THE IMPACT OF LANGUAGE AND COMMUNICATION OF MEANING ON ICT DEVELOPMENT PROJECTS

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Abstract

This study focusses on language and the communication of meaning within the ICT systems development project management environment. Neglecting to identify the importance of language within the multi-national and multi-cultural ICT project is a major risk to the success of the project. The diversity of the cultures and languages of the project's human resources and the existence of language barriers are identified and proven as being risk factors that need to be managed as part of the project management plan. The author compiled a framework that incorporates guidelines and critical success factors for an ICT project to assist in identifying and managing specific problems and risks related to language and the communication of meaning within the project. This framework emphasizes the importance of communication that transfers meaning and not only information.

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SECTION 1: INTRODUCTION

PROBLEM STATEMENT

"The greatest problem in communication is the illusion that it has occurred"

- George Bernard Shaw

Information and communication technology (ICT) systems development has been expanding rapidly beyond the boundaries of countries and nations especially with the support of the internet and the establishment of the global village. Many companies outsourced ICT software development because they did not want to be distracted from their core purpose. ICT marketers from other countries target these companies with the lure of financial benefits due to differences in exchange rates and cheaper labour. At the same time ICT software development companies are looking beyond their own country's borders for projects that will ensure a better income.

The contractual agreements between two or more entities to develop an information system can however pose certain problems that need to be addressed to ensure the feasibility of achieving the objectives of such an ICT development project. ICT software development has a defined life cycle. Each phase has its own executable requirements and specifications that must be considered when committing to delivery of a product within a specified budget and delivery date.

The feasibility of such a project, based on critical success factors (CSF) with specific focus on the communication of meaning as expressed in the language of the participants, is addressed in this paper. The discussion will focus on the communication of information necessary for software development, including the business requirements for the product and project related communication using verbal and written language where the involved participants do not share the same native language.

The problem statement can be expressed by the main research question: "What is the impact of language and the communication of meaning on an information systems (IS) development project?" Sub-problems emerged that were analysed within the context and content of the problem statement. These sub-problems are related to the different knowledge areas of the system development life cycle (SDLC) and the ICT project management phases. The problems relating to these areas are presented below as secondary research questions.

Language and communication

Successful communication between human beings, especially between cultures, requires that the message and meaning intended by the sender is correctly received and interpreted by the receiver. In order to analyse this problem, it is necessary to investigate related questions regarding the concepts of language and communication:

1. What is the role of language in the expression of knowledge and information for the individual and for the group in the ICT development project context?
2. What is "meaning" and what role does semantics (the study of the meanings of words) play?
3. Can syntax (the study of the structure of language) influence the meaning of the communication?
4. What is the impact of language-related issues on the translations of ICT documents or text relating to project communication?
5. What noise can be identified within the communication process that influences the meaning of the message being transferred?
6. Can we study language or refer to it as an impacting factor without involving culture?
7. How does the ICT context of communication affect the use of language?
8. Can the participatory communication process be successfully applied within the context of the language barrier within an ICT project?
9. What is the impact of failed communication on the building of relationships with specific reference to trust?

ICT project management

1. Is it feasible to undertake an ICT project where a definite language barrier exists that might cause a major breakdown in communication between the different stakeholders of the project? To to answer this question one must look at the role of communication in an ICT project as well as the main

areas where dysfunctional communication can break down the communication channels of the project.

2. Can areas of risk be identified related to language and mutual understanding problems, and how can it be managed throughout the project?

These problems will be discussed by addressing project management issues with specific reference to the CSF, project risk identification and management and project planning within the context of a cross-border ICT project.

Language, technology and translations

1. Is the current available dictionary and translating software sufficient to easily and correctly translate contextual ICT terminology? How will users ensure the correct translation of a word within the ICT context?
2. Why is it important to determine the verbal and text (e-mail, specifications, planning) language of project communication, in the project contract?
3. If different translators or translating services are used, how can consistency of the translation of certain words, having context related meanings, be established?
4. What is the importance of background knowledge, training, exposure, experience and skills of an ICT project participant in the specific cultural and ICT domains?

The secondary research questions form the foundation of the investigation into the main research question.

BACKGROUND AND DELIMITATIONS

The problem statement evolved from real problems identified from ICT projects developed for clients not speaking the same language as the ICT contractor performing the development. These problems were identified during a project done by a South African company for an east European country. In this instance the diversity of cultures and languages created situations where both the contractor and the client had to converse in a second language. All the variables that influence the outcome of an ICT project will not be addressed in this study due to the complexity and number of variables. Issues such as the distance between the client and the developer and the influencing aspects of a foreign culture will therefore not be discussed.

This study will be limited to language and communication of meaning-related problems within the ICT systems development project management environment.

OBJECTIVE

The main purpose of this research study is to provide guidelines on how to solve or address the communication problem in a multi-national and multi-lingual ICT project. The proposed solution addresses the main problem area substantiated by answers to the sub-problems; any assumptions or recommendations are based on recognized theories of the relevant disciplines and lessons learnt from similar cases.

The problems regarding the language barriers in an ICT project for clients in a foreign country can be overcome by firstly acknowledging the different impacting factors and then including them in the initial feasibility study of the project. The project stakeholders can then make informed decisions on the specific risks factors relating to language, communication and mutual understanding. These guidelines can then be used for the ICT project, together with the technology-related issues, from the initiation phase towards a successful project outcome.

In order to make these informed decisions, all the impacting factors, the sub-problems and sub-sub-problems, must be identified. Together with an analysis of the environment of the specific ICT project, the probability of the occurrence of these problems must then be determined and actions taken to either prevent or manage them throughout the project life cycle.

The main outcome of the study is to create a framework to assist in analysing the different elements related to the linguistic communication and mutual understanding problems, to enable the stakeholders to identify and address these problems and to minimize regrets after completion of the project relating to background knowledge and project planning.

The framework for the outcome of the study is based on the social nature of ICT systems development with specific reference to the human and communication aspects of an ICT project. Through the combination of the theories of the multi-dimensional disciplines involved, combined with pointers

from the case study, the framework emphasizes the importance of communication that transfers meaning and not only information.

The author proposes certain practical guidelines within the ICT project management context underpinned by theories that substantiate the assumptions made. A framework incorporating these guidelines and CSF's based on lessons learnt from similar projects, the theory and literature studies are therefore presented as the outcome of this study. This framework created through the integration of observations and interpretations can be utilized as a valuable tool for future ICT development projects where language barriers pose a definite risk.

IMPORTANCE OF THE STUDY

This study originated from an actual project that experienced major problems related to foreign language issues and the breakdown of communication and relationships. As a result of these language issues the whole project was compromised. The author would like to contribute to the Information and Communication Technology (ICT) systems development field, with specific reference to the project management approach as prescribed by the Project Management Institute Body of Knowledge (PMBOK), by proposing a framework of guidelines for IS development that will assist in identifying specific problems and risks related to language and the communication of meaning.

An ICT project across national borders and cultures has more at stake than just a successful project for the company. It will influence the perception of the peoples of the country that could affect current and future international relations and future work contracts within the global context.

Theoretical investigation of the linguistic aspects of computing, information systems, information or information technology and the limited case study of a project with a definite IS slant, helped to put the language issues of an ICT development project into perspective.

The underlying problems identified as part of this study have been investigated by looking at the study fields of linguistics, communication, project management and systems analysis, design and development. These components were studied within the context of an ICT project where the client has a different culture and language than the ICT contractor. The resulting identified factors are major risks that need to be acknowledged and managed to ensure the successful completion of such a project.

Proposing guidelines to address these problems, identifying the related risks and putting contingency plans in place even before the start of the project, can assist in effective decision-making, establishment of relationships, management of all the project related issues, and ultimately result in successful projects in the ICT environment.

The main contribution of the study is therefore the creation of a framework of guidelines on the impact of language and communication of meaning on the development of information systems across national borders and different cultures.

The research into the importance of meaningful communication within an ICT project will be described in the following sections: Section 2 presents an overview of relevant literature and the establishment of a gap between the problem statement and the literature. Section 3 discusses the theoretical considerations and the research approach. Section 4 presents a case study of an ICT project for an east European country. A summary of the results are presented in section 5, as well as additional discussions related to 1) communication, language and meaning, 2) project management principles, and 3) global ICT projects. In section 6 the paper discusses a framework of mutual understanding within ICT development projects. The paper concludes with a brief discussion and recommendations.

SECTION 2: LITERATURE REVIEW

The literature review places the problem of language and communication of meaning into the context of the ICT and social environments. Most of the literature used is not directly relevant to the problem statement, but together with the applicable theories, assisted in analysing the problems and created the guidelines to address them.

OVERVIEW OF RELEVANT LITERATURE

The literature review focuses on the existing knowledge or absence of knowledge to address the aspects related to the problem at hand.

Communication and meaning

The study done by Zappavigna-Lee and Patrick (2004) on eliciting tacit knowledge from spoken discourse indicates that misunderstanding due to language issues can cause a gap in what needs to be communicated. They argue that an implicit process is present in "*making meaning with language"* and from this an "*analysis of language appears a means for understanding and eliciting tacit knowledge"* (*op. cit.*: 2195). The specification of specific strategies to uncover implicit knowledge can be influenced by culture. These are aspects or "*embedded components"* that "*cannot be understood by looking at what and how people communicate verbally"* (*op. cit.*: 2195). According to Zappavigna-Lee and Patrick the process of telling is not only the transferring of explicit codified artefacts to the mind of the receiver, but involves processes not always noticeable and are "*subject to both the unconscious and conscious interpretation by the listener*, [and] *linguistic structure is* [therefore] *reinstated*

as relevant to understanding tacit knowledge" (*op. cit.*: 2196). A barrier to communication is the difficulty people experience in interpreting the meaning of communication. The risk for the ICT project is that this type of obstacle "*often contributes to misalignments in the perception of systems analysts compared with users, and knowledge engineers compared with experts"* (*op. cit.*: 2196). Zappavigna-Lee and Patrick (2004) also looked at a theory of language, Systemic Functional Linguistics (SFL) that is used as a tool to study the spoken discourse of participants. SFL considers language as a "*social semiotic*" (*op. cit.*: 2197), suggesting that there is a fixed relationship between language and meaning. This further indicates the importance of language to convey certain meanings. It is a factor that cannot be discarded; on the contrary, it must be regarded as an important success factor within the communication channels of any social structure.

Within a social structure communication is the thread that links everything and keeps them together. Communication channels within the social structure of the ICT project must also address human and social aspects to ensure successful meaningful communication between the client, the contractors and all other stakeholders. The social structure of the ICT project is the context or environment of the project.

In the studies of human psychology (Jordaan and Jordaan, 1998: 42 – 51) five rules of contextualisation have been identified that are crucial to the understanding of human experiences and behaviour, the way they interpret and appropriate data to create information they can relate to. These rules are:

1. A context is a prerequisite for understanding experiences, behaviour, phenomena and problems.
2. Experiences, behaviour, phenomena and problems can occur in more than one context.
3. If experiences, behaviour, phenomena and problems can occur in more than one context, it means that such experiences, behaviour, phenomena and problems can be described in different but equally valid ways.
4. The relationship between lesser contexts and the larger context (context of the whole) is based on the interdependence of the parts and the whole, from which a specific pattern or organisation emerges.
5. The interdependence of lesser contexts (parts) and the larger context (whole), and the pattern or organisation that emerges from it, form a contextual spiral.

By identifying the context of the project communication it is evident that the majority of communication actions that occur during an ICT project are those of group communication. Cragan and Wright (1999) define group communication as the actions where people interact with each other through communication in mostly a face-to-face situation. The group have common goals and norms and communicate in a certain pattern to meet these goals depending on each other. In the scenario where the participants of the group communication cannot interact in face-to-face sessions it becomes difficult to establish the communication pattern, even though they have shared goals. By including a difference in language and culture in the group communication, the

establishment of the norms of communication becomes a specific task that cannot just be assumed as with a group sharing the same language and culture. These norms of communication forms influence the meaning of the content of the communication as perceived by the various participants in the communication process.

The interpretations and appropriation of information through communication is based on the perceptions of the people part of the communication process. Jordaan and Jordaan (1989:346) describe perception as an interpretation of reality. Without perception there can be no reality due to the constant interaction of people when communicating. This process creates "*shared interpretations of the world, and create shared meanings of what the perceived reality signifies*". Shared interpretations and meanings can be described as intersubjective. This concept of intersubjectivity refers to cultural and linguistic differences, but also to the creation of communities of knowledge with shared and specific discourses. They also acknowledge the complications of these intersubjective processes of creating meaning: *"basic perceptual conservatism, which causes us to experience and apply our own intersubjectively created meanings as the only 'real' ones*" (*op. cit.)*.

The effectiveness of communication is described by Young and Regnart (1992) as how effectively we convey our intended meanings and how these are understood and responded to. The words, symbols and gestures must have the same meanings for all the participants of the communication process. The meanings of words and ideas must be shared not only according to the

dictionary definitions, but also in relation to the social context of usage. All the participants must acknowledge and accept the specific values assigned to the sounds, words, symbols, signs, gestures and images. Young and Regnart (*op. cit.)* also identify prejudice as interference to effective communication. This indicates the importance of good relationships and trust. They make specific mention of differing languages and cultures that result in difficulties in mutual understanding. The different customs, values and belief systems can often result in miscommunication and conflict. Language, as the most used medium of communication and expression of such values, must therefore be carefully controlled to assure accurate conveyance of written or spoken information. The control over the use of language can help to prevent the creation of barriers in the communication process.

Barriers and gateways to communication are addressed in an old (1952) article by Rogers and Roethlisberger who describe the different rules of communication. The most basic and fundamental is that *"Before each person speaks up, he or she must first restate the ideas and feelings of the previous speaker accurately and to that speaker's satisfaction"*. The tendency to evaluate a barrier identified by them, is a judgment from a personal frame of reference that can block interpersonal communication. This barrier can be overcome by listening with understanding based on information regarding the other person's frame of reference. It is necessary to obtain agreement that the description represents the situation as perceived by all participants and a willingness to express and accept differences. Misunderstandings are due to misevaluation and not the clarity of the content of the communication as such.

Miscommunication results in perceptions of uncooperativeness or unintelligence. These assumptions create a *"chain reaction of perceptions and negative feelings, which blocks communication" (*Rogers & Roethlisberger, 1952*:*111).

To further this interpersonal cooperation and communication Carberry and Lambert (1999) present a plan-based model for understanding cooperative negotiation sub-dialogues that address both the communication acts and the beliefs that support it. Person's beliefs are based on their cultural background and the environment of the communication process. These sub-dialogues can promote cooperation and acceptance of the content of the communication action.

The importance of communication and language is further recognised by researchers such as Yetim (2001) in his study: The meta-communication model for structuring intercultural communication action patterns. He investigated the semiotic domains from a structural point of view and then created the meta-model. Basic communication is a process of exchanging information. Meta-communication forms part of this basic communication process and describes the communication situation. It is those components added to the content of the communication that give meaning to the message. Meta-communication is an integral part of any ICT system's design and development process. It addresses the construction of the language to be used among all the participants during the project. It also includes the anticipation and prevention of communication breakdown. There are different levels of

conversation that focus on different aspects of the communication. The success layer of this model addresses the meaning of a word, while the discourse layer looks at the general rules and norms of the communication actions. These levels represent the actions necessary to establish the communication rules and standards of a project. This model of conversation for intercultural communication action patterns focuses more on the structures than the content and can be used during all the phases of the SDLC. The communication rules and norms as encapsulated in the meta-communication models proposed by Yetim, will provide structure to a problematic communication space.

Project management principles

Project management principles are guidelines for project managers to ensure the successful completion of a project. The two project management factors that relate to the problem at hand are project communication management and project risk management (Oosthuizen, *et al*., 1998, Schwalbe, 2002 and the PMBOK Guide). The most important resources of any project are the human resources and therefore any actions that will influence their role in the project must be addressed. This leads to investigations on the human factors determining the behaviour of people.

Oosthuizen *et al*. (1998:84) describes the importance of human factors in relation to the communication process as follows: "*If the human being is the organisation's most precious resource, communication is probably the most important human factor in the work environment*". When third parties get

involved in an ICT project, more people are involved and thus the complexity of communications also increases. With geographical distance between the participants of the ICT project, the non-verbal communication such as body language is lost (Schwalbe, 2002:277). Information systems are social systems and within that context the human factors cannot be discarded or neglected. "*Communication as an instrument to bring large quantities of information intelligently and selectively into the project*" (*op. cit.*:98) is important from the organisational level, all project management levels and down to all the system development life cycle actions. Language as a communication media in an ICT project has been addressed by a number of authors such as Sacher *et al*. (2004). He investigated the fact that a distinct user language can be the key to a deep understanding of a culture. This ultimately leads to solutions that go beyond purely functional language support.

The other important project management factor is the identification of project risks. The feasibility of a project can be determined by including the identified risks in the management plan. This will enable the project manager(s) to consider these risks during the project lifespan. The identification of project risks involves the understanding of potential problems that might occur during the project and determing their impact on project success (Schwalbe, 2002:303). This study attempts to answer the questions regarding language barriers as potential problems (risks), the identification and management of the risks within the project management context. The specific project scenario

where cross-border ICT projects are launched creates specific risk factors in the communication process.

Global software outsourcing takes place due to low costs and the availability of labour. Investigations into the language barriers are focussing on the cultural component of these outsourced software development projects. Krishna *et al.* (2004) point out that different cultures use language in different ways. They explained that American clients work with extensive written agreements and explicit documentation, reinforced with frequent and informal telephone and e-mail contact. The Japanese, in contrast, prefer verbal communications and less frequent but formal use of electronic media. Their research came to the conclusion that the challenges of global software outsourcing "*not only concern the need to adapt to different ways of working but to cultural norms of social behaviour, attitudes towards authority, and language issues*" (*op. cit.:* 64) They proposed guidelines to address these concerns:

- The usage of common systems by all project participants.
- The usage of coordination processes and project control mechanisms as agreed on by all the project participants.
- The usage of common or standard processes, for example the systems development methodology.
- The usage of common or standard compatible technologies in terms of computers, software systems and telecommunication links.
- The acceptance of a negotiated culture perspective that allows the modification of work behaviours taking account of the cultural norms of all the participants.

- The exchange of staff between the different nationalities on a long-term basis.
- The employment of people who have been exposed to different cultures with the purpose to bridge these cultures.
- Cultural training must be offered to all employees from basic orientation to training on language and cultural practices. It is important that the cross-cultural training should be on a continuous basis.
- The cultural training should be a two-way learning process, and not only from the contractor (developer's) perspective: "*all aspects of the relationship, from contract negotiation to the delivery of the final software product negotiation to the delivery of the final software product, can take place on the basis of a well-informed understanding of the culture and business practices of one's customer or supplier*" (*op. cit.*: 66).

Jonsson *et al.* (2001) also investigated the complexities of a multi-national project utilising global development teams. They identified certain guidelines to manage such a project effectively. The project management process will have to be adapted to follow these guidelines when dealing with cross-border, multi-national project teams. These guidelines include addressing the challenges inherent in differences in language, culture, perceptions and cognitive patterns, as well as distance and other communication problems.

Even though people speak the same language, their usage of the language can differ, leading to misunderstandings within the project team. For example

they can put important information in different positions in the sentences and use different communication styles, e.g. formal or informal, making jokes or being serious. These misunderstandings include the use of different jargon and terminology.

Adding to these misunderstandings, cultural awareness has also become an important condition necessary for success. The cultural awareness includes specific actions to allow the team members to get to know each other and to establish a common work or project language. The major success factors within global research and development projects as identified by Jonsson *et al.* are:

- There must be common understanding of the project goals and commitment of the local organisations to achieve those goals.
- Good leadership is necessary to resolve problems based on misunderstandings (common for global projects).
- The focus must be on requirement engineering with the aim of creating qualitative requirement specifications before the start of the execution phase of the project. This will reduce costs and minimise the risk for misunderstandings and the 'blame game' during later project phases. The lack of precise requirement specifications allows for free interpretation during the project execution phase that might affect the functionality of products.

At project initiation a set of rules and elements must be determined to facilitate the establishment of communication channels ensuring mutual understanding

of the content of the communication. Mental models can be created according to the various participants' culture. These models can be mapped and a different set of rules and elements can be created for the specific software development project. To address the different phases and components of an ICT project, this can be done on a continuous basis throughout the project. The different components can be added to the model as the need arises. The different areas demand different rules and elements that can be identified through semiotic analysis. From an ICT project perspective this is also a quality control that investigates the effective communication of information systems personnel (Weber, 1999: 86).

Information technology development

The importance of ICT has been discussed in depth at the Fifty-sixth General Assembly Plenary of the United Nations (Press Release GA/10031, 2002) and can be summarised by the words of the representative from Costa Rica, "*The only way for developing countries to close the digital divide is to enthusiastically embrace the current technological revolution".* The assembly emphasised that the technology provided to the people of the developing countries, should address their needs. However, they did not mention how these needs can be determined. The role of communication of meaning should play a major role in determining people's needs regarding the implementation and usage of ICT.

A number of studies were done on the importance of communication in developing information systems. They all conclude that it is a major success

factor that cannot be neglected. For example, Valenti *et al.* (1998) investigated the communication obstacles to successfully determine system requirements. Ineffectual communication between users and analysts has been identified by them as one of the major error sources. In support of this Van Der Poll *et al*. (2003) focus on the usability aspects of language and communication. They describe the improvement and mediation of communication between usability engineers and software development teams.

Khaslavsky (1998) focusses on cultural and language variables from a usability and interface design point of view. She discusses the importance of cultural issues such as translations, numbers, dates, etc., where localization of the project becomes an important factor. She introduces her topic by stating that "*with the increasing globalization of the software industry, designers must create interfaces that fit the needs of users in foreign countries"*. Similarly, Chan and Suwanda (2004) focus on the design of multinational online stores and the importance of different cultures, languages and business practices to ensure project success.

Interface design includes the need to design for the user communities. The success is based on consistency with the specific culture of the user. The GVO design firm as described by Sacher and Margolis (2000) identified a need to understand the language, culture and conversation protocols. They focus on the culture that has become central to their work and service offering. The critical questions they identified are:

- What tools and approaches can uncover and analyse the culture of interaction of a specific customer community?
- How to model and describe cultural rules of interaction?
- How can the real world interaction rules be translated into interactions with software and internet applications?

These questions confirm the importance of communication with specific reference to language, culture and conversation protocols.

The differences in language, culture and conversation protocols led to the proposal by Cao and Woo (2004: 4296) that domain modelling is an important factor for information systems development. They reasoned that a lack of domain knowledge can lead to fluctuating and conflicting requirements which can cause communication breakdowns. The basis of a domain is an ontology that represents the domain concepts and their relations; the "*objective representation of the real world"* (Cao & Woo, 2004).

The domain modelling approach as described by Coa and Woo (2004) will formalise the domain knowledge. The knowledge components of the domain model are a lexicon, thesaurus, ontology, taxonomy, templates, relationships, products, events and actions. The benefits of using an ontology during information systems development are 1) knowledge sharing, 2) a verified knowledge base, 3) software engineering principles, 4) knowledge acquisition, and 5) knowledge re-use. All these benefits can contribute to the elimination and prevention of misunderstandings due to differences in languages.

Language and translations

The literature investigates the quest for better IS requirements by looking at the communication process. The problem of mutual understanding and the usage of a common language to establish "*clear understanding of user requirements*" are addressed in the article on "Better IS Requirements Management" on the well-known About website. Increasing numbers of articles are written on these issues emphasising the emerging importance of the use of language in communication to create mutual understanding.

Studies have been done on specific problems relating to language usage and interpretations to create meaning. One such study was done on work language and naming problems. Katzenberg and Piela's (1993) study addresses the naming problem on user interfaces. These aspects also apply to an ICT software development project developed across national borders and dealing with multi-linguistic issues.

Their description of the problem is as follows: "*The semantic approach is focused on the aspects of language where meaning is invariant across situations. It is based on the assumption that one meaning can have only one name. The pragmatic approach is focused on the situation of use, and while retaining the premise of one name for one meaning, this is presumed to stay constant only within comparable language use situations. For example, the same meaning can have different names in the dialects of different cultural or professional groups. Conversely, the same name can be used by different groups to convey different meanings, or even within one group to convey*

different meanings in different situations" (op. cit.: 1*).* This problem is applicable to all situations where language is used to communicate a certain meaning. Task–centred language relies on assumptions about what the other person knows and his/her intentions. Conventional terms must be determined at the start of a project and be part of the project glossary, the naming conventions and communication guidelines. The speakers will then be consistent with the assigned meanings*.* This study also addresses the methods to compile language and translation guidelines, but time restrictions inherent of ICT projects usually do not permit the establishment and maintenance of a glossary containing explicit definitions for different objects and actions. Project trade-offs will have to be made to ensure timely completion of the project while not compromising quality. This can be done by following strict rules on all forms and means of project communication.

Offshore outsourcing creates an awareness of potential issues and problems emerging from differences in language, culture, politics, regulations and work practices that might hinder collaboration efforts*.* There are, however, certain companies that realise the importance of global business ventures. For example Advanced Linguistic Services (2001) developed standard language applications and customised solutions to help their clients expand their business globally. They offer translation, interpretation and many other related services from and to nearly all language groups.

Addressing translation issues Jones (2002) did a study titled "Do information systems have nationalities? 'De-scribing' electronic patient record systems".

He investigated an electronic patient record system created by a French development company that needed to be implemented in United Kingdom hospital. He concluded with the following:

- Translation is more then a matter of language:
  - National differences may be inscribed in systems.
  - Description is a complex, active process.
- Implications for software development :
  - Don't assume international transfer as unproblematic.
  - Be aware of cultural specificity of practices.
  - Be alert to subtle differences that may have significant effects.
  - Develop sensitivity to diversity.

These types of studies indicate a new dimension to the offshore outsourcing tendencies that started off as a primary interest in the foreign low-cost labour: a workforce available globally. Companies are realising that for international development projects, specific factors are emerging that need to be addressed when creating project teams that share joint ownership of key project objectives and deliverables.

ESTABLISHMENT OF GAP BETWEEN PROBLEM STATEMENT AND LITERATURE

Many studies address the language and communication barriers with the focus on the usability aspects of the software design. This does not solve the problem of how a software application could be designed for a society or a

group of people if the language to communicate the requirements in is not only foreign to the analysts and developers, but also to the managers of the project.

The project management principles (PMBOK) describe the importance of communication, but on a general level. There is no mention of language-specific barriers in understanding the meaning of the message to be transferred. This gap also exists in the studies on software development and information systems, using a multi-national and multi-lingual project team.

Language, meaning, and communication are addressed in the literature, but from a positivist and structuralist perspective. The authors propose models and agents (technology) to address these and other linguistic problems. They, however, do not address the communication problems in the ICT project development environment (a social system) created by a lack of understanding of the language used by the other project participants.

The gap between the current literature and problem at hand created an opportunity for the author to link all the identified areas. Based on the lesson learnt from the case study, these links were used to create the proposed framework of guidelines to address the issues surrounding the impact of language and the communication of meaning on an information systems development project.

The literature study presented the current knowledge on language and the communication of meaning. It also identifies the importance of communication

within an ICT project. Based on these studies the underpinning theories and research approach were selected and will be described in the next section.

SECTION 3: THEORETICAL CONSIDERATIONS AND RESEARCH APPROACH

Existing knowledge on the study areas that influence this study is of great importance. Firstly, it gave structure to the study and a foundation to build on. It was also used to substantiate certain assumptions and to motivate the conclusions and the proposed solutions.

The data collected from observations, informal and formal interviews are used in relation with the theories to address the research problem. Theories and theoretical principles regarding the different schools of thought were used to assist in reasoning about the different aspects of the research problem and to uncover aspects that could assist in creating the framework.

Knowledge from relating disciplines including psychology, sociology, management, anthropology and informatics contributed towards the investigation of the research problem. Certain social concepts were investigated to explain and motivate observations and conclusions. These concepts were understood within the context of the study through the principle of hermeneutics.

Understanding occurs or happens through the hermeneutic dialogue. This implies first understanding the parts in order to understand the whole. The understanding process forms a circle that spirals upwards to a higher level of understanding. This principle was used to analyse the different parts of the

problem under study and to create the basis of the solution to the communication problem.

The communication of meaning used to develop interfaces for international communities is similar to the way users convey requirements to the software development team. The following study areas can be used during the planning phase:

- Anthropology concepts can be used to understand the user cultures
- Semiotics, the science of signs, can be used to understand a language in its context of use.

The shared rules of interaction within a group that include the actual language, as well as the specific language used in a domain, sub-culture or social group (the work language) must be part of the planning. This will create the group's interaction protocol necessary for participation in effective communication. The interaction protocol will increase the appropriateness of the terminology used during the project.

THEORIES

The following theories will be briefly defined and their relevance to the study stated.

Symbolic interactionist ethnography

The human resources are the most important component of an ICT project. Their behaviour and the elements that influence it, is therefore of great

importance to the project. Humans, their perceptions and actions are explained in the theory of symbolic interactionist ethnography.

Symbolic interactionist ethnography can be described by three basic assumptions (Tan *et al*., 2003):

- That human beings act toward things on the basis of the meanings that these things have for them.
- That the meaning of such things is derived from, and arises out of, the social interaction that one has with one's fellows.
- That these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he/she encounters.

Tan *et al.* refer to Blumer's (1969) explanation of the term 'symbolic', referring to it as the basic premise that humans live in a world of objects (physical as well as social objects) that do not have intrinsic meanings. Instead, the meanings of objects arise out of the interpretations that people assign to them during the course of everyday social interactions with others. Meanings emerge from these but they are always subject to the possibility of change. A continuing process of interpretation takes place primarily by means of the shared symbols of language. These meanings influence people's actions towards the objects. Each culture can therefore attach different meanings to objects influencing the mutual understanding between the nations.

Habermas' theory of communicative action

Cecez-Kecmanovic (2001) identifies two levels of social interactions: The speech or linguistic acts, and the social actions constituted by individual linguistic acts. The linguistic acts are an observable part of linguistically mediated social interaction. The type of social action can be determined by the way participants attempt to achieve their goals. Other actions involved are instrumental action (actors oriented to success intervene in the target system instrumentally to achieve their goals), strategic action (influencing others to achieve goals), and action towards understanding (actors attempt to achieve their goals by communicating with other actors in order to achieve a common understanding of the problem at hand).

Habermas's communicative action determines the starting point from where certain claims and/or actions originate. He uses a person's moral point of view to determine the claim's or action's perspective. According to him people originating from the same perspective or norm can fairly and impartially reason or look at a problem. Habermas' discourse model requires that participants in a reasoning process should focus on "*trying to put themselves in each other's shoes*". According to him perspective-taking must be general and reciprocal, and must allow empathy to reach a reasoned agreement.

Habermas wants to establish the concept of justice that goes beyond individual political cultures and focuses more on a common core of morality by applying communicative interaction that will develop a "*thoroughly intersubjectivist*

interpretation of the moral point of view: [a] *practical discourse interaction* [that will] *preserve* [s] *that common core*" (Habermas, 1995).

McCarthy, as referred to by Habermas (1995), summarises it as follows: "*Concern for the common good is reflected in the requirement of general and reciprocal perspective taking: in seeking mutual agreement, each attempts to get beyond an egocentric viewpoint by taking into account the interests of others and giving them equal weight to his or her own".* In discourse participants cannot take fairness, impartiality and people's notion to share common ground for granted.

Habermas determines that factual statements (nature) differ from normative statements. The latter are intrinsically linked to the human social world. The validity of normative statements is based on the human social recognition and approval (*op. cit.:* 61). According to Habermas the feelings of people are essential in normative statements and that human action is required to validate them.

In Habermas' theory of communicative action he defines his universalization principle as follows: "*For a norm to be valid, the consequences and side effects that its general observance can be expected to have for the satisfaction of the particular interests of each person affected must be such that all affected can accept them freely*" (*op. cit:* 120). The principles that Habermas takes into account to determine this universalization principle are as follows:

- Cognitivism assumes that moral judgements are based on the cognitive experiences that relates to the reasons. It is therefore more than just contingent expressions of feeling (*op. cit:* 120).
- Universalism assumes that, because a person is capable of thinking reasonably (cognitively), anyone participating in the reasoning process can in principle reach the same conclusions or judgements on the acceptability of the actions (*op. cit:* 121).
- Formalism assumes that, because of the standard agreed-on actions or norms, all other existing non-generalizable content influencing the actions, will be ignored (*op. cit:*121).
- All the standard norms must be approved by all the participants of the practical discourse (*op. cit:* 121).

According to Habermas, his theory can be applied across all the different cultures based on ”*a transcendental-pragmatic demonstration of universal and necessary presuppositions of argumentation"* (*op. cit:*116). He therefore believes that argumentation is the process of reflection during the actions of communication. These actions are directed towards the reaching of understanding while assuming that reciprocal relationships and mutual recognition of moral ideas already exists (*op. cit:* 130).

Habermas further states that during argumentation the communication process is determined by the success-orientation of the participants. The participants are only interested in convincing each other of their point of view. Based on the assumptions they can cooperatively search for the truth. The person’s

convictions will only change if their attitudes are changed through a process of rational motivation (*op. cit*: 160).

Based on the ideas of Habermas acceptance of norms within the ICT project context is crucial for effective project communication and mutual understanding among project participants. The participants of communication actions during a project must base their discourse on the same norms. This will ensure that any discourse to mediate specific deliverables of the ICT project will work towards the required outcomes.

The proposed framework hopes to ground a conception of justice. Common ground needs to be established as the most important factor within a cross-border and multi-cultural ICT project. From that point pro-active meditated action must be taken to ensure meaningful communication to seek the same objective.

Communication theories

Both the diffusion and participatory models of communication (Servaes, 1995) will be used to investigate the current reality with specific reference to the case study and to identify the guidelines part of the framework addressing the research problem.

In the diffusion model the communicator focuses on the transmission of information on the understanding that communication is something one does to another. Components of this model are:

- Knowledge of the information.

- Communication of the information (persuasion).
- Decision to adopt or reject the information communicated.
- Confirmation by the individual of the information communicated.

The message is communicated from the sender to the receiver. From a technological point of view the medium is the message. It is deterministic in assuming that technology solves problems and drives development.

The participatory model is receiver-centric and focuses on the meaning of the transmission. The communication process is therefore an exchange of meaning. The normative theory of alternative communication focuses on participation, self-management and access to information. It also focuses on respect for culture, the dual strategy for group dialogue and respect for other people.

Within the context of the multi-cultural ICT project it is advisable to focus on the participatory model of communication. This is important to enable the communication of meaning between the participants of the communication process. Where meaning gets lost between the sender and the receiver of a message, the purpose cannot be fulfilled and incorrect actions are taken.

Structuralism

Structuralism as based on the work of Ferdinand de Saussure recognises the meaning of language as a function of a system. The meaning of an idea depends on its logical relationship to the other ideas in the system. This is

important because the focus is on analysing the social and collective dimension of language (Appignasnesi and Garrat, 2002) in creating language meanings, especially when translating between different languages.

The translations can therefore not be done in isolation. The meanings of the words can only correctly be translated within the correct system. This includes the culture as well as the specific business domain, in this instance it will be the ICT development project.

Systems approach in information technology development

The process of developing computerised information systems is reflected by the systems development life cycle (SDLC). The importance of communications within the structure of SDLC can be accommodated by defining the tasks and deliverables of each phase. Problems or risks need to be addressed as part of the SDLC.

Ahituv *et al.* (1994: 81) summarise the application of the systems approach as follows:

Table 1 – The systems approach to information systems development and problem solving

Information systems development	**Problem solving**
1. Information system analysis	1. Defining the problem 2. Gathering data relevant to the problem
2. Information system design	3. Identifying alternative solutions 4. Evaluating the cost and effectiveness of the alternatives 5. Selecting the best alternative
3. Information system implementation	6. Implementing and monitoring the selected alternative

"*The systems approach is concerned with a holistic entity, but does not neglect the components of the entity. It cognises the activities of the components while simultaneously considering the activity of the whole system that contains them"* (*op. cit.*: 77).

The SDLC phases that form part of the ICT project plan provide information on the tasks and deliverables to build and implement the system. It is therefore important to acknowledge that problems part of the project life cycle will have a direct influence on the SDLC. The SDLC phases are:

1. Conceptual phase: This phase includes project conception, feasibility studies and the acceptance and initiation of the project.
2. Development phase: This phase includes the planning and design of the product.
3. Implementation phase: This phase includes the development, construction and/or implementation of the product.
4. Termination phase: This phase includes the hand-over of the product to the client and the establishment of any maintenance agreements.

The SDLC is the heart of any ICT project. It describes the process that needs to be followed to create the desired product. Communication is of great importance during this process. The management of the SDLC can only be efficient and effective when it is done through the formal structure of a project driven by accepted project management principles.

Project management principles

The project management knowledge areas, as defined in the Project Management Body of Knowledge (PMBOK), with specific reference to communication management and risk management, will be addressed within the study to tie all the social and management factors together in the context of an ICT project. These principles have been identified by the Project Management Institute and have been accepted internationally. They provide structures and guidelines on how to efficiently and effectively manage any project.

RESEARCH APPROACH

The research approach was determined by the problem as identified from the case study. All the research questions are based on this problem area. The ideographic research style was therefore used to explore a particular case and events, and to create a subjective account from observations made. It was followed by constructive research in developing a framework of guidelines and refining related concepts.

The ideographic view of social reality (based on the assumption that information systems are social systems) focuses on how individuals create, modify and interpret the world in which he/she finds him/herself. The emphasis tends to be placed on the explanation and understanding of what is unique and particular to the individual rather than of what is general and universal.

This view is used in the interpretive paradigm characterised by a need to understand the world as it is, to understand the fundamental nature of the social world at the level of subjective experience. It seeks explanation from the frame of reference of the participant, rather than those of an objective observer. It also seeks to understand the basis and sources of social reality that determines the fundamental meanings of social behaviour (Roode, 2004).

The different aspects of the research problem were investigated by considering the epistemology (the type of valid knowledge about it) and the ontology that refers to the underlying assumptions made, based on the stance that knowledge of reality is a social construction as created by humans. Due to the multi-disciplinary nature of the problem, different theories addressing the different dimensions of the problem were used to identify the causal relationships and the patterns that determine the factors governing the reality.

Due to the social nature of information systems, a variety of social disciplines can be used to describe certain phenomena of the ICT project. The approach followed to conduct the study therefore used the interpretivist approach. The focus of the study is on the social aspects, with specific reference to linguistics

and mutual understanding within the ICT development project. The interpretive approach was followed using action research, subjective, argumentative, descriptive and interpretive observations and analyses, aimed at understanding the problem situation.

The different theories taken from ethnography, communication and structuralism, together with the systems development life cycle and project management principles formed the foundation of the evaluation. The case study and the proposed framework will be described in the following sections.

SECTION 4: CASE STUDY OF AN ICT PROJECT FOR AN EAST EUROPEAN COUNTRY

The case study used to identify the problem of language and meaningful communication between ICT project team members, is that of a South African (S.A.) ICT company, partnering with an ICT company in an east European country to develop a system for the east European country's government. The tender has been awarded to the South African company based on a similar system currently operating in S.A.

The marketing team sold the system to the east European country's government before any projects were initiated. The project then had to be planned according to the tight schedule determined by the client as part of the signed contract. The project planning was complicated by the inclusion of an east European country's ICT company. This company formed a third party of the multi-national project. They fulfilled the important function of intermediary between the S.A. team and the client, the east European country's government, as well as the end users of the system. They were also, according to the contract, responsible for certain components of the system such as the database (this include the data conversion and data cleaning actions), establishing the infrastructure and two or three smaller functional modules of the total system.

The fact that the role players, stakeholders and actual ICT project resources were spread over different continents and from different nationalities, posed a certain degree of difficulty from the start. Added to this, the inclusion of a third party or intermediary between the S.A. ICT contractor and the client caused tension and at some stages open conflict. They didn't want the S.A. company involved and it seemed as if they tried to discredit them with the client. Lanuage differences helped them in their business strategy. The S.A. team could not speak their language and the government refused to converse in English. Interpreters had to be used which took a lot of time; creating frustration and breakdown in communication during formal and informal meetings. The third party company, being of the same nationality, could talk directly to the client and the users. This put them in the "driving seat" and gave them control over the project, because they had all the information.

From management side, regular contact was made with the east European country's contact persons. The project director spent lengthy periods in the east European country and even moved there with his family. Unfortunately, this was then too late and after a period of about two months he returned to S.A. when the project was stopped.

These occurences were on a management level between the stakeholders who played a political game. On the software development level, things were also breaking down even before they started. Every S.A. analyst had his /her east European counterpart in the east European country. The requirements had to be communicated from the east European team to the S.A. team.

Documents and letters arrived in the east European country's language and then had to be translated before any actions could be taken. Finding translators who understand ICT or who had an ICT background was difficult. These translations took about three to five days depending on the size of the document. Only then could the analysts try to understand and the translated document. Management realised that this was a major problem and subsequently employed a highly paid east European ICT specialist with the same native language. He tried his best, but could not fulfil the roles of interpreter, translator, developer, communicator and negotiator all at once. Other translators were employed, but this lead to inconsistencies in the translations. A glossary existed, but was not constructed and maintained to be an effective tool.

Nearly a year into the project an analyst originating from the east European country was employed, but her translations differed from the previous ones creating more confusion. She spent about three to four weeks in the east European country, but couldn't add much value except for the interpretation of informal conversations and formal discussions during meetings.

Other S.A. team members also spent periods of time, varying from one to three weeks, in the east European country trying to sort out the requirements and to deliver the prototypes. However, the broken usage of the English language lead to wasted time and even more frustration. The resulting communication was without any contextual meaning.

E-mail battles were fought over the translation of documents. Issues included: Who was responsible for the translation of the documents into which language; must the S.A. contractor deliver east European language documents or English ones; must the prototype, including all the user interfaces, be in English (as developed by the English-speaking developers) or must it be developed in the east European country's language (the translated text was totally incomprehensible to the developers). These battles over the language format of the documents and the prototypes (and in the end the systems) lead to mistrust. Relationships which are so crucial for an ICT project team to be able to plan, design and build a software application could not be established. The contractor's inputs regarding the infrastructure, the database and user requirements were important. They had to work with the S.A. team to fulfil their contractual obligations.

Total breakdown in communication and relationships were inevitable. The S.A. team found out that the east European team did not give the correct information to the client and prototypes delivered were not those developed by the S.A. team, but developed by the east European team based on the concepts from the S.A. team. The S.A. team did not know this because they could not understand what was communicated and only selective information was conveyed to the S.A. developers, and in some instances even misinformation. The S.A. team experienced difficulty to establish trusting relationships essential to build and maintain the open communication channels necessary for successful communication within an ICT project.

The S.A. team terminated the project. Fortunately, due to solid contractual agreements and high level negotiations there was no financial loss to the S.A. company.

Numerous lessons can be learnt from this project. Focussing on the language and the communication of meaningful information between all the participants, the following can be deduced:

- From a management and project management point of view no planning was done to cater for the language and cultural problem. Management only realised it after the project was well underway and then tried to rectify already broken relationships and mistrusts.
- From the results of the project it is questionable whether the project management team identified the lack of mutual understanding through the medium of the written and oral language, as a project risk factor. Did they identify it as a critical success factor and managed it as such?
- From a project management point of view, the project schedule did not provide additional time for translations, neither did the budget provide for different translators, or highly paid (head-hunted) east European ICT specialists. The east European country resources, based in S.A., were added to the team too late.
- The building of relationships between S.A. and the east European country's team members across national boundaries were not of prime concern to management. The people didn't trust each other. Meetings, formal and informal, were usually inconclusive. Meeting attendees

formed groups discussing issues or action points in their own language, not understood by the rest of the meeting attendees.

The main effect of the language problems were on the following aspects of the project:

1. Project management communication (letters, e-mails, project plans).
2. Software development documents (requirements, specifications).
3. Software development communication (mostly e-mails, and on rare occasions face-to-face).
4. Software prototypes (software application, user interfaces and database field names).

Based on these aspects of the project the observations and suggestions from the project team members have been collected. These are listed below, grouped under the specific problem areas related to the cross-border and multi-linguistic factors part of the ICT project:

Project management (Planning, risks and communication):

- The role of a 3rd party adds to the complexity.
- Inexperienced project resources will encounter even more difficulty. For these kinds of projects the aim should be to employ experienced resources. It is important that the project in all its complexities is properly defined to ensure the identification and allocation of the correct skills.
- Companies have their unique culture and work methods. The coordination between these cross-border companies should be

identified as a critical success factor for the project. At project initiation the work methods must be determined and agreed upon to establish a foundation for the rest of the project phases starting with extensive planning.

- The use of a standard methodology is important to minimise misunderstanding and improve cooperation and collaboration.
- Actual face-to-face contact is necessary for the clarification and the elimination of incorrect interpretations. From a project point of view this needs to be incorporated into the time schedule, such as time to translate, time to read the documents and time to clarify the meaning of what has been communicated.
- The requirements must be analysed carefully to ensure understanding. According to one of the project team members the S.A. team suspected that the east European country's team did not read the documents because they probably did not understand it. This could be the reason why they preferred prototypes. Both the east European country's development team and the client preferred prototypes representing the system as a graphic user interface.
- It was suggested that management must ensure that international accepted project management standards are followed.
- Distance makes it difficult to sort out communication problems. It is often difficult to see the whole picture; the information is often not seen in context.
- Cooperation to complement each of the group's strong points is difficult because of language and distance.

- It is also important to find out whether the language used as the working or business language is the first, second or third language of the relevant participants. It is more difficult to speak and convey information as intended if the working language is not the native language.

Relationships and resources:

- Certain resources were highly intolerant when dealing with the different nationalities and reacted as if the persons they were dealing with were ignorant, incompetent and even stupid.
- Frustration levels increased when a single concept has to be explained repeatedly. Especially if, according to the person's own perception, the concept should be common knowledge for ICT people.
- Resources should be informed about and even forced to attend information sessions on soft skills specifically related to relationships across nationalities.
- Understanding of the culture will assist with language barriers and meaningful communication.
- The selection of human resources is crucial, especially the analysts between the client's representative and the developing company/party.
- The benefits of establishing service level agreements (SLA) and the end-user relationship types must be identified, as well as all the factors that might affect it either negatively or positively.
- The real end-user must be identified, as well as their level of ICT and business understanding.

- The end-user relationship must be created by following an iterative process that follows a path of consultations, discussions, negotiations, involvement of the 'real' end-users. Contacting the 'real' users is not always feasible and is usually the responsibility of the intermediary or third party. This relationship is more valuable because it has been created through the involvement of all stakeholders – the people that make the decisions.
- To ensure a good end-user relationship the correct people must be involved to establish and maintain this relationship. Technical staff are usually not good communicators and are known for their impatience with people ignorant of technical jargon.
- A good end-user relationship, as with any relationship between people, takes time. It takes a long while to gain the trust of an end-user, but only a few seconds or a few words to break it down. To re-establish such a relationship is twice as difficult to achieve, especially where multi-nationalities are involved.
- The importance of honesty in an end-user relationship and SLA's must be determined. Service companies sometimes lie to "cover themselves". It must however be determined whether it is worthwhile to lie and thereby cause distrust that will break down the end-user relationship.
- Questions should rather be typed (written). Written communication will be more effective than frustrating conversations that could damage relationships.
- It is important to ensure that the working conditions build loyalty within the project team. Losing people may put the project back time wise

when new people have to be trained, informed, relationships built and trust established.

Language and translations:

- Explaining something in a language different from native language usually takes more time. It is time consuming to find the correct word to convey the intended meaning.
- The exact word meaning as taken from a dictionary is not helpful. Different words are used for the same thing, making it difficult to determine which document or word is correct. The meanings of some words and their interpretation need to be confirmed beforehand.
- Understanding the translated documents requires reading behind the words and between the lines.
- The translators must work with the analysts to reduce time. They must be able to understand the ICT terminology, but with the assistance of the analysts. This could save time and also eliminate the time the analyst needs to spend reading and making sense out of a translated document.
- The translators must be involved from the start of the project and be available throughout.
- The translators must be accepted by all parties and if possible all the parties must make use of the same translating company or services. Management must make sure that even though the same company or service is used, the same persons are allocated to the project. This company must also have a contingency plan in place and their quality control procedures must be identified. This could include two to three

people working together as a team to deliver a translation service to the project.

- One of the east European country's senior analysts drew a picture of an elephant to illustrate how perspective determines meaning.
- When the translation was not making sense, the translated documents were given to an east European analyst fluent in English. This double work cannot be afforded in an ICT project where time is always a very important success factor.
- Two analysts spent lots of time trying to understand what needs to be done. For example, the field where the organisation's short name must be entered has been translated into "Nick Name". Another example is the phrase "stop a driver". Does it mean to arrest him or just to pull him off the road? More lateral thinking must be done to ensure that the real meaning emerges.
- The participants must agree on the translation. Different modules, different authors and translators complicate things and create inconsistencies. For instance, are "kind" and "sub-kind" the same as "category" and "sub-category"? If not, what is the difference?
- The team members asked for the installation of the same software translator (application) on each team member's computer. A common tool used for translations, as well as an up to date glossary can promote mutual understanding and the use of identical words and phrases.
- The system architect asked the east European resources to have their own meeting and only to call him if needed. It is frustrating and time-consuming to try and interpret every word said during a meeting.

Meetings between the different participants must be carefully planned. The language groups must each have to have their own meeting first to sort out their viewpoint. This need to include all the possibilities and to pre-empt certain scenarios before presenting those standpoints, issues, problems or concepts to the other party(s).

All these points describe information gathered from the project participants. To further demonstrate the problems as experienced by the team, extractions from e-mails received from the east European country's resources illustrating translation problems are:

"*We reject latest version of prototype.*

We found that:

- *the prototype is in English,*
- *Is not compliant with latest version of GUI.*

We don't want to waste time to translate it into [language]."

also

"*….You were given with translation table. In my opinion if we do not ask you to prepare prototypes in* [our language] *right now we will have the same problem with preparing real software (e.g. knowledge of meanings of* [language] *phrases by our workers and so on).*

Translating a prototype is a wasting time for us.

Maybe multilingual version could be a solve?..”

Further examples of translation problems can be seen in the following extract from a feedback from the east European contractors. Please note that this is an exact replica of the received document. The syntax and usage of the English language indicate unprofessional translations. They did acknowledge the mistakes and misunderstandings due to translation problems in this feedback form.

Question: S.A team	**Response: East European team**
What is the Program registry data	Data blocks [possibly translation problem]
(list will be refined during the work done on the prototype). What is meant by this?	It means that we have to decide what the scope of presented data will look like. [possibly translation problem]
(specific scope of the data will be described in the prototype). What is meant by this?	As above.
Please give me the correct translation of the paragraph? What is document [6]?	No longer needed.
System data (diagnostic) moving inspection. What is this?	Moving is wrong word. Is it making of roadworthy test.
Stopping a document. What is this?	It is taking of document.

These problems illustrate that careful attention must be given to the documentation. Most ICT projects, especially when time is limited, fail to do this. The problem usually lies with the technical people themselves. Most of them admit that they do not like documentation. Their focus is not on documentation and they often neglect to update the documentation. Tools using reusable components, for example, the Rational Unified Process (RUP)

can assist with this problem. The management teams of both companies tried to get RUP implemented, but it was too late.

These kinds of problems must be identified at project initiation phase. The project manager must ensure that software tools are available to assist or simplify the process. The aim must be to continuously improve the quality of the execution of the project tasks and deliverables, as well as the product itself. This again highlights the importance of correct and timeous planning of the project.

At the stage where it was evident that the project experienced major problems, the new Project Director addressed the S.A. project team. According to him there were no big differences between the cultures, that the teams could find each other and that the language and culture problems would be sorted out as the project continued. For him it was important that all the people shared the same goal, a common objective. This statement proved to be very naïve. It could be interpreted as more motivational if put into context and in relation with the content of his speech given to the project team. He asked them to:

- focus on the future and meet each other halfway as the history cannot be undone;
- be committed;
- walk the extra mile to achieve the project objectives;
- build relationships;
- show that the team are able do the job;
- embrace the spirit of cooperation;

- enjoy the work;
- acknowledge that perceptions are more important than facts;
- realise that the team is committed into a partnership and work accordingly;
- be reasonable and help each other;
- build an impression that the team is committed to the task;
- be eager to please the client and to make the determined deadlines.

The communication media used during this project was primarily translated documents, specifications, letters and e-mails. These translations added to major communication and relationships breakdowns. Visits to the client country did not assist in building relationships or improve the communications. The east European team used the lack of understanding of their language as an excuse to do things their way and to not consult the other project partners. This had a major impact on the contractual agreements. They could also speak the language of the client and users and could therefore influence them.

Trust is important because it helps clients overcome perceptions of uncertainty and risk. Bahli (2004) noted that trust is of such importance that it is present in each level of project maturity models. The level of trust based on relationships established through meaningful communication was absent in this case.

Being part of the project, the author realised that one of the major factors contributing towards the failure of the project, was the absence of meaningful communication. Communication did take place. Proof could be given, but the

question was never asked whether the context and content of the communication, the process of sending and receiving information, was ever understood as intended.

This case study brought to light a risk factor within all ICT projects, development of information systems (IS), communication of meaning and mutual understanding between all the project participants and stakeholders.

SECTION 5: RESULTS AND DISCUSSION

SUMMARY OF RESULTS AND ADDITIONAL DISCUSSIONS

Based on the case study, the available literature and the theoretical principles answers to the research questions are summarised in the following section. Additional discussions on important related aspects and detailed answers are incorporated in the framework of mutual understanding (Section 6).

Communication, language and meaning

With reference to the five rules of contextualisation as identified by Jordaan & Jordaan (1989: 42 – 51) knowledge on the contexts is important to understand a person's behaviour. It is therefore important to firstly identify the users or client of the ICT project, and also to determine the stakeholders, the participants, the project team and all other people interfacing with the project team. By identifying them, their environment and the context in which they interact during communication, can be determined.

The interpretations and appropriation of information through communication is based on perceptions. In a multilingual ICT project where the agreed language of communication (the work language) is not a person's native language, people have difficulty to express themselves properly. It creates a lack of conceptual proficiency. An important risk identified by Jordaan and Jordaan (1998:365) is that *"it is risky to make arbitrary inferences about conceptual competence from people's command of English*".

The language doesn't stand alone, but includes other important aspects of communication such as facial expressions, gestures, posture and bodily movements, tone of voice and expression. These can have different meanings in different cultures and could create a noise in the communication process. The use of metaphors to describe certain concepts must be related to the context. This includes the ICT context as well as the cultural background of the people involved, to ensure the delivery of the intended meaning.

Based on the observations and suggestions as described in the case study, the importance of the communication of meaningful information has been identified as very high. The communicators must interact from an accurate perspective to be effective. Making sense of the language, the meaning and the purpose of what is being communicated, is fundamental to the communication process. Communication in the context of an ICT project is to express cognitive meaning through information and direction. The informative content of the message can be direct or indirect. Indirect communication is that message that must be "read between the lines". In a multi-lingual project this can be one of the major causes of diverse interpretations.

Direct straightforward statements can minimise the breakdown in communication due to these diverse interpretations. This also applies when actions are initiated or prevented as a result of communication direction. If the discourse through language is misinterpreted, actions can be channelled in a direction not intended by the sender of the message. The receiver of the message can use his/her own subjective logical interpretations of the direction

to be taken according to his or her frame of reference and linguistic understanding.

People use different communication strategies during normal discourse in order to convey information, give direction and/or to persuade or convince people. It is important to separate informational language and emotional language to be able to extract and evaluate the intended meaning of the message or argument. The use of emotional language is usually carefully applied to attain emotional reaction, but this complicates analysis of the message especially where people with diverse cultural backgrounds react differently to the same language construction on an emotional level.

An aspect of communication that cannot be ignored is the use of language to convey emotions. Emotional language is used to persuade or influence people, but in the multi-lingual and multi-cultural ICT project this can pose a major risk and it needs to be prevented or minimised. Cultures may have different emotional reactions for the same situation.

Separating the emotional language from basic information is important to ensure that the correct message is evaluated. Even a neutral word with a straightforward meaning can carry an emotional impact which may affect the reaction of the receiver. Even the choice between two different words having the same neutral meaning can elicit different emotions. It is therefore important to learn to use language in such a manner that thoughts and ideas can be

structured to promote better understanding. It is especially important when project documentation needs to be translated.

In the context of an ICT project the usage of software application programs to translate any written documents or communiqué is something that must be thoroughly investigated to ensure the correct usage of technical or domain specific terminology based on a multi-lingual semantic approach agreed to by all the participants.

Project management principles

The foundation of any ICT project is the basic principles and knowledge areas as described in the PMBOK guide (2000). The two knowledge areas most prominent in addressing the problem area are communication and risk management. This does, however, not exclude the other knowledge areas as they all form an integral part of the ICT project. The specific relevance and importance of these areas are explained by looking at the main points.

1. Project communication management

Communication is the exchange of information. It starts with the sender who is responsible to ensure that the information is clear, unambiguous and complete in such a manner that the receiver will understand the intended meaning. In a project, the dimensions of project communication are:

- Written and oral, listening and speaking.
- Internal (within the project) and external (to the customer).
- Formal and informal.

- Vertical (up and down the organisation) and horizontal (with team members and partner organisation).

Within a multi-cultural project team, a client and/or partners from other cultures and languages, these communication dimensions need to be taken to a more detailed level to ensure that all the aspects of the communication process necessary for a successful ICT project, will be catered for.

The communication process itself must be appropriate within the context of the project. The factors to be considered are:

- The sender-receiver models (feedback loops and barriers to communication).
- Choice of media (when to communicate in writing or when to communicate verbally; when to write an informal memo or a formal report).
- Writing style (active versus passive voice, the syntax and word choice).
- Presentation techniques (body language and visual aids).
- Meeting management techniques (composing and agenda and conflict handling).

These factors can be taken to a more detailed level by applying the following practical communication guidelines (Kerzner, 2003: 233):

- Think through what you wish to accomplish.
- Determine the method of communication.
- Appeal to the interest of those affected.

- Give playback on ways others communicate to you.
- Get playback on what you communicate.
- Test effectiveness through reliance on others to carry out your instructions.

Supporting these guidelines are communication techniques that will assist in establishing more effective project communication:

- Obtaining feedback, possibly in more than one form.
- Establishing multiple communication channels.
- Using face-to-face communications if possible.
- Determining how sensitive the receiver is to your communications.
- Being aware of symbolic meanings such as expressions on people's faces.
- Communicating at the proper time.
- Reinforcing words with actions.
- Using a simple language.
- Using redundancy whenever possible.

These project communication factors, guidelines and techniques as identified by Kerzner (2003) summarise and present solutions to the communication issues as identified in the case study and other related studies.

The management of the communication aspects of a project must start at the beginning of the project by informing all participants of their roles in the

communication process and the impact of a breakdown in the communication process on the project as a whole. It forms part of the project communication plan (PMBOK, 2000) that determines the information and communication needs of all the stakeholders. This includes information on who needs what information, when they will need it and how it will be given to them.

2. Project risk management

"*A project risk is an uncertain event or condition that, if it occurs, has positive or a negative effect on a project objective*" (PMBOK, 2000).

In an ICT project where the team and their project partners are from different countries, with different cultural backgrounds and using different languages to communicate, the basic barriers of project communication can be made more problematic and might pose definite project risks that must be managed. Management of these project risks will ensure that the glue that keeps the project together, namely communication, won't be torn apart. The Project Management Institute states in their body of knowledge that to be successful, the organisation must be committed to address risk management throughout the project (PMBOK, 2000).

Risk management identifies those actions necessary to deal with risks. Risk planning, identifying and analysing risk issues, developing risk handling strategies and monitoring risks, all form part of the risk management process (Kerzner, 2003: 655). Risk management is generally accepted as an important factor for sound project management and can be closely linked to all the

project processes: the overall project management, systems development, costing, scope, quality and schedule.

By identifying project risks at project initiation it is evident that proper risk management is proactive rather than reactive. Risk management includes risk handling that provides for specific methods and techniques to deal with known risks, the responsible person(s) to deal with it, and to provide estimates of the impact on costs and schedule to reduce the risk. The planning and execution of objectives to reduce the risks to acceptable levels are included in the risk handling activities. For known risks, such as communication breakdown due to language issues, the risks need to be handled through control, prevention or mitigation. Risk control doesn't attempt to eliminate the source of the risk but rather to reduce the risks and its impact on the project. Important to realise is that to put mitigation steps in place could affect the schedule and or the costs of the project.

The project communication risks can be listed on a more detailed (lower) level as communication barriers. Project communication barriers as identified by Kerzner (2003: 655) are:

- The receiver hears what he or she wants to hear.
- The receiver and sender have different perceptions. Kerzner identifies this as being vitally important when interpreting contractual requirements, statements of work and information requests.
- The receiver evaluated the source before accepting the communication.
- The receiver ignores conflicting information and does as he pleases.

- Words meaning different things to different people.
- Communicators ignore non-verbal cues.
- The receivers are emotionally involved.

Known risks, such as the communication barriers mentioned above, are those risks that have been identified and analysed to enable incorporating it in the project plan. To identify project risks the McFarlan risk questionnaire is a useful tool. This questionnaire lists the performance of off-site personnel as a high risk factor. The questionnaire also focuses on the establishment of a joint ICT/user team, but the interaction based on communication and mutual understanding is not described in detail. These and other project management guidelines on communication and risk management only touches on the aspects of diverse project team members, indicating that these are aspects that needs consideration. With the expansion of ICT projects and outsourcing across national borders, these aspects need to be brought forward as prominent risk and critical success factors.

Global ICT projects

As with the case study, organisations increasingly seek cross-border outsourcing companies to develop ICT applications for them. This trend has risen over the past few years as indicated in formal and informal writings. Warnings were given on the "*potential issues and problems emerging from differences in language, culture, politics, regulations and work practices that might hinder collaboration efforts*" (Hameed, 2004).

Globally dispersed teams face problems determining accurate requirements due to the complexities of communication between the client, users and developers. Misunderstandings occur due to contextual and linguistic differences. Project managers must acknowledge the importance of the communication plan and take cognisance of these differences. The effectiveness of communication in this scenario is of such importance that it should be identified as a known project risk. It needs to be managed throughout the life span of the project. Constant clarifications, explanations, translations and the soothing-over of relationships, results in wasting of time and money that cannot be traded-off against the scope or quality of the project. This will then ultimately results in projects not delivered on time and/or within budget.

Investigation into the language barriers as part of the cultural aspects of an outsourced software development project indicates the positive and negative aspects of the product. The cultural issues must be assessed and the contractor must establish the client's communication preferences. This will assist in determining the best way to manage the project with all its cross-cultural issues.

These concepts and guidelines must be included in the detail project management plan. Project communication is the golden thread that keeps the project together from inception to the sign-off of the final deliverable. If the communication barriers are not identified as specific risk factors and managed as such, project success will pose an uphill task.

Conclusions made from the literature, the case study and observations agree with Kerzner (*op. cit.)* as per his summary:

- Don't assume that the message you sent will be received in the form you sent it.
- The quickest and most effective communications take place among people with common points of view. Thus, the manager who fosters good relationships with his associates will have little difficulty in communicating with them.
- Communications must be established at project initiation.

The identification of the informational needs of all the stakeholders and determining a suitable means of meeting those needs is an important factor for project success (PMBOK, 2000: 119). The communication process should be reviewed throughout the project and adapted according to additional or changed needs. This forms part of the organisation's commitment to manage known risks throughout the life span of the project.

EVALUATION AND REASONING

ICT intervenes in the lives of people (Crafford & Roode, 1998) and this entire process in all its dimensions must be investigated, analyzed, incorporated in the feasibility analyses, the planning of the projects (time, scope, budget and quality) and the building and implementation of the technology.

The process of developing and delivering a software system to a foreign client can be divided into two prominent parts. Firstly, the client's (for the purpose of this paper the client will include the actual users) communication and interaction with the ICT development project team. Secondly, the project team consists of the management and administrative part and the analysts and developers. The communication needs for these two groups differ, but the importance of the correct transfer of information and the mutual understanding of the message of the communication, however, carries the same importance than its related risks.

One of the major factors for the failed ICT project was the lack of planning to accommodate the language issues throughout the SDLC as incorporated in the project management plan. The marketers of the ICT providing company play an important role and their influence and knowledge can either enhance the likelihood of a successful project or ensure its downfall by creating wrong impressions or unreasonable expectations. If mutual understanding has not been established, it could (and has in the case study) lead to vague contract stipulations that can be interpreted in many different ways to suit either of the parties involved. That in itself creates mistrust, the breakdown of communication and unreasonable demands leading to non-compliance with timelines.

The basic channel to convey information in ICT projects is through statements, proposals and specification documentation: the formal communication that needs to be approved and signed-off between the client and the contractor.

Based on the different ways language can be used and interpreted, communication strategies and language skills need to be re-examined with the focus on simplicity, directness and avoiding emotional language. The key aspect is to understand the intended meaning of what is being communicated within the correct context.

The World Wide Web creates a global village making linguistic services freely available. These services offer to help clients understand and communicate with foreign and diversity markets. Their proposed solutions are based on translations and interpretations. The question should be asked whether these offerings can bridge the language barriers within an ICT project. Does the communication created through these services convey meaning or just words?

The need to map the source language to the target language and to convey the correct meaning in the translated text, are complicated processes and no single rule exists to solve these problems. Every ICT project of multi-national and multi-lingual nature is unique and the communication of meaning between the different participants must be addressed individually and as pro-active measures.

Winorad and Flores (1986) as quoted by Hoppensbrouwers and Weigand (2000), stated that for satisfactory communication to take place, it has to be realised that the condition of satisfaction is not objective and cannot be free of the interpretations of the speaker and the hearer. It is important to listen and

to keep in mind that there is always the potential for a difference among the parties that could lead to breakdown.

The human factors within a multi-national ICT project play a major role in the success of the project. All the people participating in the project must foster an awareness of the other participants. It is also important to remember that as the project passes the initiation phase more hidden problems will emerge. If the basic communication guidelines and principles as described in this document and specifically as defined in the list of critical success factors, are not addressed early on in the project the problems will snowball and the damage might become irreversible.

Including communication, language and meaning in the ICT project management plan, with specific reference to project communication and project risk management as identified in this section, will add other dimensions to global ICT projects. These dimensions focus more on the social aspects of the ICT project and not only on the technology. The following section describes a framework of guidelines to include such a dimension in a global ICT project.

SECTION 6: FRAMEWORK OF MUTUAL UNDERSTANDING WITHIN ICT DEVELOPMENT PROJECTS

APPLICATION AND VALUE OF THE FRAMEWORK

The purpose of the framework is to create guidelines for multi-cultural, multi-linguistic ICT projects to acknowledge the problems associated with the communication of meaning as a threat to project success. Within the framework certain rules needs to be adhered to in the project undertaking. The rules include communication, relationships and project management principles.

The question on the establishment of mutual understanding to ensure that all participants work towards the same goal must be answered. Communication within and around an ICT project is more on a business level, but is founded on interpersonal communication. People need to understand others to recognise the meaning of the information conveyed. Emotions must be minimised and trusting relationships need to be established.

Information system design is based on specification processes that use language-related techniques and tools to facilitate the communication of the relevant information. Meta-communication is identified by Hoppensbrouwers and Weigand (2000) in the language action perspective and put into the context of ICT specification and design.

From the literature the notion has been identified that ICT developers accept language as a given, not acknowledging or incorporating it into their project

schedules. Three main risks arising from this as identified by Hoppensbrouwers and Weigand (2000) are:

- Immediate communication breakdown as a result of clearly perceived incomprehensibility of some utterances.
- The receivers of the communication suspect incorrect interpretation because of a perceived mismatch between what is said and what is to be expected in the wider context of the conversation.
- No misunderstanding is perceived and problems may arise only later.

It is therefore important to ensure that all the people involved in a conversation or communication of sort, are satisfied that what has been communicated has been understood as intended.

The purpose, strategies and medium of project communication must be determined and accepted by all participants. This is important to ensure that the communication expectations are understood and can be managed. it is extremely important when making decisions, involving the right people and formalising the decisions by sign-off.

Aspects that need scrutiny are the feasibility studies, the identification of risks and the management of these risks. The feasibility studies must include the identification of all the roleplayers: the client, the users, and the ICT software development team, within the context and content of the individual's language and culture. The following is an example of a problem situation that needs to be addressed: People who need to communicate in order to ensure a

successful project experienced major problems resulting in misunderstandings. They discovered too late that there is a lack of mutual understanding. The political games played within the project use the language barrier as an excuse for slippages on time, bad business requirements and the allowance of scope creep.

Planning the communication process and determining control or mitigation steps to manage the risks related to the communication process, must be done carefully during the initiation phase of the project. Care must be taken to avoid additional costs related to inappropriate communication, translation and other technology or additional resources not budgeted for. Management of the risks and determination of the mitigation steps must include the provision of sufficient (reasonable) time. Using the basic project management principles, knowledge areas and guidelines as proposed by project management experts, it can be taken a few steps further and all the aspects of communication related to the transfer of meaning within the multi-lingual and multi-cultural ICT project can be included.

Included in the project resource planning should be a translation tool applicable to the specific project scenario. New multi-national versions of translation and project management software tools can give multi-national project team members access to cross-border project information. These international users can benefit while receiving, updating and communicating project status in their own languages. When investigating the handling of language issues in ICT software development, Esselink (2004) highlights the

technical and language issues in enterprise recourses planning (ERP) software and how these systems need to adapt to the global marketplace.

The translation actions part of the project is crucial to the whole project and the creation of an international workspace. "*When we accept that translation is not merely a transfer between cultures, we may also view it as a merging of cultures and a creation of new space. Translation does not confirm the borders of asymmetrical languages and cultures but identifies pluri-centers for the negotiation of cultural differences"* (Bin, 2004). The importance of linguistics and contextual knowledge are imperative for the cooperative interaction part of information systems design.

THE FRAMEWORK

The following paragraphs identify guidelines to form a framework. These guidelines have been deducted from observations and interviews with the role players in the case study, as well as with ICT practitioners in the Gauteng province of South Africa. Part of the framework is to recognize the importance of linguistics and contextual knowledge in cooperative interaction as defined in the list of CSF's.

There are factors influencing this framework that need to be explored to ensure the validity of the arguments put forward in the framework. The factors are:

1. Project Management principles according to the PMBOK.

2. ICT development principles (refer to the SDLC and the SSM). These principles can be ensured through continuous project evaluation and risk management throughout the project life cycle.
3. Communication and meaning within different cultures (i.e. the human aspects).
4. Language and translations.

Guidelines to the framework will first address the project management aspects and then look at the communication aspects within the ICT project. From the project management perspective, Kerzner, a world renowned project management expert, points out that one of the aspects determining a project's maturity is the cultivation of effective communication, cooperation and trust to achieve rapid project management maturity (Kerzner, 2003). Project risk assessment and management's effectiveness throughout the project is based on introspective project evaluation. It is timely information on the health of the current project determining the maturity level. The identification of what's working and what's not working will allow the project management team to make improvements during the whole life cycle of the project. The basic project management principles, such as using project checkpoints where audits are performed on the project state at that point in time, must include the assurance that the meaning of what has been communicated, has been understood as intended.

The project management process encapsulates the development process including the content development. Internationalisation however, "*adds a layer*

*of complexity to the content development process and does require planning, communication, time and effort to implemen*t" (Brown, 2004). Issues identified by Brown (2004) regarding the clarity, consistency and terminology in the source content, as well as ineffective and inefficient processes can cause considerable and unnecessary costs added to the project budget.

At Eastman Kodak management believes that their projects' success is based on the use of multinational teams: "*At Kodak, we believe global development teams are critical to success. It is very important to involve engineers from the major countries where the product will be sold in the development process. This ensures that cultural differences will be addressed at the right point in time*" (Herz, 2002). Together with this statement they also identify the aspect of communication as a key to success or failure.

Global communication and exchange of information that are meaningful to the various participants in the communication process are founded on understanding the different cultures and the needs of the various groups. Team members not able to communicate in English, although English is accepted by many companies as the world business language, are unable to share their ideas, knowledge and insights due to the absence of fluency in the English language. This can affect the development of the product in terms of time spent to solve certain problems or identifying problems only during user testing.

When looking at the communication aspects, certain preparatory actions must be identified during the project initiation phase. The environment must be prepared to allow the delivery of a successful project:

1. The relationships must be established: the focus must be on business, professional conduct, reliability and trustworthiness.
2. Neutral, not personal, business communications must be the objective.
3. All role players must be prepared for the communication process including the rules of communication as well as conduct rules.

The effective and efficient establishment of the correct communication channels depends on the following aspects of the multi-national project:

1. Appointment of appropriately skilled and experience project manager.
2. The project management plan must focus on the project communication management plan and the project risk management plan.
3. Agreed on methodology, processes and procedures must be in place.
4. The project resources must be skilled and experienced in their specific fields; and must participate in induction sessions to prepare them for language and cultural issues to promote the establishment of good working relationships based on trust and respect, and a common goal.
5. Establishing a documentation team including translators. This includes the sourcing of an applicable translation or writing expert to assist all groups of the project team in establishing mutual understanding through all the communication channels.

6. CSF and lessons learnt from other similar projects must be incorporated where applicable within all the dimensions of the project and addressed throughout the project life cycle.

The communication channels are identified within the ICT project in a multi-national environment. The main communicators are the business partners, the end-users and the organisation representing them, and the software developing (ICT) company. Other role players are the translating company and other suppliers and contractors involved in the project resources.

These different communication channels are identified in figure 1. The diagram shows the main groups of communicators and the position of the translators or interpreters.

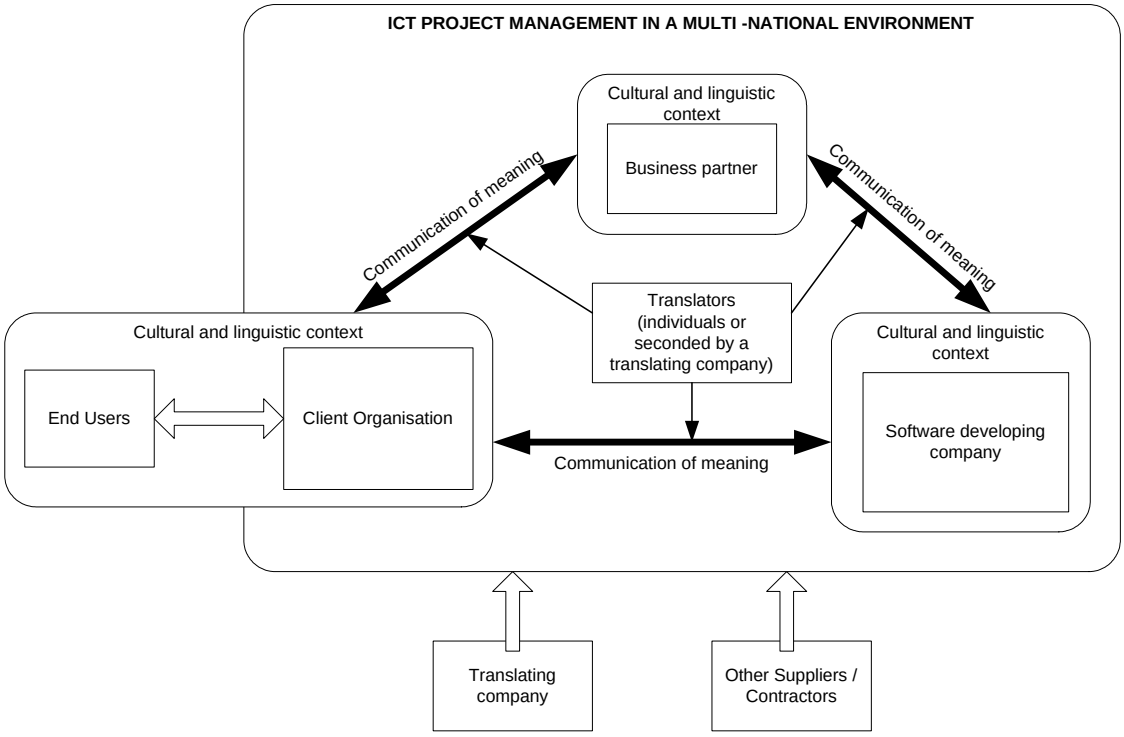

Figure 1 - ICT project communication in a multi-national environment

Participants should keep this diagram in mind and follow basic communication patterns and rules, as presented in the following paragraphs. This will prevent the chain reaction of perceptions and negative feelings that block effective communication.

The first and most fundamental rule is to compile a project glossary and to determine communication rules crucial to a multi-linguistic ICT project. This will form the centre of the communication actions. The glossary is of great importance because not only are there different translations for a specific word that could change the meaning, but there is also specific ICT domain terminology that needs to be clarified and mutual agreement obtained as to their meaning and use.

To assist with the establishing of the rules, Cragan and Wright's (1999) eight ways to define a word can be considered:

1. Definition by origin: Key words created by a group for a specific purpose are defined according to where it originated from.
2. Definition by negation: The meaning of a word is determined by what it's not supposed to mean. These definitions can be deducted from the project charter and contract agreements. It is good practice to keep to definitions that originated from these legal documents.
3. Definitions by example: To eliminate ambiguity between a word and all its possible meanings, specific examples can be used. Another way is to use pictures and diagrams of key objects to clarify its meaning. In the

ICT domain different methodologies and standards are used, for example the Unified Modelling Language (UML) that uses specific notations with specific meanings. These notations have the same meaning irrespective of what language is used.

4. Definition by description and classification: An example is the use of client and user. These people are all project stakeholders and could or could not be participants. All the people and or entities can be grouped (classified) with a proper description and reasons for the classification to eliminate any confusion.
5. Definitions by analogy: To define something based on an analogy is to refer to the similarity between the two things. Knowledge of the one thing will help to understand the other. The use of figurative analogies must be carefully approached as it can lead to misunderstandings especially when the group members don't share the same native language and culture. However, the use of figurative analogies should not be discarded as they have great value in describing complex ideas. Literal analogies can be linked to examples, but care must be taken to consider the context of the referred example.
6. Definition by purpose and function: This describes the intent and behaviour of a word or phrase within the boundaries of the ICT project goals.
7. Definition by operations performed: The compiling of operational definitions linked up with the previous point, but add to it the measurable behaviour.

8. Definition by context: Words can have different meanings depending on its connotations and the meaning can therefore only fully be established when placing it into context.

The project glossary and identifying the different communication channels within the project, as well as the identified project management issues, can be further enhanced by the critical success factors as indicated in the following paragraph.

CRITICAL SUCCESS FACTORS (CSF): SUPPORTING THE FRAMEWORK

The CSFs are those aspects of the ICT project that need to be addressed otherwise the success of the project can be jeopardized. The factors are grouped according to the most applicable domain and in no specific order. Most of the factors overlap across the different domains. By no means does this represents a complete list. The list can be expanded based on other experiences and research.

The CSF's were compiled from research done by various writers, as well as derived from the case study and information obtained from formal and informal interviews with team members and managers participating in cross-border multi-national ICT projects. These are represented in table 2 below. The domain groupings relate to the previous discussions on 1) communication and meaning, 2) project management principles, 3) information systems development, and 4) language and translations. Any other notes, explanations or examples to support the CSF's will be added to the last column of the table.

Table 2 - Critical success factors for a multilingual multi-national ICT project

	Domain	Critical success factor	Additional notes
1.	Communication and meaning	Communication tools are necessary to create quick and effective communication on a national level.	Care should be taken not to rely too heavily on the tool as most translation tools do not cater for invisible and underlying ambiguities and misunderstandings. Translation tools "*facilitate consistency and focus on the linguistic aspects of the content, and, while they may have a deep knowledge of the industry for which they are translating, translators typically do not possess the depth of product knowledge required of a technical communicator*" (Brown, 2004).
2.	Communication and meaning	The formalities in communication between different nations differ and should be acknowledged. A work language protocol must be established.	The way to communicate is important as it is linked to the different cultures. While Americans and South-Africans have a more informal approach to business dealings, countries such as Asia and the Middle East maintain formality in communications
3.	Communication and meaning	The technical communication must be structured to improve workflow.	This can be determined within the process and configuration management plans.
4.	Communication and meaning	A participatory communication model must be used. It is receiver centric and focuses on the exchange of meaning.	Participatory communication is multi-dimensional and targets all levels of participation. It allows harmony with the environment and results in the satisfying of the needs of the communicators.
5.	Communication and meaning	Proper education and preparation are crucial in language and cultural aspects to ensure prosperous relationships.	Relationships based on trust and effective communication are crucial in creating a solid foundation for any successful ICT project.
6.	Communication and meaning	Conflict to be handled based on the identified communication risks and knowledge of the different cultures, traditions and language	The reality of conflict must be acknowledged based on different cultures, traditions and language concepts. Every project participant must identify the other's

	Domain	Critical success factor	Additional notes
		concepts.	needs and strengths to be able to handle conflict in a productive manner.
7.	Communication and meaning	The project participants must be informed of the procedural cultural differences and not react in an ultra-sensitive manner. First investigate before reacting.	A good guideline is to first ensure that what is perceived as the meaning of the communication is what was meant by the communicator.
8.	Communication and meaning	The content of the communication must be understood by all. The creation of shared meaning is based on determining the meaning of concepts, symbols, behaviours and other forms of expression.	The communication content must not only be explained, it must be understood. There is a difference between explanation and understanding. "*Understanding is connected to the thoughts, motivations and intentionality of the objects*" (Hovorka, 2004).
9.	Communication and meaning	The meanings created must be rational and clear as perceived by all.	
10.	Communication and meaning	Specific actions must be taken to sort out misunderstandings.	"*Problems occurred when the involved organizations failed to sit down and discuss with each other and therefore did not understand each other correctly*" (Jonsson *et al.,* 2001).
11.	Project management	Team members must get to know each other to establish good relationships. This will ease the handling and sorting out of misunderstandings.	Relationship building is important to minimize breakdown in communications, and to build mutual trust and confidence.
12.	Project management	Good leadership is crucial to solve problems based on misunderstandings.	
13.	Project management	Project management must be thorough and done by people who understand all the relevant issues.	This will enable the incorporation of the necessary actions during the life span of the project to ensure consistency and continuous addressing of the factors that could impact the project success.

	Domain	Critical success factor	Additional notes
14.	Project management	A formal methodology must be determined and agreed on by all the different project groups. This must include the processes and guidelines regarding the language communication issues and translation problems.	The solutions methodology will ensure the collation of accurate, timely and related information. It will structure the whole project ensuring effective management of the whole project and specifically the risks related to language and cultural differences.
15.	Project management	The need for meta-communication must be incorporated into the project management plan.	
16.	Project management	A translation strategy must be included in the project management plan as defined in the scoping and planning phase.	
17.	Project management	All parties must be informed of the new means of communication: the use of translators and interpreters.	It is a change environment and all parties must get used to this new way of communication.
18.	Project management	The project policy, based on the organization policy, must include the recruitment and training of the project team. The focus must be on communication, cultural differences, trust and context sharing.	
19.	Project management	All the participants must have the same understanding of the project goals and the project progress.	
20.	Project management	Project templates to compile effective and complete documentation must be put in place.	The use of templates will limit the variation in creating the documents and will therefore increase consistency.
21.	Project management	Meetings must be carefully planned and attendees must prepare for the meetings.	This is to ensure that ‘to the point’ issues can be discussed and no time wasted on sorting out

	Domain	Critical success factor	Additional notes
			unnecessary ambiguities.
22.	Project management	Time estimates for translations must be realistic.	The same measures used to measure the project outputs cannot be used for translations. It is different than creating documentation in own language. Translations are measured on a per-word basis. The project timelines, i.e. the target delivery dates can be compromised due to excessive time spent on translations and cross-checking of translated documents.
23.	Project management	Create a documentation team and ensure that their costs are budgeted for in the project cost management plan.	All communication should be conducted in a professional manner and documented as well.
24.	Project management	The project glossary must be continuously updated and all project resources must be aware of the glossary and any new changes or updates.	The glossary must be created in a structured way to ensure the translation of concepts, within context. The documentation team can be made responsible for the glossary.
25.	Project management	All actions to promote effective and efficient project communication must be done on a continuous basis. When new team members join the project these aspects must be part of the induction.	As the project proceeds, the induction and continuous education of the project team members are often neglected. This takes time that was not planned for. It is important because in many cases the project starts off with all the correct plans and actions in place, but the team changes during the lifespan of the project.
26.	Project management	The education of writers, analysts, developers, engineers, and product and project managers about translations during an ICT project is an ongoing process.	
27.	Project management	Sufficient time must be allocated for the project participants to familiarize themselves with the different nation's customs before	Single mishaps can break a deal or create awkward or potentially offensive results.

	Domain	Critical success factor	Additional notes
		project communication commences.	
28.	Project management	The selection of the human resources must be done with the following requirements: - specialists with proven expertise - language skills - understanding the issues surrounding the implementation of ICT in another language and culture.	
29.	Project management	Compiling a project team must include soft skills. The personalities of the resources must contribute to building relationships for optimal cooperation and collaboration.	More patience is required when participating in a multi-national ICT project. This is due to the cultural differences in decision making, but also due to unclear meanings of communication.
30.	Project management	Include people of the same ethnicity in the project team. Teams with multi-disciplinary skills will result in a holistic approach to management and development.	This will create language smoothness and better knowledge of customs. However, care should be taken when persons of the same ethnicity are included as they could be seen only as a glorified translator and not a decision maker. In China and other hierarchical societies this could undermine the negotiations.
31.	Project management	The project manager must realize and include the technical writing requirements in the project management plan.	Brown (2004) quotes a survey respondent who pointed out that "*Localization project managers don't believe that technical writing is a specialized discipline …Technical writers are considered no more than desktop publishers who understand grammar".*
32.	Language and translations	The notion that translations can invoke feelings of resistance must be identified and managed as a project risk.	
33.	Language and translations	In multi-lingual projects where the translation of information is necessary, the project	The project management life cycle is iterative throughout the life cycle of the ICT software. Including

	Domain	Critical success factor	Additional notes
		manager must include a translation phase in the project management life cycle.	the translation of communication content in this cycle will ensure that the correct meaning is transferred.
34.	Language and translations	The aspects of word collocation, the correct use of word combinations, must be part of the team's education and preparation for the project communication.	A dictionary and thesaurus will not be sufficient to address these issues. A tool or resources to assist with the correcting and or suggesting of more applicable phrases or words are necessary. The project glossary, as described before, will be essential to address this factor.
35.	Language and translations	Language and linked cultural issues must also pay attention to aspects that are not obvious.	These invisible issues can impact the building of trusting relationships. In contrast with the visible cultural aspects that include language and social gestures, the invisible aspects could be seen as "reading between the lines".
36.	Language and translations	The use of an applicable "English writing expert" to help the project team improve their word choice and clear up any ambiguities.	This is especially relevant for non-native English speaking team members. This is only a tool that can assist with a small part of the language problem. It will therefore not suffice on its own to handle the language problems.
37.	Language and translations	Any written communication, e-mail, letters and documents, must be done in such a way that it easy to translate – "write for translation".	Aspects to consider are (Brown, 2004): - keep it simple, concise and clear - avoid jargon and acronyms - be consistent - understand the audiences - avoid text in graphics
38.	Language and translations	The terminology and translations must be clarified between the professional groups.	
39.	Language and translations	Simple language constructs must be used.	The use of metaphors can have different cultural meanings and should be avoided.

	Domain	Critical success factor	Additional notes
40.	Language and translations	The translators must be carefully selected; accepted by all parties as neutral, without any political or business interest; must use the same and accepted glossary of terminology and concepts to translate the text.	The meaning of translated text is based on linguistic information as well as personal judgement determined by cultural background. It is therefore important to determine neutral ground for the translations.
41.	Language and translations	Translators and interpreters must be dedicated to the project.	The same persons must be used throughout the project to ensure consistency. Contingency plans must be put in place to follow this through.
42.	Language and translations	Translators must have domain knowledge. The team of translators must have technical, terminology and domain knowledge. The number of translators must be scalable to suite the needs of the project.	The comprehension and knowledge of ICT terminology are crucial to the correct translation of text.
43.	Language and translations	Translators must work with the analysts to reduce the time spent on clarifying the meaning of the text.	
44.	Language and translations	Translators must not translate word for word, but conceptual units to ensure that the conceptual meaning is preserved and communicated.	
45.	Language and translations	Translations must be managed as text-meaning-transfers (Bin, 2004).	If the meaning of the information is an integration of concepts, discussions will be necessary to clarify the meaning.
46.	Information systems development	Co-operative development must be based on knowledge sharing.	Knowledge sharing can only take place where meaningful information is communicated.
47.	Information systems	Putting all the necessary measures in place to address the language and translation	The ICT specialists' part of the project team should not be hampered in their tasks by unnecessary language

	Domain	Critical success factor	Additional notes
	development	issues will allow the ICT specialists to focus on their tasks.	issues.
48.	Information systems development	Domain knowledge is crucial to the understanding of the user requirements.	Limited domain knowledge can affect the design and implementation phases, as well as the quality of the system. Misunderstanding due to language barriers will add to the complexity.
49.	Information systems development	Use of international recognized standards in the system analysis and design, such as the Unified Modeling Language (UML)	UML notations and techniques have standard meanings ensuring that even though the communication language and culture differs, the meaning of the designs are interpreted the same. The specific standards must be determined beforehand and be added to the project toolkit.
50.	Information systems development	Precise requirement specifications are necessary to prevent free interpretation.	Specific requirements must be described in short, simple sentences.

The framework has identified guidelines on ICT project management, the ICT systems development, communication and meaning within a multi-national context and language translations. This framework is supported by a list of CSF's. These factors are not all applicable to every project and should only be used as a starting point to identify each individual project's CSF's with specific reference to the communication of meaning through all the project communication channels. Care should be taken not to neglect any factor as they al support each other.

An ICT global project needs all the communication channels as identified in figure 1, to ensure successful project completion. However, for these channels to be effective, these guidelines and CSF's must be implemented and managed throughout the project.

SECTION 7: CONCLUSION AND RECOMMENDATIONS

The goal of the study was to find possible solutions to the problem at hand. The main objective was to identify specific non-technical aspects of the ICT project, conducted for a foreign country. The language barriers had to be bridged in such a way as to improve relationships, deliver a successful product that would meet the requirements of the client and to create an environment for future business relationships.

The expected findings of the study were focused on the social nature of ICT systems development with specific reference to the human and communication elements of an ICT project often neglected. The author attempted to determine certain practical guidelines, underpinned by theory that support the assumptions made. The study tried to determine the feasibility of an ICT project where definite language barriers exit. The feasibility study should include determing the probability of success implementing the guidelines and CSF's identified. These factors play a role and should therefore be taken into consideration when deciding on whether or not to go ahead with the project.

Through the literature study, observations and the case study, the common and unique aspects related to the research problem were identified. These observations were interpreted and integrated to create a framework of guidelines and CSF's that could be utilized as a valuable tool for future ICT development projects where language barriers pose a definite risk.

From the experiences and lessons learnt based on the case study it is evident that the success of an ICT project where different languages are used to communicate the project deliverables, can be put at high risk if these issues are not addressed in the most efficient and effective manner. Important is to acknowledge that the risks exist and have to be managed according to project management guidelines as proposed in the PMBOK with specific reference to the risk management section.

The trend to seek ICT projects across national borders will stay; even internationally known business people recognise the international cross-border market. Most of the participants at the World Economic Forum in Davos, 2003, believe that globalisation with its unconstrained flow of capital, labour and technology across national borders is both welcome and unstoppable (Gumbel, 2005). Teams must work together, but are still separate. Klaus Schwab, founder and executive chairman of the World Economic Forum argues that to endorse a global outlook doesn't mean the erasing of national identities. He said that globalisation cannot provide cultural identity that is inherently local and national in nature. In the same breath Martin Sorrell, chief executive of the advertising and marketing services giant WPP, emphasised that it is dangerous not to be sensitive to local issues. Even though the world is seen as one big marketplace, national identity is still important. People are different in more aspects than was generally believed. Important from this is that to be competitive in the global market with ICT or any other business, cultural and linguistic diversity must form part of the strategy, planning and implementation of these business initiatives.

From a usability and interface point of view, the cultural and language variables must be investigated. This introduces the importance of cultural issues such as translations, numbers and dates. Globalisation's expansion in the software industry will force the designers to create interfaces that will meet the needs of the users of foreign countries. Localisation projects usually focus on translations, numbers and dates. These projects ensure that the icons used are culturally appropriate. Not only is the design of the interfaces important, but also the design of the whole system, to ensure that all the business requirements are met.

The requirements and its feasibility within the context of a cross-border project, can be determined by methodologies focussing on the needs of the users and prototyping. These must run concurrently to ensure the correct interpretation of the requirements. The users must have a system that addresses their needs. To identify these needs it must be communicated and understood through the communication process. The software development team must be able to understand the meaning of the communication to be able to comprehend the nature of the requirements within its context.

The cultural differences also present itself in the national languages. Cragan and Wright (1999) pointed out that language theorists argue that the meaning of a word depends not only on the sentence and paragraph in which it is used, but also the nonverbal behaviour that accompanies the verbal communication. They pointed out that understanding what is being said in a group is complex. It is therefore important to create a unique group language to convey the same

meaning to all the participants irrespective of their native language. This is also a means to create trusting relationships within a project. The technical jargon, abbreviations and acronyms created within the project environment also allow all the participants to communicate more efficiently within the project.

Nietzsche said that "*truth, like morality, is a relative affair: there are no facts, only interpretations* [and that] … *language [reality] falsifies*" (Osborne, 1992: 130). Other philosophers such as Quine also identified people's difficulty with language and meaning (*op. cit.*: 142). The philosopher, Frege, stated that "*the sense of a word can vary widely. For example two people from different vantage points give different colourings to the word mount. But the reference – the actual mountain – is constant*". From years back the importance of language and the meaning of words have been acknowledged. These philosophers' teachings should be incorporated into ICT projects.

Within the ICT project and a multi-linguistic environment the creation of the project glossary emphasises the important aspect, namely, not to incorrectly assume that other people understand the meaning of the content of the communication. Throughout the project life cycle participants come and go, the rules of the communication of specific meanings is something that cannot be established only at the start of the project. It is important to ensure that all new participants have knowledge of established communication rules and guidelines. Another important factor is the development of new definitions as the project proceeds. These need to be documented and brought to the attention of all project participants.

As mentioned before, the effective communication between ICT project participants can be identified as a top management quality control and can be used during audits. Weber (1999:86) states it as follows: "*effective communications are essential to the conduct of high-quality planning, organising, and controlling. Effective communications are also essential to promoting good relationships and a sense of trust among work colleagues.*"

The communication of meaning between the participants of an ICT software development project is a critical success factor for the project and therefore justifies the attention given to it in this study. This is even more important in a project that crosses national borders.

CONTRIBUTION TO THE FIELD OF INFORMATION SYSTEMS/INFORMATICS

This study originated from a project, as described in the case study (the author was part of the project team), that experienced major problems related to foreign language issues and the breakdown of communication and relationships as a result of it, compromising the whole project. A contribution to the ICT systems development field was made, with specific reference to the project management approach as prescribed by the Project Management Institute in the PMBOK, by proposing a framework of guidelines for IS development that will assist in recognising the relevant CSF's and risks.

Proposing a guideline to address these problems, identifying the related risks and putting contingency plans in place even before the project started, could assist in effective decision-making, establishment of relationships, management of all the project related issues, and ultimately resulting in successful projects in the ICT environment.

The main contribution of the study is the creation of a framework of guidelines, inclusive of a list of CSF's, as a result of the identification of the "true" knowledge of the impact of language and communication of meaning on the development of IS.

FURTHER RESEARCH

Research is currently being done by the Language Engineering and Applications European Commission, Human Computer Interaction and National Science Foundation on multilingual information access and management. They identified differences in language and culture as obstacles for unrestricted communication and free circulation of information. Their research aims to identify specific issues in accessing, managing and exchanging information in a multilingual and multicultural context; to create the knowledge required for new technologies or combination of technologies to address these issues in an effective way; and to evaluate the potential effect of these technologies, their impact and benefits (EC-US Research, 1999). The planned activities include the preparation of future research geared towards the development of innovative and advanced language technologies in the area of multilingual information and cross-cultural communication. These

activities are supported by the Human Language Technologies line of the European Union's (EU) Information Society Technologies (IST) program for EU partners and the Human Computer Interaction Program of the National Science Foundation for US partners.

The results of the EU research support further studies necessary to substantiate the results of this study which investigated the impact of language and the communication of meaning within ICT development project across national borders and having to deal with multi-national and multi-lingual project team members. This study only identified a framework of guidelines based on literature studies, limited observations and interviews, to address the issues related to these kinds of projects. Follow up research, based on this study will add enormous value to the communication and language issues in ICT projects.

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