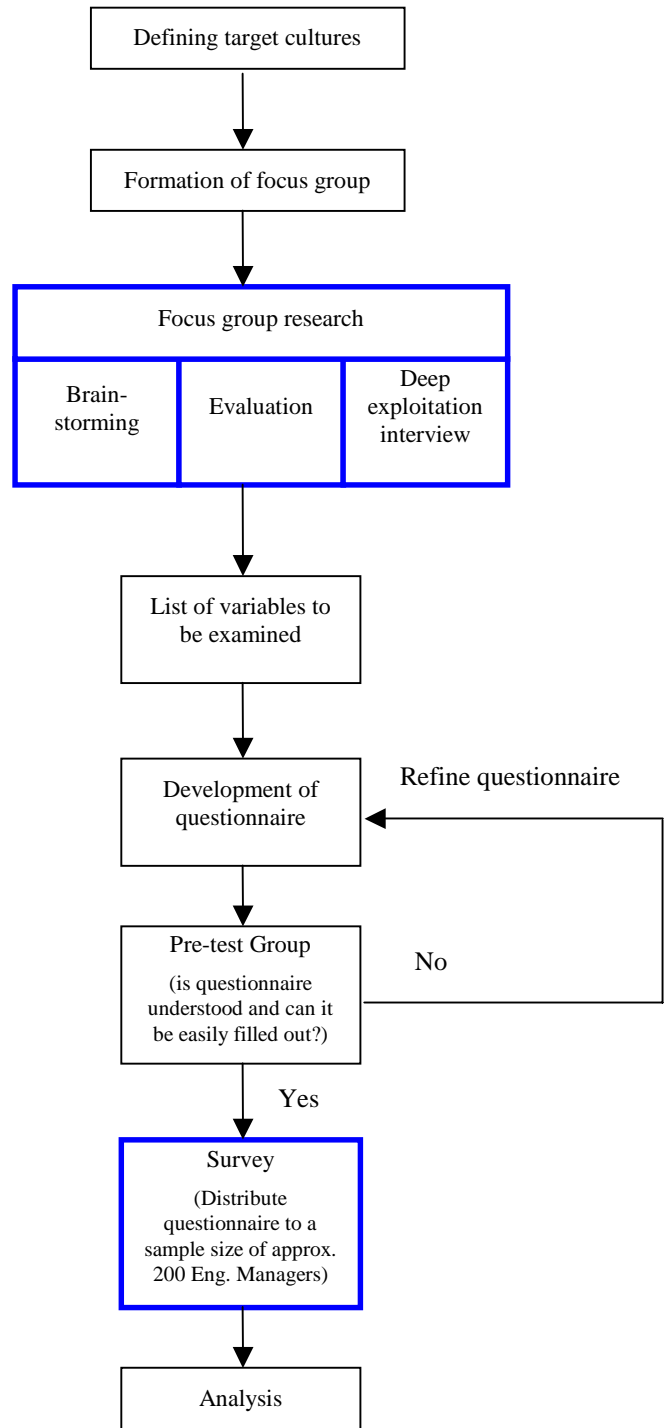


Figure 1: Methodology of the project.

- Non verbal communication;
- Behavioural patterns;
- Etiquette and protocol;
- Rituals;
- Personal relationships;
- Importance of a mediator from the targeted culture (eg sales agent - a local who is a member in the foreign culture);
- The role of gifts;
- The role of business meals (lunch, dinner, etc);
- The role of entertainment.

In order to determine the specific phenomena (from now on called variables) that should be covered with the survey, qualitative research in the form of a focus group will first be conducted.

According to Maxwell, who differentiates between research purposes (focused on understanding something) and practical purposes (focused on achieving something), one of the main research purposes for which qualitative studies are especially useful is to identify phenomena and influences, and to generate new *grounded* theories about the latter. He goes on to state that:

Qualitative research has long been used for this purpose by survey and experimental researchers, who often conduct exploratory qualitative studies to help them design their questionnaires and identify variables for experimental investigation [19].

One form of qualitative research is Focus Group Research. According to Stewart and Shamdasani,

Focus Group Research is among the most common research methods used by marketers, policy analysts, political consultants, and other social scientists to gather information [21].

The focus group used in the project will consist of five internationally experienced senior engineering managers. The focus group participants were selected from a number of senior engineering managers based on a number of selection criteria, some of them listed below. In this group of five engineering managers each of the managers represents one of the five cultural regions whose communication patterns are to be investigated. This means that there is one manager for each of the five regions. The engineering managers, the geographic region they represent and their negotiation focus is given in Table 1.

Table 1: Engineering managers their negotiation focus and the geographic region they represent.

Manager	Negotiation Focus	Geographic Responsibility
Manager A	Precision Machinery/ Turn Key Plants	Middle East
Manager B	Precision Machinery/ Turn Key Plants	South East Asia
Manager C	Machine Tools/Turn Key Plants	East Asia
Manager D	Machine Tools	South America
Manager E	Machine Tools	Eastern Europe

The most important selection criteria for the focus group participants are the following:

- A minimum of 20 years intercultural communication experience.
- An engineering background.
- Negotiation experience gathered using English language as a non-native speaker.
- Extensive experience in the targeted region, preferably having lived there as well.
- Extensive experience in other regions too.

The objective in the focus group research of this study is to find out from the point of view of experienced engineering negotiators what variables are influential on the negotiation process and should therefore be further examined. In a brainstorming session, the group will compile a list of topics

and items (some possible examples were given above) that should be covered with the questionnaire. The findings will be supplemented with items selected from the relevant literature.

In a subsequent discussion, the brainstorming list can be expanded and refined and then used as a basis to create a suitable questionnaire.

Before the questionnaire is designed, the focus group findings (ie list of variables to be examined) will be discussed with academic researchers and consultants in the field of intercultural communication to increase the validity (ie principle of triangulation).

In particular, the following strategies will be used in the qualitative study in order to deal with particular validity threats. As such, it will contribute to increasing the credibility of the findings.

Feedback

According to Maxwell, soliciting feedback from others is an extremely useful strategy for identifying validity threats, personal biases and assumptions and flaws in personal logic or methods. He goes on to say that one should try to get such feedback from a variety of people, both those familiar with the phenomena or settings being studied and those who are strangers to them [19].

Member Checks

Another strategy used to increase the validity is the use of member checks, which is the systematic solicitation of the views of participants in the study about data and conclusions. Maxwell emphasises that:

This is the single most important way of ruling out the possibility of your misinterpreting the meaning of what the participants say and the perspective they have on what is going on. However, it is important that you not assume that participants' reactions are themselves necessarily valid (Bloor, 1983), their responses should be taken simply as evidence regarding the validity of your account (see Hammersley & Atkinson, 1983) [19].

The member checks in this study will be accomplished in the form of individual consultations with the focus group participants after the focus group meetings have been completed.

Triangulation

Another important strategy to reduce the risk of validity threats is termed triangulation. Triangulation of methods is used to compensate for the fallibility of any single method. Maxwell further states:

Triangulation reduces the risk of systematic distortions inherent in the use of only one method, because no single method is completely free from all possible validity threats. [19].

The triangulation used in this study will be achieved by complementing the focus group work with additional

interviews. In the focus group experienced engineering managers will participate. The findings based on their experience will be discussed with academic researchers in the field of intercultural business communication, as well as with consultants working in this field.

In order to test the suitability of the instrument, it is important to pilot test the questionnaire. Sudman and Bradburn state that *If you don't have the resources to pilot test your questionnaire, don't do the study* [22].

For the pilot test the questionnaire will be given to a pre-test group consisting of five to eight engineering managers who were not part of the brainstorming group. This is to ensure that the questionnaire is precise and clearly understood. Depending on the outcome of this pre-test it might be necessary to refine the questionnaire. In other words, should members of the pre-test group have difficulties understanding and filling out the questionnaire, it will be redesigned based on their suggestions. After this final revision of the questionnaire (if necessary), the survey can be conducted.

The chosen sampling method comes from the field of non-probability sampling. The difficulty with a probability sampling would have been to attain a list with all the people of the targeted population (in this case all German engineering managers who are engaged in international business). The people who would be required to fill out the questionnaire could have been randomly chosen from such a list. However, using non-probability sampling does not mean that the sample is not representative of the population. Trochim states:

The difference between non-probability and probability sampling is that non-probability sampling does not involve random selection and probability sampling does. Does that mean that non-probability samples aren't representative of the population? Not necessarily. But it does mean that non-probability samples cannot depend on the rationale of probability theory [23].

The selected sampling method is a combination of convenience sampling and purposive sampling. The convenience sampling element comes from the fact that existing industry contacts of the researcher to internationally operating engineering managers will be used. Purposive means sampling is undertaken with a purpose in mind.

Two subcategories of purposive sampling will be integrated. These are expert sampling, which is considered as the best way to elicit the views of persons who have specific expertise [23]. The other subcategory is snowball sampling, which is used in the sense that the approached persons will be asked to contact similarly suitable candidates to fill out the questionnaire. In this way, a minimum sample size of approximately 150 engineering managers from a diverse range of engineering corporations who have had at least five years negotiation experience is envisaged.

Results

Based on the fact that the anticipated response rate can be achieved, this section of the thesis will give the results of the statistical analysis of the gathered data.

Discussion

In this section, the results from the data analysis will be compared to the results of existing research. The existing research will come from both the field of intercultural communication and negotiation theory. To support the analysis, selected case studies will be utilised.

Conclusion

This section will make conclusions from the findings and will possibly suggest how the results can be used for engineering education.

Recommendation

This section will give an outlook and make recommendations on future research requirements.

References

SUMMARY

Increasing globalisation will result in increased intercultural communication. Engineers will be at the forefront of people who will need to be successful intercultural communicators. The type of communication that engineers and engineering managers will be involved in includes intercultural communication in general and intercultural negotiation in particular.

Negotiation can be of a technical and/or commercial nature. Intercultural training is required in order to develop the required intercultural communication competence. Research into all aspects of intercultural engineering communication is necessary in order to provide a basis for high quality, adequate training.

The objective of the above described research programme is to contribute to the field by investigating the intercultural negotiation experience of engineering managers. A two-part field study consisting of qualitative and quantitative research will be at the centre of the research programme. The results of this study will hopefully give insights into the factual situation of intercultural negotiations and help people to better understand the same.

As Boyer points out:

... [we] should become familiar with other languages and cultures so that [we] will be better able to live with confidence in an increasingly interdependent world [24].

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