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# IMPROVE COMMUNICATION QUALITY: A CHALLENGE IN GREEK SHIPPING COMPANIES

**By**

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To my grandparents

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# BIOGRAPHY

Aikaterini G. Liapaki, Professional

Aikaterini (Katerina) G. Liapaki was born in Athens, Greece, on January 29, 1982. After high school graduation in 1999, she continued her studies in Technological Institute (TEI) of Chalkida in Mechanical Engineering with an orientation in Construction Engineering. During her studies she won three annual scholarships for high her performance and she also got a prize for the higher graduate degree in her field in 2004.

Her high performance gave her the chance to be enrolled in an six month practical education in Hellenic Aerospace Industry (EAB) where she joined the CAD/CAM department and got an important on – the- job training in designing basic mechanical parts as well manufacturing tools for the aerospace industry. After completing the six month educational practice in EAB Katerina was employed by a Greek SA company specialized in manufacturing and design of desalination plants in 2005.

In a short time Katerina was promoted to manager in R&D department and one year later developed the construction and manufacture department with a great success. After approximately four years of experience in desalination plants, Katerina thought that she should develop and prepare for an engineering career in this area of expertise. However, her decision to continue her studies with a Master degree in Project Management and her enrollment in the Program, made her to change her professional direction. This revelation, together with the further study of project management and all its knowledge areas, paved the way for the next phase of her professional career path.

In 2008, Katerina was employed for the purchasing department by a large multinational company in Greece which was specialized in construction of renewable energy projects. As her focus was mainly in project management, after one year and a

half in the purchasing department she promoted to the company's finance department for controlling and monitoring large "turnkey" contracts for construction projects. Her further ambition is to undertake to create a PMO and involved in the strategic planning of the company where it is currently employed.

## Abstract

The present paper explores the issue of project communication quality and examines the quality levels of communication in the Greek shipping maritime sector. The research methodology included the review of the existing literature mainly related to project communication; communication in shipping environment and within virtual teams. Moreover, in an effort to determine the factors that inhibit the effectiveness of communication during a shipping project in Greek shipping maritime sector, a survey questionnaire was distributed to a total of 60 Greek shipping companies. Data was collected from 35 shipping companies which represent a fleet size of 744 vessels. Results indicated that several factors were impact communication quality in shipping projects. The majority of these factors seemed to be negatively correlated to information quality and communication channels quality, while the quality levels of communication means and technology used were satisfactory. Through the Pareto analysis tool, the paper focuses on the vital few elements that lead to miscommunication and should be overcome in order to improve communication effectiveness. The paper concludes that lack of trust among project team members, lack or delay of feedback as well the multiculturalism that characterizes the project team, are the main communication barriers for the Greek shipping maritime companies.

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# Chapter 1 – Thesis Introduction and Overview

## 1.1 Introduction

Focusing on Greek shipping industry sector, this study aims to examine the quality of communication in shipment projects and introduce the concepts of the project management in that field. This thesis begins with the premise that exist many communication problems in shipment that affect significantly the smooth project execution and the project's overall success, expressed mainly in terms of time and cost. The thesis takes a position with the argument that miscommunication takes place mainly due to the particular nature of the project, as the higher portion of the project's life cycle is taking part under a virtual environment, and the characteristics of the project team, the strong element of multiculturalism seems to carry the team. All above statements and arguments shall be questioned and examined through a literature review most oriented on communication processes, the Greek shipping environment, and global virtual teams hereinafter (GVT) multicultural project teams and, challenged through the results of the research conducted.

The aim of this paper is to detect and identify the hidden factors that cause communication problems in shipment projects which Greek shipping companies have to deal with in order to be more competitive, and therefore to suggest adequate quality methods/tools to minimize or even eliminate them. A proposed framework based on Total Quality Management (TQM) philosophy shall be provided to be implemented by Greek shipping companies to improve their shipping operations sector shall be proposed and the overall success of their shipment project.

**1.2 Importance of thesis topic**

It is well known that in the international transportation of goods issues, maritime transportation appears to be the cheapest and most preferred. According to the World Trade Organization (WTO) more than 90 percent of the global trading is carried out by shipping and this fact presents the industry's vitality. Nowadays, the world economic crisis influences in an immediate way maritime transport, lowering the growth rate for all advanced and developing countries.

For the Greek commercial shipping, except from the exogenous characteristics that affect its vitality, such as the difficulty to control the fares, it is recommended for to discover and overcome its internal barriers, to increase the quality and the overall performance in operations with a view to become more competitive, qualitative and effective in the global market.

Competitiveness is the key word throughout the Greek shipping industry which would enhance the qualitative features of the services provided, as well as the actual shipping operations. Functionality improvement, elimination of bureaucracy, strengthening and modernization are indispensable requirements to meet the exigencies of time, especially nowadays in such rigid economic environment. It is important that any improvement should be based on conditions and long-term investment performance.

In this effort, the business acumen of the Greek ship-owners, the good traditional management and the usual practices followed thorough the shipping history up to now are not enough, but there are also needed the discipline of project management, with its advanced principles and theories such as quality, continuous improvement, systems thinking, etc.

Given the wide area of the above subject, for the purposes of this paper, we are going to limit the scope. This study will focus on communication quality improvement in the Greek shipping industry, since communication takes up 90% of a project manager's time (Kerzner, 2004) and is essential for smooth operations in the shipping sector.

### 1.3 Nature of the Study

Although exists satisfactory literature for the communication process in virtual teams and Greek shipping industry in general the specific topic of the thesis has not been fallen bibliographically into satiation. Its universality derives from the combination of two parameters: a) communication and b) quality from a project management perspective into Greek shipping sector. The term communication itself comprises various dimensions and embraces a large body of study and knowledge. Thus, although a qualitative approach concerning the quality of communication can be facile, a quantitative analysis requires higher attention and must be done meticulously, to be valid.

### 1.4 Thesis Outline

The thesis will be comprised of seven chapters. Following the introductory chapter, which outlines the nature of the study, Chapter 2 and 3 will present the problem statement and reviews on related literature on the communication barriers within virtual teams, on communication patterns in shipment projects; on quality and how it can be measured in the field of communication. The attention should be focused on the quality of communication and, Chapter 3, will be devoted to defining it, outlining its theoretical precepts and discussing its implementation.

Chapter 4 will present the thesis's selected methodology, the limitations and author's expectations. Chapter 5 will present the results of the survey providing relevant graphs that illustrate them and will discuss the results through a presentation of the research findings, while Chapter 6 will conclude the results of the study. In Charter 5 also the author shall offer a detailed discussion and debate of the research results.

Finally, Chapter 7 will present a guideline of actions and strategies adequate to be taken and used in the Greek shipping sector according to the findings of research. Chapter 7 will also provide a discussion of the implications of these findings and the presentation of a set of recommendations and future expectations arisen from the thesis.

**1.5 Relation to the Program of Study**

To relate the concrete thesis approach with theories and courses that have been introduced in my Graduate program, my thesis can be linked at least with the courses taken below:

1. PM503 - Communication for Project Success. As I have already attended this course I have become more knowledgeable about the methods and/or types of communication are more adequate throughout a project life cycle depending on situational criteria and also I have learnt to apply critical thinking skills to effective communication techniques.
2. PM511 - Measuring Project Performance for Success. This course made me to appreciate more the issue of quality, I became more familiar with quality concepts and also I learned about the project quality processes; the importance of quality, and the current techniques and tools to exceed quality.

3. PM506 - Leading Domestic and Global Teams. Is the course through which I became able to identify strategies for accelerating the development of true team effectiveness and alternatives for overcoming barriers to project success using people and teams.

# Chapter 2 – Problem Statement

## 2.1 Definition of Terms

Although “you cannot define being exactly on time” (Deming, 1900-1993 B.C.), below it is given a short definition of maritime terms that have been used in the sections that follow, as the (Glossary of maritime terms) provides:

1. “COASTAL SERVICE - Domestic shipping routes along a single coast”.
2. “CREW - The personnel engaged on board ship, excluding the master and officers and the passengers on passenger ships”.
3. “LASH - Lighter aboard ship: A barge carrier designed to act as a shuttle between ports, taking on and discharging barges”.
4. “OPERATOR - The holder of a freight contract with a cargo shipper”.
5. “SHIP'S AGENT - A person or firm who transact all the ship's business in a port on behalf of ship-owners or charterers”.
6. “STOWAGE - The placing of goods in a ship in such a way as to ensure the safety and stability of the ship not only on a sea or ocean passage but also while in port when parts of the cargo have been loaded or discharged”.
7. “VOYAGE CHARTER - A contract whereby the ship-owner places the vessel at the disposal of the charterer for one or more voyages, the ship-owner being responsible for the operation of the vessel”.

**2.2 Problem Statement**

Communication quality in the operations sector in the Greek shipping industry has to be improved in order to increase shipment project success.

**2.3 Rationale**

The core of a shipment project which is essential for its success is the operations sector. Many people specialized in maritime either academically or through their on-the-job experience, have pointed out the importance of having healthy operation management without suffering miscommunication issues.

On-board to shore-based office, communication is even more essential in shipping projects than in other common project because of its wide virtual team collaborative environment.

Additionally to projects' particular nature, it is necessary to point out the multi-faced, bilinear dimension of communication patterns in such projects. The first seems to correspond to the shore-based office where the Operations Manager as the responsible project manager for the whole operation - hereinafter Project Manager (PM) has to provide clear information about the project's scope to the ship and get a project status feedback on a daily basis in order to schedule properly the agencies and also provide all the necessary information among all the stakeholders and the customer. The second level of communication it is found at the same time in the self-managed team on board, where the Master has to manage the crew and the ship. Both of them possess important information that often needs to be exchanged at the right time. This bilinear communication channel is the core of communication pattern in shipment projects. Notwithstanding, shipping communication is multi-channeled and more complex, as involves more stakeholders than the two basic, already mentioned (PM – Master).

In Appendix A, are presented relevant matrices, which figure out shipment project communication patterns, where the project manager is either the receiver of a message or the sender.

Taking into consideration the nature of such a project; the project team; the processes needed to be followed during operations; as well as the stakeholders involved, the importance of exceeding high level quality of communication becomes obvious. To be more specific, from a project managerial point of view, a shipment project includes a "turnkey" operation and continuous supervision from site to site; all necessary documentation; appropriate and well considered coordination; total port captaincy supervising the loading, stowing, lashing and securing, and unloading of the cargo within a specific budget and time. All the aforementioned issues are referred to the operations sector as long as the voyage charter has been signed and the project execution begins.

The most frequent problems that impact the overall performance in Greek commercial shipping companies are the operational problems that might occur on-board at all phases of the shipment project. These problems depending on their nature and on the way by which are handled, can seriously threat shipping project success affecting its scheduled duration and budget. In order to overcome such problems and improve shipping project's performance, by suggesting solutions and methods applications from a project management point of view, it is needed to research and thus indentify the deep causes that generate, maintain and/or invigorate communication problems and subvert teamwork and processes quality.

# Chapter 3 – Literature Review

## 3.1 Shipping as a barometer of global economy and the Greek shipping industry

In a world of increasing globalization of economic activities, in an era where communication dominates, shipping is the major international activity, which bridges the economic and trades cooperation and rapprochement between peoples.

Greece, since the ancient times -2nd Millennium BC- in spite of political and social disruption in many city-states and the intra-tribal standing rivalries, was characterized by the appeal in seamanship and commercial activity across the water highways of the eastern Mediterranean. Despite diverse structural changes at historic level today as in antiquity the Greek fleet is the biggest in the world. According to the Bureau of Transportation (BTS),"the Greek-owned maritime fleet is nowadays the largest one in the world, with over 3.000 vessels" which is almost the 20% of the world fleet capacity (Engber).

Over the past two decades the Greek fleet was extended significantly gained access to international financial markets and is still along with tourism the driving engines of the Greek economic growth and geopolitical stability.

The virtuous circle of Marine is supposed to run out around 2010, which predisposing to a general global economic downturn. Careful observation of the shipping industry can provide insights conclusions about the general economic situation worldwide because the shipping sector is the most universal and trends in signal changes on a larger scale. Essentially the shipping sector is the signaling behavior of the global capitalist system and any changes are essential in the concept and processes of international decision-making.

## 3.2 Project Communication

### 3.2.1 Defining communication.

According to Fabun the definition of communication in general is the transfer of a meaning (Fabun, 1968). Considering communication as a process whereby information is enclosed in a package and is channeled and imparted by a sender to a receiver via some medium, it is obvious the two-way process of exchanging information which characterizes communication as a whole as well as its multi-dimensional essence.

The total communication process, as given by Cleland and Kerzner has the following scheme:

■ **Figure 1:** Total Communication Process (Cleland & Kerzner, 1986)

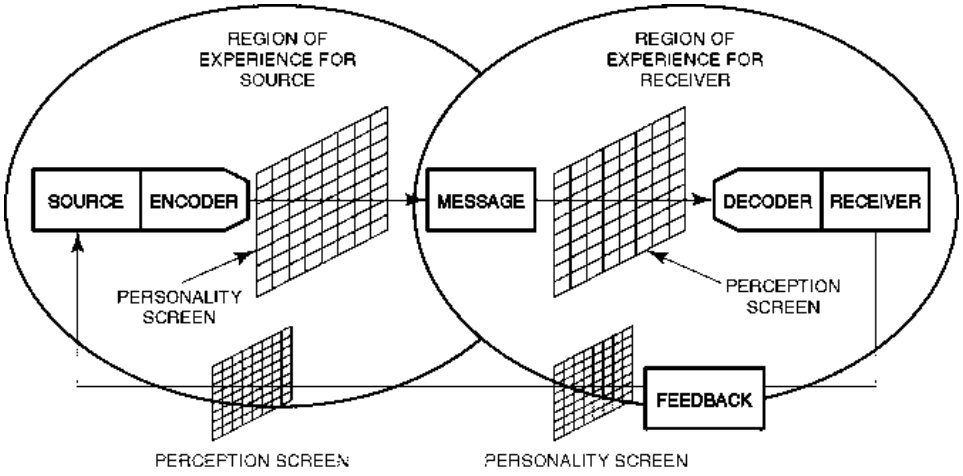


*Figure 1.* Illustrating the communication process. The elliptic shapes define the region of experience for both source and receiver. The arrows represent the communication flow which forms a cycle. The perception and personality screens are filtering the original message communicated and feedback provided affecting their quality. Adapted from " *Engineering Team Management"* by Cleland and Kerzner p.134.

Such approach is focused more on the Sender-Receiver (PMBOK) models including also the needed feedback loops and presenting the areas where communication barriers potentially arise.

### 3.2.2 Project communication and its importance to project success.

Project communication includes general communication between team members but is more encompassing, it is customer focused, it's limited in time, it is product focused with the final image in mind, and it involves all levels of the organization. Judging from the above, an obvious inference is that in a project environment communication is the most important component. The success of most projects, whether handled by a dedicated project team or a cross-departmental team, depends upon a set of crucial communication techniques and skills by both project

manager and project team. According to Verzuh one of the five factors that affect project success is "effective communication among everyone involved in the project in order to coordinate action, recognize and solve problems, and react to changes" (Verzuh, 2008). Especially in customer-driven project management, where the demand of free and proper information flow is even higher, communication becomes more vital (Barkley & Saylor, 2001).

A typical communication pattern in a project management environment, presenting project manager's main aspects of communication and communication channels is provided in the following figure.

**Figure 2:** Communication Channels (Cleland & Kerzner, 1986)

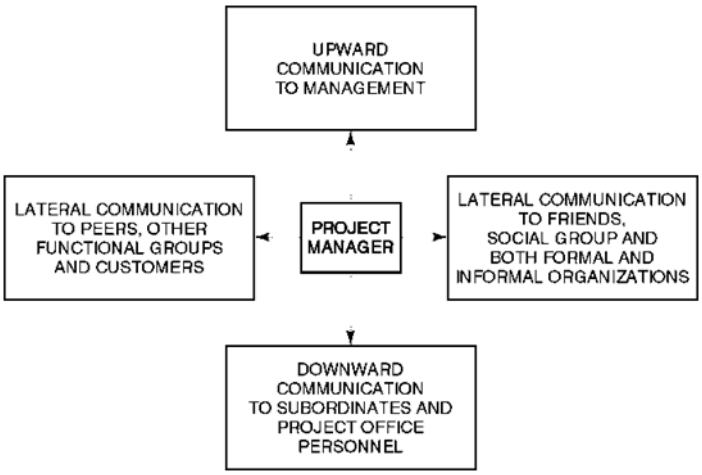


*Figure 2.* Presenting the three main communication channels in a project environment. Project Manager is the core of project communication. He flows information upward, downward and lateral. Adapted from " *Engineering Team Management"* by Cleland and Kerzner p.134.

From the above figure someone can easily point out the three main channels where project manager communicates: a) the upward communication to the top management; b) the downward communication to subordinates and project office personnel; and c) the lateral communication to customers, peers and other functional groups.

The upward channel stands for the communication with the senior executives where risks and exceptions are highlighted. The communication tools commonly used for in this channel are: exceptions and weekly status reports; face-to-face reviews; e-mail updates; communication plan and Project charter. Mainly in this communication channel are used the "visibility rooms" which are the areas displaying key project documents (project charter, statement of work (SOW); risk management plan (RMP)

etc) to inform the project stakeholders and make them act accordingly. In this channel communication takes place vertically or diagonally.

The downward channel is the internal communication within the project team. Except from providing direction it is also important to meet "project team's four major communication needs" (Verzuh, 2008) : "the responsibility of every team member; coordination information; status information and authorization information". The communication tools are project plan; work breakdown structure (WBS); verbal exchanges, agendas, minutes and the "visibility rooms" as well. Communication progresses vertically or diagonally as in the upward channel.

Finally, the lateral channel copes with communication to customer, vendors other functional and social groups. Through this channel, negotiations for resources, budgeting and time allocations are made. At this channel communication is more interpersonal and has often a rather unofficial format. During the project life cycle, the "grapevine" which may arise due to employees' and/or other interested parties' lack of information can cause changes in project and in various sectors as well. This grapevine also constitutes a part of this unofficial communication which flows through the lateral channel.

### 3.2.3 Communication in shipment projects.

Communication in shipping is an on-going process thorough the shipment life cycle. The continuous communication demands for accurate and in time information between the ship, the operations manager and the agent have to be satisfied for ship's positioning procedure, usual operation's processes such as monitoring project progress and control of any potential slippage in time and/or cost.

The project team consists of shore-office, shore-based as well as on-board members. The team members in shipment projects are people from the chartering department, the supply department the technical department, the Broker, the Master, the Chief Engineer, the Designated Person Ashore (DPA), the agent and the cargo receiver while the project manager is called Operations Manager in marine sector terms. A typical communication pattern can be found in Appendix A.

The main stakeholders outside from the shipping company environment, except for the customer, frequently mentioned as charterer, are: the General Manager, the port state control, the port authority and the shipping register authority.

By using the formula which calculates the number of the two-way communication channels (Kerzner, 2006) we conclude to a network with at least 45 two-way channels.

$$\mathbf{N = X(X - 1)/2} \quad (1)$$

Where,

*N*: the number of two-way channels and,

*X*: the number of people communicating with each other (at least the number of team members and the project manager = 10).

Such high number of communication channels presents the great importance of communication in shipping and the great quality it must have emerges.

Apart from the size identification of the communication network and considering the communication process as given previously in Figure 1, in order to analyze the conditions under which communication between team members is taking place; it is necessary to examine the profile and the characteristics of the people who work in such project. By this profile adumbration, we would be able to identify the

perception's and personality's screens that inhere in the communication process and consequently potential communication barriers.

As a primary finding of the literature review, the low labor cost being accomplished by the recruitment of foreign employees as seafarers in the Greek-owed ships, limits the employment of Greeks as a crew (Sambracos & Tsiaparikou, 2001), resulting to incongruity and multiculturalism in on-board team members and thus to the whole project team. According to BIMCO/ISF latest manpower reports, the majority of manpower in marine sector the last years comes from the Eastern Europe (BIMCO/ISF, 2008).

As a result of such multiculturalism phenomenon in shipping, three tools have been created to overcome potential communication and linguistic problems usually occurring: a Standard Marine Navigational Vocabulary (SMNV), Standard Maritime Communication Phrases (SMCP) and Sea-Speak (Sampson & Zhao, 2003). Notwithstanding there are not too many expanded studies referred to the synthesis and the multiculturalism phenomenon in the Greek shipping industry. Only a few of them focus on multicultural issues concerning the shipping safety and accidents, crew efficiency, communication and quality. Moreby, through his study, underlines satisfactorily such issues providing relevant and useful information about inherent communication problems that occur in such environment (Moreby, 1990) and he mentions also the great significance and the crucial role of the human element in shipping communication. Moreover, he stated that especially crew's performance is high correlated with their cultural background (Moreby, 1975). Fitzgerald states that "Intercultural communication is inherently problematic. Different cultural values and communication styles constitute the underlying causes of the difficulties common in this type of communicative interaction" (Fitzgerald, 2003) .

A research on job-related communication problems from Sampson and Zhao, during shipping operation presents a series of possible problems, starting from simple difficulties up to potential serious dangers (Sampson & Zhao, 2003). Additionally, an interesting approach was found in literature that questinos the influence of cultural diversity on the effectiveness of crews and shipping operations by Theotokas and Progoulaki. According to their survey findings there are three areas, which correspond to operations sector and need special attention, as the most affected – problematic: a) good relationship and smooth cooperation between company's offices and ship; b) misunderstandings arisen between ship and other, third parties such agents; port authorities etc and c) communication problems among members of the crew (Theotokas & Progoulaki, 2007).

According to Hollingshead, to achieve successful communication it is necessary that communicators possess mutual knowledge and through their linguistic and physical expressions impart knowledge to each other, which cannot be accomplished with the usage of a simple text alone (Hollingshead, 2000). Hollingshead's argument makes the forceful statement of the impact of poor communication quality in shipment projects. As a matter of fact, in some surveys conducted the BIMCO/ISF manpower report, a high incongruity is presented in shipping industries as far as it concerns the mutuality of the human resource; their age, their experience and their knowledge (BIMCO/ISF, 2000).

Additionally to the virtual element which seems to characterize the communication within the project team, high communication quality is essential. This means that a great challenge in the project team appears to be not only the cultural diversity in particular but also the difference in time zone in an ongoing basis, which affects, in a major way, team communication and relations also (Kelley & Sankey,

2008). Noteworthy to that the space boundaries and difference in time which do not only impact the communication context (Montoya-Weiss, Massey, & Song, 2001) but communication itself (Turoff, Hiltz, Bahgat, & Rana, 1993).

Another dimension which has been met in the literature is the way by which virtual teams process information (Curseu, Schalk, & Wessel, 2008) and the barriers to knowledge and information sharing (Rosen, Furst, & Blackburn, 2007).

## 3.3. Quality

### 3.3.1 Defining quality.

Several definitions of quality have been met thorough the literature review. All of them seem to focus on the customer (either internal or external) needs and satisfaction, and/or requirements, features of products or services. The Project Management Institute (PMI) provides the quality definition as "the degree to which a set of inherent characteristics fulfill requirements" (PMBOK, 2004). Such definition is the same that was given also from ISO 9000:2000, published by the International Organization for Standardization (ISO 9000:2000, Quality Management Systems - Fundamentals and Vocabulary, 2000).

What preoccupy most in the literature related to quality are its management and its cost. Joseph M. Juran, one of the gurus of quality, in his Quality Handbook gave two meanings for quality and states that these are the most important to its management (Juran & Godfrey, 1999). He defined quality as "freedom from deficiencies" and a set of "features of products which meet customer needs and thereby provide customer satisfaction" (pp. 2.1-2.2).

Another important aspect of quality has been given by Kenneth who figures out the "counter entropic" dimension of quality. Through his argument based on the phenomenon of entropy, inspired from the Second Law of Thermodynamics where things naturally move from a state of organization to a state of disorganization, states that “quality is not the natural order of things”, but a result of a tough work which includes good planning, consideration of contributing elements, disciplined processes and tools application (Kenneth, 2005). Considering this statement and all the definitions of quality mentioned, apparently quality achievement in project implementation it is mainly a matter of management.

### 3.3.2 Communication quality.

Taking into consideration definitions given for communication and quality in the earlier paragraphs, communication quality emerges from quality in each major component of communication process individually and systemically too. That means, in other words, that communication quality accrues from a) the quality of information communicated, b) the quality of the medium through which is communicated and technology used and c) the quality of communication channels. These three critical elements, despite the complexity involved in an actual entity resolution system implementation can be described simply in terms of “equivalence relation” from basic abstract algebra providing the following model:

$$Q(co) = Q(in) + Q(me) + Q(ch) \quad (2)$$

Where:

*Q(co)* : Communication Quality

*Q(in)* : Information Quality

*Q(me)* : Medium Quality

*Q(ch)* : Communication Channels Quality

Moreover, the feedback mechanism that is used, as well as the perception filters of both message sender (encoder) and receiver (decoder) can affect significantly communication quality (PMBOK, 2004). The feedback mechanism mainly can affect communication in terms of time (delays), but it is very important to underline it as a quality assurance tool for the communication process itself. For example the receiver, by giving feedback that the message was read, the sender assures that his message was transferred to the recipient and none potential breakdown in the communication process occurred.

The perception filter of the sender, his attitude and culture are injected into the message/information communicated before it actually reaches the receiver, by deciding and determining the channels through which it should flow (Communicating Within The Organization). The perception screen of the receiver affects communication quality likewise, through translating the message and providing feedback. Matters of trust can be also included in sender-receiver perception screens, considering the project virtual team and the fact that "trust is a topic that comes up repeatedly in virtual team literature" (Kelley & Sankey, 2008).

For a better approach of communication quality it is needed the identification of quality for each component that constitutes it. In the following paragraphs is provided further analysis for every basic element of communication quality, through

which will be determined the communication quality measures to be based on for the survey framework and the recommendations which will follow later in the thesis.

#### *3.3.2.1 Information quality (IQ).*

For the majority of the institutional, operational and project management processes, the quality of information consists one of the key determinants on decision making quality, because all the above processes mainly depend on current information provided (Stvilia, Gasser, Twidale, & Smith, 2007).

By reviewing the related literature, many authors state the high sensitivity that questions the information quality definition. Stvilia and others state that information quality "cannot be described, measured, and assured with a single model" (Stvilia, Twidale, Smith, & Gasser, 2008) and that results on the information quality concept to become more context sensitive (Wang & Strong, 1996).

Information quality concept is multi-dimensional. From literature were found and identified several dimensions. An interesting approach of IQ framework was presented by Gasser and Stvilia, which contains 22 dimensions organized into three categories; intrinsic; relational and reputational IQ (Gasser & Stvilia, 2001).

The crucial dimensions/measures that figure quality of information that were met most thorough the research and are "yardsticks" for measuring quality (Claxton & McDougali, 2000) are:

- Accuracy: examining whether the information is correct and true;
- Clarity: testing for meaning clearance;
- Completeness: how deep information to be understandable;
- Conciseness: examining whether the same information is repeated; and
- Consistency: to examine contradicting of one information piece to another.

All of the above characteristics are in relation to some reference standard in a given culture, in general cultural norms and conventions. Such characteristics will be examined with the survey questions in the multicultural shipping environment.

#### *3.3.2.2 Quality of medium.*

Nowadays there is a vast variety of medium that can be used for communication purposes. The media can include telephone, email, face-to-face communications, electronic file transmission, teleconferencing, satellite broadcasting and much more.

Quality of medium in a project environment does not only refer to the technical specifications and attributes of the medium used, but also to appropriate medium selection of the available ones. Such medium choice on a project depends on several factors that must be taken into account in every project communication (Kliem, 2008).

Some of main factors as stated by Kliem are: *technological maturity*, which is relevant to the supporting infrastructure; *time*, according to the urgency of sending or receiving a message; *importance* of message; *geography* which is related to project team and its dispersion size; desirable *impact* of the message communicated; the level of *trust and credibility* between the sender and the recipient; potential communication *obstacles* which the sender will encount; recipient's predominant *thinking style* that must be also considered by the sender in order to obtain the desired feedback and responses and to maximize receptivity in parallel (Kliem, 2008).

Consequently to the above, quality of medium can be characterized by both medium's high technical requirements for great performance and fully satisfying current project communication needs in terms of time, importance etc. as mentioned earlier.

#### *3.3.2.3 Communication channels quality.*

When transmitting a message in every project, especially in a shipment project, the demand for maintaining quality of original message is high. The challenge comes from the necessity of the sender or the intermediate to pass originality of the message to the receiver as efficiently as it is possible and therefore to select the most appropriate communication channel for accomplishing that.

The three main communication channels within a project environment – upward, downward and lateral - are presented in figure 2 and analyzed in paragraph 3.2.2. of this paper.

The selection of the most suitable communication channel occasionally and its proper exploitation underlines the meaning of communication channel quality.

### 3.3.3 Barriers to communication that affect quality.

After having analyzed the overall communication process and its major components through a quality perspective, following the barriers which affect communication effectiveness will be identified and will be translated into the shipping environment accordingly.

As literature provides a large variety of articles and aspects about communication barriers, their analysis in micro and macro barriers is useful for better approach and easier correlation between general communication and shipment project communication process.

Vijayk dissociates the macro and micro barriers to effective communication in projects (Vijayk, 1996). Macro barriers include information overloading, cultural diversity, low organization maturity and climate, lack of subject knowledge and high

and extended number of communication channels and links. On the other hand micro barriers are considered the perception screens of message sender and receiver, message competition and project jargon and terminology used.

According to the literature related to shipping, many difficulties in communication are due in part to cultural diversity and due to language barriers (IMO, 2002).

In the following chapter, it will be described the methodology used for the purposes of this paper, which will be followed in order to identify the factors that lead to miscommunication in shipment projects.

# Chapter 4 – Methodology

## 4.1. Description of Methodology

The aim of the research, that took place from 28 March to 19 May 2011, was to define the reasons that impact communication quality in the operations sector in the Greek shipping company. This exploratory study conducted by using a survey methodology. Information and data were gathered through questionnaire and face to face and over the phone interviews. Especially in personal interviews, for the majority of them, the author used a voice-recorder with interviewer's prior acquiescence.

The framework of the research questions and the constructs to be measured was based on the literature review findings and highlights. The purpose of the study is to identify the root causes which affect communication quality in shipment projects.

## 4.2. Tools and Procedures Used

In accordance with Lundahl's and Skarvard's statements the three main manners through which surveys are conducted are (Lundahl & Skarvad, 1992): a) face – to – face interviews, b) questionnaires as well as c) interviews via telephone. As the sample size (*n*) of the survey resulted to be quite large and the need for a provided feedback in a short time was high and essential for the completion of the thesis, the method of questionnaires was preferred by the author and used most. However, a few number of interviews (face – to – face and via telephone) were also performed. Telephone interviews were very helpful for avoid time consuming in difficult occasions for convenient meeting arrangements for both interviewer and interviewee.

### 4.2.1. Questionnaire.

Questionnaire has been constructed under the guidelines of the literature findings, and were based also on a previous survey (Theotokas & Progoulaki, 2007) found in the literature review, as well as on some templates in Question Pro. The survey questionnaire had been uploaded in (QuestionPro) under the veil of anonymity, a site that is meant for students doing online research to use a statistical software as the data-collection and analytical tool. The disadvantage that the questionnaire method emerges is the high possibility of question's misinterpretation by the respondent, survey participants. For that so, in the introductory text of the questionnaire was mentioned the author's email address and telephone where someone who might needed further explanation could use.

The questionnaire was consisted of seven questions of four different types: open-ended, multiple choice questions; permitting maximum two answers for selection, and two sets of questions whose answer was correlated with the known in terms of statistic science "*Likert Scale*" and *"Guttman Scaling"* methods. Through these two methods used, were provided the opportunity for ascribing quantitative value to qualitative data, and thus make it amenable to statistical analysis.

The first section comprised four open – ended questions which aimed to identify the characteristics of the sample, e.g. size of company, participants' employment position and experience etc. The second section of questions was formed in a multiple choice scheme, which permitted to the participant to select maximum two possible answers. This section aimed to discover the existence of multiculturalism phenomenon especially in key onboard project members, e.g. Master(s), Chief Engineer(s), for the shipping companies participated. In the Appendix B is presented the template of the survey questionnaire. The last section comprised two sets of

questions of *"Likert Scale"* and "*Guttman Scaling"*methods. Both of them provided five possible selections. The set of questions related to "Likert Scale" method was consisted of 22 statements. These statements represented 22 "negative" situations that may occur and consequently impact communication quality, as pointed out from the previous literature review. The survey participants were asked to select their answer according to the frequency that they have met for each statement based on their professional experience so far. The set of questions related to *"Guttman Scaling"* statistical method was consisted of five "positive" situations that support effective communication and the participant was asked to evaluate from the lowest to the highest in a five grade scale the validity of each statement through his professional experience as well.

#### 4.2.2. Distribution and gathering.

The distribution of the questionnaires was made mainly electronically, through direct email from the author's email address either as an attachment or via a web link to the questionnaires uploaded in (QuestionPro), to the shipping companies' email addresses. However, a small number of questionnaires were provided by the author herself to the shipping companies.

The gathering of information and data made both from primary and secondary sources. The primary data gathered from questionnaires addressed both to the Greek shipping companies and seafarers, Masters and Chief Engineers. In the later, questionnaires mostly addressed through face to face and over phones or personal interviews method because distribution of the questionnaire electronically resulted to be in many cases impossible and in other cases the respondents wanted to comment further and enrich their answers. Often a more personalized approach was needed.

### 4.2.3. Sample identification.

The sample for the survey constituted from the Greek shipping companies listed in the Greek Shipping Directory (GSD). The directory was used by the author as a tool to identify the population *(p)* of the survey, the number of Greek shipping companies. It also served not only for taking information for companies' general profile and size, i.e. their fleet size and area of expertise, but also for providing contact details as companies' telephone numbers and emails. According to Spruyt, for the shipping companies whose fleet is equal to or less those nine vessels diseconomies of scale emerge (Spruyt, 1990), thus the sample consisted of companies whose fleet size was greater and consequently allow them exploiting economies of scale and implementing project managerial methods and quality tools on their operations. A prior short author's survey in the GSD pointed out that 97 from 710 shipping companies have a fleet more than nine ships. These companies outlined the population (*p*) of the survey, while the sample (*n*) for addressing questionnaires was finally 35. Although the sample of the survey may seem small, however it is rather representative of survey's population and meets the requirements of the thesis scope.

#### *4.2.3.1 The characteristics of the sample.*

The characteristics of the sample on which the questionnaire was addressed, are presented in Table 1 Table 2 and Table 3 below.

Table 1

*Size of Companies*

| Fleet Size (No of vessels) | 9-15 | 16-25 | 26-40 | >40 | Total |
|---|---|---|---|---|---|
| No of Shipping Companies | 13 | 12 | 7 | 3 | 35 |
| Percentage (%) | (37%) | (34%) | (20%) | (9%) | (100%) |

It is noteworthy to point out that the 35 companies which participated to the survey all together represent a fleet size of 744 vessels.

Table 2

*Participants' characteristics*

| Years of Experience | 1-6 | 7-12 | 13-18 | 19-24 | >25 | Total |
|---|---|---|---|---|---|---|
| No of Participants | 6 | 15 | 6 | 5 | 3 | 35 |
| Percentage (%) | (17%) | (43%) | (17%) | (14%) | (9%) | (100%) |

Table 3

*Companies' Onboard Most Frequently Employed Nationalities (for the position of Master and Engineer A,B,C)*

| | Companies' Fleet Size (No of vessels) | | | |
|---|---|---|---|---|
| Nationality | 9-15 | 16-25 | 26-40 | >40 |
| Chinese | 8% | 25% | 43% | 0% |
| Filipino | 31% | 50% | 57% | 67% |
| Pakistani | 8% | 33% | 29% | 0% |
| Bulgarian | 15% | 8% | 14% | 33% |
| Greek | 69% | 92% | 86% | 100% |
| Other | 23% | 25% | 14% | 0% |

*Note:* Multiple answers are possible.

### 4.3. Problems Faced

The author, who undertook also the role of the interviewer, faced a few challenges during face to face interviews with the seafarer's. Striving not to be mislead from the core subject because of the long experience narrations was one of the major challenge. Moreover, building trust between the interviewer and the interviewee was another quite difficult issue that the author overcame it. Trust was even more essential in order to investigate in a deeper and a more sincere way the actual problems.

Another problem was met during questionnaires distribution and feedback. In some cases the email message sent by the author to the shipping companies went into the *junk folder* and many emails lost and never answered.

### 4.4. Limitations

As survey limitations could be considered that the sample will consist of seafarers with Greek nationality only and of shipping companies that are located and in Piraeus.

### 4.5. Validity and Reliability

According to Patel and Davidson any scientist has to ensure his/her investigation reliability (Patel & Davidson, 1994) and for that so the survey contains also the '*true value*' and '*value of error*' yields of reliability. Confidence level at 95% also was calculated for reliability reasons as in all statistical methods. Moreover, for the questionnaire survey tool selected was performed the statistical *F-test* method examining the adequacy of the sample size for the more as possible representative survey results. As far as it concerns the interview reliability the voice recorder was

used, providing also the opportunity to the author to re-run as many times needed for ensuring that data is interpreted properly.

### 4.6. Expectations

According to the literature review it is expected that the possible outcomes from the survey will point out that the major reason that affects communication quality in the operations sector is the multiculturalism phenomenon which characterizes the project team and secondly the virtual environment that figures the overall communication between the ship and the shore-based office.

As author's further ambition could be the thesis paper to constitute a useful advisory role for the shipping industry environment and also to emerge and highlight the project management philosophy into this sector.

## Chapter 5 – Results and Discussion.

By analyzing the overall statistics of the survey thorough the QuestionPro online statistical tool it was found that 49 people viewed the questionnaire distributed, the 37 started the survey (p=75.51), while the 35 of them completed it (p=71.43), forming a completion rate p=94.59%.

Figure 3: Survey Statistic Report

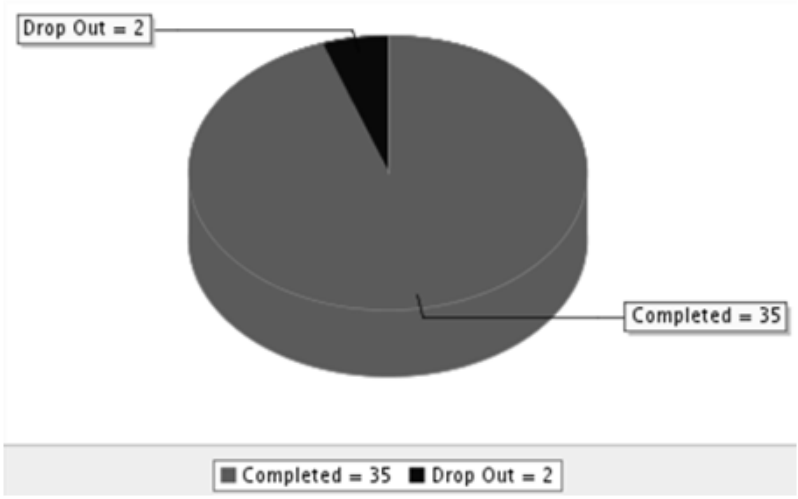


*Figure 3.* Presenting the completion / drop-out rate of the questionnaire survey.

From the sample of 35 people who completed the survey it is very important to analyze the frequency with which they experience problematic areas which can lead to miscommunication. For that so, each of the 22 negative statements which presented in the 6th question (Q6) of the questionnaire has been analyzed. In the Appendices C and D where are presented all the tables and graphs accordingly from the survey results,

can be also found the tables for each of these statements providing the percentage of the respondents in relation to the frequency they experienced such situations.

Moreover, except of the mean, standard deviation, the percentage of participants and their response to each question as well as the variance on the answers, it was also calculated for each statement in the Likert Scale the score that is formed after the 35 responses. Each score was calculated by using a custom scoring – grading scale which allowed corresponding in every multiple choice from Likert, a number. Being more specific, the *'never'* option corresponded to the score number one, while the *'very often'* option to the number five, creating a 5 level scale. Through this manner, not only a qualitative analysis was made but a quantitative also.

The most frequent barriers to effective communication during a shipment project appeared to be lack of honesty $f$=74.29%, $M$=4.571, $SD$=0.917, 95% CIs [4.268 - 4.875], $SE$=0.155 and lack of trust $f$=68.57%, $M$=4.486, $SD$=0.919, 95% CIs [4.181 - 4.790], $SE$=0.155 as the sample $n$=35 responded by choosing the *'very often'* option.

These results according to the literature were expected to be met, as the matter of trust in virtual teams is very highlighted as a critical issue to overcome for higher team performance and effective communication (Gibson, Cristina, & Cohen, 2003), (Nemiro, Beyerlein, Bradley, & Beyerlein, 2008), (Duarte & Snyder, 2001). Such situation of lack of trust and/or honesty are usually arisen in virtual team environment mainly due to the "lack of social presence and context inherent to face – to – face environments" (Jarvenpaa, Knoll, & Leinder, 1998), (O'Hara-Deveraux & Jonabsn, 1994), on the stages where trust among team member is developed (Kelley & Sankey, 2008).

Although issues of lack of trust and honesty appeared most frequently in survey results, the frequency of information inaccuracy during communication process was graded in a lower percentages than the previous situations, with its statistical measured values to be at the following levels of *f*=45.71%, *M*=3.714, *SD*=0.987, 95% CIs [3.387 - 4.041], *SE*=0.167.

As lack of honesty and accuracy of information are two values that somehow contradict each other, a further analysis with the cross – tabulation of these two variables was implemented in Tables 4 and a chi-square analysis with the correlation of these two variables also in Table 5.

Table 4

*Cross-tabulation of two variables presented in the 6th question [Q6].*

| Frequency /Percent | | [Q6] Lack of honesty | | | | | |
|---|---|---|---|---|---|---|---|
| | | Never | Rarely | S/times | Often | Very often | Row Totals |
| [Q6] Inaccuracy information | Never | 1<br>100% | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>2.86% |
| | Rarely | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>33.33% | 2<br>66.67% | 3<br>8.57% |
| | Sometimes | 0<br>0% | 1<br>12.5% | 1<br>12.5<br>% | 3<br>37.5% | 3<br>37.5% | 8<br>22.86% |
| | Often | 0<br>0% | 0<br>0% | 0<br>0% | 2<br>12.5% | 14<br>87.5% | 16<br>45.71% |
| | Very often | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 7<br>100% | 7<br>20% |
| | Column Total | 1 | 1 | 1 | 6 | 26 | 35 |
| | Column Percent | 2.86% | 2.86% | 2.86% | 17.14% | 74.29% | 100% |

Table 5

*Chi- Square analysis and correlation between cross-tabulation variables of 6th question.*

| Pearson's Chi-Square Statistics | |
|---|---|
| Chi-Square | 47.938 |
| p Value | 0.000 |
| Degrees of Freedom | 16 |
| Significant Correlation Between Variables Exists : @ 95% | |
| Critcal Value for (p = .01 [1%]) | 32.0 |
| Critcal Value for (p = .05 [5%]) | 26.296 |
| Critcal Value for (p = .10 [10%]) | 23.542 |

Time zone difference was also a statement which was answered to be met and experienced often during project's life cycle (*f*=48.57%, *M*=4.371, *SD*=0.690, 95% CIs [4.143-4.600], *SE*=0.117) due to the shipping's virtual environment. Undoubtedly, time zone difference appear to be "a real challenge when teams are distributed across time zones" (Curseu, Schalk, & Wessel, 2008) and such difference can have a direct affect on project team's coordination especially in situations where the demand for actions' coordination is very critical (i.e. safety issues, SOS signals etc). Due to failures of synchronization many conflicts among the project team members can be arisen (Burlea, 2007) and consequently the asynchronous phenomenon occurred, even temporally, is enough to impact the virtual team's effectiveness (Montoya-Weiss, Massey, & Song, 2001) , (Kirkman, Rosen, Tesluk, & Gibson, 2004).

As far as it is concerned the quality of information communicated, except from information inaccuracy results ( *f*=45.71%, *M*=3.714, *SD*=0.987, 95% CIs [3.387 - 4.041], *SE*=0.167), the responders also pointed out that often the information given lacks of consistency ( *f*=57.14%, *M*=3.429, *SD*=0.778, 95% CIs [3.171 - 3.686], *SE*=0.131), and very often arise the need for further explanation of the message communicated ( *f*=57.14%, *M*=4.457, *SD*=1.039, 95% CIs [3.913 - 4.601], *SE*=0.176).

The aforementioned results present low information quality and therefore the overall communication quality is affected, as presented by the *Equation 2* in previous Charter.

Noteworthy are the responses given from the survey participants about the feedback process. In the sample of 35 people the 82.86% of the responses refer to often and very often options about the frequency that lack or delay of feedback occurs during the communication process ($M$=4.143, $SD$=0.944, 95% CIs [3.830 - 4.456], $SE$=0.160).

The delay of feedback receiving, according to Burlea can "diminish the spontaneity and creativity of the receiver" as provides more time for 'thinking' the answer to give or reaction to take place (Burlea, 2007) and therefore time needed on decision making in virtual teams is greater (Curseu, Schalk, & Wessel, 2008). On the other hand, based on Lin et al. arguments, as well as according to a paper presented at the Proceeding of the 35th Hawaii about the asynchronous communication in virtual teams found in the literature, such delay observed and occurred between the feedback and response can contribute on team's efficient performance due to the opportunity that is given to the team members to think better the problem itself and its area reflecting with more efficiency before providing any relevant answer (Lin, Standing, & Liu, 2008), (Dufner, Kwon, Park, & Peng, 2002).

Additionally, the lack or the delay of feedback can contribute to the creation of many peradventures for the message sender about whether his message has been successfully transferred to the recipient or not. In accordance with the results provided for the relevant statement of the seventh question (Q7), it is obvious the significant correlation that these two variables have (lack/delay of feedback and successful

message transmission). For that reason a cross-tabulation matrix and a chi-square analysis for these two variables were performed, as presented below.

Table 6

*Cross-tabulation of two variables presented in the 6th question [Q6] and 7th [Q7].*

| Frequency/Percent | | [Q7] If my message has been transferred successfully to the recipient | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | Row Totals |
| [Q6] Lack or delay of feedback | Never | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>100% | 1<br>2.86% |
| | Rarely | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>100% | 1<br>2.86% |
| | Sometimes | 0<br>0% | 1<br>25% | 0<br>0% | 1<br>25% | 2<br>50% | 4<br>11.43% |
| | Often | 10<br>66.67% | 1<br>6.67% | 2<br>13.33% | 1<br>6.67% | 1<br>6.67% | 15<br>42.86% |
| | Very often | 12<br>85.71% | 1<br>7.14% | 0<br>0% | 1<br>7.14% | 0<br>0% | 14<br>40% |
| | Column Total | 22 | 3 | 2 | 3 | 5 | 35 |
| | Column Percent | 62.86% | 8.57% | 5.71% | 8.57% | 14.29% | 100% |

Table 7

*Chi- Square analysis and correlation between cross-tabulation variables of 6th and 7th questions.*

| Pearson's Chi-Square Statistics | |
|---|---|
| Chi-Square | 27.159 |
| p Value | 0.040 |
| Degrees of Freedom | 16 |
| Significant Correlation Between Variables Exists : @ 95% | |
| Critcal Value for (p = .01 [1%]) | 32.0 |
| Critcal Value for (p = .05 [5%]) | 26.296 |
| Critcal Value for (p = .10 [10%]) | 23.542 |

From the table 6 we observe that the 85.71% of the participants who responded that they are not aware if their message has been transferred successfully to the

recipient also responded to the option with the highest frequency, ‘very often’, for conditions where lack or delay of feedback occurs.

The 77.14% of the responders chose the selection of ‘very often’ and ‘often’ about the frequency that they meet language problems or inadequate written and verbal orders’ transfer *M*=4.029, *SD*=0.954, 95% CIs [3.712 - 4.345], *SE*=0.161). From those percentages is verified the fact that through a virtual communication it is very important to use adequate language and terminology, in order to avoid message misinterpretation.

Table 8

*Cross-tabulation of two variables: message misinterpretation and language problems*

| Frequency/Percent | [Q6] Message misinterpretation | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Never | Rarely | Sometimes | Often | Very often | Row Totals |
| [Q6] Language problems, inadequate written and verbal orders’ transfer | Never | 1<br>100% | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>2.86% |
| | Rarely | 0<br>0% | 1<br>100% | 0<br>0% | 0<br>0% | 0<br>0% | 1<br>2.86% |
| | Sometimes | 0<br>0% | 2<br>33.33% | 4<br>66.67% | 0<br>0% | 0<br>0% | 6<br>17.14% |
| | Often | 0<br>0% | 0<br>0% | 2<br>13.33% | 12<br>80% | 1<br>6.67% | 15<br>42.86% |
| | Very often | 0<br>0% | 0<br>0% | 3<br>25% | 3<br>25% | 6<br>50% | 12<br>34.29% |
| | Column Total | 1 | 3 | 9 | 15 | 7 | 35 |
| | Column Percent | 2.86% | 8.57% | 25.71% | 42.86% | 20% | 100% |

Table 9

*Chi-square analysis and significant correlation for message misinterpretation and language problems*

| Pearson's Chi-Square Statistics | |
|---|---|
| Chi-Square | 73.252 |
| p Value | 0.000 |
| Degrees of Freedom | 16 |
| Significant Corelation Between Variables Exists : @ 95% | |
| Critcal Value for (p = .01 [1%]) | 32.0 |
| Critcal Value for (p = .05 [5%]) | 26.296 |
| Critcal Value for (p = .10 [10%]) | 23.542 |

Under the same vein with language problems, other two questions in the questionnaire; message misinterpretation and the need for message further explanation frequency were also high enough. The 80% of the participants noted that the need for further explanation of a message is met 'often' and 'very often' (*M*=4.257, *SD*=1.039, 95% CIs [3.913 - 4.601], *SE*=0.176) while at the same time the 68.57% admit that exists message misinterpretation with a medium frequency (*M*=3.686, *SD*=0.993, 95% CIs [3.357 - 4.015], *SE*=0.168). In the tables that follow the two relevant variables mentioned are cross-tabulated per couple and their correlation significance has been calculated.

The aforementioned results highlight the existence of the communication micro barriers as stated by Vijayk (Vijayk, 1996) and they affect seriously communication quality in shipping.

Table 10

*Cross-tabulation of two variables: message misinterpretation and need for further explanation*

| Frequency/Percent | [Q6] Message misinterpratation | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Never | Rarely | Sometimes | Often | Very often | Row Totals |
| [Q6] Need for further explanation of a message | Never | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% | 0<br>0% |
| | Rarely | 1<br>25% | 1<br>25% | 2<br>50% | 0<br>0% | 0<br>0% | 4<br>11.43% |
| | Sometimes | 0<br>0% | 2<br>66.67% | 1<br>33.33% | 0<br>0% | 0<br>0% | 3<br>8.57% |
| | Often | 0<br>0% | 0<br>0% | 4<br>50% | 2<br>25% | 2<br>25% | 8<br>22.86% |
| | Very often | 0<br>0% | 0<br>0% | 2<br>10% | 13<br>65% | 5<br>25% | 20<br>57.14% |
| | Column Total | 1 | 3 | 9 | 15 | 7 | 35 |
| | Column Percent | 2.86% | 8.57% | 25.71% | 42.86% | 20% | 100% |

Table 11

*Chi-square analysis and significant correlation for message misinterpretation and need for further explanation*

| Pearson's Chi-Square Statistics | |
|---|---|
| Chi-Square | 35.596 |
| p Value | 0.003 |
| Degrees of Freedom | 16 |
| Significant Corelation Between Variables Exists : @ 95% | |
| Critcal Value for (p = .01 [1%]) | 32.0 |
| Critcal Value for (p = .05 [5%]) | 26.296 |
| Critcal Value for (p = .10 [10%]) | 23.542 |

Moreover to the frequency related to the language problems it is interesting to consider also the culture parameter. That is to say that according to the literature and the common sense, it is expected to arise more frequently language problems in the project teams with a multicultural profile.

Coherently, the further analysis made for examining the correlation between multiculturalism and the frequency that language problems and inadequate written and verbal orders' transfer during shipping, has shown that although in cases where Greek nationalities maintain a key employment position in on-board team face often (*p=48.28%*) such problems, the most notable percentages are presented in table 10, where the multicultural teams mainly formed by Chinese (*p=42.86%, f=3-often, p=57.14%, f=4-very often*), Filipino (*p=62.5%, f=3-often*) and other nationalities *(p=42.86%, f=3-often).*

Table 12

*Cross-tabulation of two variables: key position onboard member' nationalities and frequency in language problems*

| Frequency/Percent | [Q6] Language problems, inadequate written and verbal orders' transfer | | | | | | |
|---|---|---|---|---|---|---|---|
| [Q5] Nationalities mostly employed for on-board key positions | | Never | Rarely | Sometimes | Often | Very often | Row Totals |
| | Chinese | 0 | 0 | 0 | 3 | 4 | 7 |
| | | 0% | 0% | 0% | 42.86% | 57.14% | 9.86% |
| | Filipino | 0 | 0 | 3 | 10 | 3 | 16 |
| | | 0% | 0% | 18.75% | 62.5% | 18.75% | 22.54% |
| | Pakistani | 0 | 0 | 1 | 6 | 0 | 7 |
| | | 0% | 0% | 14.29% | 85.71% | 0% | 9.86% |
| | Bulgarian | 0 | 0 | 1 | 2 | 2 | 5 |
| | | 0% | 0% | 20% | 40% | 40% | 7.04% |
| | Greek | 1 | 1 | 5 | 14 | 8 | 29 |
| | | 3.45% | 3.45% | 17.24% | 48.28% | 27.59% | 40.85% |
| | Other | 0 | 1 | 3 | 3 | 0 | 7 |
| | | 0% | 14.29% | 42.86% | 42.86% | 0% | 9.86% |
| | Column Total | 1 | 2 | 13 | 38 | 17 | 71 |
| | Column Percent | 1.41% | 2.82% | 18.31% | 53.52% | 23.94% | 100% |

The dimension of quality of medium in communication process was examined by the set of the statements 8, 9, 11, 18, 21 and 22 in the Likert scale of question Q6. The responses showed that the quality of means of communication is in a satisfactory level considering technological problems in means of communication occurred, system communication breakdowns and difficulties in the usages of communication means.

What is noteworthy to be mentioned is that although technology used in communication process is satisfactory, the 77.14% of the survey participants responded that a delay in information processing is met in medium frequency of 'sometimes' and 'often' (*M*=3.543, *SD*=0.852, 95% CIs [3.261 - 3.825], *SE*=0.144).

These statistics results can lead us to the presumption that such information delays are due mainly to the human factor and/or organization's maturity rather that the technology used. To evaluate better this presumption it is important to take into consideration also the responses given in the seventh question (Q7) which in fact examines indirectly whether a communication plan has been created for the needs of a shipment project, as well as organization's maturity in the field of communication. According to the results that accrue from responses given in relation with the third statement in question Q7, the 60% of the responders answered that quite often team members do not know who should deliver relevant information in every shipment project phase (*M*=3.257, *SD*=0.886, 95% CIs [2.964 - 3.551], *SE*=0.150).

Additionally to the quality of the communication mediums and technology used in shipping, a 60% stated that sometimes the medium used is inappropriate while at the same frequency the 42.86% consider that technology used limits significally the expression of para-verbal cues, as expected.

Finally, information overloading highlights a percentage 37.14% to be met very often during project's life cycle (*M*=3.657, *SD*=1.305, 95% CIs [3.225 - 4.089], *SE*=0.221). Such situation can lead to over-communication which can have a negative impact to project team effectiveness and communication quality as well. Especially in case of communication via emails, "the volume of messages and endless mail pong-pong forward and backwards" (Kelley & Sankey, 2008) results to be really unmanageable making communication even more difficult, although recurrence of information.

## Chapter 6 – Survey Results Conclusions.

The survey results in generally concurred with the literature findings. The strong virtual element that characterizes shipping projects is the core issue that affects communication quality. The multiculturalism observed in project teams is also one of the main factors that has a great impact on communication effectiveness as it generates languages problems, unfavorable situations of lack of trust and honesty, and delay of feedback consequently affects information quality.

To conclude, the weakness was observed mostly at the two of the three main elements that describe communication quality, information quality Q(in) and communication channels quality Q(ch). Means of communication, although presented notable results regarding the problems they occur; do not affect the overall communication quality as the technology and the instruments used in Greek shipping companies are met satisfactory levels of quality.

# Chapter 7 – Recommendations.

## 7.1. Problematic areas to focus on.

After gathering all the raw data and performing its statistical analysis by calculating mean, standard deviation, confidence level, standard error and other statistical elements, as it is presented in Charter 5 and Appendices C and D, the next step is to make recommendations for communication quality improvement in Greek shipping. As the factors that impact communication quality are many and thus decision-making for improvement actions is getting more difficult, the use of Pareto analysis is indispensable. Edward Deming states, "It is not enough to do your best; you must know what to do, and then do your best." (Deming, 1900-1993 B.C.).

Considering Deming's quote through the charts that Pareto analysis will provide, the problem areas that affect quality will be indentified and prioritized in such way that will help to focus on the most significant problems. Considering the *Pareto principle*, known also as the "80/20 rule", which states that "a large percentage of the results (80%) are caused by a small percentage of the causes (20%)", from the survey results it is going to be indentified the "small percentage" of the causes that impact communication quality.

In accordance with the collected data from the survey conducted, has been created the data-collection worksheet on which the Pareto chart has been constructed. Due to the high number of all the 22 statements had been prior used in the Likert Scale questions of the survey questionnaire, before using the Pareto analysis those statements were categorized in macro and micro barriers that affect communication, according to the mentioned literature. Following, macro barriers were categorized further into the

three main elements that communication quality consists of, as presented in the Equation 2.

Table 13

*Survey's statements categorization in micro and macro barriers of communication*.

| Macro Barriers | Micro Barriers |
|---|---|
| Language problems, inadequate written and verbal orders' transfer | Timezone difference |
| Need for further explanation of a message | Lack of honesty |
| Lack or delay of feedback | Lack of trust |
| Message misinterpratation | Difficulties in integrating information |
| Delay in information processing | Customs,traditions, religion problems |
| Inaccuracy of information | Lack of training, education, skills |
| Information overloading | Lack of Subject Knowledge |
| Information lacks of consistency | Emotional Barriers |
| Technology limitation in para-verbal cues | |
| Forget to inform someone who should have been informed | |
| Inappropriate communication medium | |
| Technological problems in means of communication | |
| Difficulties in the use of communication medium | |
| System communications' breakdown | |

Table 14

*Macro barriers categorization into the three basic communication quality elements.*

| Quality Element | Communication Quality Barriers |
|---|---|
| Information | Laguage problems, inadequate written and verbal orders' transfer |
| | Need for further explanation of a message |
| | Message misinterpratation |
| | Inaccuracy information |
| | Information lacks of consistency |
| Communication Means/ Technology used | Delay in information processing |
| | Technology limitation in para-verbal cues |
| | Inappropriate communication medium |
| | Technological problems in means of communication |
| | Difficulties in the use of communication medium |
| | System communications breakdown |
| Communication Channels | Lack or delay of feedback |
| | Information overloading |
| | Forget to inform someone who should have been informed |

The Pareto analysis performed for both macro and micro barriers to communication quality. Each category elements were included in the Pareto data worksheets. The data that were used for Pareto chart construction is arranged in descending order of importance by the magnitude of its mean score, as it was calculated by interpretation of the frequency scaling value from the survey participants' answers. Below it is shown the table of the data-collection sheets for both Pareto analyses and Pareto charts, as well.

Table 15

*Pareto work sheet for communication macro barriers.*

| # | ID | Communication Macro Barriers | Frequency | Percetange of Total % | Cumulative% |
|---|---|---|---|---|---|
| 1 | 2. | Language problems, inadequate written and verbal orders' transfer | 4.467 | 9,2% | 9,2% |
| 2 | 12. | Need for further explanation of a message | 4.467 | 9,2% | 18,4% |
| 3 | 9. | Lack or delay of feedback | 4.000 | 8,3% | 26,7% |
| 4 | 14. | Message misinterpratation | 3.933 | 8,1% | 34,8% |
| 5 | 11. | Delay in information processing | 3.667 | 7,6% | 42,4% |
| 6 | 1. | Inaccuracy information | 3.600 | 7,4% | 49,8% |
| 7 | 16. | Information overloading | 3.600 | 7,4% | 57,2% |
| 8 | 20. | Information lacks of consistency | 3.533 | 7,3% | 64,5% |
| 9 | 21. | Technology limitation in para-verbal cues | 3.200 | 6,6% | 71,1% |
| 10 | 13. | Forget to inform someone who should have been informed | 3.067 | 6,3% | 77,4% |
| 11 | 18. | Inappropriate communication medium | 3.000 | 6,2% | 83,6% |
| 12 | 8. | Technological problems in means of communication | 2.933 | 6,1% | 89,7% |
| 13 | 22. | Difficulties in the use of communication medium | 2.733 | 5,6% | 95,3% |
| 14 | 10. | System communications breakdown | 2.267 | 4,7% | 100,0% |
| | | Columns Total | 48.467 | 100,0% | |

*Note:* the ID numbers correspond to the number of statements as per question Q6 of the survey questionnaire.

**Figure 4:** Pareto Chart for Macro Communication Barriers

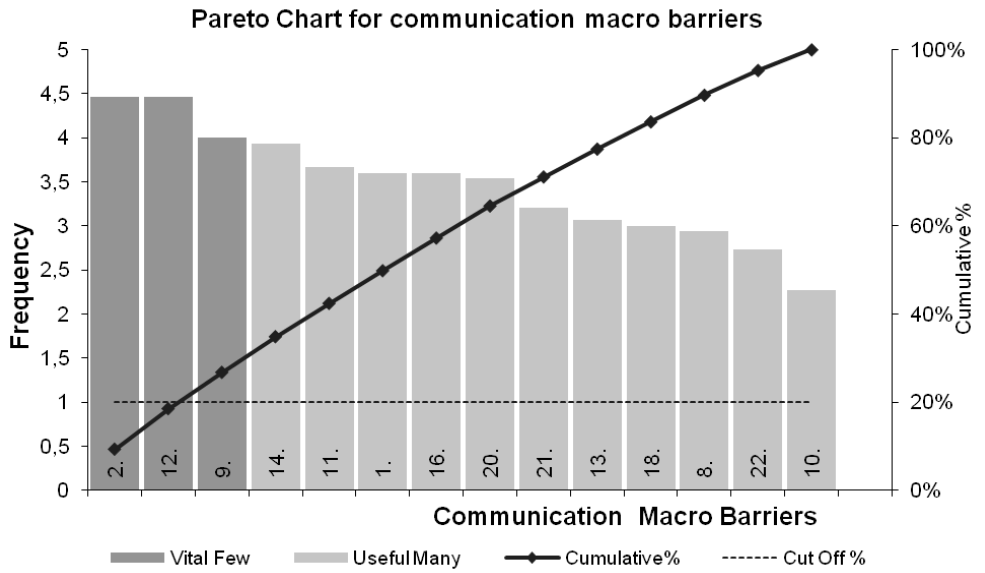


*Figure 4.* Pareto chart for macro communication barriers. Barriers are arranged in descending order of importance by the magnitude of its mean score resulted from the questionnaire survey. Cumulative percentage cut off used at 20% in order to be focused on the vital few barriers that affect the overall communication process.

*Note:* The numbers in the bars correspond to the number of communication barriers as per question Q6 of the survey questionnaire.

Table 16

*Pareto work sheet for communication micro barriers.*

| # | ID | Communication Micro Barriers | Frequency | Percetange of Total % | Cumulative% |
|---|---|---|---|---|---|
| 1 | 5. | Timezone difference | 4.733 | 16.4% | 16.4% |
| 2 | 6. | Lack of honesty | 4.467 | 15.5% | 31.9% |
| 3 | 7. | Lack of trust | 4.333 | 15.0% | 46.9% |
| 4 | 19. | Difficulties in integrating information | 3.533 | 12.2% | 59.1% |
| 5 | 3. | Customs,traditions, religion problems | 3.467 | 12.0% | 71.1% |
| 6 | 4. | Lack of training, education, skills | 2.933 | 10.2% | 81.3% |
| 7 | 15. | Lack of Subject Knowledge | 2.733 | 9.5% | 90.8% |
| 8 | 17. | Emotional Barriers | 2.667 | 9.2% | 100.0% |
| | | Columns Total | 28.866 | 100.0% | |

**Figure 5:** Pareto Chart for Micro Communication Barriers

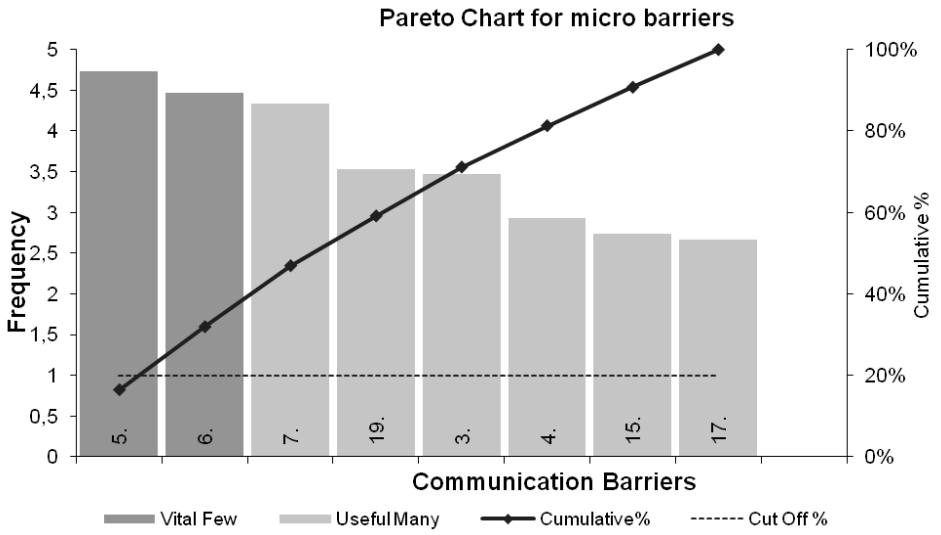


*Figure 5.* Pareto chart for micro communication barriers. Barriers are arranged in descending order of importance by the magnitude of its mean score resulted from the questionnaire survey. Cumulative percentage cut off used at 20% in order to be focused on the vital few barriers that affect the overall communication process.

*Note:* The numbers in the bars correspond to the number of communication barriers as per question Q6 of the survey questionnaire.

From the above Pareto worksheets and charts, considering a cumulative percentage cut off at 20% we indentify the communication barriers that shipping companies should be focused on to minimize and/or eliminate them.

In order to ensure the validity of the results provided through the Pareto analysis method, the Wilcoxon signed rank test was also performed. The Wilcoxon signed rank test is "a non-parametric statistical hypothesis test for the case of two related samples or repeated measurements on a single sample" (Wikipedia). None significant variance was noted from comparing the results of the Wilcoxon signed rank test and Pareto analysis. Such correspondence in results observed by these two

methods, proved the validity of our results about the areas that we shall be focus on in order to improve communication. From the Wilcoxon signed rank test results, as are shown in the table 17, the greater focus shall be given on the micro and macro barriers, that their frequency is above the value of 4.400 and 3.800 accordingly.

Table 17

*Wilcoxon sign -rank test results.*

| | | | | Confidence Interval | |
|---|---|---|---|---|---|
| A/A | N | Median | Achieved Confidence | Lower | Upper |
| Micro Barriers | 8 | 3.584 | 94,1 | 2.833 | 4.400 |
| Macro Barriers | 14 | 3.467 | 94,8 | 3.067 | 3.800 |

Considering the results, the barriers that we should be focus on are the same that the Pareto charts highlighted prior.

## 7.2. Managing Problematic Areas.

Focusing on the barriers that resulted to have the greatest affect on the overall communication process and according to the "80/20" Pareto rule, a set of response actions will be presented for each of the outlined barriers.

### 7.2.1. Micro Barriers.

The micro barriers that should get greater attention to be minimized or even eliminated are according to the previous analyzes are: (a) timezone difference and (b) lack of honesty/trust.

#### *7.2.1.1. Timezone difference.*

The timezone difference seems to be difficult to be overcome as such difference by definition itself forms the virtual team the virtual environment and is the core element for shipping projects. Timezone difference is the one of the most

discussed issues in the virtual team literature. Many authors in the academic literature present it to be one of the greatest challenges in the virtual teams. Thus, as it is by definition impossible to eliminate timezone difference, we are going to accept it and mitigate the impact of risks that can occur because of it, related to the communication quality. What is important when accepting a risk, according to the theory that risk management, is to monitor it during the project's lifecycle.

In order to overcome somehow the timezone difference it is recommended to set a temporal patterning which it would provide a temporal coordination for the virtual team's member. According to Ocker the temporal coordination can be exceed by "a sequenced or structure process for work and problem solving activities" (Ocker, Hiltz, Turoff, & Fjermestad, 1997).

Additionally, in order to mitigate the impact on communication quality due to the timezone difference it could be created a continuously updated project data base, being available and accessible for every team member. Such up to date project data could be a great facilitator for retrieving at no time any information necessary for decision making and immediate response actions.

In cases that the project budget enables the cost of teleconference, the online meeting solution once a week, depending on the project's total duration as well as on its level of importance, can work effectively.

Finally, it is important for the project manager and other key project team members (master, chief engineer etc) to be aware when to be synchronous and when asynchronous and choose the appropriate communication medium for each case. Both synchronous and asynchronous communication can provide advantages that should be exploited occasionally.

#### *7.2.1.2. Lack of honesty/ Lack of trust.*

Building trust within the project team is a crucial issue not only for effective communication but for the overall team's performance. Every project manager has to overcome this issue with a variety of managerial and soft skills. Especially in global virtual teams (GVT) the '*building trust*' task has a more sensitive meaning, and traditional managerial techniques may not be enough. According to Panteli and Tucker "developing a sense of identity for team members" in a virtual environment can contribute to building trust in GVT (Panteli & Tucker, 2009).

Additionally to the above, through establishing clear roles and responsibilities and a well written statement of work (SOW), at the beginning of the project, help to build trust within the project team.

Moreover, according to Curseu et al. the selection of communication medium that enable transferring para-verbal cues, such as video conference "is essential for the building of trust and commitment in social relations" (Curseu, Schalk, & Wessel, 2008).

The literature highlights that face-to-face (FCF) communication assists on building and maintain high levels of trust. Considering that for communicating from on-shore to on-board is quite impossible and emerges high costs, it is recommended especially for the on-shore based team member, whenever it is possible the face-to-face communication..

Finally, the establishment of the PMO where information distributed is of a high level of accuracy, the creation on the early project phase of mutually agreed "Done" or "Exit" criteria by the project team members and a dynamic server point

with the project data providing all the necessary information and lessons learnt log can reinforce team's trust building.

### 7.2.2. Macro Barriers.

Following, the macro barriers that should get greater attention are: (a) language problems/inadequate written and verbal orders' transfer (b) the need for further explanation of a message and (c) the lack or delay of feedback.

Based on the categorization of the macro barriers as presented in the table 14, the first two barriers (a) and (b) affect the information quality while the third one (c) the communication channel quality. It is important to underline that none of the barriers we shall be focus on, affect communication medium quality. That lead us to the conclusion that technology and communication means quality in the Greek shipping are rather satisfactory as far as the overall communication quality.

#### *7.2.2.1. Language problems, inadequate written and verbal orders' transfer.*

Although, as mentioned in Chapter 3, in the latest two decades have been established the Standard Marine Navigational Vocabulary (SMNV), the Standard Maritime Communication Phrases (SMCP) and a common Sea-Speak (Sampson & Zhao, 2003), the language problems still occur affecting seriously communication quality. Therefore for overcoming such problems, in parallel with the use of the above standardized vocabularies it is recommended to the shipping company's crew department to ensure "high minimum levels of fluency in one common language when recruiting officers and ratings" (Theotokas & Progoulaki, 2007). Another dimension about linguistic problems can be also the cultural background of the team members as well as the homogeneity of the group. For example, apart from the type of language used, the crew synthesis regarding their culture and nationality contribute to a quite

high level of linguistic problems and miscommunication. Loginovsky argues based on the results of his study about verbal communication failures and safety at sea, that the seafarers of Russian nationality have serious problems concerning communication in the English language and they present to meet high difficulty especially when communicating with people who had English language as their mother tongue (Loginovsky, 2002). Sampson and Zhao also point out the communication problems that Chinese encounter due to their "lack of competence in the English Langue" (Sampson & Zhao, 2003). Unlike the Russians and Chinese seafarers, the Filipino do not show any major problem while collaborating in a multicultural project team, although they have significant differences in language, culture background and attitudes among the other members that consist the crew team.

Considering all the above, it is recommended apart from the establishment of standardized marine shipping terms vocabulary and training, the creation of homogenous project team, as long as it is possible, or the composition of the nationalities those who seem to overcome language problems. Additionally to these, according to Theotokas and Progoulaki manning strategies that "encourage stable crewing patterns" can minimize negative impacts of crew multiculturalism and language problems (Theotokas & Progoulaki, 2007). Moreover, "continuous employment policies, rather than employment per voyage" as Thomas et al argue can also minimize above the mentioned problems (Thomas, Sampson, & Zhao, 2003).

#### *7.2.2.2. Need for further explanation of a message.*

The increased need for further explanation of a message exposes the low information quality Q(in). Further explanation may be needed for variable reasons, i.e. either because information lacks of consistency or lacks of clearance etc. Another case that further explanation is necessary can be due to the briefness of a message for cost

saving reasons, abbreviations for avoiding time consuming, individuals' low capacity of written or spoken or even due to sender's and receiver's different perception.

For minimizing the frequency of further explanation requests, it is recommended for the sender of the message to use some rules (i.e. avoid long sentences, active versus passive style in writing, attachment of necessary files etc) that helps to achieve message consistency and clearance. For that purpose, great attention shall be given for at least key members' training. Furthermore, the standardization of some data - information documents, the creation of simple and well written templates (i.e. issue logs, change log, change request and correction actions templates, memo template, minutes of meeting templates etc) which will be used during project communications will facile message understanding and information integration will be faster. Such response actions' results can be achieved effectively with the establishment of a Project Management Office (PMO) and/or even better a Portfolio Project Office (PPO), as the Greek shipping companies participated in the survey consist of a high fleet and consequently they undertake many projects forming a large pool of portfolios. Finally, it is important to note that our intention is not to eliminate questions arisen, but to avoid time consuming and exceed the over communication associate costs be at low levels.

#### *7.2.2.3. Lack or delay of feedback.*

Absence or low feedback is an important barrier for communication that emerges from low communication channels quality Q(ch). Feedback demonstrates project team's *connectedness* and interactivity ability. In order to achieve feedback or avoid high delays we recommend the establishment of a well written communication plan, stakeholder analysis and communication channels analysis in every project's initial phase. By this way, every project team member and everyone involved would

be aware about: how the message should be informed; by whom; who should be informed and when to be informed, what are the communication channels in the project and which one must be selected according to project's phase.

Furthermore, for cases of great importance where feedback is very crucial, it is prompt the selection of channels that is more interactive (i.e. telephone) and provide greater connectivity (Timmerman & Scott, 2006). The use also of communication means that enable automatic notification about message's delivery in a form of feedback, like emails are also suggested. Finally, if project budget allows, the use of more than one mode of communication can be a solution in some cases of increased severity.

### 7.3. Additional Research and Study

As recommendations for communication improvement in Greek shipping companies, provided to this study, did not take into account cost of improvement action, as further research and study could be the identification of such cost and the value added to shipping projects and shipping companies after improvement.

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## Appendix A - Shipping Typical Communication Plan

| The operation manager is the "SENDER" of the info/message. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| a/a | information/message/report type | source of the information | 1) to whom (possition in the company) | 2) to whom (possition in the company) | 3) to whom (possition in the company) | style of communication (e.g. formal, informal) | media/manner of communication (e.g. mail,face-to face, meeting etc) | tools - supported documents for this communication | information importance for the shipping smooth operation (rank from 1 to 5, with 1 the lowest) | need feedback ? (yes/no) | if needed feedback from whom? |
| 1 | 1st notice of the shipment | Charter Party/Recap of main terms | Chartering dept. | Operation dept. | Supply dept. | Formal | Inter-office message | Softway fax-mail communicator | 5 | Yes | Supply dept. |
| 2 | Daily Report (Until the end | Master/Agent/Charterer | Chartering dept. | Operation dept. | General Manager | Informal | Meeting | | 4 | Yes | General Manager |
| 3 | Technical matters during the voyage or at loading/discha | Master/Agent | Technical dept. | DPA (Designated Person Ashore). | | Informal | e-mail, face-to face | Official report of the vessel | 5 | No | |
| 4 | Notice to fixing | Charter Party/Recap of main terms | Charterer/Broker | Agent | Ows chartering dept | Formal | e-mail | Softway fax-mail communicator | 5 | Yes | Charterer/Broker |
| 5 | Voyage instruct | Charter Party/Recap of main terms | Master | | | Formal | e-mail | Softway fax-mail communicator | 4 | Yes | Master |
| 6 | Disbursement Accounts | charter Party/Recap of main terms | Agent(Or Charterer as per aggreement | Ows Chartering Dept | Ows Account dept | Formal | e-mail | software fax-mail communicator | 4 | Yes | Agent/Charterer/Ows chartering Manager |
| 7 | 1st Notice of sh | Charter Party/Recap of main terms | Agent | Charterer | Receiver of cargo | Formal | e-mail | Softway fax-mail communicator | 5 | Yes | Agent/Charterer/Receiver |
| 8 | Daily Notices (When the vessel under | Master | Agent | Charterer | Receiver of cargo | Formal | e-mail - telephone | Softway fax-mail communicator, pre-arrival forms | 5 | Yes | Agent/Charterer/Receiver |
| 9 | Daily Notices of loading/discha | Master/Agent | Charterer | Receiver of cargo | | Formal | e-mail | Softway fax-mail communicator | 5 | Yes | Charterer/Receiver |

| The Operation Manager is the "RECEIVER" of the info/message. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| a/a | information/message/report type | the source of the information | 1) from whom (possition in the company) | style of communication (e.g. formal, informal) | media/manner of communication (e.g. mail,face-to face, meeting etc) | tools - supported documents for this communication | information importance for the shipping smooth operation (rank from 1 to 5, with 1 the lowest) | need feedback from your side? (yes/no) |
| 1 | Voyage Instructions | Charter Party/Recap of main terms | Chartering dept. | Formal | Inter-office message | Softwa,fax-mail communicator | 5 | Yes |
| 2 | Vessel's technical informations | Technical Dept. | Technical manager | Informal | Face - to face | | 5 | Yes |
| 3 | Vessel's availability of main certificates | Charter Party/Recap of main terms | DPA (Designated Person Ashore). | Informal | Face - to face | | 5 | Yes |
| 4 | Pre-arrival forms (for loading/discharing port) | Depends on the local Port Authority | Master | Formal | e-mail/fax | Softway fax-mail communicator | 5 | Yes |
| 5 | Port conditions | Charter Party/Recap of main terms | Agent | Formal | e-mail | Softway fax-mail communicator | 4 | Yes |
| 6 | Daily informations regarding the shipment | Company's policy | Master | Formal | e-mail/fax/telephone | software fax-mail communicator | 5 | Yes |
| 7 | Official documents of loading/discharging | Charter Party/Recap of main terms | Agent, BL, sof, nor, cargo plan | Formal | e-mail | Softway fax-mail communicator | 5 | Yes |
| 8 | Special informations regarding the cargo, quantities etc. | Depends on the contract | Charterers/Shippers/Receivers | Formal | e-mail - fax - telephone | Softway fax-mail communicator | 5 | Yes |
| 9 | Various informations regarding supplies, bunkers etc | - | Master - Agent | Informal | e-mail - fax - telephone | Softway fax-mail communicator | 2 | No |

## Appendix B – Questionnaire Template

Communication Quality In Shipping

Introductory Paragraph

Dear Sir/Madam:

You are invited to participate in the survey I conduct for my Master Thesis. In this survey Greek shipping companies will be asked to complete a questionnaire about Communication in Shipping Projects. It will take approximately 5-8 minutes to complete it.Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for me to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact with Katerina Liapaki at +302103448377 or by email at the email address specified below. Thank you very much for your time and support. If you agree to participate in the survey check the box below. Please start with the survey now by clicking on the Continue button below.

Sample Characteristics and Demographics

**Q1**. Position (in the company or on board)

…….

**Q2**. Years of experience in this position or similar?

……

**Q3**. What is the number of vessels the company has?

……

**Q4**. What is your nationality?(*question to be answered only from employees on board*)

…….

**Q5**. What nationalities company employs in positions of Master A and/or Chief Engineers A?(*Question tobe answered only from onshore employees*)

- Chinese
- Filipino
- Pakistani
- Bulgarian
- Greek
- Other ……

## Communication Quality Evaluation

**Q6**. Considering communication during a shipment project, what is the frequency you experience the following issues:

| | | | | | |
|---|---|---|---|---|---|
| | Inaccuracy information | | | | |
| | Language problems, inadequate | | | | |
| | written and verbal orders transfer | | | | |
| | Customs,traditions, religion | | | | |
| | problems | | | | |
| | Lack of training, education, skills | | | | |
| | Timezone difference | | | | |
| | Lack of honesty | | | | |
| | Lack of trust | | | | |
| | Technological problems in means | | | | |
| | of communication | | | | |
| | Lack or delay of feedback | | | | |
| | System communications | | | | |
| | breakdown | | | | |
| | Delay in information processing | | | | |
| | Need for further explanation of a | | | | |
| | message | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | Forget to inform someone who | | | | |
| | should have been informed | | | | |
| | Message misinterpratation | | | | |
| | Inaccuracy information | | | | |
| | Laguage problems, inadequate | | | | |
| | written and verbal orders transfer | | | | |

## Appendix C - Survey Statistics

| **Overall Survey Statistics** | |
|---|---|
| | |
| Viewed | 49 |
| Started | 37 |
| Completed | 35 |
| Completion Rate | 94.59% |
| Drop Outs (After Starting) | 2 |
| Average time taken to complete survey : 4 minute(s) | |

What nationalities company employs in positions of Master A and/or Chief Engineers A?

*(Question to be answered only from onshore employees)*

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Chinese | 7 | 9.86% | |
| 2. | Filipino | 16 | 22.54% | |
| 3. | Pakistani | 7 | 9.86% | |
| 4. | Bulgarian | 5 | 7.04% | |
| **5.** | **Greek** | **29** | **40.85%** | |
| 6. | Other | 7 | 9.86% | |
| | **Total** | **71** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.761 |
| Confidence Interval @ 95% | [3.380 - 4.141] n = 71 |
| Standard Deviation | 1.634 |
| Standard Error | 0.194 |

**Key Facts**

**63.38%** chose the following options :

- Greek
- Filipino

Least chosen option **7.04%** :

- Bulgarian

Considering communication during a shipment project,what is the frequency you experience the following issues:

**Overall Matrix Scorecard**

| | Question | Count | Score | Never Rarely Sometimes Often Very often |
|---|---|---|---|---|
| 1. | Inaccuracy information | 35 | 3.714 |  |
| 2. | Language problems, inadequate written and verbal orders' transfer | 35 | 4.029 |  |
| 3. | Customs,traditions, religion problems | 35 | 2.914 |  |
| 4. | Lack of training, education, skills | 35 | 2.914 |  |
| 5. | Timezone difference | 35 | 4.371 |  |
| 6. | Lack of honesty | 35 | 4.571 |  |
| 7. | Lack of trust | 35 | 4.486 |  |
| 8. | Technological problems in means of communication | 35 | 2.829 |  |
| 9. | Lack or delay of feedback | 35 | 4.143 |  |
| 10. | System communications breakdown | 35 | 2.171 |  |
| 11. | Delay in information processing | 35 | 3.543 |  |
| 12. | Need for further explanation of a message | 35 | 4.257 |  |

| | | | | |
|---|---|---|---|---|
| 13. | Forget to inform someone who should have been informed | 35 | 2.743 | |
| 14. | Message misinterpratation | 35 | 3.686 | |
| 15. | Lack of Subject Knowledge | 35 | 2.629 | |
| 16. | Information overloading | 35 | 3.657 | |
| 17. | Emotional Barriers | 35 | 2.343 | |
| 18. | Inappropriate communication medium | 35 | 2.800 | |
| 19. | Difficulties in integrating information | 35 | 3.200 | |
| 20. | Information lacks of consistency | 35 | 3.429 | |
| 21. | Technology limitation in para-verbal cues | 35 | 2.943 | |
| 22. | Difficulties in the use of communication medium | 35 | 2.286 | |
| **Average** | | | **3.348** | |

Inaccuracy information

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 3 | 8.57% | |
| 3. | Sometimes | 8 | 22.86% | |
| **4.** | **Often** | **16** | **45.71%** | |
| 5. | Very often | 7 | 20.00% | |
| | **Total** | **35** | **n = 35** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.714 |
| Confidence Interval @ 95% | [3.387 - 4.041] n = 35 |
| Standard Deviation | 0.987 |
| Standard Error | 0.167 |

**Key Facts**

**68.57%** chose the following options :

- Often
- Sometimes

Least chosen option **2.86%** :

- Never

Laguage problems, inadequate written and verbal orders' transfer

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 1 | 2.86% | |
| 3. | Sometimes | 6 | 17.14% | |
| **4.** | **Often** | **15** | **42.86%** | |
| 5. | Very often | 12 | 34.29% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.029 |
| Confidence Interval @ 95% | [3.712 - 4.345] n = 35 |
| Standard Deviation | 0.954 |
| Standard Error | 0.161 |

**Key Facts**

**77.14%** chose the following options :

- Often
- Very often

Least chosen option **2.86%** :

- Never

Customs,traditions, religion problems

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 4 | 11.43% | |
| 2. | Rarely | 8 | 22.86% | |
| **3.** | **Sometimes** | **14** | **40.00%** | |
| 4. | Often | 5 | 14.29% | |
| 5. | Very often | 4 | 11.43% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.914 |
| Confidence Interval @ 95% | [2.534 - 3.294] n = 35 |
| Standard Deviation | 1.147 |
| Standard Error | 0.194 |

**Key Facts**

**62.86%** chose the following options :
- Sometimes
- Rarely

Least chosen option **11.43%** :
- Never

Lack of training, education, skills

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 2 | 5.71% | |
| 2. | Rarely | 11 | 31.43% | |
| **3.** | **Sometimes** | **13** | **37.14%** | |
| 4. | Often | 6 | 17.14% | |
| 5. | Very often | 3 | 8.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.914 |
| Confidence Interval @ 95% | [2.570 - 3.259] n = 35 |
| Standard Deviation | 1.040 |
| Standard Error | 0.176 |

**Key Facts**

**68.57%** chose the following options :

- Sometimes
- Rarely

Least chosen option **5.71%** :

- Never

Timezone difference

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 0 | 0.00% | |
| 2. | Rarely | 1 | 2.86% | |
| 3. | Sometimes | 1 | 2.86% | |
| **4.** | **Often** | **17** | **48.57%** | |
| 5. | Very often | 16 | 45.71% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.371 |
| Confidence Interval @ 95% | [4.143 - 4.600] n = 35 |
| Standard Deviation | 0.690 |
| Standard Error | 0.117 |

**Key Facts**

**94.29%** chose the following options :

- Often
- Very often

Lack of honesty

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 1 | 2.86% | |
| 3. | Sometimes | 1 | 2.86% | |
| 4. | Often | 6 | 17.14% | |
| **5.** | **Very often** | **26** | **74.29%** | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.571 |
| Confidence Interval @ 95% | [4.268 - 4.875] n = 35 |
| Standard Deviation | 0.917 |
| Standard Error | 0.155 |

**Key Facts**

**91.43%** chose the following options :

- Very often
- Often

Least chosen option **2.86%** :

- Never

Lack of trust

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 0 | 0.00% | |
| 3. | Sometimes | 4 | 11.43% | |
| 4. | Often | 6 | 17.14% | |
| **5.** | **Very often** | **24** | **68.57%** | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.486 |
| Confidence Interval @ 95% | [4.181 - 4.790] n = 35 |
| Standard Deviation | 0.919 |
| Standard Error | 0.155 |

**Key Facts**

**85.71%** chose the following options :

- Very often
- Often

Technological problems in means of communication

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 9 | 25.71% | |
| **3.** | **Sometimes** | **20** | **57.14%** | |
| 4. | Often | 5 | 14.29% | |
| 5. | Very often | 0 | 0.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.829 |
| Confidence Interval @ 95% | [2.595 - 3.063] n = 35 |
| Standard Deviation | 0.707 |
| Standard Error | 0.119 |

**Key Facts**

**82.86%** chose the following options :

- Sometimes
- Rarely

Lack or delay of feedback

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 1 | 2.86% | |
| 3. | Sometimes | 4 | 11.43% | |
| **4.** | **Often** | **15** | **42.86%** | |
| 5. | Very often | 14 | 40.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.143 |
| Confidence Interval @ 95% | [3.830 - 4.456] n = 35 |
| Standard Deviation | 0.944 |
| Standard Error | 0.160 |

**Key Facts**

**82.86%** chose the following options :
- Often
- Very often

Least chosen option **2.86%** :
- Never

System communications breakdown

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| **2.** | **Rarely** | **27** | **77.14%** | |
| 3. | Sometimes | 7 | 20.00% | |
| 4. | Often | 0 | 0.00% | |
| 5. | Very often | 0 | 0.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.171 |
| Confidence Interval @ 95% | [2.021 - 2.321] n = 35 |
| Standard Deviation | 0.453 |
| Standard Error | 0.077 |

**Key Facts**

**97.14%** chose the following options :

- Rarely
- Sometimes

Delay in information processing

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 0 | 0.00% | |
| 2. | Rarely | 4 | 11.43% | |
| 3. | Sometimes | 12 | 34.29% | |
| **4.** | **Often** | **15** | **42.86%** | |
| 5. | Very often | 4 | 11.43% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.543 |
| Confidence Interval @ 95% | [3.261 - 3.825] n = 35 |
| Standard Deviation | 0.852 |
| Standard Error | 0.144 |

**Key Facts**

**77.14%** chose the following options :

- Often
- Sometimes

Need for further explanation of a message

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 0 | 0.00% | |
| 2. | Rarely | 4 | 11.43% | |
| 3. | Sometimes | 3 | 8.57% | |
| 4. | Often | 8 | 22.86% | |
| **5.** | **Very often** | **20** | **57.14%** | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.257 |
| Confidence Interval @ 95% | [3.913 - 4.601] n = 35 |
| Standard Deviation | 1.039 |
| Standard Error | 0.176 |

**Key Facts**

**80%** chose the following options :

- Very often
- Often

Forget to inform someone who should have been informed

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 6 | 17.14% | |
| 2. | Rarely | 5 | 14.29% | |
| **3.** | **Sometimes** | **16** | **45.71%** | |
| 4. | Often | 8 | 22.86% | |
| 5. | Very often | 0 | 0.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.743 |
| Confidence Interval @ 95% | [2.408 - 3.077] n = 35 |
| Standard Deviation | 1.010 |
| Standard Error | 0.171 |

**Key Facts**

**68.57%** chose the following options :

- Sometimes
- Often

Message misinterpratation

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 3 | 8.57% | |
| 3. | Sometimes | 9 | 25.71% | |
| **4.** | **Often** | **15** | **42.86%** | |
| 5. | Very often | 7 | 20.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.686 |
| Confidence Interval @ 95% | [3.357 - 4.015] n = 35 |
| Standard Deviation | 0.993 |
| Standard Error | 0.168 |

**Key Facts**

**68.57%** chose the following options :

- Often
- Sometimes

Least chosen option **2.86%** :

- Never

Lack of Subject Knowledge

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 2 | 5.71% | |
| **2.** | **Rarely** | **20** | **57.14%** | |
| 3. | Sometimes | 5 | 14.29% | |
| 4. | Often | 5 | 14.29% | |
| 5. | Very often | 3 | 8.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.629 |
| Confidence Interval @ 95% | [2.268 - 2.989] n = 35 |
| Standard Deviation | 1.087 |
| Standard Error | 0.184 |

**Key Facts**

**71.43%** chose the following options :

- Rarely
- Sometimes

Least chosen option **5.71%** :

- Never

Information overloading

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 9 | 25.71% | |
| 3. | Sometimes | 4 | 11.43% | |
| 4. | Often | 8 | 22.86% | |
| **5.** | **Very often** | **13** | **37.14%** | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.657 |
| Confidence Interval @ 95% | [3.225 - 4.089] n = 35 |
| Standard Deviation | 1.305 |
| Standard Error | 0.221 |

**Key Facts**

**62.86%** chose the following options :

- Very often
- Rarely

Least chosen option **2.86%** :

- Never

Emotional Barriers

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 6 | 17.14% | |
| **2.** | **Rarely** | **19** | **54.29%** | |
| 3. | Sometimes | 5 | 14.29% | |
| 4. | Often | 2 | 5.71% | |
| 5. | Very often | 3 | 8.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.343 |
| Confidence Interval @ 95% | [1.975 - 2.711] n = 35 |
| Standard Deviation | 1.110 |
| Standard Error | 0.188 |

**Key Facts**

**71.43%** chose the following options :
- Rarely
- Never

Least chosen option **5.71%** :
- Often

Inappropriate communication medium

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 2 | 5.71% |  |
| 2. | Rarely | 8 | 22.86% |  |
| **3.** | **Sometimes** | **21** | **60.00%** |  |
| 4. | Often | 3 | 8.57% |  |
| 5. | Very often | 1 | 2.86% |  |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.800 |
| Confidence Interval @ 95% | [2.536 - 3.064] n = 35 |
| Standard Deviation | 0.797 |
| Standard Error | 0.135 |

**Key Facts**

**82.86%** chose the following options :

- Sometimes
- Rarely

Least chosen option **2.86%** :

- Very often

Difficulties in integrating information

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 7 | 20.00% | |
| **3.** | **Sometimes** | **13** | **37.14%** | |
| 4. | Often | 12 | 34.29% | |
| 5. | Very often | 2 | 5.71% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.200 |
| Confidence Interval @ 95% | [2.891 - 3.509] n = 35 |
| Standard Deviation | 0.933 |
| Standard Error | 0.158 |

**Key Facts**

**71.43%** chose the following options :

- Sometimes
- Often

Least chosen option **2.86%** :

- Never

Information lacks of consistency

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 3 | 8.57% | |
| 3. | Sometimes | 11 | 31.43% | |
| **4.** | **Often** | **20** | **57.14%** | |
| 5. | Very often | 0 | 0.00% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.429 |
| Confidence Interval @ 95% | [3.171 - 3.686] n = 35 |
| Standard Deviation | 0.778 |
| Standard Error | 0.131 |

**Key Facts**

**88.57%** chose the following options :

- Often
- Sometimes

Technology limitation in para-verbal cues

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 1 | 2.86% | |
| 2. | Rarely | 11 | 31.43% | |
| **3.** | **Sometimes** | **15** | **42.86%** | |
| 4. | Often | 5 | 14.29% | |
| 5. | Very often | 3 | 8.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.943 |
| Confidence Interval @ 95% | [2.622 - 3.264] n = 35 |
| Standard Deviation | 0.968 |
| Standard Error | 0.164 |

**Key Facts**

**74.29%** chose the following options :

- Sometimes
- Rarely

Least chosen option **2.86%** :

- Never

Difficulties in the use of communication medium

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | Never | 7 | 20.00% | |
| **2.** | **Rarely** | **17** | **48.57%** | |
| 3. | Sometimes | 8 | 22.86% | |
| 4. | Often | 0 | 0.00% | |
| 5. | Very often | 3 | 8.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.286 |
| Confidence Interval @ 95% | [1.930 - 2.641] n = 35 |
| Standard Deviation | 1.073 |
| Standard Error | 0.181 |

**Key Facts**

**71.43%** chose the following options :

- Rarely
- Sometimes

Rate the following statements according to their validity." In every shipment project phase I know..." (select 1 for the lowest and 5 for the higher)

**Overall Matrix Scorecard**

| | Question | Count | Score | 1 2 3 4 5 |
|---|---|---|---|---|
| 1. | Who needs what information | 35 | 4.600 |  |
| 2. | When do they need the information | 35 | 4.086 |  |
| 3. | Who delivers the information | 35 | 3.257 |  |
| 4. | How should the information be delivered | 35 | 3.600 |  |
| 5. | If my message has been transfered succesfully to the recipient | 35 | 2.029 |  |
| | | **Average** | **3.514** | |

Who needs what information

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | 1 | 0 | 0.00% | |
| 2. | 2 | 1 | 2.86% | |
| 3. | 3 | 1 | 2.86% | |
| 4. | 4 | 9 | 25.71% | |
| **5.** | **5** | **24** | **68.57%** | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.600 |
| Confidence Interval @ 95% | [4.370 - 4.830] n = 35 |
| Standard Deviation | 0.695 |
| Standard Error | 0.117 |

**Key Facts**

**94.29%** chose the following options :

- 5
- 4

When do they need the information

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | 1 | 0 | 0.00% | |
| 2. | 2 | 1 | 2.86% | |
| 3. | 3 | 5 | 14.29% | |
| **4.** | **4** | **19** | **54.29%** | |
| 5. | 5 | 10 | 28.57% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 4.086 |
| Confidence Interval @ 95% | [3.840 - 4.332] n = 35 |
| Standard Deviation | 0.742 |
| Standard Error | 0.126 |

**Key Facts**

**82.86%** chose the following options :

- 4
- 5

Who delivers the information

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | 1 | 1 | 2.86% | |
| 2. | 2 | 3 | 8.57% | |
| **3.** | **3** | **21** | **60.00%** | |
| 4. | 4 | 6 | 17.14% | |
| 5. | 5 | 4 | 11.43% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.257 |
| Confidence Interval @ 95% | [2.964 - 3.551] n = 35 |
| Standard Deviation | 0.886 |
| Standard Error | 0.150 |

**Key Facts**

**77.14%** chose the following options :

- 3
- 4

Least chosen option **2.86%** :

- 1

How should the information be delivered

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| 1. | 1 | 1 | 2.86% | |
| 2. | 2 | 3 | 8.57% | |
| 3. | 3 | 10 | 28.57% | |
| **4.** | **4** | **16** | **45.71%** | |
| 5. | 5 | 5 | 14.29% | |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 3.600 |
| Confidence Interval @ 95% | [3.287 - 3.913] n = 35 |
| Standard Deviation | 0.946 |
| Standard Error | 0.160 |

**Key Facts**

**74.29%** chose the following options :

- 4
- 3

Least chosen option **2.86%** :

- 1

If my message has been transfered succesfully to the recipient

**Frequency Analysis**

| | Answer | Count | Percent | 20% 40% 60% 80% 100% |
|---|---|---|---|---|
| **1.** | **1** | **22** | **62.86%** |  |
| 2. | 2 | 3 | 8.57% |  |
| 3. | 3 | 2 | 5.71% |  |
| 4. | 4 | 3 | 8.57% |  |
| 5. | 5 | 5 | 14.29% |  |
| | **Total** | **35** | **100%** | |

**Key Analytics**

| | |
|---|---|
| Mean | 2.029 |
| Confidence Interval @ 95% | [1.517 - 2.540] n = 35 |
| Standard Deviation | 1.543 |
| Standard Error | 0.261 |

**Key Facts**

**77.14%** chose the following options :

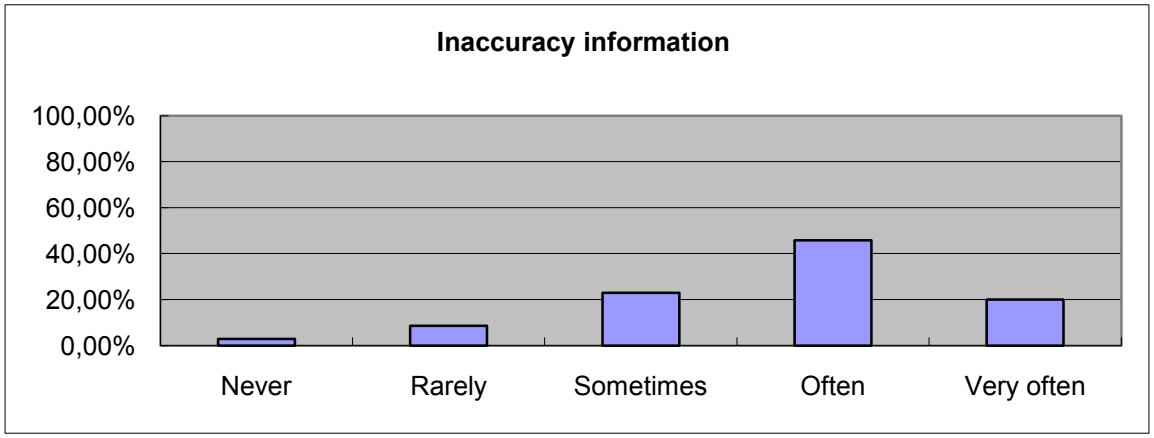
- 1
- 5

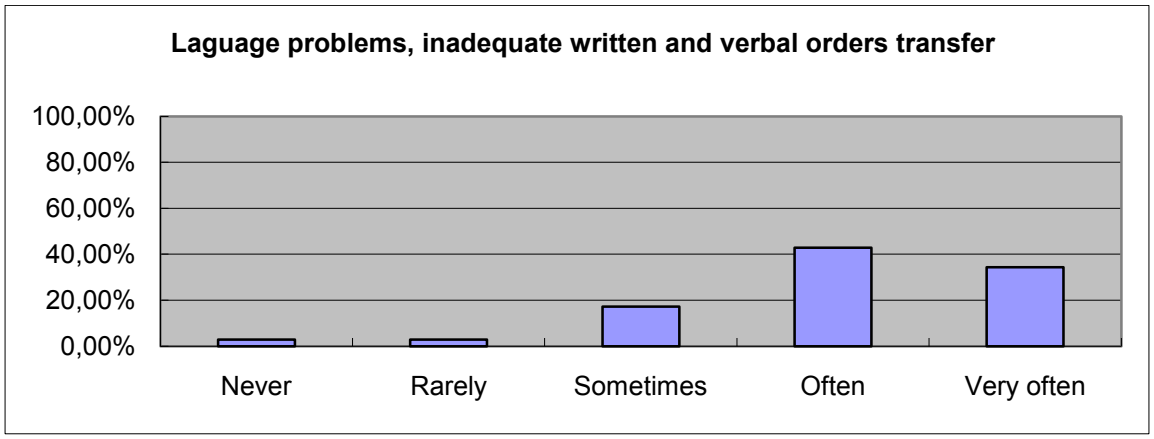
Least chosen option **5.71%** :

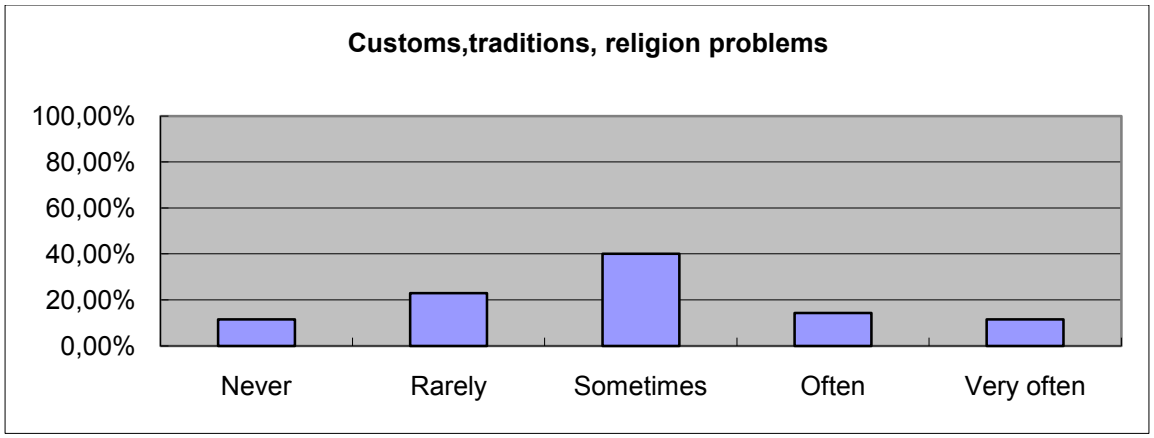
- 3

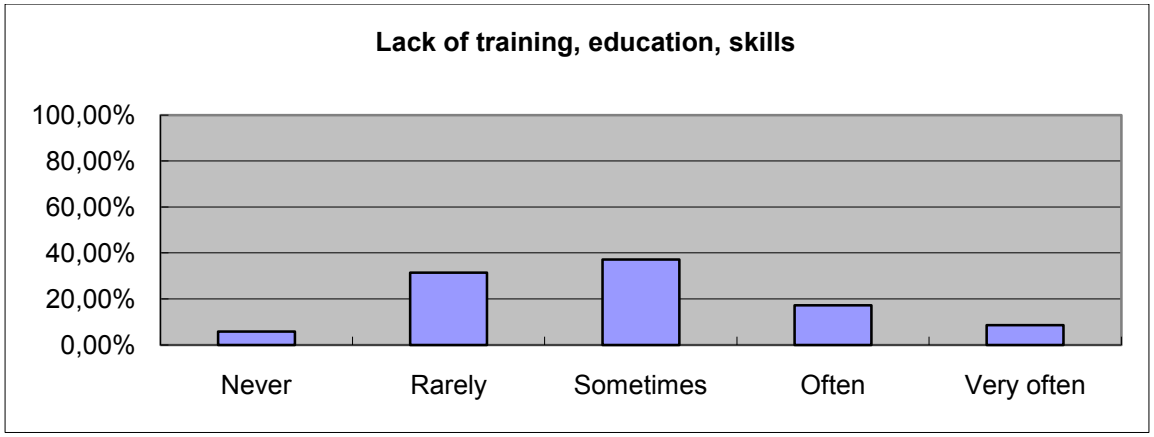
Analytics Powered by QuestionPro

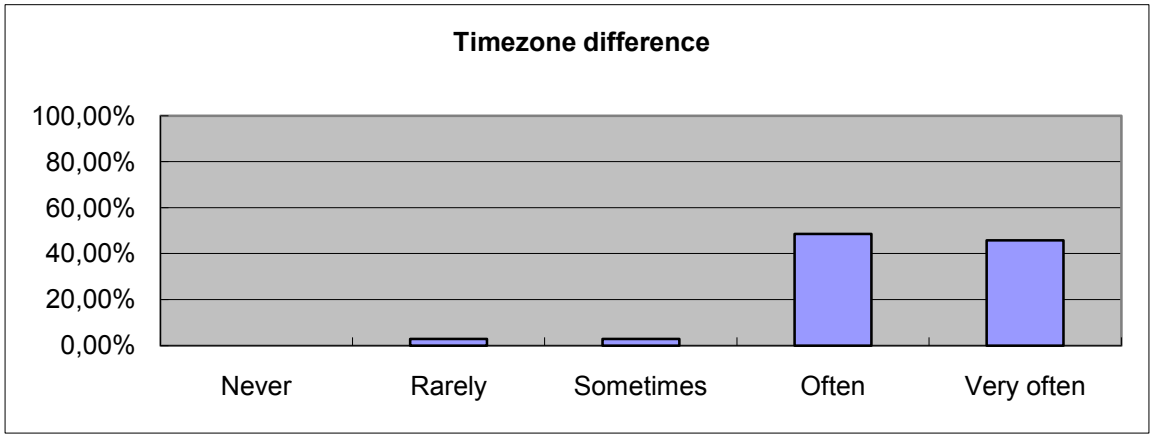
## Appendix D – Graph Results.

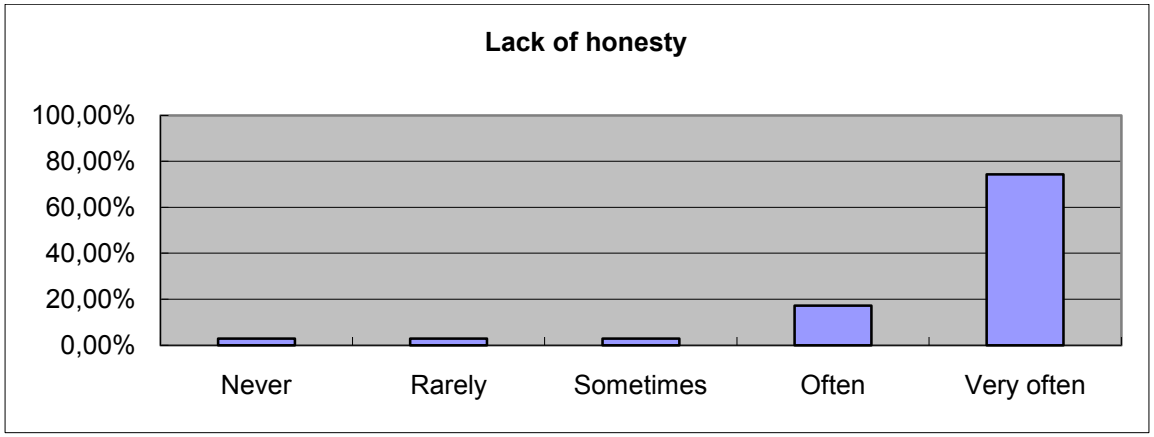


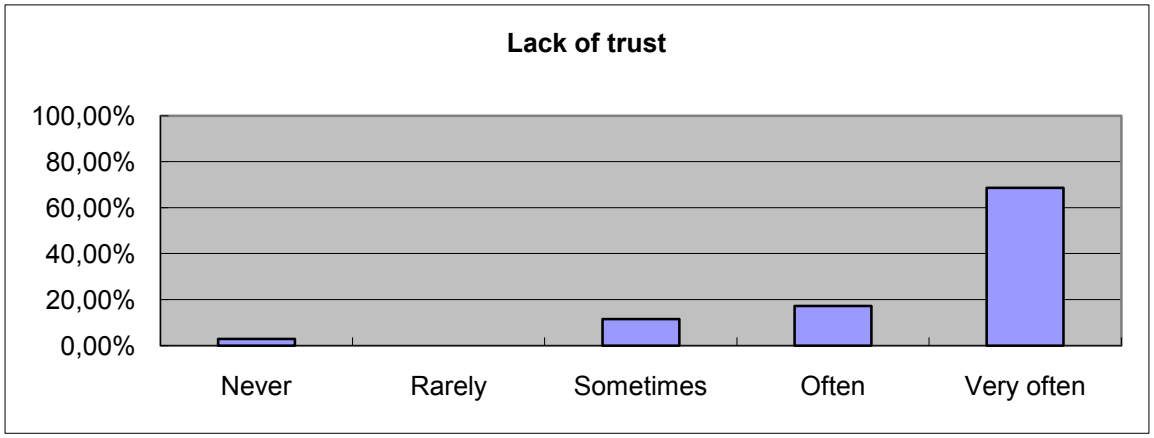



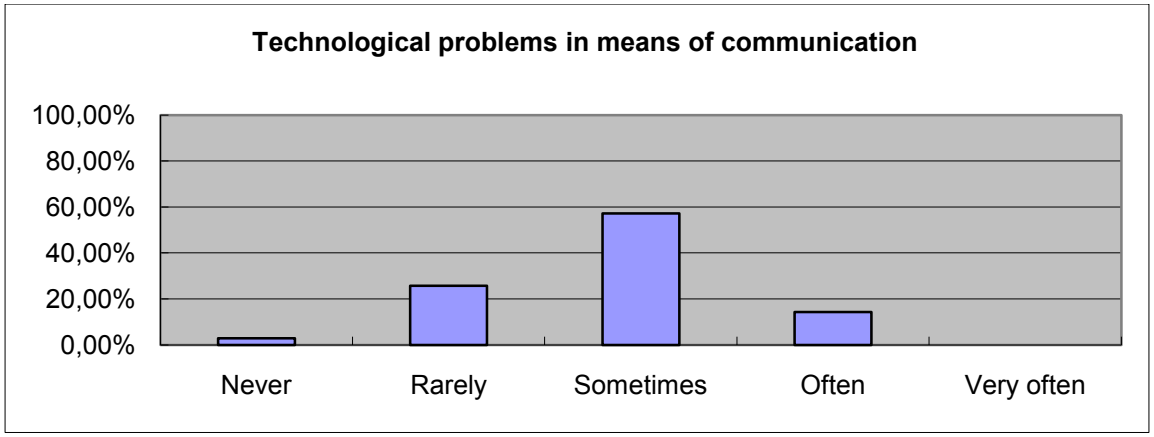



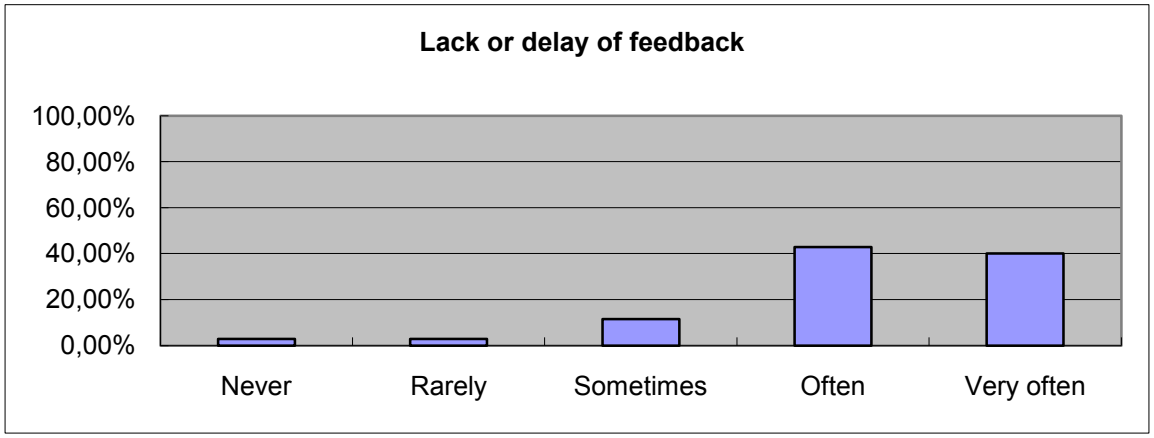

Lack of training, education, skills
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

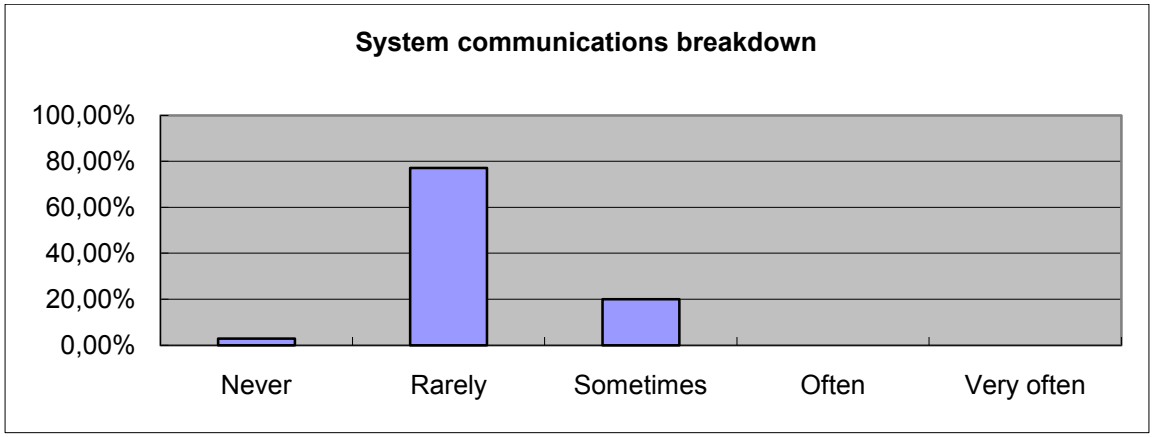

Timezone difference
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

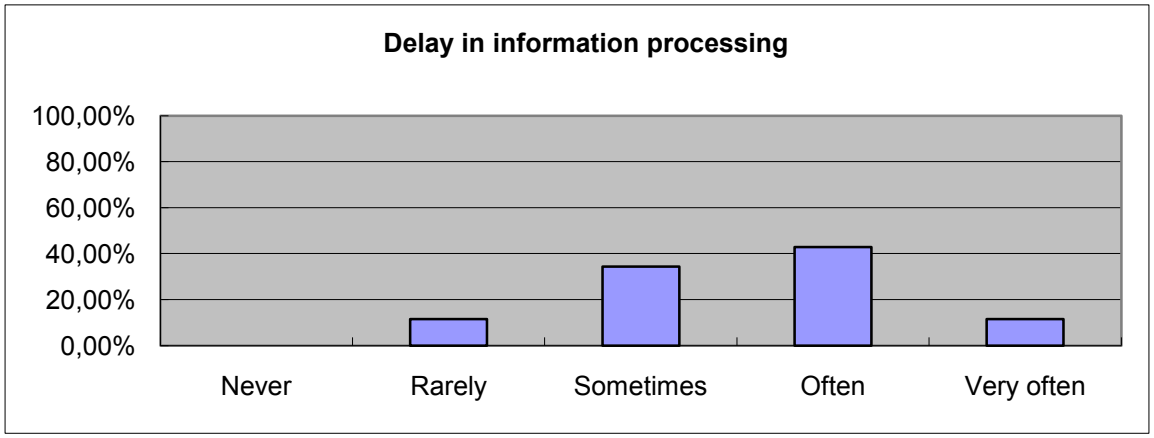

Lack of honesty
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

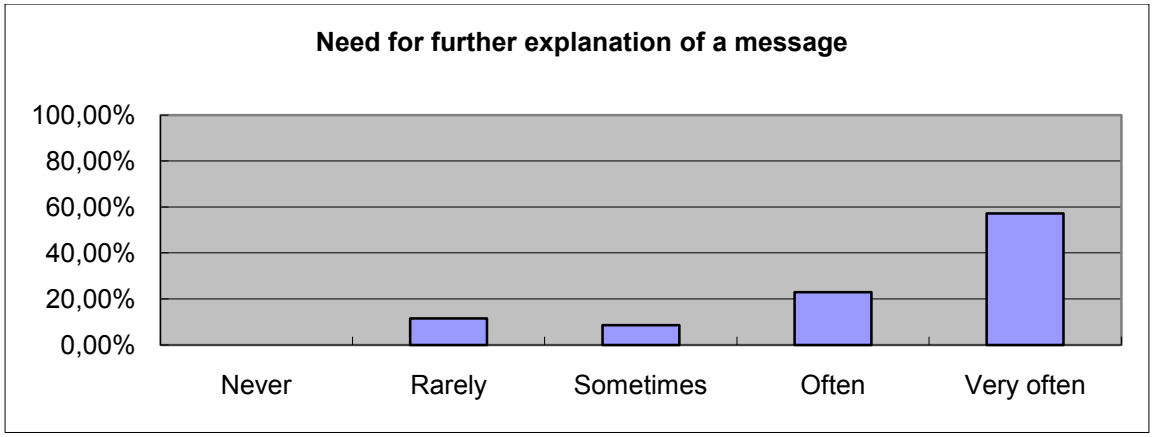

Lack of trust
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

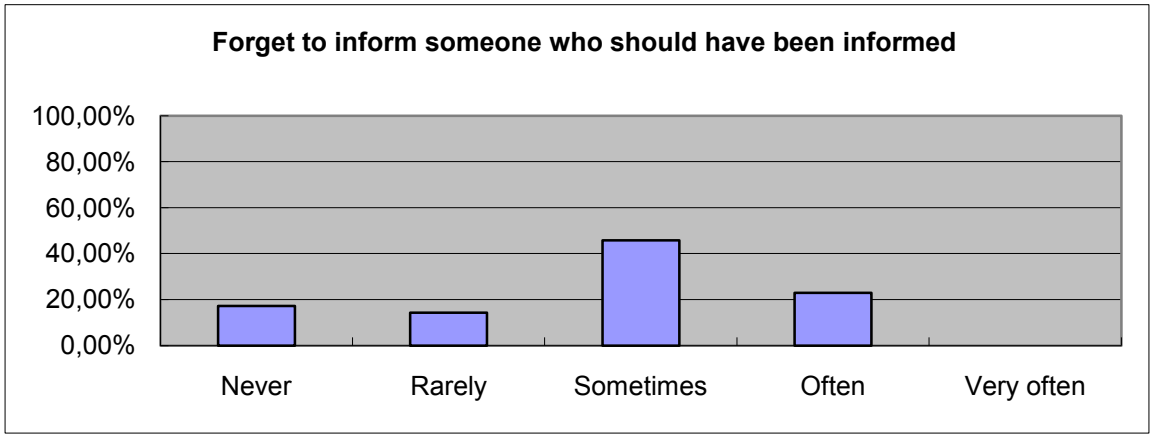

Technological problems in means of communication
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

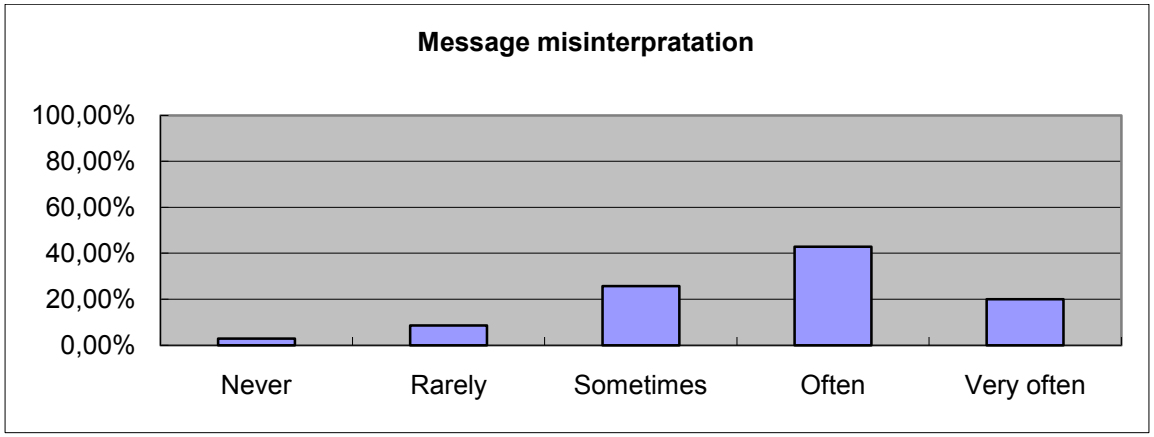

Lack or delay of feedback
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

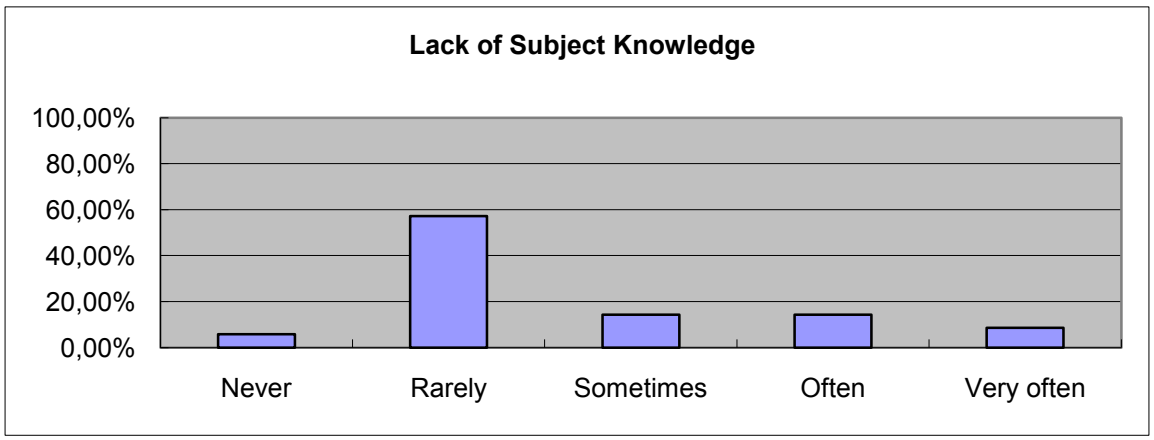

System communications breakdown
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

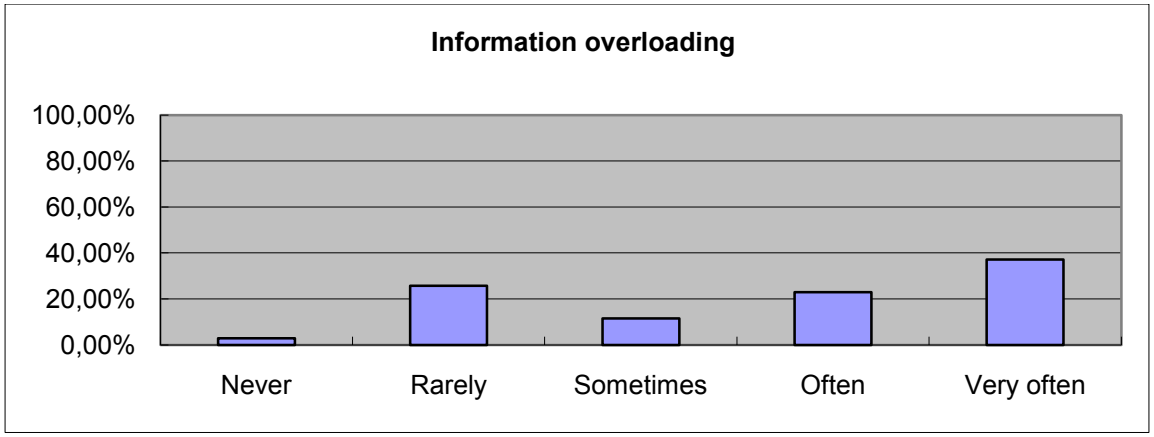

Delay in information processing
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

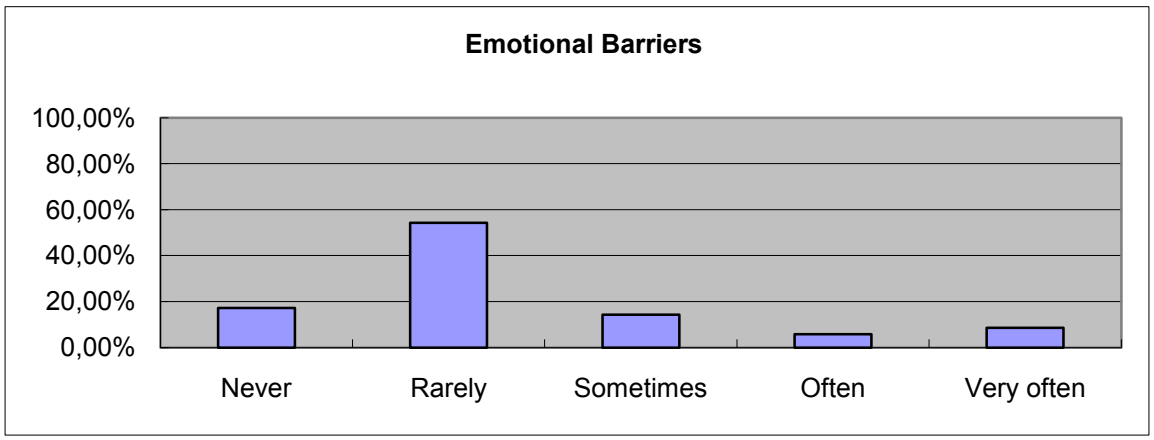

Need for further explanation of a message
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

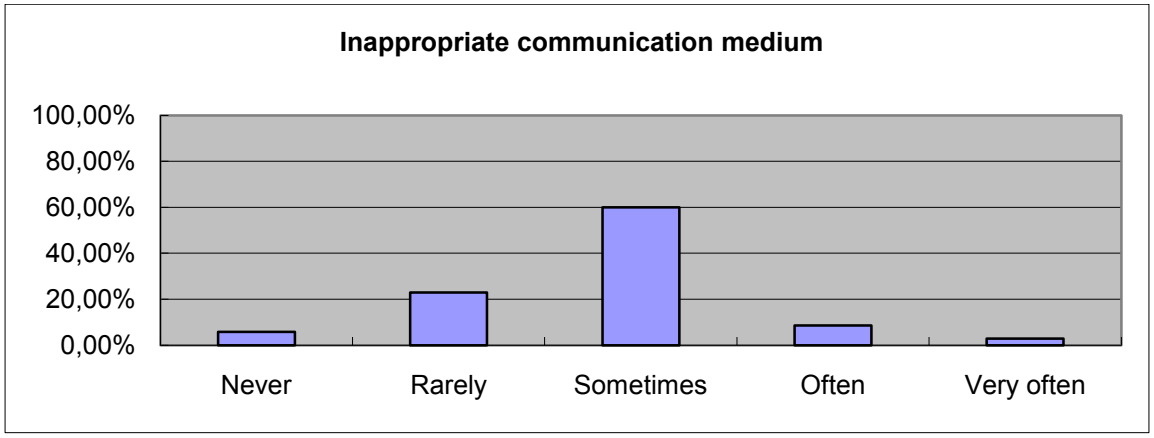

Forget to inform someone who should have been informed
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

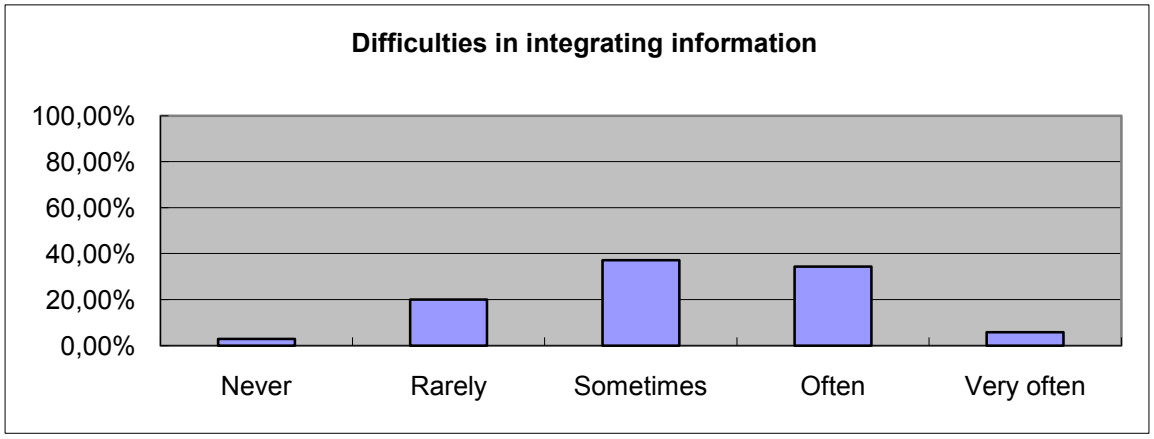

Message misinterpratation
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

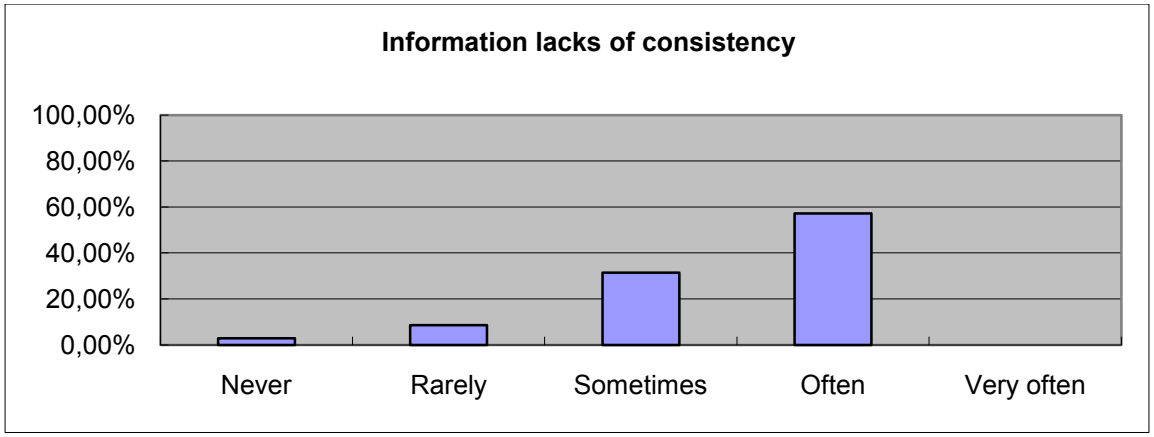

Lack of Subject Knowledge
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

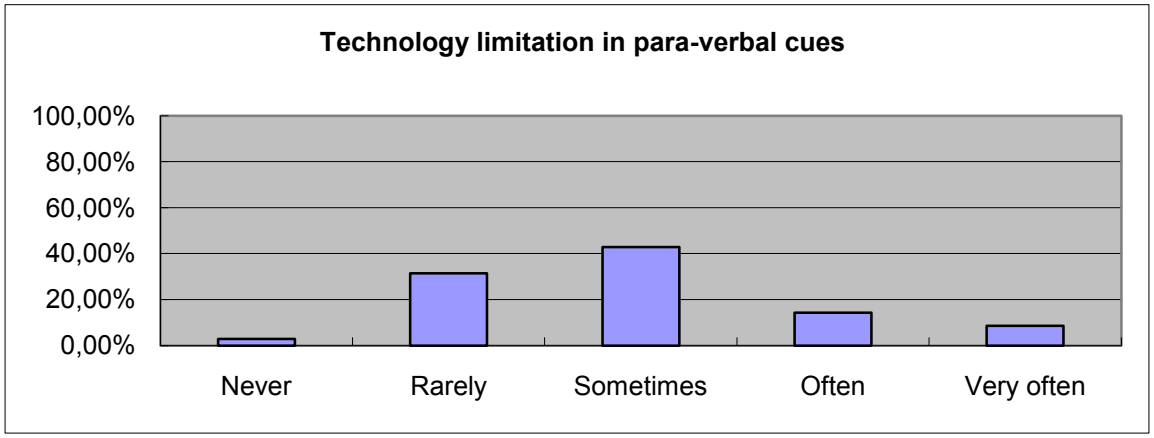

Information overloading
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

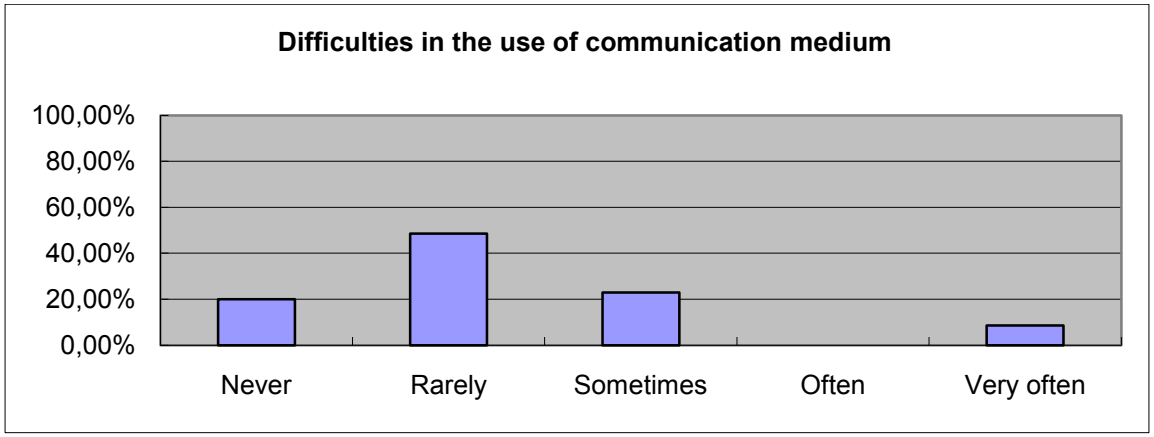

Emotional Barriers
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

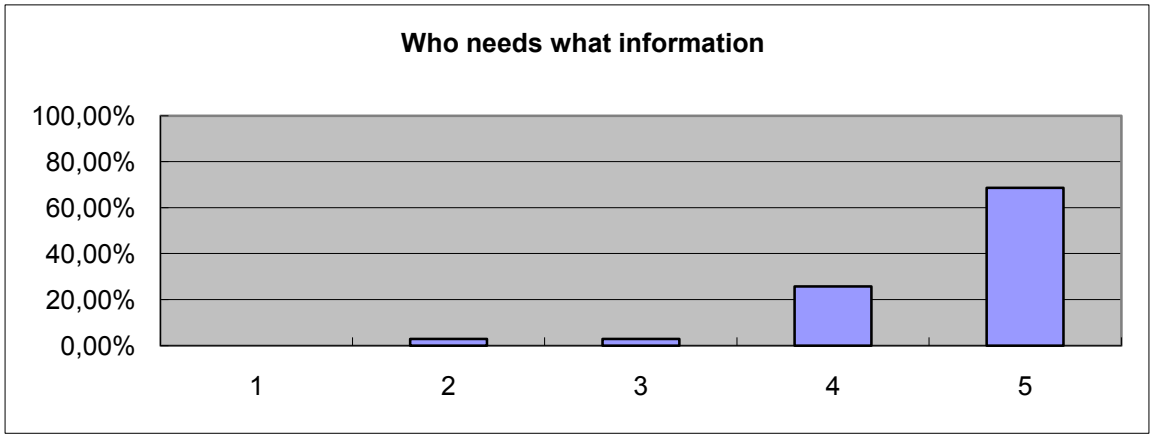

Inappropriate communication medium
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

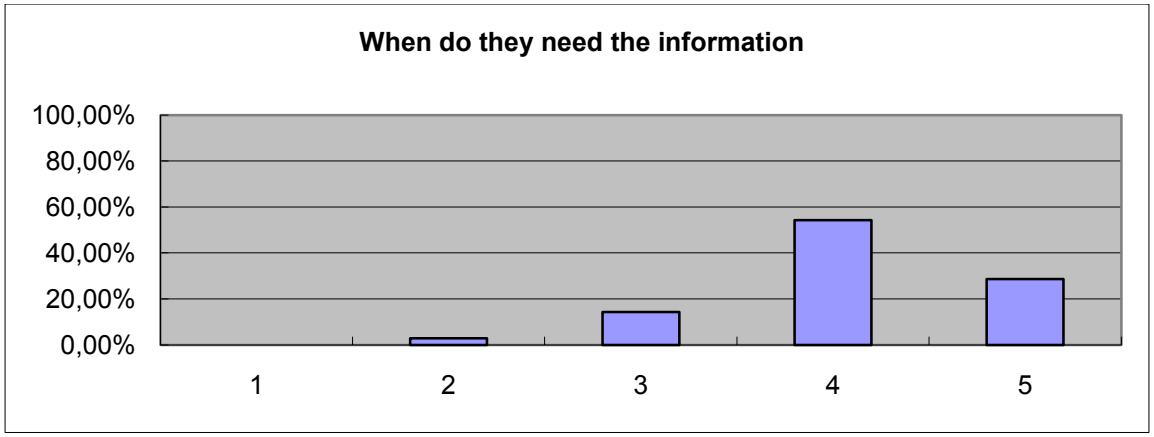

Difficulties in integrating information
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

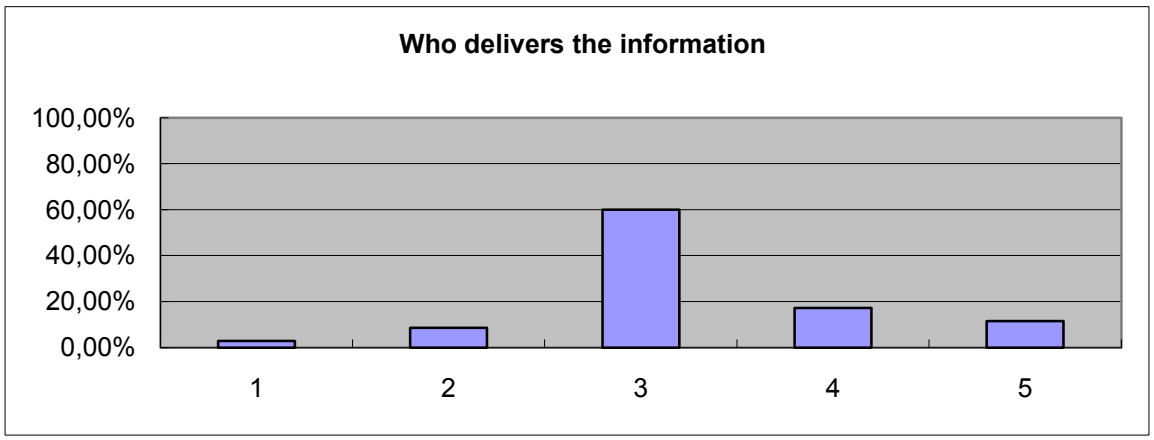

Information lacks of consistency
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

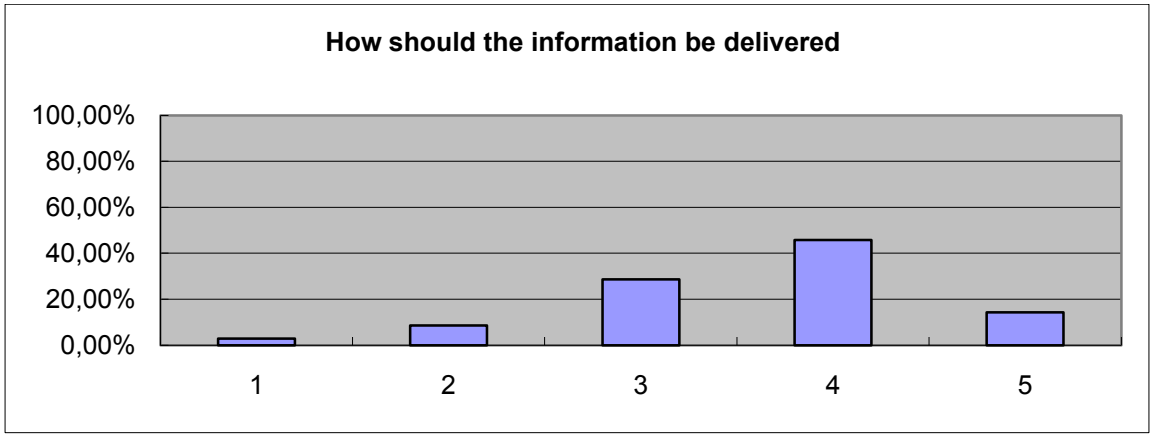

Technology limitation in para-verbal cues
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often

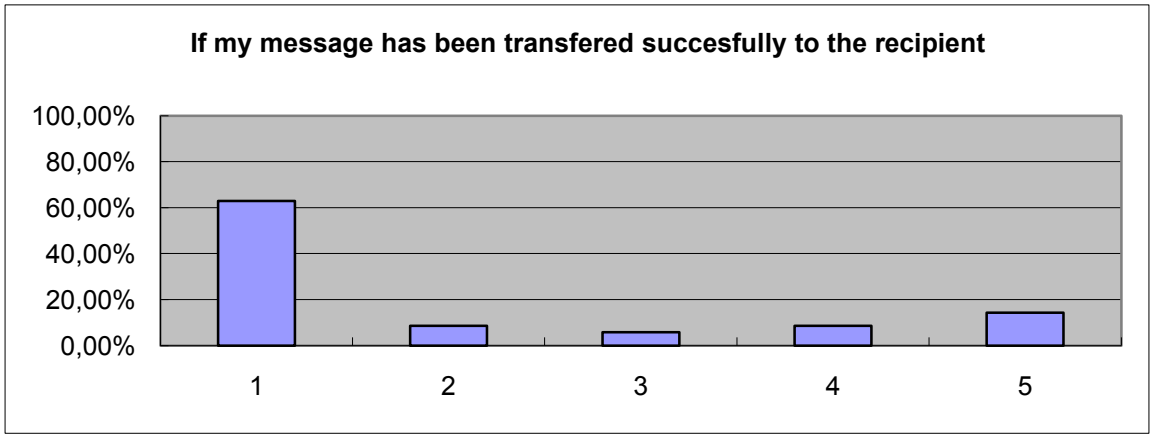

Difficulties in the use of communication medium
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
Never
Rarely
Sometimes
Often
Very often


Who needs what information
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
1
2
3
4
5


When do they need the information
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
1
2
3
4
5


Who delivers the information
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
1
2
3
4
5


How should the information be delivered
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
1
2
3
4
5


If my message has been transfered succesfully to the recipient
100,00%
80,00%
60,00%
40,00%
20,00%
0,00%
1
2
3
4
5