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ICT Tools and Group Dynamics

ICT Tools Enhancing Communication in Inexperienced Intercultural Project Teams Alternatively Working in a Collocated and Virtual Context at the Forming and Storming Stages

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ABSTRACT

Due to the prevalence of virtual and hybrid project teams, in the contemporary business environment, the use of ICT tool has also increased, as means of communication and collaboration. The research at hand aims to discover the ways such tools can enhance communication and, implicitly collaboration, of intercultural virtual and hybrid teams, at their early stages of group development.

The research can be seen as consisting of two interrelated parts: the literature review and the empirical segment. The literature review highlights the most important culture and virtual environment related issues, which trigger the necessity of ICT tools' use.

The research framework promotes the choice of an ICT tool for two different project groups, based on their communication and collaboration needs. The study is an explorative one, conducted qualitatively, and based on the principles of design science.

The results of repeated observation sessions, transferred into graphs, served as a base for interviews' structures and further analysis. The observed and perceived benefits of the used ICT tool were transferred into an affinity board including the most beneficial functionalities. All the resulting information was analysed and concluded upon, in accordance to the literature review.

The results of the research indicate that, although not a group development panacea, ICT tools can improve the quality of the incipient phases of group development, in certain ways: communication is encouraged and facilitated regardless the implemented communication model; meetings' efficiency is increased; workflow is improved by work synchronisation and awareness; client communication and collaboration is favoured; the adoption of new members is streamlined and the impact of direct interaction's low extent is alleviated.

Key words: Group Dynamics, ICT tools, Forming, Storming, Virtual Teams, Hybrid Teams, Intercultural Communication

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ABBREVIATIONS

A/N	Author’s note
BIT	Business Information Technology
HD	High Definition
ICT	Information Communication Technology
IS	Information Systems
LP	Initials of the company Team 2 worked for, which will be referred to as to LP team
PS	Initials of the company Team 1 worked for, which will be referred to as to PS team
SaaS	Software as a Service
SME	Small and medium-sized enterprise
USA	United States of America

1 INTRODUCTION

Teams are preponderantly seen, in contemporary business firms, as the best solution for an organization to efficiently achieve product or important task related goals. The flexibility and quick response to change recommend teams to be more effective than traditional departments or other forms permanent grouping (Robbins, Judge, Campbell, 2010, 262).

Studies of group dynamics show that a group of people, consisting of more than two people, cannot be expected to work as well together at the early stages of teaming as they would at the latest ones. According to the same studies (Tuckman 1965, Katzenbach; Smith 1993, Skyttä 2005) every team starts from being a group, and develops into a high performing team, as the project goes on. However, there is also the possibility of an organization including only groups or highly experienced teams, whose members have worked together for many years. In the latest mentioned case the group dynamics theories do not anymore apply, but they have applied in team's earlier history.

The earliest stages of group development are proven to be the most challenging for traditional teams, who work in the same place and time. The difficulties relate to communication, collaboration and motivation and they also apply for teams whose working space is set across time, space and organisational boundaries (Lipnack, 1997, 352). These teams are called virtual teams and they have become more and more common in the nowadays business environment (DuFrene, Lehman, 2011), due to for example, globalization. It is to be noticed that the challenges brought by the stages of group development affect even more severely the virtual teams.

The earliest stages of group development, namely Forming and Storming (Tuckman, 1965), imply a low degree of communication and a high degree of individualism. During these stages, group members should be encouraged to communicate and get to know each other. While this is difficult for the traditional monocultural collocated teams, virtual intercultural teams are even more challenged. The lack of direct communication and interaction inhibit group

members' trust and interpersonal relationships building, which would facilitate harmonious team working.

Communication inside an intercultural virtual team can be improved by the use of ICT tools and supported by face-to-face communication sessions (Hossain et al., 2004). The direct (face-to-face) communication sessions are strongly recommended to take place at the very early stages of group development, which here are referred to as "Forming" and "Storming" phases.

This study will intend to show how an ICT tool can facilitate the communication inside inexperienced intercultural ICT project teams, situated at the Forming and Storming stages, alternatively working in a collocated and virtual context.

2 RESEARCH BACKGROUND

This chapter contains the description of the key concepts, continuing with the research motivation and a description of the way the research will be conducted.

2.1 Definition of Key Concepts

The key concepts of the present study are: ICT team tools, Intercultural ICT Team, Intercultural Communication, Forming and Storming Stages, Virtual and Hybrid Team.

The above mentioned key concepts of the study at hand will be defined in the following subchapters.

2.1.1 ICT team tools

The term of Information Communication Technology (ICT) tool is mainly defined as a tool used by teams "to communicate and to create, disseminate, store, and manage information" (Blurton, 1999, 46). ICT tools are represented by a rather large range of evolving technologies including telecommunication technologies, such as computer-mediated conferencing, video conferencing, as well as digital technologies: computers, information networks (internet, World Wide Web, intranets and extranets) and software applications (Haliso, 2011). Such tools that support communication and collaboration between members of a project team are here referred to as to ICT team tools.

2.1.2 Intercultural ICT Teams

Groups are seen, by specialists in group dynamics, to develop into teams as the project in which they are involved goes on (Tuckman 1965, Skyttä 2005, Katzenbach and Smith 1993). However, depending on the working environment and project purpose, working groups can also remain working groups.

A group is comprised of more than two people who hold individual accountability and individual orientation towards delegated tasks (Heikkilä, 2002, 16-17), while a group, working for achieving the common goals of a project

(O'Reilly, 2009) holding mutual accountability for the progress (Heikkilä, 2002, 16-17), defines the concept of team.

Interculturalism relates to an environment built upon more than two different cultural backgrounds (Gudykunst; Mody, 2002, 2), while an ICT project is defined as "a unique, temporary endeavour undertaken to create a product or service that includes a significant ICT component" (Schwalbe, 2012, 4).

Therefore, an intercultural ICT team can be defined as a working entity formed by more than two people, belonging to different cultures, who hold mutual accountability for the ICT component's development progress assigned through a project.

2.1.3 Intercultural Communication

The process of communication is generally divided in three categories: oral, written and nonverbal communication, while the oral and nonverbal factors being inseparable in the process of face to face communication.

The oral, written and nonverbal communication means are seen as channels of "transferring and understanding" the meaning of the message to be delivered. On the other hand, they provide a release for the emotional expression of feelings and fulfilment of social needs, while facilitating common goals setting, action planning and decision making. (Robbins et al., 2010, 290)

Gudykunst and Mody defined intercultural communication in 2002 as the communication taking place between two or more individuals belonging to different nationalities. The intercultural type of communication is affected by cultural differences and individuals' language skills. Pinto (2000, 14), however, states that it is very difficult, if not impossible to formulate a definition of intercultural communication without describing its goals.

The concept of intercultural communication is here defined as the oral, written and nonverbal communication happening between people belonging to different cultural backgrounds.

2.1.4 Forming and Storming Stages

Forming and Storming are the first and most critical stages in project team building, as they ensure the future success of the team, in terms of collaboration and project goals achievement.

Forming is the stage where individuals come together and are introduced to each other, as future team members. Each individual has the wish of being accepted by the other ones while being insecure on the own self, and others.

The Storming stage brings a certain level of collaboration and it represents the stage where team members doubt each other's competencies and the possibility of achieving project goals.

These two stages are the stages when conflicts are most likely to appear, and during which several issues are to be dealt with through communication. While Forming and Storming are very difficult phases for the developing teams, communication barriers imposed by intercultural and virtual contexts can only aggravate the situation. It has been previously studied that communication is the most difficult issue to handle while dealing with an intercultural team which works geographically dispersed (Chutnik, Grzesik, 2009, 88).

2.1.5 Virtual team, Hybrid Team

A virtual team is defined by Lipnack as "a group of individuals who work across time, space and organizational boundaries with links strengthened by webs of communication technology" (Lipnack, 1997, 352).

Earlier studies have pointed out that such project teams are more and more common in the contemporary business environment (DuFrene, Lehman, 2011) and that the virtualization has come, in many cases, as a natural change (Witchalls, Woodley, Watson, 2009, 4); Therefore in the past years, researchers and specialists in the field have put a great focus on providing solutions fitting the virtually activating project teams. (Nurlin et al., 2009; Levi, 2009; Nader, Shamsuddin, Taha, 2009; Indrawati, Dyson, 2006)

Not only are intercultural geographical dispersed teams very popular, but they are also perceived to surpass the classical collocated teams, in terms of performance, and, implicitly, appropriate fast decision making. (Hossain, Wigand, 2004) However, in order to ensure a team's high performance, it is crucial for its members to work with the right collaboration and communication platform, which is preferably to also have the properties of a knowledge sharing platform. (Malhotra, A. Majchrzak, Carman, Lott, 2001, 246)

2.2 Motivation of the Study

The present research will focus on the communication challenges arising inside intercultural teams, as above defined, whose activities will require their members to work as collocated teams, as well as virtual teams (geographically dispersed teams).

According to Bruce Tuckman's group development model (1965), during a project, a team goes through five stages of development: Forming, Storming, Norming, Performing and Adjourning; whereas Forming and Storming are the very incipient and delicate phases. Forming and Storming are the two most difficult, but yet vital, stages in the process of group development, as they will influence team's entire lifecycle. Forming and Storming will have a great impact on the way the team will Norm and Perform and, therefore on the output of the project itself.

It is fairly common for a team working as a geographically dispersed team, at its very initial phases, to communicate and collaborate through ICT tools that implicitly support collaboration. Nevertheless, it has repeatedly been proven that face-to-face communication improves a team's performance and the building of interpersonal relationships. The building of interpersonal relationships involves a certain level of trust, even if the intercultural factor is not present (Hossain, Wigand, 2004).

2.3 Research Question, Objectives and Scope

The objective of the present research is to discover the ways ICT tools enhance the communication inside inexperienced intercultural ICT project teams who, at the stages of Forming and Storming, alternatively work as collocated and virtual teams. In respect of Forming and Storming stages relying on the power of communication and relationship building, and of certain ICT tools' main roles being to support communication, the present study aims to bring a better understanding of the ways these tools enhance communication, at such difficult stages in group development. Therefore, the research question upon which the study was built is:

"How can ICT tools enhance and facilitate the communication process inside an inexperienced intercultural ICT team, at the stages of Forming and Storming, which alternatively work as a collocated and virtual team?"

Research limitations relate to the broad meaning of intercultural communication, which, here is defined as the communication to be taking place between two or more individuals belonging to different nationalities (Gudykunst, Mody, 2002, 2). "Culture" has been defined in many ways along the years, as the word has a complex, multidimensional meaning including factors such as: ethnic, organizational, and national.

The definitions of Interculturalism, or cultural diversity, mainly relate to racial, sexual, organizational, professional, and national heterogeneity, while Pinto (2000, 14), however, states that it is very difficult, if not impossible to formulate a definition of intercultural communication without describing its goals. Nevertheless, the concept of intercultural communication is here defined as the oral, written and nonverbal communication happening between people belonging to different cultures, implicitly nationalities.

2.4 Research Methodology

The present study will be conducted using the qualitative research methodology. The reason for the choice of the methodology is that the research attempts to focus

on people's feelings, thoughts and the understanding of their experiences and perspectives.

The qualitative research method is conceptualised as any type of research about people's lives, experiences, behaviours, emotions and feelings, as well as about organizational functioning, social movements, cultural phenomenon and interactions between nations (Strauss, Corbin, 1998, 11). As the present research focuses on people, their behavioural patterns and communication process, as well as it considers the different cultural background, meaning the characteristics of people that cannot be numerically measured, qualitative research methods are considered to be the right research methods for this study.

The aim of the research is to discover the ways that ICT tools enhance communication under the circumstances in which the teams work as geographically dispersed and hybrid teams. The knowledge base of the study is shaped around the available information on the fact that ICT tools are beneficial for such teams, and around the challenges brought by the early stages of group development. Therefore the present study will use an inductive approach in order to discover how the phenomenon happens. As the study will focus on two particular case studies, and the results of the research will help on generalizing (Hatch, 2002, 161) and building a solution to the existing problems in the Forming and storming phases, the chosen approach is the inductive research approach.

Figure 1 shows how the research process is designed. The decision relating to the design of research is based on the available theories on research methodologies, whereas the qualitative research method suits the cases in which the researcher is interested in understanding individuals' and groups' feelings, behaviours and perspectives (Strauss, Corbin, 1998, 11). On the other hand, the inductive approach serves researchers who do not start their study from an existing theory, but they start from specific themed observations and analyse the gathered data in an attempt to build a hypothesis of their own (Mertens, 2010, 225).

As the study will be conducted in a qualitative manner, which is stated to be more open ended in nature (Saunders et al. 2007, 117-19), the richness of the data

should be of high extent. This supported author's choice of gathering the data through direct observation and themed interviews, continuing with decoding it, with the help of an affinity board to be developed after the data gathering process had come to an end.

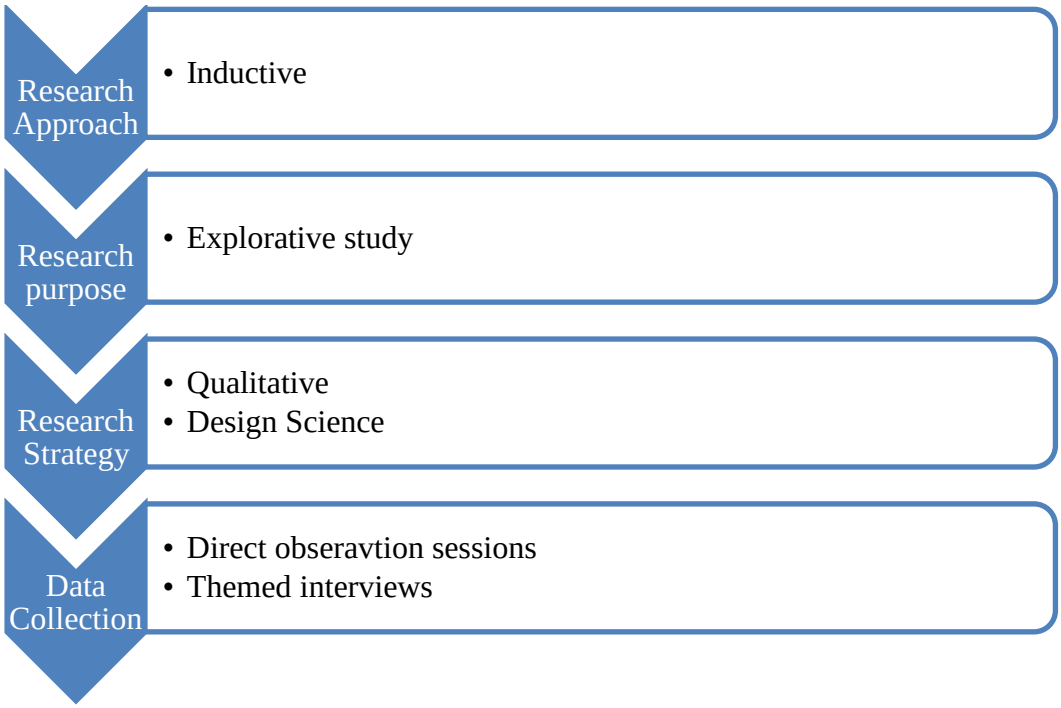

FIGURE 1 Research Design of the thesis

In order to find out how an ICT tool can enhance the communication in a project team, as previously defined, the author will consider the findings of previous studies in the field, in terms of useful ICT tool features and their benefits. In addition to this, the communication needs to be discovered in the initial observation sessions will represent the base on which the ICT tool will be chosen.

As the central issues to be studied in the present research are represented by people, the project teams, and an ICT tool, the most appropriate research approach is represented by the design science, whereas the research focuses on people's behaviour (behavioural science) and an artefact (information system, design science).

The study of an artefact, such as an ICT tool, in order to solve a real-world problem, matches the conceptualization of design science given by Hevner and Chatterjee (2010, 261) citing Simons (1996): "Design Science supports a

pragmatic research paradigm that calls for the creation of innovative artefacts to solve real-world problems", while focusing "on the IT artefact with a high priority on relevance in the application domain".

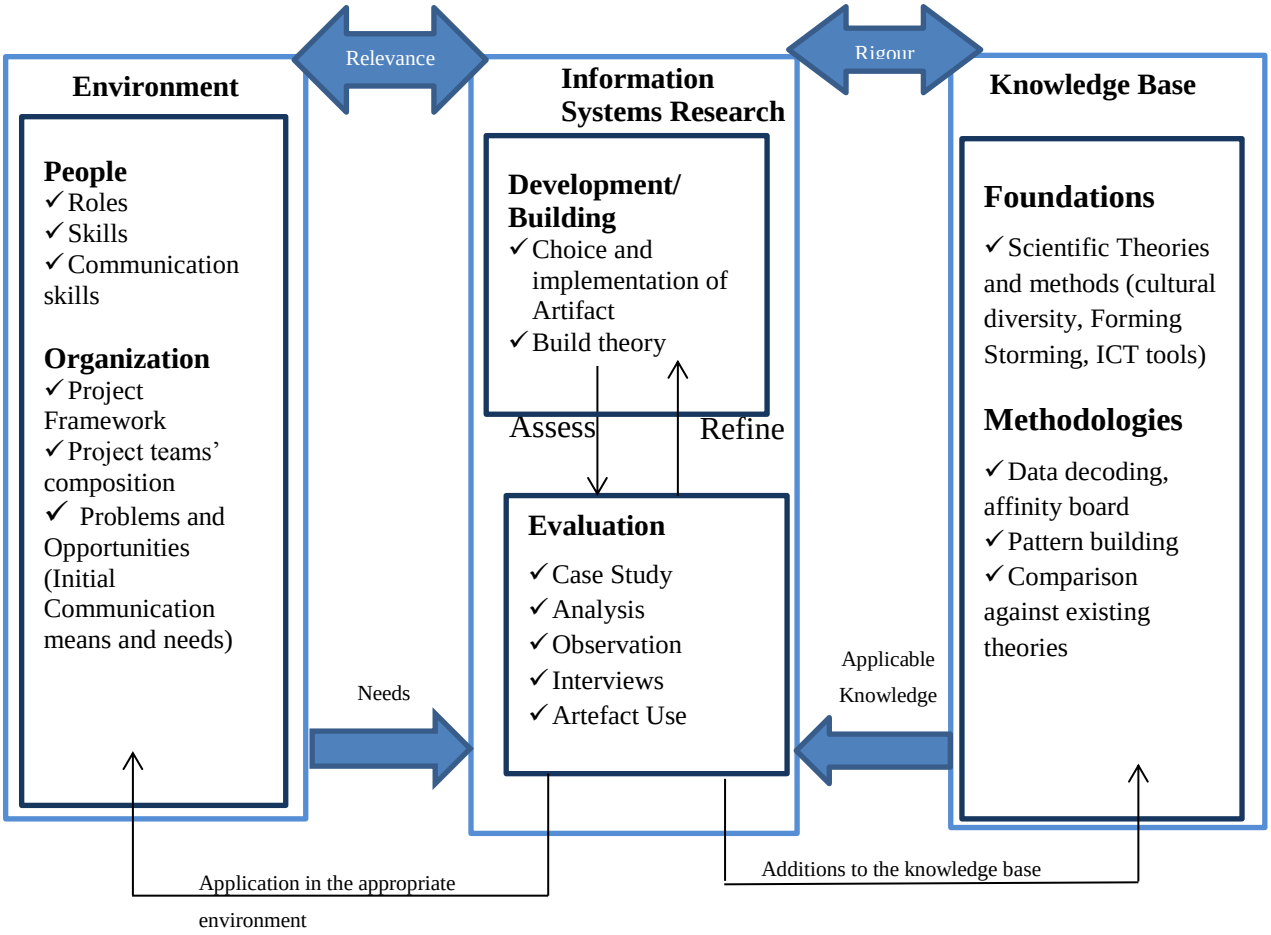

FIGURE 2. Design Science model adaptation for the present research

Original figure: Information Systems Research Framework, Hevner, March Park, Ram, 2004, 80

Figure 2 shows how the research at hand is to be conducted under the principles of the design science approach. The design science approach focuses on the main two components: the people, or organization and the existing technologies inside the organization, outside of it, or which can be designed in order to bring benefits to the organization. Included in the Information Systems (IS) research are the tasks, problems and opportunities, which shape up the organizational needs, as perceived by the people involved in the organisation. These perceptions are influenced by the roles and capabilities of the people. The business or organizational needs assessed within the organizational context include its

structure, processes and culture. All these factors influence on the perception of the researcher and the evaluation of the "problem".

Design science is conducted in two phases: the behavioural science, whose goal is the truth and the design science, whose goal is utility. According to Hevner et al. (2004), truth and utility are inseparable: "Truth informs design and utility informs theory". Therefore, the present research studies people's behaviour, their perceptions of communication problems and intercultural aspects which may have encumbered the communication process. Further, it amalgamates these aspects with the utility of the implemented ICT tool.

2.5 Research Framework and Structure

This chapter contains information on how the study will be conducted. The steps undertaken by the researcher are shown in Figure 3 and they correspond, in specific ways to the three main components on the Information Systems Design Framework given by Hevner et al. 2004.

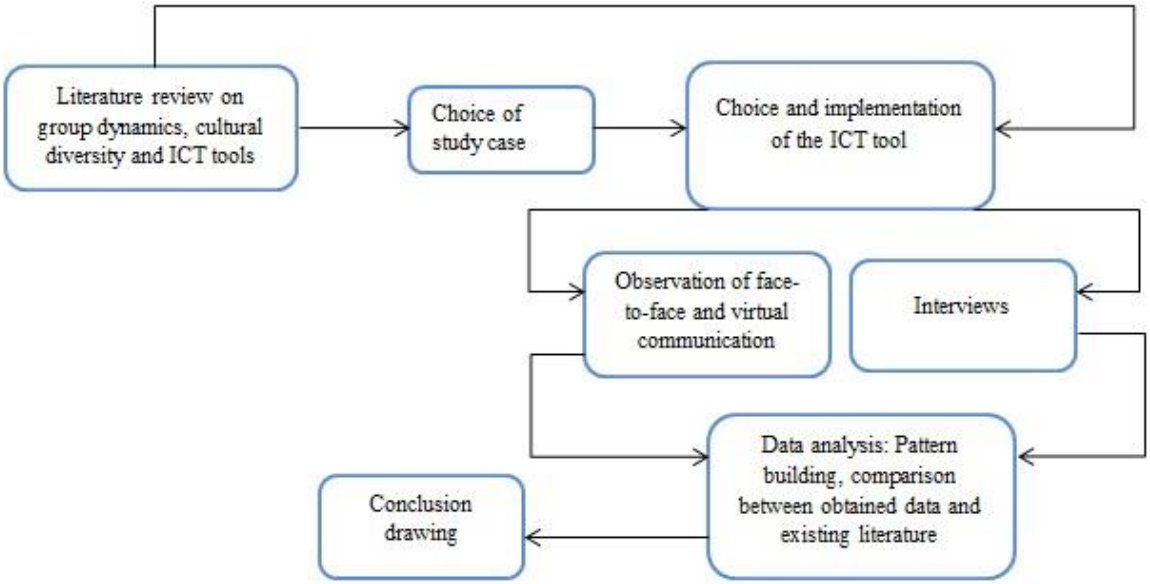

FIGURE 3. Research Framework

The present study is comprised of three main interrelated phases, each containing two or more steps.

The study of the environment, as given by Hevner et al. 2004, will start with a well-structured literature review on the key issues of the research: group dynamics, including aspects of collocated and virtual teams, cultural diversity (the intercultural factors inside teams) and ICT tools. The literature review has the role of building a strong, realistic and comprehensive background for the study to be undertaken. Because the intercultural factor has been studied, and is still a subject of continuous study for many researchers, due to its prevalence in the contemporary business environment, the researcher found it crucial for this study to be guided by reliable information. The literature review phase will also help in the choice of the study cases, which are two inexperienced, intercultural ICT project teams, who alternatively work, at the moment of study, as collocated and virtual teams, at the incipient phases of group dynamics.

As shown in Figure 3, the choice of the study cases is based on the researcher's literature review-reasoned judgement. In order to ensure the intercultural factor, the study cases will be selected as heterogeneous groups, in terms of cultural backgrounds.

While one may argue that a project team built by young international students is a superficial choice and the project's output is implicitly a target of failure, because they lack previous experience, the present study includes students who have solid knowledge in software development and basic knowledge of project management. This scenario makes the case an archetypal situation, in which at least one project team member is inexperienced. Furthermore, the teams will benefit of systematised supervision and guidance from the leading responsible teacher for software development projects in the University. It is to be noticed the projects are real life projects, and real client companies benefit of the software solutions developed by the teams, during the project.

The observation sessions that will be held at the very beginning of the projects, which will represent the study cases, will give the researcher a point of view on

project members' communication needs and organizational goals regarding the assigned projects' goals. These observation sessions of the incipient phases in the projects, in correlation with the literature review on the main beneficial features of an ICT tools for such cases, will highlight the needs of the project teams and the most relevant information for the choice of the ICT tool. Furthermore, the researcher will have access to the given ICT project process description, which is also to help in the understanding of people's and organizational needs, as well as in the choice of the ICT tool.

All these pieces of information, crucial for the research start-up, will present the Environmental factors included in the information systems research framework as well as part of the Information Systems Research, given by Hevner et al. in 2004, adapted by the researcher and represented in Figure 2.

In terms of other data gathering methods, other observation sessions will be undertaken during each face-to-face meeting each team will hold. The meetings are to be documented by the researcher, while being guided by an observation sheet developed according to the literature review. The main issues to be observed will be documented each meeting, other notes being added as needed. The predefined matters of observation are related to the average English skills each team has shown, and the main Forming stage's characteristics. Team's average English skill will be evaluated on a scale from 1 to 5, whereas 1 represents "very poor" skills and 5 is associated with "excellent" skills. The Forming stages' characteristics will also be evaluated on the same scale and, if they exist, they will be assigned the same values as the English skills, namely on a scale from 1 to 5, whereas 1 has the value of "very less" and 5 is associated with the value of "very much". As each observation session includes these two aspects, they serve the research in creating charts that help in the observation of the progress or regress of the groups in terms of English skills and, most importantly, the group dynamics phases. The observation sheet used in the observation sessions can be found in the Appendices section of this paper under the name of Appendix 1.

The chosen ICT tool will be used by the project teams throughout the whole project for planning, communication, collaboration, knowledge and document sharing. The author of the research will have access to the ICT tool used by the

team, for observation purposes. The information to be gathered through the observation of teams' use of the ICT tool will complement the data to be gathered through themed interviews. The interviews will be held with each team member, at a time, and they will represent an addition to the knowledge base to be analysed, as shown in Figure2.

The interviews will be held only once and directly (face-to-face), in order to give the researcher the opportunity to observe the individual and their emotions, as well as their level of comfort in approaching the given discussion issue. While qualitative research methods focus on behaviours and emotions, as well as on interactions between individuals (Strauss et al., 1998, 11), the researcher found it crucial to observe interviewees' behaviour and emotions. All the interviews will be recorded, recordings serving for the later pattern building process. The interviewer will take notes regarding interviewees' moods, body language and external factors which may influence interview's results.

The interviews will be guided by the main themes, namely: interviewee's view on their own performance and on the project, the group dynamics and the ICT tool to have been chosen. Several questions will be predefined due to their high relevance for the study, but the interviews will not be limited to only those questions. The interview sheet used in the present research can be found in the Appendices section of the present paper, under the name Appendix 2.

The data to be gathered during the interviews in correlation with the results of the observation sessions and use of the proposed ICT tools will be summarized and transferred into an affinity board. The affinity board is to contain the most prevalent communication issues relating to the intercultural context the project teams have work in, as well as will it include teams' members' references to the ICT tool involved in their activities.

The resulted patterns in the data gathering phase of the research will be compared against the literature review conducted in the earlier phases on intercultural communication inside virtual and collocated teams and the assets that certain ICT tools can bring to such scenarios. This will strengthen the researcher's background on which conclusions are to be drawn.

3 GROUP DYNAMICS

Groups tend to generally be mistaken for teams. However, the purpose and implementation of activities, as well as their performance make them clearly distinguishable. In case their purpose is not to stay as a group, they develop into high performing teams, as Tuckman, Skyttä and Katzenbach and Smith show.

The concepts of group, team and the theories of group dynamics will be described in the subchapters to follow.

3.1 Groups vs. Teams

Although working groups and working teams may seem the same, there are big differences between the two. Mostly the differences relate to the way the people work, their accountability and their coordination while working, as well as to the impact the earlier mentioned factors have on the final product.

For instance, Heikkilä (2002, 16-17) points out that groups are usually led by managers who are powerful in authority and result-oriented, while teams can have many leaders and coordinators for different tasks. The individual accountability and individual orientation towards delegated tasks are the main characteristics for working groups. In contrast to this, team members are accountable to each other and work together for the tasks that are shared between the members. Furthermore, Robbins, Judge and Campbell (2010, 262) show that groups and teams have opposite types of synergy; teams are characterised by positive synergy and, therefore, benefits of coordinated efforts; groups stand under a neutral or negative synergy, as their members have random and varied skills, compared to teams, whose members have complementary skills.

However, there are many theories concerning the evolution of groups into teams, if exceptional situations do not occur. These theories relate to the group dynamics, whereas a number of people gather and start working together.

According to the existing literature on project management, human resources and organizational behaviour, a group of people who meet for the first time and are assigned a task cannot be expected to have the workflow and results of an

experienced (high-performance) team. (Tuckman 1965, Katzenbach; Smith 1993, Skyttä 2005)

3.2 Theories on Group Dynamics

Regardless of the author of the theories on group dynamics or development, there are five stages through which groups typically go before they reach the stage of team, or high performing team.

Tuckman identified in 1965 four stages of group development, which generally describe the evolution of a group. His theory, including the Forming, Norming, Storming, Performing, and the later on (1997) added Adjourning, phases served as a reference for many researches in the field of group dynamics. Although later research show that not all the groups follow this patterns (Robbins et al. 2010, 231, citing K. H. Hammonds, Practical Radicals), Tuckman's theory is seen as a start point and useful framework for understanding the dynamics of a group.

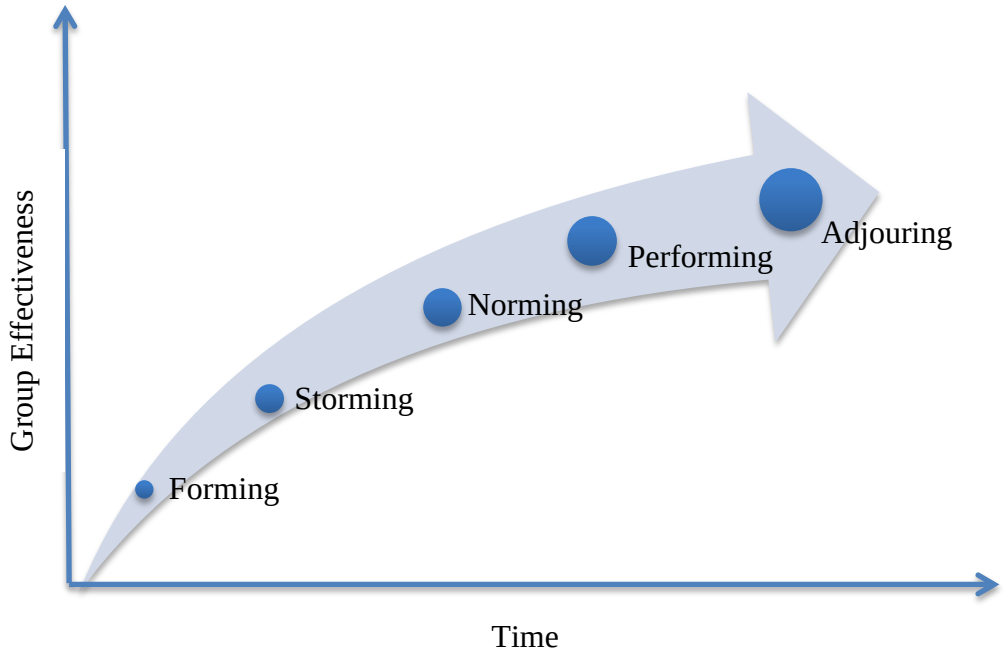

FIGURE 4. Tuckman's Group Dynamics Theory (1965)

Original Figure: Managing Projects; Building and Leading the team, Boddy, 2001, 136

For instance, the authors of the Performance Curve model (Figure 5.), Katzenbach and Smith (1993), as well as Skyttä (2005), the author of the Group Development

to Top Team model (Figure 6.), showed that, at the very early stages of group development, "working group" in the Performance Curve, and "group" in Skyttä's model, group members are dominated by introversion and very little interaction takes place. These two characteristics can be seen as an effect of the confusion and uncertainty that Tuckman upholds in the Forming stage of his group dynamics theory.

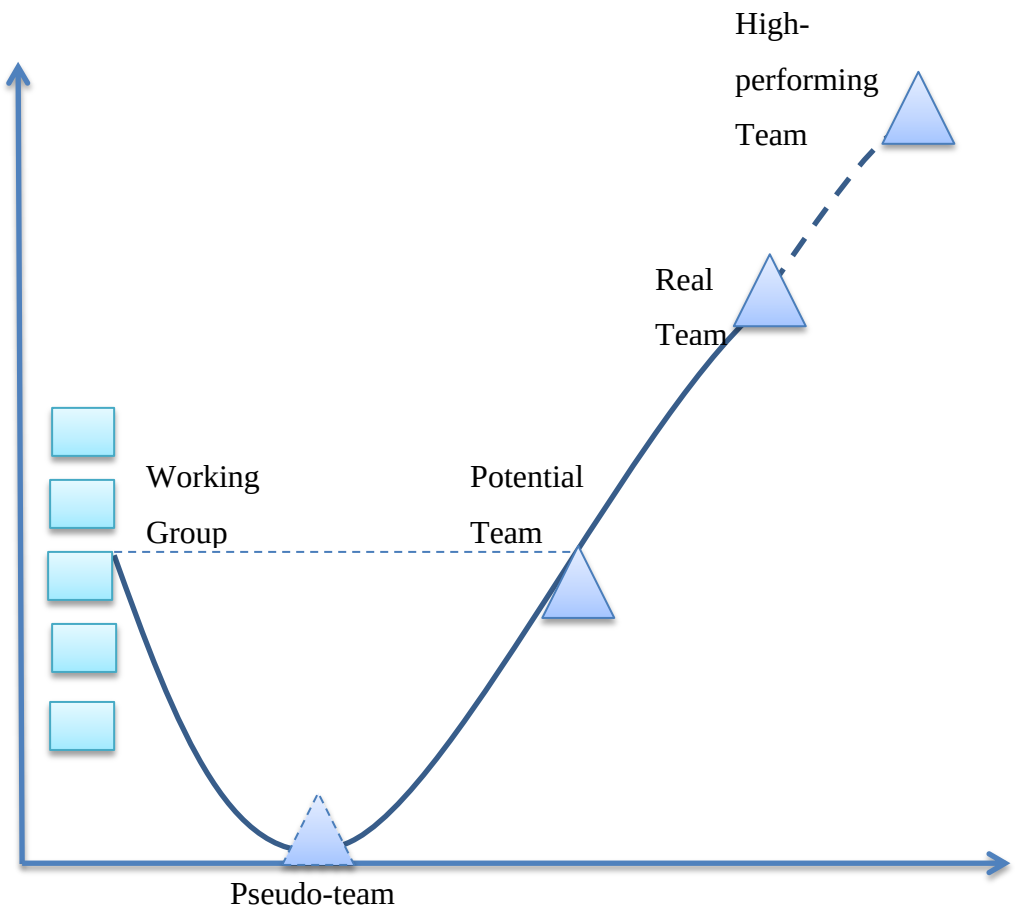

FIGURE 5. Performance Curve, Katzenbach and Smith (1993)

Original Figure: Managing Projects; Building and Leading the team, Boddy, 2001, 114

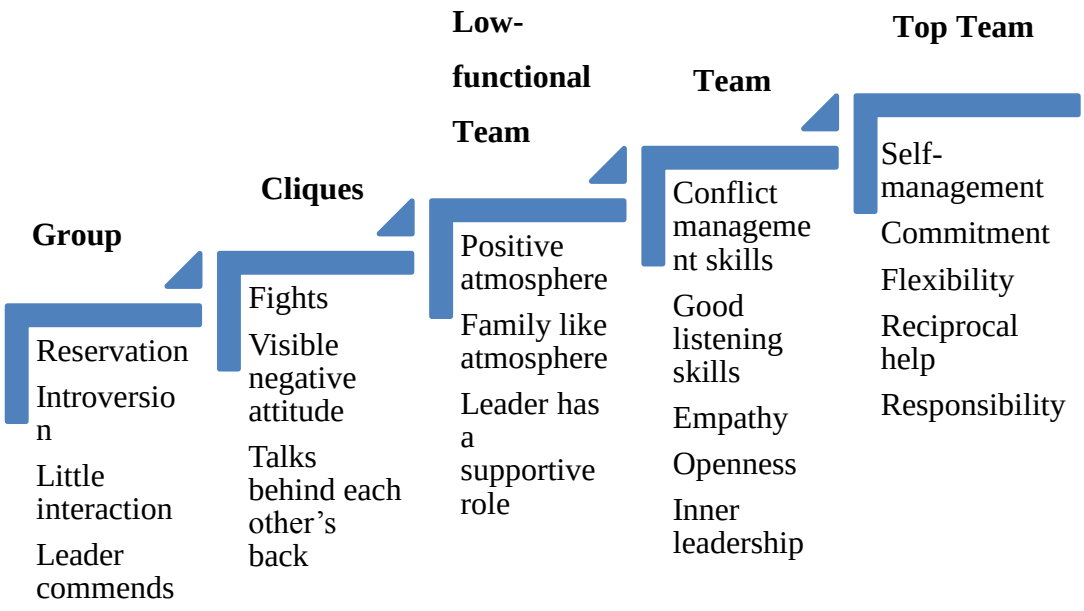

FIGURE 6. Skyttä's group development to top team model (2005)

Original Figure:Tiimiytys ja sen läpivienti, Skyttä,2005, 111 (Translation by the author of the present research)

In contrast with Tuckman's group dynamics model structure (Figure 4.), where the Forming, Storming, Norming, Performing and Adjourning represent incremental steps in a group's journey towards its status of a high performing team, represented by the Performing stage, Katzenbach's and Smith's Performance Curve model, shows that the second stage, namely the "Pseudo-Team" stage is the lowest stage in performance for a group. In Skyttä's model's second stage group members split up into cliques and most of the conflicts appear. He also sees regress, rather than a progress in groups' development.

Nevertheless, all the three theories support the fact that the second stage is characterised by high levels of conflicts, individuality, negativity, lack of will and common purpose, as well as by group members' need of a leader who can solve the conflicts. Furthermore, the following two stages, in all of the three group dynamics models, are characterised by progress towards groups' members' aim of becoming a high performing team. However, while Tuckman's fifth stage is represented by teams' adjournment, where the initial group has become a team and reports on the work to have been carried out, the other two models' fifth stage is the high-performing stage for a group, were the team members are deeply committed to team's goal and hold mutual accountability for their progress.

Due to the fact that present research's scope does regard the latest stages of the three group dynamics models, the discrepancies concerning the fifth stage, as described above, do not influence the study.

According to Robbins et al. (2010), teams tend to be more and more ubiquitous due to their high degree of flexibility and fast reaction to the changes occurring so often in the contemporary business world. Literature on organizational behaviour show that teams surpass in performance the classical departments, or other types of permanent staff grouping, when it comes to dealing with change and fast decision making. (Robbins et al. 2010, 262)

4 VIRTUALIZATION

The communication challenges encountered by virtual teams, who implicitly are intercultural, are higher in extent than the communication challenges encountered by traditional collocated teams.

The present chapter describes the process of virtualization happening in the current business environment, as well as does it describe the implications of cultural diversity in the communication process to be undertaken by intercultural teams.

4.1 Teams' Virtualization

As a result of globalization, team virtualization has also become common, and the geographical dispersion of team members has ceased to be seen as a problem, but started to be seen as an advantage (Furst, Reeves, Rosen, Blackburn, 2004; Witchalls, Woodley, Watson, 2009). Virtualization saves the costs of travelling and periodical collocation of organization members working on a common purpose, and it is made possible by purpose-appropriate technologies. One of the main characteristics of virtual teams is the distance lying between its members and the use of technology that facilitates communication and collaboration. While technology makes communication and collaboration possible for teams working across time and space, it also undermines trust and social-emotional information exchange (Robbins et al. 2010); this being one of the reasons why virtual team members are more task oriented than the collocated teams, and also why they report less satisfaction on communication and social interaction.

Virtual teams are influenced by the global factor, namely their geographical dispersion that implies cultural diversity which brings along new challenges, such as a unanimously established language of communication. As the language used for communication is usually different than team members' native language, it causes miscommunication, message misinterpretation and therefore misunderstandings. (Lewis, 2008; Nataatmadja et al., 2006, 499) These are seen as communication barriers, all based on semantics, connotations and tone

differences. These three results of communication in such a language generally cause stress and conflicts. (Robbins et al. 2010, 305)

However, Nataatmadja et al. (2006, 500) suggest that the communication mediated by ICT can reduce cultural differences. If teleconferencing or videoconferencing is disregarded, the technology-mediated communication does not imply non-verbal cues or eventual non-native speakers' accent. The provided asynchronous technologies, such as discussion forums, allow non-native speakers more time "to study information, process and respond to messages", which implicitly decrease misunderstandings.

4.2 Cultural Diversity, the intercultural factor in communication

Group diversity, in terms of culture, involves increased chances of conflicts at the early stages of group development and members tend to drop out of the group. Nevertheless, researches show that if conflicts are appropriately solved, intercultural groups are more likely to perform better than culturally homogeneous groups. Surface diversity – the observable characteristics, such as nationality, gender, race, etc., "cues people to possible deep level diversity – underlying attitudes, values and opinions". The deep level of diversity can lead to conflict, which gives the group the opportunity to solve problems in a unique way. (Robbins et al., 2010, 251)

Another implication of the cultural diversity is represented by teams' members' attitude towards individuals from different cultures, members who implicitly have different views on arising issues, as well as they have different ways of sharing information. This can cause trust problems and hesitance upon communication, and seamless collaboration.

Robbins et al. stress that the "cross cultural factors increase the potential of communication problems". In addition, studies show that despite the cultural differences running throughout their organizations, only 18% of companies have documented strategies for communicating with employees across cultures and only 31% require the corporate messages to be customised for different cultures. (Robbins et al., 2010, 305)

According to the same specialists in the field, the main cultural barriers relating to communication are caused by semantics, connotations and tone differences. It is well known that words have different meaning for different people and that in a multi-cultural context some words don't exactly translate between cultures. For instance, the Finnish word "sisu" does not have an exact translation into English language. On the other hand, words have different connotations in different languages. For example, the Japanese "hai", translating as "yes" in English, means "Yes, I am listening", rather than "Yes, I agree" (Robbins et al., 2010, 305). Situations as such can mislead in message interpretation. In addition, the context of communication involves a change in the communication tone, whereas individuals change their tone when they communicate with their families, friends or colleagues.

In addition to the differences in perceiving semantics, word connotations and tone differences, a big impact on the manner of communication is brought by the cultural context (the cultural identity of the individuals). Depending on the cultural origins of the individual, they belong to either high context cultures, or low context cultures (Figure 7.). For instance, the Eastern cultures, such as Chinese, Korean, Japanese, etc. are considered to be high context cultures; and the Western cultures. Such as English, German, Swiss, Scandinavian, etc. (Robbins et al., 2010, 306) are considered low context cultures. The context extent is given by the influence of the nonverbal communication in the message to be delivered during the communication process; whereas, in the high context cultures, the nonverbal communication has a greater value than the verbal cues, while the low context cultures strongly use words to convey the meaning.

FIGURE 7. High- versus Low- context cultures

Original Figure: Organizational Behaviour, Robbins et al. 2010, 306

The communication in high context cultures involves far more trust, namely oral agreements imply strong commitments and individuals' position on the social scale influences the way a person's credibility is perceived. On the other hand, low context cultures value directness, while in high context cultures, managers rather suggest than order.

5 COMMUNICATION

5.1 Communication as a process

The three universally accepted communication means, namely oral, nonverbal and written communication, are seen to be the channels of "transferring and understanding" the meaning of the message to be delivered. On the other hand, they provide a release for the emotional expression of feelings and fulfilment of social needs, while facilitating common goals setting, action planning and decision making. (Robbins et al., 2010, 290)

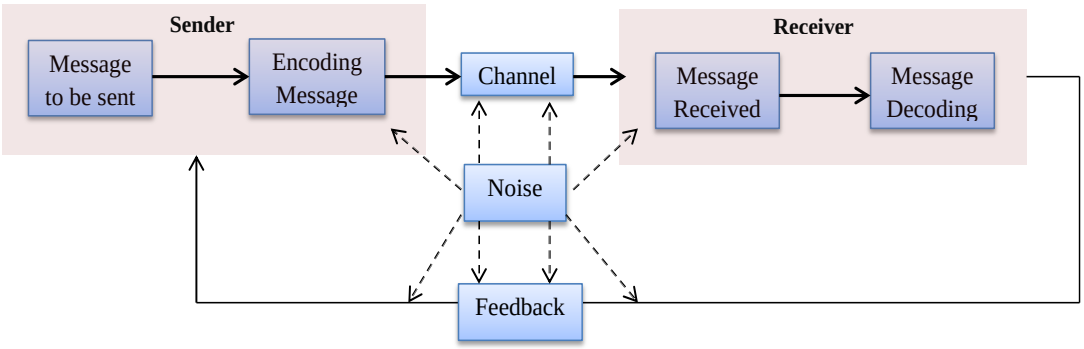

FIGURE 8. The communication process

Original Figure: Organizational Behaviour, Robbins et al., 2010, 290

Robbins et al. show that oral communication is seen to be the strongest type of communication, as the verbal message is conveyed and responded in a minimal amount of time; therefore it is characterised by speed and rapid feedback. However, if the verbal message passes through a big number of persons, until it reaches the final receiver, its meaning is highly likely to be distorted. Oral communication always includes nonverbal communication, whereas "93% of a verbally delivered message's meaning comes from nonverbal channels" (Robbins et al., 293). Body movement, intonation, emphasis placed on words, facial expressions, physical distance between the communicating parties, they all give a fuller meaning to the verbal message. It is to be noticed that body language and its meaning differs from a culture to another.

Direct face to face communication is the most effective communication channel. However, it is to be noticed that this also depends on the individuals taking part in

the communication process. For instance, communication apprehension causes people to avoid situations that require oral communication. Communication apprehension is the "undue tension and anxiety about oral communication, written communication, or both". (Robbins et al., 2010, 304)

In contrast with oral communication, written communication such as letters, memos, e-mails, bulletin boards, etc., is seen to be time consuming, and the message sent may or may not reach the recipient who may, as well misinterpret the message. However, messages sent through written communication are more likely to be "well thought out, logical and clear" (Robbins et al., 2010, 293; Nataatmadja et al., 2006, 500) as, according to researches, people are more careful in written than in oral communication. The main advantage of written communication is that messages can be stored for an infinite amount of time, making them available for reference, tangible and verifiable.

Oral and mostly, written communication are the forms of communication virtual teams also rely on. Channels of communication, however, differ from case to case, mostly such teams relying on electronic communication, which is made possible by the ICT tools such as: e-mail, IM software, groupware, video conferencing tools, etc.

5.2 Virtual Communication

The communication taking place in a virtual context is recognised to be a complex and fundamental process for the successful achievement of project goals. It should be supported by a "detailed analysis of the human and, organisational aspects according to the technology that is being used". As complex, and at times challenging as this type of communication might be, ICT offers a broad range of possibilities that are intended to support efficient cooperation and to eliminate the cultural and geographical barriers, specific to virtual teams. (Burlea A., 2007)

In addition, the communication mediation, through the use of appropriate ICT tools, enables equalisation between virtual team members, as well as does it promote increased participation. (Shachaf, 2005)

Robbins et al. (2010) show that 71% of the communication in an organization happens electronically, one of the most common electronic communication channels being e-mail.

E-mails can be quickly written and distributed to many recipients at once and they are a cheaper alternative for the classical letters. People tend to feel more comfortable to communicate by e-mail things that they would not dare to communicate in a face to face communication session; for instance, Nataatmadja et al. (2006) show that non-native English speakers who can write and read English better than they speak it, feel more comfortable in using e-mail, rather than face-to-face communication. The messages sent by e-mail can be read by the receivers at their own convenience, fact which sometimes may undermine communication efficiency. According to an earlier research made by a team of New York University, in the 50% of the time, the message can easily be misinterpreted due to receivers' emotional state. (Robbins et al. 2010, 296-297, Nataatmadja et al., 2006, 501) Due to privacy issues, such as content monitory by European Union Data Retention Directive, organizations need to consider whether e-mail is an appropriate communication channel.

Discussion forums have similar advantages as e-mails do. In addition to the similar advantages e-mails have, discussion forums offer their users the possibility of editing their postings and offer better search functions. (Nataatmadja et al., 2006, 501)

Instant messaging (IM) is a faster alternative to e-mail, as it delivers the message in real time and it is accessible from different types of devices. However, the contents of a message sent through instant messaging, or text messaging cannot be as broad as of the ones sent by e-mail. While this type of communication tool can be effective for short urgent message deliver, researches show that most organizations refuse to use it, as they find it distracting for their staff's daily activities. (Robbins et al. 2010, 297) Instant messaging channels, such as chatrooms are perceived to suit the purpose of building relationships between members of a virtual team. (Nataatmadja et al., 2006, 501)

Nataatmadja et al., (2006, 501) also show that intranet is a good solution for quick information dissemination between team members, as well as for reducing eventual problems related to the understanding of the spoken English.

Groupware solutions are appropriate for sharing information with a large amount of people, for instance the project team, and it is characterized by flexibility and versatility. Groupware's flexibility comes from the range of tools it can provide: intranet, Web, discussion forums, email, etc. Furthermore it is seen to be informal and spontaneous, which promotes relation building among group members. (Nataatmadja, 2006, 501)

Videoconferencing is seen to be the best alternative to face to face communication sessions, when the communicators are geographically dispersed. It guarantees interactive meetings without collocation, during which people can see, hear and, talk to each other. (Barlow, Peter, Barlow, 2002; Nataatmadja, 2006, 501) However, time zones and broadband's quality influence of the communication process.

Videoconferencing has become extremely common in the contemporary business environment. Whether it is used inside virtual teams for communication upon the product to be developed, or just as a communication means between different departments of an international businesses, videoconferencing is a nowadays popular choice. The main reason for this big communication technology movement relates to reducing costs and time, and improving productivity. Comparing to the costs implied by sending a team to another country, videoconferencing is clearly a cheaper and faster alternative. The meeting stands a few clicks away and the access to the conferencing room can be customised according to organization's preferences. Furthermore, the unproductive time spent on travelling is replaced by the actual meeting. Some organizations also think of videoconferencing as of a way to reduce the carbon footprint. (Barlow et al., 2002; Lewis, 2008; Smarter Interactive, 2013)

In addition to possible time differences which might hurdle regular efficient communication, the major drawback of videoconferencing, as expected, relates to the message delivery and lack of direct interpersonal interaction. Although the HD

videoconferencing technology offers clear image, and therefore gestures and facial expressions are clearly visible (Smarter Interactive, 2013), face to face meetings are still preferred (Hossain ,Wigand, 2004).

The contemporary communication, knowledge management, information distribution and exchange technology has reached high standards which can satisfy most organizations' needs. This makes organizations' choice even harder. However, according to Robbins et al. (2010, 301) the information richness offered by communication channels, and the purpose of communication are the main factors to influence communication channels' choice. Communication channels differ in the capacity of conveying information; whereas the high channel richness fosters the maximum amount of information, and the low channel richness, deals with the minimum information (Figure 9.). Videoconferences and face to face conversations are seen to have high channel richness, as they make possible the simultaneous handling of multiple cues and facilitate rapid feedback. Online discussion groups and voicemails have medium channel richness, while bulletins, memos and letters are seen to have low channel richness (Robbins et al., 301). The most effective communication channels are, according to previous researches, team briefings (64% of respondents), e-mail (59% of respondents) and the intranet (38%). (Robbins et al. 2010, 302, citing Bingham C., Stuff P., 2002).

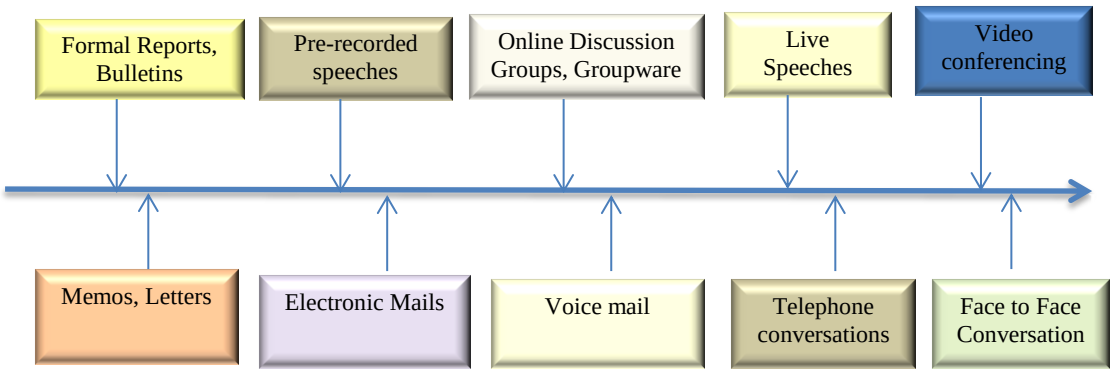

FIGURE 9. Information richness of communication channels
Original Figure: Organizational Behaviour, Robbins et al., 2010, 301

Communication, interaction, decision making and problem solving are all prerequisites of collaboration. All the available systems that nowadays support group work originate from one of these functions. (McNurlin et al., 2009, 473) Although, as previously stated, electronic communication is nowadays very

common in all organisations, virtual teams are the ones to benefit the most of not only electronic communication channels, but also of the collaboration platforms.

McNurlin et al. (2009, 475) appraise DeSaints-Gallupe matrix (Figure 10.), where teams and their collaboration directly depend on time and place: same time – same place, different times – same place, same time – different places, different places – different time.

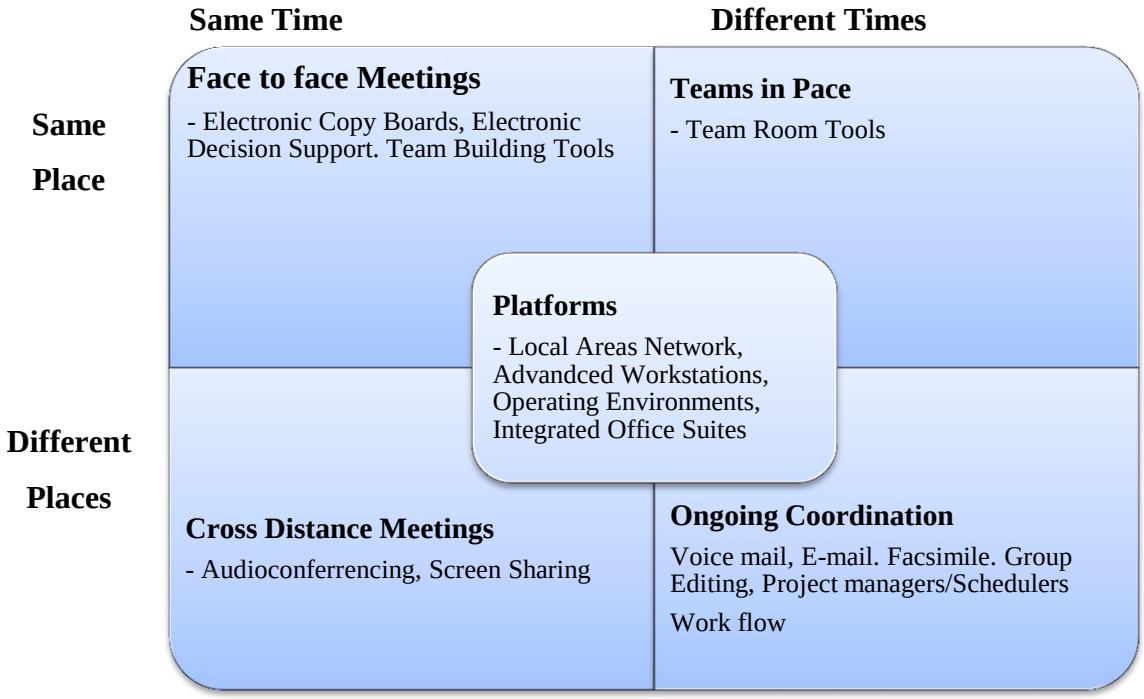

FIGURE 10. DeSaints-Gallupe matrix

Original Figure: Information Systems Management in Practice, McNurlin et al., 2009, 475

These two main variables define whether group/team members communicate and interact over time and/or distance. The DeSaints-Gallupe matrix, graphically represented in Figure 10, exemplifies types of systems that facilitate the interaction and collaboration of teams conditioned by time and space, whereas the "same place – same place" type of teams can greatly benefit of face to face meetings supported by electronic copyboards, electronic decision support and team building teams; "different times – same place" teams can use the team room tools; "same time – different places" teams can use audio conferencing, videoconferencing and screen sharing for cross-distance meetings; and the teams

situated on different time zones and different places can be served by voice mail, e-mails, facsimile, etc. Nevertheless, all these types of conditioned communication and collaboration require local area network, advanced workstations, operating environments and integrated office suites.

In respect to the complexity of the communication process inside a virtual team, an ICT tool to be used by such a team, for project communication and collaboration purposes, should support different types of activities.

According to Steinfield, group tools are needed to support "both synchronous and asynchronous interaction", and represent a shared workspace including archives for group's artefacts, while supplying the needed awareness information on their position and work progress to the other team members. These tools are to also support decision making, and project management. The synchronous interaction refers to video conferencing, whiteboard, real time chat and the asynchronous interaction refers to newsgroups and mailing lists, collaborative writing systems, group calendars. Furthermore, the ICT tools can also include simple or more sophisticated decision making support features which would allow team members to generate, develop and organize ideas, as well as voting for specific decision related issues. (Steinfield, 2013)

Such solutions can be chosen to be client- or web-based applications, depending on the preferences. The web-based solutions do not need any software to be installed on users' computers, and they can access the information and materials from any place they benefit of an internet connection. On the opposite pole stand the communication and coordination client applications, which diminish the delays of information access, typical to the web-based solutions.

Whatever the choice, the tool's features should strongly match the communication and collaboration needs of the team who will use it in their routine and non-routine activities.

6 THE STUDY CASES

This chapter introduces the two project teams which represented the study cases of the present research.

In respect to the theories on group dynamics, the teams studied will be referred to as to “groups” or “project groups”.

Both of the project groups were formed by students of Lahti University of Applied Sciences and their goal was to achieve their study-specific real-life project goals, under the supervision of their teacher. The projects were not randomly assigned to the students, but in order to assure the match of skills and project goals, the leading supervising teacher requested resumes and application letters. The second purpose of these projects was the simulation of real working life.

During the one month observation period, the groups were assigned projects and started their activities by roles and responsibility sharing, and project planning. Furthermore, the groups were responsible for visiting the customer and ensuring that the requirements built inside the groups matched the expectations of their clients. Subsequently, the groups needed to build up a project summary to be delivered to their supervising teacher with whom they had their supervision meeting and prepare for the steering group kick-offs.

The students were to develop ICT solutions for companies operating in the city of Lahti, Finland, in a little more time than three months. Out of the three months of project work, the groups were observed for only one month. Due to the short period of time dedicated to the projects’ goals achievement, one month was believed to be the time span during which the groups would go through the Forming and Storming phases of group development.

In order to respect the confidentiality protocol, no real names will be used in the following chapters, but only initials of both the group members, and companies for which the groups have worked.

A more detailed view of the projects and their processes is presented in the Appendix section of the present research, under the name of Appendix 3.

6.1 The LP Group

The LP group was a group formed by four BIT students who have knowledge in software development and basic knowledge of project management. Three out of four group members belonged to the same study group and year, and therefore knew each other up to a certain extent.

The cultural heterogeneity percentage in this group was 25%, namely three group members were Vietnamese and one was Finnish. The two cultures involved are seen to be at the almost opposite poles of cultural context, whereas Vietnamese culture is a medium to high context culture and Finnish culture is a low context culture. The level of cultural context is stated by Robbins et al. (2010) to affect on the way the message is sent and received by the communicators. This issue was presented in more details in chapter 4.2.

The initial average English language skill was 4, whereas some group members showed stronger language and communication skills than others. During their first project meeting, which corresponded to their project assignment session, the group had a positive attitude towards the project, their group composition and project's goals' achievement. Furthermore, during the same meeting, the group chose their group's leader. The rest of the roles and responsibilities were later on specifically defined by the group. Figure 11 shows the structure of the group, as defined by its members.

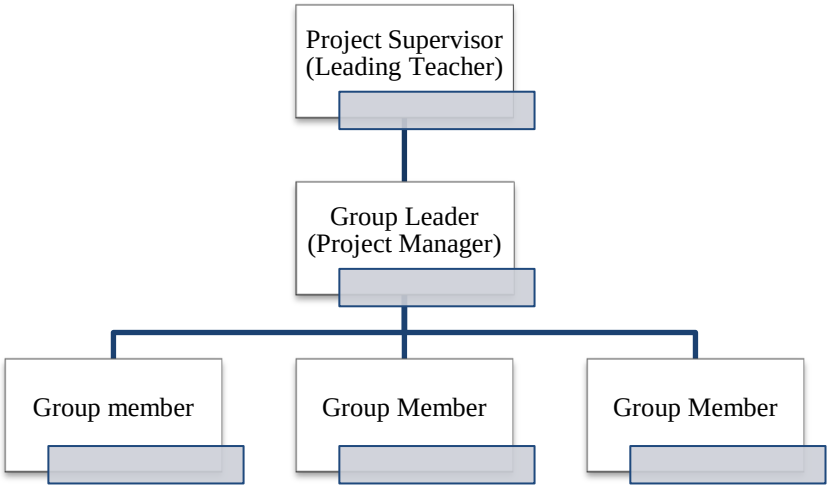

FIGURE 11. LP Group's structure

The main goal of their project, as described during the project kick-off meeting, was the implementation of a fully functional prototype of a database/archiving system, in which various types of information about automated car parking system components could be stored.

6.2 The PS Group

The PS group was initially formed by three BIT students and two students from the Business Faculty of the same University, namely Lahti University of Applied Sciences. While the BIT students were familiar with each other up to a certain extent, they had never met the students coming from the Business Faculty.

The PS group was a special case, as it was formed by two separate subgroups working under the same group leader. However, the BIT students, representing the ICT part of the group, had their own leader, responsible to report to their own supervisor. Although the groups were to work together for the project goal's achievement, they independently reported to their own supervisor. However, the ICT group was to work under the general project manager, who belonged to the Business Faculty of the university. The structure of the group can be found below:

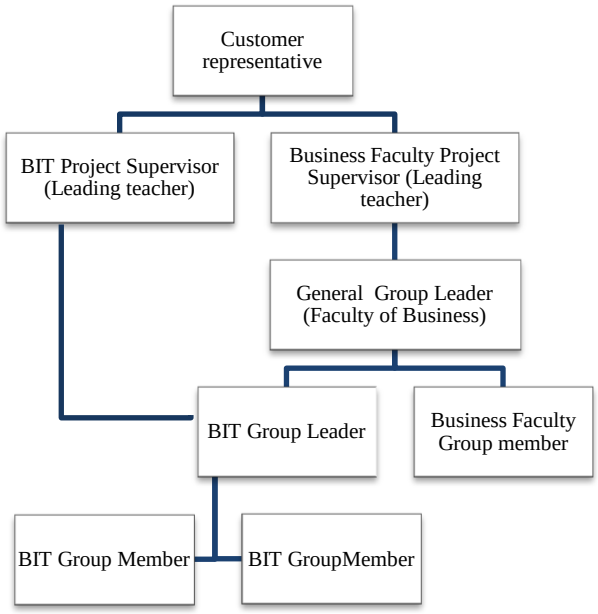

FIGURE 12. SP Group's Structure

The actual final composition of the group was not yet defined when the observation sessions of the research came to an end. The BIT group, part of the PS project group, was not changed during that time. Group members from the Business Faculty were added and some dropped out. During the research, the size of the group varied from between four members up to seven. The number of individuals included in the present study was six, five of them being continuously involved in the project and one coming at the end of the research time. Therefore only five members were observed during the observation sessions. However, the last individual was also interviewed, in order to get a more complex perspective on group dynamics and the perceived usefulness of the ICT tool.

The PS group had two kick-off meetings, one in which the project was described and assigned to the BIT part of the group, and one in which the general group leader communicated more a detailed description of the project goal, as well as in which four out of five members got to communicate with each other for the first time.

The cultural heterogeneity of the group was 60%, whereas, the group was formed by two Chinese, one Vietnamese and two Finnish. According to Robbins et al. (2010, 306), Chinese culture is a high context culture in which people rather convey the message than communicating it directly, Vietnamese is a medium to high context culture, while Finnish culture scores as a very low context culture. The average English skill of the PS group was 4, whereas their English language and communication skills varied from a group member to another. Although the initial attitude towards to project goal, during the BIT group's kick off was neutral to negative, it changed to be neutral to positive after the general kick-off, during which the group members got to understand better what the goal of the project was, and also met the general project manager.

The main goal of the PS group's project was to design and create a fully functional intranet for a company which outsources and offers welfare, and household aid services, for elderly people in Päijät-Häme region.

7 WIGGIO – THE ICT TOOL

This chapter offers an overview on what Wiggio is how it was chosen, its features and basic information in its implementation in the research.

Due to the lack of direct interpersonal interaction, a virtual project team needs an ICT tool in order to communicate, collaborate and deliver. As Steinfield (2013) states, the group tools have to support both synchronous and asynchronous interaction, creating, this way, a shared workspace where all group's artefacts can be stored.

Based on the fact that the project groups studied in this research were at the stages of project planning and early development of the products, the ICT tool to have been chosen had to offer the groups great possibilities of communication and knowledge sharing. The tools would be to include chat rooms and offer the possibility of videoconferencing, which is seen to be have highest communication channel richness from all the technologies available. These two means of instant communication and synchronous interaction were a very important milestone in the choice of the ICT tool.

According to Steinfield, the asynchronous interaction is as important as the synchronous one; Newsgroups, mailing lists, collaborative writing systems and group calendars, being very useful in the case of virtually activating groups. The statement is also supported by the confessions of some group members who have expressed their past experiences of sharing project related documents and information through Facebook groups, Google Docs and Dropbox. The main reason for the use of Facebook was the opportunity of commenting on threads and communicating through chats and messages, while Google Docs offered them the opportunity of editing documents directly from their browser, while storing them in the same place. Therefore, these issues relating to communication and collaboration were also considered, along with the privacy policies the above mentioned platforms have.

Furthermore, in order to ensure the basic needs of project management, the tool needed to include indispensable features, such as group calendars, to-do-lists and the possibility of expressing schedule availability.

Due to the fact that the groups involved in the present research, as study cases, did use face-to-face meetings, the decision support features to have been included in the ICT tool were not seen as a must. However, the great communication possibilities Wiggio offers to the groups has strongly matched the communication needs required by the Forming and Storming phases and the virtual and intercultural characteristics of the groups (Malhotra et al. 2001; Hossain et al. 2004).

7.1 General overview of Wiggio

Wiggio is a freeware solution, described by its developers as an easy to use web-based toolkit. It was created in the United States of America by Desire2Learn, a global leader in cloud-based (SaaS) learning solutions, and it is widely used by academic groups (projects, study groups, classes), clubs, committees and boards, non-profit and charity organizations, etc.

Comparing to other solutions of the kind, which only offer the possibility of creating group forums or sending messages, without sharing the information with the whole group, Wiggio stresses the importance of communication, offering its users a set of different ways of communication, such as: news feeds, comments on threads and documents, in-group e-mails, chat rooms and videoconferencing.

7.2 Functionalities of Wiggio

Wiggio offers a set of very useful communication features and basic collaboration possibilities, from the basic in-group news feeds, to document sharing and anonymous polls. Its users can create and manage more than one group, and, if necessary, each group having their own space inside which the group can separately share knowledge, communicate and collaborate.

7.2.1 Communication through Wiggio

This tool offers users the possibility of creating and managing contacts of its own. This way, the group can access everyone’s contact information and contact them straight from inside the tool. If preferences are set so, the message will be

delivered in the receiver's mailbox and it can be answered to directly from the e-mail. Messages can be sent privately, or they can be made public by the user, who has the opportunity to add people or remove them from the list of receivers. All the messages sent through Wiggio are saved in group's space and can be accessed at any time.

Newsfeeds are very popular in the groupware industry nowadays, as the users can create a thread, and their group mates can comment at their own preference. They represent an easy way of making information visible to the entire group, or to the chosen people in the group. Wiggio gives the opportunity to search for threads with the help of a search option and sort them according their contents (i.e.: events, meetings, messages, etc.).

The threads created in Wiggio can include documents, video and voice messages, invitations to events or meetings schedules, as well as polls.

Chatrooms can be created by any group member and they can be schedules according everyone's availability, meaning that during the creation of the chatroom, a user can send availability requests and upon everyone's confirmation the chatroom can be accessed, at the agreed time. The same option is available for videoconferences and also for in-person events.

The chatrooms are seen to be useful for quick message delivery, and in contrast with text messaging, which is also an option in Wiggio, but only available in USA, is cost effective, as well as the sent messages can have a greater length (Robbins et al. 2010). Group members can discuss issues that need agreement upon or arrangement, such as meetings or customer related issues. Wiggio offers the opportunity to archive the discussions held in the chatrooms, archives which can serve as a great material for minutes of the virtual meetings.

On the other hand, the videoconferences can replace face-to-face meetings, when they are not possible. In a videoconference, the users can share documents, their own desktops, while they can also hear and, or see each other. A Wiggio's videoconference can host up to 10 people.

7.2.2 Collaboration through Wiggio

Wiggio provides its users with the opportunity of storing links, which might be useful for the group, and documents which can also be edited by different users. All documents' versions are automatically stored, once the editing session ends. These links and documents can be sorted into folders, according to groups' needs and preferences. The documents and links can be commented by the users, as they are being posted.

On the other hand, this ICT tool gives the groups an opportunity to create to-do-lists, including tasks and subtasks, set deadlines for them, and assign them to different group members. These tasks, along with other events created by the group, appear in group's calendar, which has multiple views: personal and group view. This way, group members are aware of the tasks going on in their project, their responsible, as well as of the dates when the tasks need to be accomplished. Once accomplished, the tasks can be marked as done.

7.2.3 Decision making through Wiggio

Wiggio is not a decision making type of system, however it offers minimal help when groups need to get to a consensus upon simple issues. Groups can create polls and surveys to which all members can also answer anonymously. The questions asked, with the help of Wiggio's polls and surveys, can be answered according to creator's preferences, in three different ways: yes/no, short answer (text input) and multiple choice.

The anonymous type of option, attached to the polls and survey functions, is a great way of receiving accurate and honest answers (Wyse, 2012). However, respondent's identity can be attached to the answers, if the creator of the survey decides so.

7.3 The implementation of Wiggio

The tool was introduced to the groups after LP group's kick-off meeting and PS group's second face-to-face meeting.

Wiggio's knowledge base includes online how-to-videos which represent a good starting point of training for the groups.

The announcement of the tool was done by e-mail, and a thorough description of it was given. Examples of the implementation of Wiggio's functionalities were provided and the groups were very prompt in accessing the tool. The examples provided by the author of the present study, in combination with the training videos in Wiggio's knowledge base, represented groups' introduction to the tool; training sessions being available upon request.

The groups used Wiggio according to their own choice and needs and they have been suggested different ways of using the tool for their purpose.

The use of Wiggio was quite poor in extent, during the first days, whereas the groups explored its features, while taking into consideration their projects' goals. Both of groups' members were asked to raise any questions on the ways they could use the tool efficiently. However, the knowledge base offered by Wiggio seemed to have brought the users enough knowledge, as no training sessions requests were made, although this possibility was repeatedly offered to them. The online activity increased once the groups' members understood the project goals that need to be achieved.

The way both groups' members took the tool into use was based on an online knowledge base, a detailed description of the tool and features, as well as on a simplified experiential learning methodology. The experiential learning methodology was implemented in the way that the author of the research set Wiggio feature discovery related tasks for the groups. The groups had to accomplish the tasks during the first week of Wiggio's usage and raise eventual questions. Due to the ease of use which characterises Wiggio, the tasks were accomplished rapidly and in a relatively equal manner. However, one of the groups had members coming in later, who did not benefit of this advantage. Nevertheless, the group leader introduced him to the project and the tool.

In spite of the above mentioned, the projects still required the group leaders to use the traditional e-mail in communicating with their client. Nevertheless the PS

group’s customer representative constantly accessed group’s virtual space for monitoring and collaborative development of the product to have been delivered.

8 FINDINGS

This chapter presents the findings of the research concerning the way the two studied groups Formed and Stormed, the way they have communicated, the impact of the intercultural factor had on the group dynamics, as well as will this chapter present the perceived usefulness of Wiggio.

This section encompasses the results of the direct observation sessions, online observation of groups' activity on Wiggio and also interpreted answers of the questions included in the interviews held with each group member at a time.

Because the communication process and groups' members' feelings and attitudes influence the dynamics of the group, these concepts will be presented together in the following subchapter, while subchapter 8.2 is dedicated to Wiggio's perceived usefulness for each study case.

8.1 Groups' communication dimensions and position on the group dynamics scale – The observed benefits of Wiggio

The two groups had quite different types of project starts in terms of their attitudes and feelings, as well as towards their projects and composition of own group.

The two major factors that differentiated the two groups were the composition of the group; whereas LP group's composition was fixed and PS's composition was a subject of continuous change; and the goal of the project, which for the LP group was clearer than for the PS group. This group got a confirmation of their project continuing from the achievement of the first goal, only after approximately four weeks of activity. These two important issues seemed to have had a great impact on the attitudes of the groups – LP group's evolution and development, as a group being more fluent than other group's development.

Wiggio, however, helped on easing the perceived challenge of dealing with the changing structure faced by the PS group. The help was represented by the possibility of communicating with the new group members through the tool; this way the absence of communication being made easier to deal with.

The LP group's project goals were seen by the group members a little clearer than by the members of the SP group, as the SP group was not sure about their responsibilities until their fourth week of common activity. This was caused by the students not knowing until which point of the project they will be involved, and what was expected from them.

Although the LP group's composition was such that all the group members knew each other up to certain extent, the level of politeness they have shown towards each other was visibly higher than the politeness PS group shown, at their first kick-off and project assignment. However, PS group was to still meet the rest of their group later on, moment when their politeness reached the same extent as LP group's politeness level.

The composition of the PS group periodically changing seemed to have also provoked negativity, confusion and uncertainty: "We don't even know how many people are in the group. I think it's ridiculous!". When asked whether she knows what is the actual goal of the project and if her group can achieve it, another BIT member of PS group has also expressed her discomfort towards the unclear goals of the project and the composition of the group: "we can try our best but I am not sure", "I only know that we are 5". The majority of group has reported very less satisfaction on the group working methodology and the continuous change in group's composition: "I don't know what to do with these people". Asked if this disturbs him he firmly answered "Yes!".

The effect of this challenge caused the PS group members to be insecure and stressed, as one of the members admitted during the interview: "Actually I don't know what to do and what do others do (…) I feel like we are useless" (A/N.: as PS group was made up by two subgroups of students, the BIT and the Business students, the interviewee referred to the BIT part of the group). The variation of the uncertainty shown by the groups' members is shown in Figures 13 and 14. These figures show how constant in uncertainty the LP group, who had a better understanding of their project goals, was and how racy the road was for the PS group.

The insecurities on groups' members' tasks have been overcame once the groups started using Wiggio's to-do-lists, as part of their planning process. Although in the PS group, who had most uncertainties on the matter, used this feature much less than the LP group, organizing tasks and their owners had a positive impact. However, instead of the to-do-lists, the PS group used the newsfeed for communicating on what has to be done, and on who was to do it.

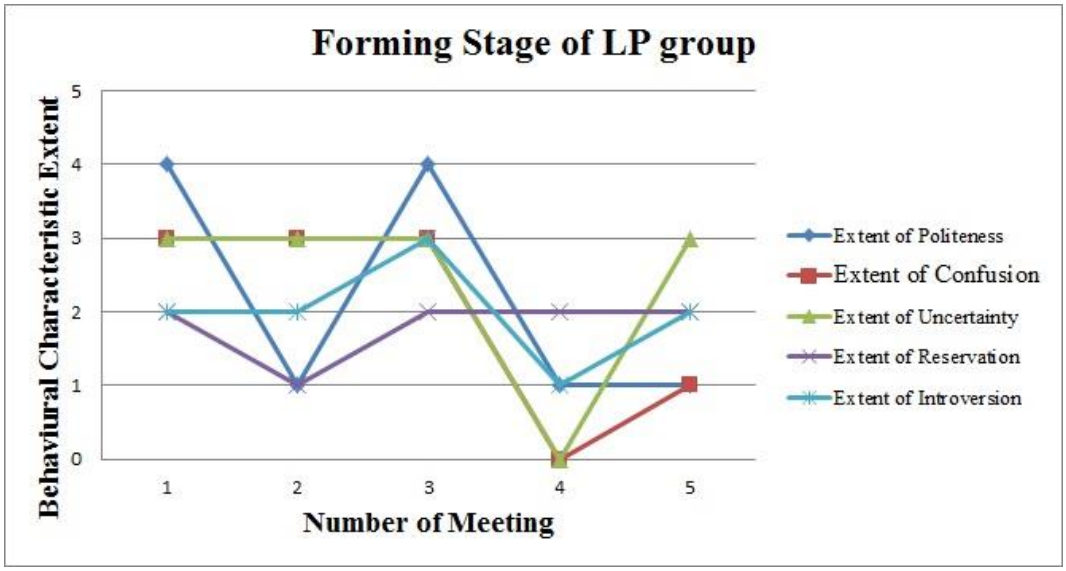

FIGURE 13. Observation Sessions' results - The Forming of the LP group

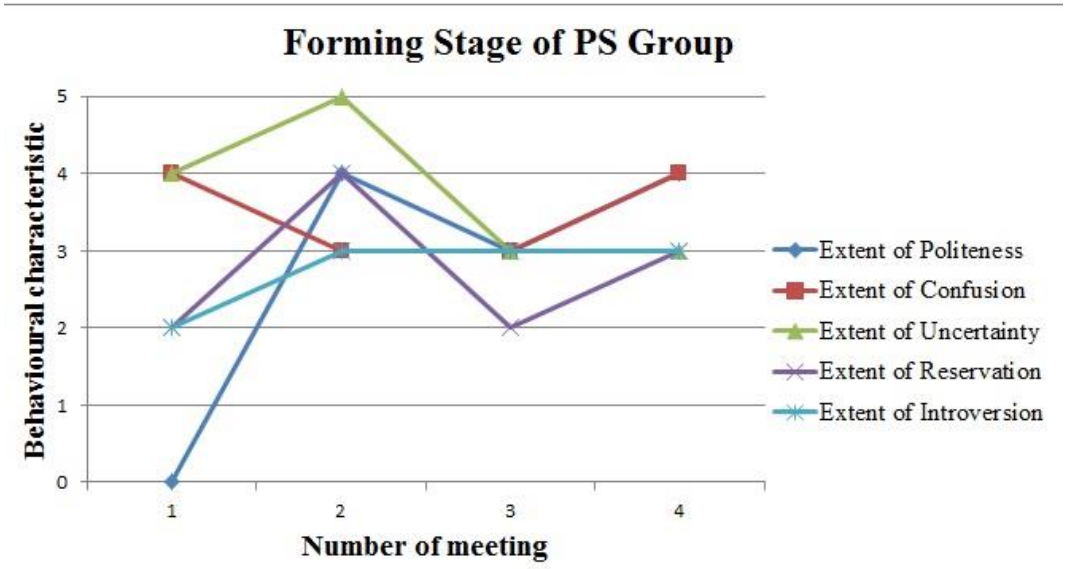

FIGURE 14. Observation Sessions' results - The Forming of the PS group

After three meetings LP group's confusion and uncertainty levels dramatically dropped to 0, while PS group's same variables dropped with only 1 up to 2 units,

leaving them with a medium extent of confusion towards knowing exactly what the actual goal of the project was and a medium uncertainty towards the achievement of the goal.

In contrast to this, BIT group members of the PS project group clearly expressed their doubts on the achievement of the second project goal, later communicated to them by their leading teacher, and supervisor: “Yes, we can achieve the first part of the project, but the building of the actual intranet, no!”

On the other hand, the fact that the PS group was built up from two different groups, and that their general group leader had more information than the rest of the group, the BIT part of the group got confused and visibly intimidated. Figure 14 shows that the meeting in which the BIT part of the group met the general group leader, belonging to the business faculty, coincided with the peak of uncertainty, reservation and introversion of the group. Along with these increasing variables, the confusion regarding the initial goal of the project decreased and the politeness increased.

The fact that the communication in the PS group corresponded to the downward communication model (Robbins et al, 2010), as represented in Figure 15, and specific decisions were not explained to the rest of the group, the group felt confused about each other’s responsibilities and the amount of work, as four of the group members admitted during their final interview. According to Robbins et al. (2010), encouraging the communication flow to go upwards, is the key to success of downwards communication. However the general group leader, when asked whether he would be aware of eventual tensions or misunderstandings the group, he answered that unless someone tells, from their own initiative, about this type of issue, he will try not “stress about it”.

In spite of the above mentioned, Wiggio has shown to be an adding value factor in the PS group, in terms of communication and opinion sharing. The tool contributed to an upwards communication flow, as group members, regardless their position, were able to express their concerns and opinions on the ongoing tasks. Although a certain extent of politeness was still present in their virtual interaction, more members got actively involved in the conversations around the

short term goals to have been achieved (i.e.: type of survey to be developed, structure of the survey, types of questions to be included in the survey, working methodology, etc.). This seemed not only to encourage communication and interaction, factors seen to be very important in the Forming stage of group dynamics, but it gave the group members a sense of belonging and confidence in expressing their opinion: " Yes, I feel like I can express my opinions easier" by using Wiggio (Q.Y., member of PS group).

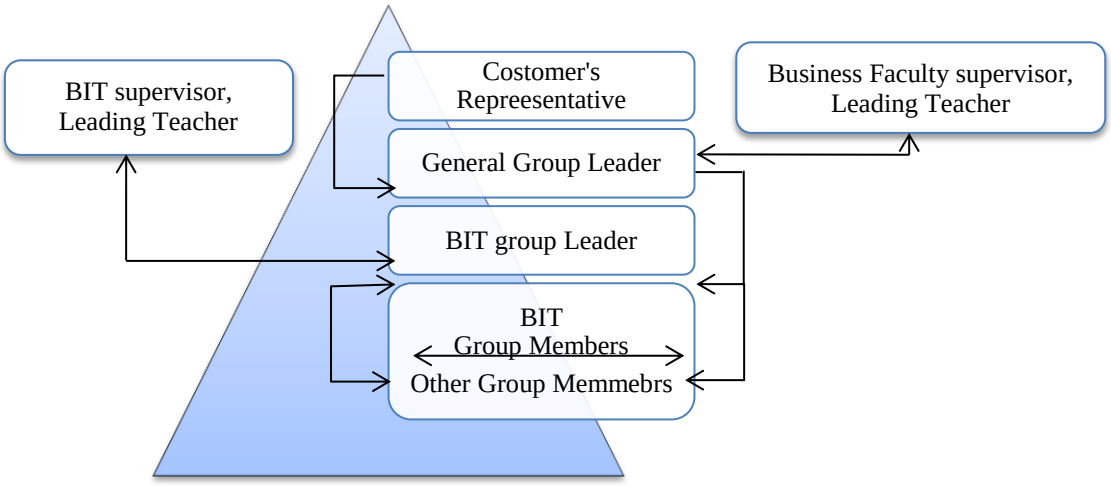

FIGURE 15. Communication Flow inside the PS group

This type of communication seemed to have no success in terms of people knowing own and others' responsibilities in the project. One of the group members expressed his confusion: "I thought it was us who were supposed to contact MC" (A/N: Company who provides software solutions to PS group's client company).

However, the later activities the group had undertaken, showed that although the communication flown downwards, using the to-do-lists or the newsfeed for task assignment, help a group to avoid such situations where group members do not know who is responsible for a certain task. Furthermore, the use of such features an ICT tool offers, also improves the possibilities of the monitoring to be done by the project supervisor, as well as does it offer an easy-to-access collaboration channel for the group and the customer on the goal achievement. As an example, the PS group's customer representative has constantly monitored group's activities and progress, leaving them suggestions for further improvement.

In contrast to the previously mentioned group, the LP group had a more complex communication model, extending from Vertical (upward and downward) communication dimension to the lateral one, while all the communication channels inside the group were open and used. The communication flow of the group is graphically represented in the figure below:

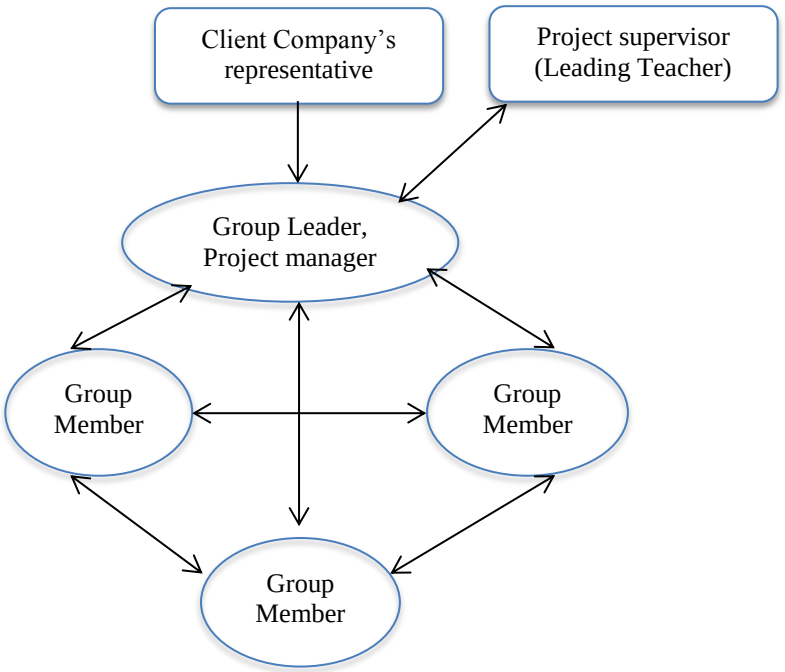

FIGURE16. Communication flow inside the LP group

As all the members in the group admitted, the fact that they knew each other up to a certain extent before the project assignment, helped them to feel comfortable in discussing project related issues, and not only. "Yes, I feel comfortable in talking to others, because we know each other for quite some time" (H.T., member of the LP group). The impact of this factor could have been recognised during their face to face meeting, where one group member who did not belong the same year of studies, and therefore not knowing the other group members, quite as well as the other ones knew each other, he was shy and did not actively participate in the conversations. According to the notes taken by the researcher during the observation sessions, he has been active in 1 out of 5 meetings, his communication activity coinciding with the presence of the supervisor.

In the meetings held by the SP group, the general leader was always actively involved in conversations with the BIT group leader, and later on with a conational, although the all the members participated in the meeting. This leaves

the group with 3 out of 6 group members, being actively involved in the communication process.

The face-to-face meetings held by the PS group seemed to be chaotic they were never based on a previously created and shared agenda. The minutes of meetings to be shared with the entire group, were also absent. The difference between the groups, form this point of view, stands where LP group put a great effort in the documentation of their meetings, next steps and task sharing and the SP group has an unstructured meeting and working approach.

In addition to the good synergy, dominating the LP group, and the open communication channels, supported by communication tools offered by Wiggio, the quick and synchronous information sharing and access has given the group members a strong project-related interaction base. For instance, in contrast with the SP group, LP group's meeting agendas were always shared through Wiggio, before the meeting. The agendas were available to all the group members, who had the access to them, at any time, before, and after the meetings. This increased their meetings' efficiency, which, comparing with PS group's meetings, were faster paced and consensus was reached quicker.

Although this difference of communication dimensions, in both of the groups the members looked up to their leader, fact considered to be a property of groups being still in the Forming (Tuckman, 1965) or group stage (Skyttä 2005). For instance PS group had two leaders, the general group leader and the BIT leader. However, all the group members, including the BIT leader, took notes while the general leader member talked about their future activities.

In spite of the communication flow in LP group being visibly better, right from the beginning, the group members did show a level of politeness and agreed with the leader without holding on to their own opinion: "we need that…" "I don't think we need it…" "OK!". Nevertheless, this episode was unique, and starting with the following meetings the atmosphere became more open and relaxed, group members actually discussing about the their skills and the way they could achieve project's goal. On the other hand, the group members also exchanged knowledge on the use of a certain project management tool, and by the third

meeting, they admitted to have an approximate idea of who will do what in the next period of the project.

The knowledge exchange through Wiggio was something both groups opted for. By the use of the ICT tool for this purpose, not only did the knowledge exchange happen between two group members who initiated the action, but the same knowledge was shared with all the group members. In the LP group, for instance, sharing links towards a time tracking system was useful for the whole group, who later on, needed to use the same system.

The misunderstandings of messages and words used were ignored in the PS group, where a member used the notion of "batched solution". The members of the group, who studied in the business faculty and did not have technology related knowledge, were visibly confused, but the issue was left behind, and conversation's subject was changed. In contrast to this, LP group has used concrete examples in order to make sure the other ones understand their message. Furthermore, members of LP group have constantly used the active type of listening and communication: e.g.: "Do you mean…" "Yes" or "Do you understand what I mean?". This is one communication feature that was absent in the PS group, but on the contrary, in their third meeting, a member was interrupted by another one from asking a question, by answering positively, as in "yes, exactly" without having the complete question being asked.

The cultural differences, in terms of context level (Robbins et al. 2010; Figure 7.), were shown in the PS group's meetings when the Finnish group members dominated the conversation, while the other ones were silent. The injections of conversation in Finnish language were also present.

In both of the groups, members who spoke the same language, as native languages, did use them in the presence of others. The ones to whom the language was unknown did not explicitly expressed their disturbance, although as a spontaneous action, a non-Finnish group member used Finnish words to explain his idea, showing his need of being understood and accepted as credible, this being a clear sign of the Forming stage in group development. However, during

the interview sessions some of them expressed their negative view on the issue: “yes it does disturb me, because I don’t know what they are saying”.

The use of Finnish language inside the PS multicultural group has constantly been present. Along with Finnish group members, the customer representative, who aimed at collaborating on the development of the survey, constantly commented group’s activities in Finnish language. The general group leader was to translate all the comments for the rest of the group. However, the use of Wiggio might have eliminated some of the isolation feelings, non-Finnish group members had, due to the fact that they would not understand Finnish. The help came from the triggered need of the group leader of translating the whole message, or comments, instead of only translating the self-considered most important issues; Having the message written in a common space, and translated on the same page, saved the group from information leaking, which although it could have been considered by the group leader, as unimportant, it would hurdle collective thinking, and therefore collaboration.

Furthermore, as Robbins et al. (2010, 293) claim, messages sent through written communication channels are more likely to be “well thought out, logical and clear” and people are more careful in written than in oral communication.

As an observation result, the situations in which a conversation is dominated, or in which information is being shared in an unknown language to other group members, are much less when the activity happens virtually, inside a common working space: the information shared in an unknown language, are automatically translated by someone in charge, and the possibilities of expressing an opinion, or participating in the conversation are diverse and high in extent. As earlier mentioned, members of the both groups have stated that for them it’s easier to express their opinion through the use of Wiggio.

As a confirmation of Robbins et al. (2010, 231; citing K. H. Hammonds, Practical Radicals) who state that not all the groups follow Tuckman’s group development model, the LP group seemed to have skipped the Storming phase and started to Norm after 3 weeks of being a group. In support to this affirmation stand the open atmosphere dominating their meetings and extremely positive attitude towards the

group and the achievement of project's goal: "Best team ever, we had no conflicts!", "Of course we can achieve the goal!", stated one LP group member during the research interview. These things coincide with the third stage in all of the group dynamics models: Tuckman's Norming (Robbins et al. 2010, 232): "a shared sense of success, camaraderie", Skyttä's Low-functional team stage (2005, 111): "Positive atmosphere, family like atmosphere" and the Potential Team stage in the Performance Curve model (Boddy, 2001, 306): "Intention of achieving common goals, confusion upon purpose, goals or joint activities".

On the opposite poll stands the SP group, who had great challenges in accepting the continuously changing group structure, group members coming and going, during the over 4 weeks of observation. During their third meeting PS group seemed to have reached the second group development stage as described by Skyttä (2005, 111): the Cliques stage.

After the meeting, the members of same nationalities got together and spoke project related issues, such as the other group members. Skyttä states that during the second group development stage, group members split into smaller groups and talk behind each other's back. The characteristics of the Cliques stage have always been present in the group, due to its composition, namely two subgroups: one from the BIT section of the university and the other one from the business faculty. Furthermore, also competitiveness between members for roles and responsibilities appeared. Over an informal conversation the researcher had with one group member on the need of the group to choose their group space's administrator in Wiggio, the group member claimed to have established with others that he would be the one to manage this task. Although his conational supported him, after the announcement being made to the whole group, it appeared that the issue was not discussed with everyone, as initially claimed. Robbins et al. (2010, 231) pronounce on the fact that, during the Storming stage there is a certain competitiveness, or conflict on who will control the group. The choice of the group's space administrator was done by anonymous vote casting inside Wiggio. Furthermore, during the meeting with their supervisor, the BIT subgroup of PS group shown a great synergy and understood the ideal workflow that was missing in their group.

In spite of all these events matching the second stage of the group dynamics models, the group has clearly stood at, or regressed to the Forming stage; during the fourth week of activity not all the group members having the feeling of belonging to the group "I feel like we are useless" (A.T., member of PS group); according to Robbins et al. (2010, 231) the moment when all members have a feeling of belonging to the group is the moment that matches the end of the Forming stage.

At the moment when the research observation activities have stopped, the PS group was still at the stage of Forming, the group being dominated by insecurities concerning the group structure, project goals and their achievement; hidden tensions and low communication extent being also present. On the other hand, the LP group's state indicated that the group has not Stormed, but Normed in a relatively short time. The goal of the project seemed to be 90% clear, group members being optimistic about meeting the customer and clarifying the issues that caused confusion. However, all the LP group's members showed irritation caused by the lack of communication and collaboration from the behalf of the customer. Nevertheless the issue did not affect the cohesion of the group.

The observation sessions undertaken for studying the group dynamics happening in the PS and LP groups, and the benefits that Wiggio would have brought to the two groups, showed different ways an ICT tool can ease the Forming and Storming phases.

The possibility of writing and storing documents in one place helped the groups in synchronizing their perception on the immediate and possibly long term project goals. Furthermore, sharing documents and information does not only affect on the way the project goals are perceived, but also on holding effective meetings, whereas everyone is aware of the agenda and past meetings' happenings. Also, when it comes down to the short-term project goals, the to-do-lists have a positive impact on sharing tasks and assigning responsibles. This way not only will the group members understand that everyone does work, but will they also know who has a certain responsibility; this type of confusions being minimized.

The opportunity of commenting on each other's activities, documents or expressed ideas encourages communication and interaction. As some group members admitted, writing their opinions and ideas in Wiggio seemed easier than expressing them all during the meetings.

Because project monitoring is so much more important and of a great necessity in virtually activating project teams and groups, sharing the common activity space with the project supervisor, and at choice and need, with the client, was a good option for one of the groups who collaboratively worked in the development of a survey, which represented one of their project goals.

On the other hand, as the groups activate also virtually, and some members might not meet in the face-to-face meetings, having the possibility of communicating with them, with the help of Wiggio, deadened some of the lack of communication.

In addition, the new group members can get acquainted with the previous activities of the groups and have their integration being facilitated, without the help of direct personal coaching. Furthermore, previously shared knowledge inside the group, with the use of the ICT tool, can also reach the new members.

Although the PS group had a difficult situation, the use of Wiggio improved the quality of their Forming and even pushed them into Storming. However, only the use of an ICT tool cannot be the only solution to the problems encountered by a group formed by two subgroups, but it can represent a supporting item for the issue in question.

8.2 The perceived benefits of Wiggio

The two groups, representing the study cases of the present research, used Wiggio according to their own choice and needs and they have been suggested different ways of using the tool for their purpose.

The below figures show the most prevalent benefits of Wiggio's features, as seen by each group and its members. The reason for which there are two separate affinity boards is that, as described in subchapter 7.3, the activities of the groups were different and the use of the tool had different purposes for each group.

The columns include most common comments each group's members made on the tool they have used, while the he rounded shapes include comments that were not prevalent.

8.2.1 Wiggio and the LP group

The activity of LP group, at the moment of research, included a high extent planning and communication between the group members, the group and the customer, and supervision meetings. Therefore their activity of Wiggio constituted of document writing, sharing, virtual meetings and discussions related to project goals and their achievement. Figure 17 shows the benefits of Wiggio, as perceived by the LP group.

All the group members have recognized a great use of the tool in sharing documents and information vital for the project. The group leader stressed that Wiggio helped in organizing the work. Furthermore, he used the tool for sharing meeting related issues, such as agendas, moments of meetings , project plan versions and summaries, which served for keeping everyone informed about project's status, the contents of the meetings, as well as for project monitoring from the supervisor's behalf.

As the group members knew each other, to a certain extent, and their studies helped them in integrating the English language in their daily activities, in an intercultural context, the language barrier was not recognized by any of the members; therefore, from this point of view, the group members did not appreciate Wiggio to have been of any use. Furthermore, the existence of choice in holding face-to-face meetings over any other type of meetings sabotaged the maximization of online meetings' benefits Wiggio could have offered. However, the group leader explained that, starting from the moment the actual software will be developed, the meetings will prevalently be virtual, videoconferencing being very useful.

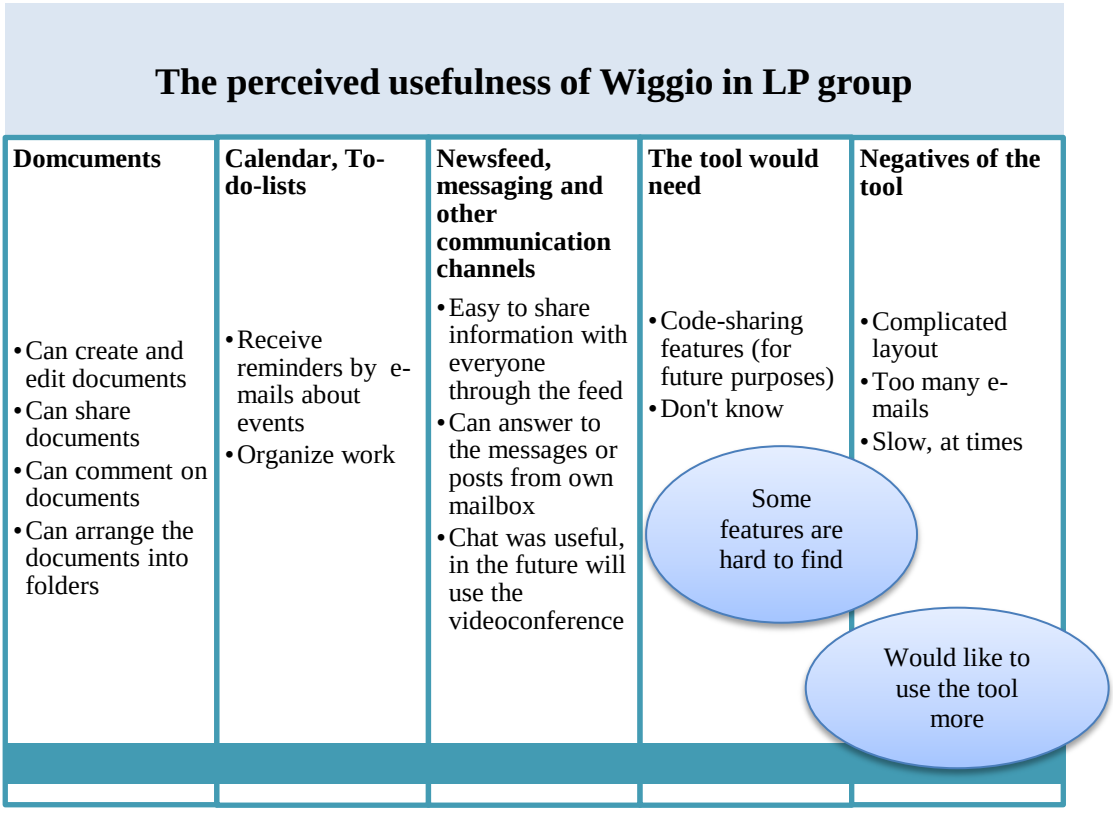

FIGURE 17. Affinity Board - Usefulness of Wiggio in the LP group

As mentioned in the 8.1 chapter, one of LP group's members did not actively get involved in the communication taking place in their meeting. He, however, used Wiggio for communication and personal documents' sharing up to a certain extent.

As the purpose appropriate technology makes activities such as communication and collaboration possible (Furst et al. 2004; Witchalls et al. 2009) and the main activities of the group were mainly related to communication and information sharing, Wiggio was a "very useful tool" (M.H., H.T., members of LP group) at the given moment.

For future purposes, two group members expressed their need of code sharing functionalities in the tool. Nevertheless, the point in time exceeds the scope of the present research.

Wiggio supported LP group's communication and stimulated the participation of all the group members, through the different communication channels the tool offered. This made the group member who did not actively participate in the

discussions undertaken during the meetings feel like he belonged to the group. Taking into consideration that the rest of the group members were somehow familiar with each other, before the group was formed, the fourth member seemed to feel like an outsider. For the group member in question, Wiggio represented a space where he could freely express his opinions and bring up ideas, this triggering his feeling of belonging to the group. The sense of belonging and camaraderie, which was also fostered by Wiggio, marks the third stage of group development, namely the Norming stage.

The possibility of sharing and storing important information, that Wiggio offered, such as summaries of the meetings with the customer, moments of meetings and agendas stimulated seamless virtual and face-to-face communication, as well as quick consensus reaching. The seamless communication encouraged group members in getting comfortable with each other and developing a positive attitude towards the group and project: “The best team ever!” (D.H., member of the LP group).

Furthermore, Wiggio served as a knowledge sharing platform also. The group shared information on project management tools and working methodologies to have been further implemented in their project. The importance of all the group members having the same information and details about project related issues, positively impacts on group’s progress on the group development scale.

In the LP group, Wiggio has proven to be an efficient tool which stimulated communication, helped in interpersonal relationship building, strengthened the links between the group members and fostered group’s progress on the group development scale. Therefore, a conclusion, according to which Wiggio was a beneficial element in the group and improved the group development process while improving the communication, can be drawn.

8.2.2 Wiggio and the PS group

The activity of the PS group started with less planning, but by accomplishing the task initially given by the customer. As the main goal of the project was to design and implement an intranet solution for a company which outsources and offers

welfare, and household aid services for elderly people in Päijät-Häme region, the group started working on a survey from the very first week of being a group.

The survey development activities undertaken by the group included a high extent of documentation and interactive document editing, all the group members coming with ideas about the content and looks of the survey.

Due to the fact that the possibilities of having face-to-face meetings existed, the group did not use the virtual meeting possibilities offered by Wiggio. The group had four meetings in four weeks of activity. However, a group member expressed his need of more face-to-face meetings, especially because the group had new members coming in almost every week. During the first meeting, the group included four members. At the end of the research, the group was comprised of seven members, two of them, never having participated in any meeting or project related tasks.

The perceived usefulness of Wiggio in PS group

Domcuments	Calendar, To-do-lists	Newsfeed, messaging and other communication channels	The tool would need	Negatives of the tool
• Can share documents • Can add and remove documents • Can comment on the documents • Everybody can access them instantly • Clients or supervisors can access them and comment	• Receive reminders by e-mails about events / help not to forget	• Easy to share information with everyone through the feed • Can express own opinions better than in the meetings (more confidence and more oportunities) • Everyone can comment or answer to our questions • Easier to find conversations • Helps on catching up with the happenings	• Online availability functions • Don't know	• Would need more time to use it to take better advantage of its features • Slow, at times

FIGURE 18. Affinity Board - Usefulness of Wiggio in the PS group

As shown in Figure 18, many of the group members liked the communication channels Wiggio offered. The diversion of features made the group members feel like their information and opinions can reach others in a more effective way. For instance, two group members who had been very passive in group's meetings because of communication apprehension, or timidity, said that they found the newsfeed very useful in the way that they felt the expression of their opinions being easier.

No member, in this group either, did find English to have been a barrier in communication. The communication hurdle was identified in people's attitude and the fact that group members did not meet the new members.

The fact that group members could have commented on each other's activities and work in the documents developed, at that moment, was very popular, each post and document version having been commented by at least a group member.

Wiggio seemed to have played a good role in introducing new members into the group and giving them the information needed, in order to integrate themselves into the group and their activities: "It gave me the opportunity to know what happened before" (T.P., member of PS group). He also stressed on the fact that the content of group's space was well organized and random issues could have been found from the feed easily. The tool helped the new member getting to know what the other group members have done before his arrival, without needing the traditional personal coaching, which would usually be needed in such situations.

In order to know if the posted message was received right away by the rest of the group, PS group's leader expressed his wish of Wiggio giving its users the possibility of seeing who is online at the moment of their own activity.

Wiggio has mainly had the function of communication and collaboration facilitator, giving the opportunity to its users to remotely collaborate on the initial task by document creation, editing and saving, while actively communicating on the improvements needed to be done in order to go on, and create the final document.

As earlier mentioned, PS group's structure was a subject of continuous change, members coming and going during the observation period. Wiggio represented, for the PS group a great solution for including new members in the group, giving them the opportunity of accessing a knowledge base created by the group. The news feeds and discussion threads, as well as the stored documentation, had a positive impact on the group dynamics from this point of view. Furthermore, the same discussion threads engaged into conversations group members who had no opportunity in meeting face to face. This effect of Wiggio has, in a way streamlined, the difficulties encountered by group members of accepting the changes and coping with them. The new group members also showed a high extent of satisfaction with the possibility of discovering group's and project's backgrounds. This has also eased their own difficulties in integration into the group and the feeling of insecurity, while having a base upon which new knowledge could be built.

Furthermore, Wiggio's to-do-lists and calendars decreased the confusions on the tasks to be achieved, as well as on their owners. Having a clearly stated structure of the tasks and their owners helped the PS group avoid confusion and know who is responsible for which tasks. This positively impacted on group's workflow and positively transformed their attitudes towards the project and other group members, while understanding that everyone has a task and knowing whether they are achieved or not, and if the project is in time.

Due to group's structure, and eventual communication apprehension, some of PS group's members found it difficult to communicate in the face-to-face meetings organized by the group. Through a wide range of communication channels, Wiggio encouraged communication and gave these group members a chanced of expressing their opinions and commenting on each other's activities. Not only did this help group members with communication apprehension to participate in group's conversations, but it also strengthened the almost non-existent interpersonal relationships between the group members. Furthermore, Wiggio's various communication channels had the role of improving group's performance and workflow, while discussing project related issues more efficiently than during the poorly planned face-to-face meetings. All these lead to a better progress on the group development scale, streamlining the Forming stage. However, due to the

fact that project goals were unclear and the group structure changed constantly, the group stood at the Forming stage. Nevertheless, according to all the above, the Forming stage and its communication-specific challenges were streamlined by the use of Wiggio.

9 DISCUSSION

The objective of the research was to find out how can ICT tools enhance the communication inside inexperienced intercultural ICT project teams who, at the stages of Forming and Storming alternatively work as a collocated and virtual team.

The present study was conducted in respect to the prevalence of the virtual and hybrid teams in the contemporary business environment. The case studies were represented by two project groups consisting of students of Lahti University of Applied sciences, who also commissioned the research.

SMEs and educational organizations who intend to use ICT tools, as mediators between people working for a project can benefit of the present research's findings. Namely, the findings can guide such an organization to choose a strong ICT collaboration tool, which would benefit the project groups at different levels, depending on the group's structure and goals. The ICT tool's features are presented in this research along with the benefits brought by each of them; therefore, the SME or educational organization can brief the needs of the group and select the ICT tool based on the needs of the group in question.

The research at hand can be regarded as an attempt to scrutinise the benefits a purpose-appropriated provided ICT tool can offer an intercultural project team, yet in the stage of a group, who is inexperienced and activates as both, a virtual and collocated team. It gives the reader an insight of the challenges that can appear in groups formed by subgroups, the factors that can dramatically influence on a group's dynamics, and the challenges that can be overcome by the use of an appropriate ICT tool.

9.1 Limitations of the study

The time constraints did not allow the researcher to follow the PS group into Norming stage, neither the progress, or regress of the LP group whose members admitted that hurdles in terms of collaboration could appear, as the project goes on. Furthermore, the LP group expressed their intention of using the videoconferencing and chats a lot more than until the moment when the research

has ceased. On the other hand, the time constrains, along with the reluctance of some groups' members also affected on the decision of introducing the tool through a series of training sessions. However, the group was provided solid material which guided them through the tool and its functionalities. Nevertheless, the activity the groups had on Wiggio and the differences in the way they used it brings the author to the conclusion that direct training sessions would have been necessary.

Furthermore, due to the fact that groups were formed before the research started, the high degree of heterogeneity inside the groups was not as high as hoped for; nevertheless, the communication going on between the groups' members represented models of intercultural communication, as initially defined in the paper.

9.2 Conclusions

The research framework was chosen in order to offer the needed flexibility in the ICT tool's choice, which was vital to match the communication and collaboration needs of both studied groups. According to the initial observation sessions, the main needs of the groups regarded the shared space, documentation sharing and editing, easy and fast communication means, planning possibilities and personal, and group appropriate privacy, which would not violate the privacy of the customer, either. Wiggio was the appropriate tool, as it matched all the initially observed needs of the groups.

The two project groups, studied during the research time, were very different in terms of structure and project goals. The results of the study showed the fact that if members know each other, namely even just saying hello to one another, and spending time in the same room, without directly interacting, it can ease the group development process. The LP group showed great speed in development and leaped from Forming to Norming, a fact which confirms the statement of Robbins et al. 2010, who citing K. H. Hammonds, says that not all groups follow the group development model belonging to Tuckman. In addition, the BIT subgroup of the PS group also had a good synergy, due to the same position. However, the PS group stood at, or regressed to the Forming stage due to the unclear goals of the

project, which proves the impact on group dynamics clear project goals have. Furthermore, the expected language barriers imposed by the use of a common language, as given by Robbins et al. (2010) were denied by both of the groups' members, due to the fact that their studies included daily activities in the same language.

The groups, having a choice of holding face-to-face meetings, have minimised the expected satisfaction they could experience with the possibility, Wiggio would give, of holding videoconferences. However, group LP have expressed their intention of using it, as the project would go on, which coincides with the suggestion of Hossain et al. 2004 , where the communication process in virtual and combined teams can be supported by the use of ICT tools and face-to-face communication sessions.

However, face-to-face communication has proved to be indeed a little challenging to certain group members, who, due to communication apprehension, or timidity, did not dare to express their opinions in the meeting, but they did with the help of the tool. In their point of view, the tool helped them to express their opinion and communicate with others in a more effective way.

Furthermore, both groups have shown great satisfaction with the other communication channels the tool offered them, the newsfeed helping them to share information quick and effectively, and even further, to integrate new members in the group. The new member of the PS group has expressed his great satisfaction on how he could have read and understood all that was done at that point by the other group members, without needing personal guidance and coaching.

In terms of collaboration, Wiggio was an aid, as most of the groups' activities related to documentation and product development which was a document itself, in the case of the PS group. Both of the groups expressed great satisfaction with the possibility of creating, editing and storing different versions of the documents on their own group's space, which gave the opportunity to all the group members to read and express their agreement or disagreement on the document.

Furthermore, the tool has helped the groups to schedule their work and events, some groups' members admitting that they are better off having reminders by e-mail and written information about their next meetings, rather than phone calls announcing upcoming meetings.

In conclusion, ICT tools increase the quality of group development stages. While Forming and Storming are difficult stages to pass, for all types of groups, ICT tools, such as Wiggio can be beneficial for communication and collaboration in a number of ways. Giving a fresh group the opportunity to interact virtually and informally encourages communication, as it did in both of the presented cases. The interactive collaboration on documentation, or document related tasks, can also be regarded as an advantage given by the ICT tool; in both of the studied cases, this being a highly appreciated feature of Wiggio. Furthermore, offering a group the opportunity of sharing meeting agendas and moments of meeting can dramatically improve the efficiency of their meetings, and the consensus achievement. In addition, an ICT tool which allows the group members to set tasks, assign the responsible persons and follow their deadlines, helps the group in understanding that everybody in the group does work and how time-effectively they do it.

Therefore, the implementation of an ICT tool, such as Wiggio, encourages the much needed communication, by offering the group members different communication channels, and it brings an asset to project monitoring. In addition, synchronised work possibilities and feedback encouraging features, such as feeds and comment in activity, opens up communication channels, something which would not be possible without an ICT tool. Furthermore, the shared working space and calendar makes group members have a sense of time in project goal achievement and task ownership, which positively impacts on the workflow. The possibility of sharing knowledge and storing it, in a virtual common space, enables new group members to fit in more rapidly. Collaboration and communication with the client, at their convenience, is also a possibility an ICT tool offers to a project group, this way avoiding, or minimising the difficulties caused by unclear project goals, number of tasks done without the consent of the client.

ICT tools are not a group development panacea, but they speed up the process of group development, in certain ways. Choosing the purpose-appropriate ICT tool can minimise most of the problems related to the earliest stages of group development, even if the intercultural factor is present and the group is inexperienced.

9.3 Aspects that could be further explored

Studies related to the factors that influence the speed of group development in intercultural teams that work as both virtual and collocated groups could be further undertaken. The fact that studied groups had the possibility of holding a limitless number of face-to-face meetings have affected on ICT tool's usage extent and purpose; therefore further studies on the versatile reluctance towards and prevalence of ICT tools' usage under circumstances could be developed. Further studies can also be directed to the ways that ICT tools can streamline groups' composition changes, as the present research has superficially traded the issue, due to time constraints and low extent of relevance for the study.

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APPENDICES

APPENDIX 1. Observation Sheet

This paper represents an observation sheet to serve for later data analysis, part of the bachelor's degree thesis.

Topic: ICT tools and group dynamics

ICT team tools enhancing the communication in the Forming and Storming Phases of an inexperienced intercultural ICT project team working alternatively as a collocated and virtual team

Author: Alina Mihaela Zarva

Degree program:

Student Number:

Group Code:

Observation sheet no.:

Observed Group ID:

Date of Observation:

Project	
Subject	
Duration	Start date:
	End Date:
Team	
Number of Members	
Number of nationalities	
Initial Synergy	

Team Average English Language Skill (1-5)*		
Phase of Observation	**Forming (Tuckman, 1965)**	
Behavioural Characteristic of the Group Dynamics Phase**		
Politeness	☐ Yes ☐ No	Extent (1-5):
Confusion	☐ Yes ☐ No	Extent (1-5):
Uncertainty	☐ Yes ☐ No	Extent (1-5):
Reservation	☐ Yes ☐ No	Extent (1-5):
Introversion	☐ Yes ☐ No	Extent (1-5):

Other Notes:

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* 1 Poor – 5 Excellent

** If the behavioural characteristic exists, its extent is to be appreciated on the following scale:

1 Very Less – 5 Very Much

APPENDIX 2. Interview Sheet

This paper represents an interview sheet to serve for later data analysis, part of the bachelor's degree thesis.

Topic: ICT tools and group dynamics
ICT team tools enhancing the communication in the Forming and Storming Phases of an inexperienced intercultural ICT project team working alternatively as a collocated and virtual team

Author: Alina Mihaela Zarvă
Degree program in:
Student Number:

Date of interview:
Interviewee's name:
Team Name:

Themes:

I. Personal Views on Own Performance and Project

1. Do you feel like you know exactly what the goal of the project is?

2. Do you feel like you and your team can achieve project's goal?

II. Group Dynamics

1. How well do you think you synchronise your work?

2. Can you tell a team member is better or more useful than the other one?

3. Do you feel comfortable in sharing your opinions and in spending time with your team?

4. Do you feel like you are actively and equally communicating in your team?

5. ICT tool – Wiggio

1. Did you find Wiggio easy to use?

2. Do you feel like Wiggio was useful to your team, so far (for instance communication, information and knowledge management and sharing)?

3. Do you feel like Wiggio helps you to communicate more efficiently (e.g.: Different communication language than your mother tongue)?

4. Is there any functionality you that Wiggio did not offer you, but you feel like you would need in order to communicate and perform better in your team?

APPENDIX 3. Groups' Project Process