A Systematic Tertiary Study of Communication in Distributed Software Development Projects

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Abstract - **Distributed Software Development (DSD) is characterized by physical distance and/or different time-zones among those involved in the process of developing software[1]. This paper presents a systematic tertiary study about communication in distributed development that aimed to identify and to synthesize factors that influence the effectiveness of communication in such settings and its effects in the design of such projects.**

Index Terms- **communication, DSD, tertiary systematic study**

I. CONTEXT

This study aims at moving towards a consolidated knowledge about communication in distributed projects by developing a better understanding of which factors influence communication processes and which are the reported effects of this influence in DSD projects. To attend our goal, we conducted a systematic tertiary literature review of communication in distributed projects[2].

We briefly present below the result of the identification, analysis, and synthesis of the effects of communication process in DSD projects and the factors in the distributed context that affect communication effectiveness.

II. RESEARCH METODOLOGY

In this study we followed systematic literature review methodology to guide the development of tertiary study, which analyzed secondary studies (literature reviews) in the context of DSD[2]. An extensive search was conducted in order to identify studies published between 2006 and 2010.

We searched the following databases: *ACM Digital Library, IEEEXplore, Elsevier ScienceDirect, El Compendex, and Scopus.*

III. RESULTS

Our manual and automatic search revealed 20 secondary studies. The findings are briefly presented according to the defined research questions.

Q.1 *Which factors influence communication in Distributed Software Development projects?*

sought to identify the main factors that influence communication in distributed projects. Based on the 20 secondary studies analyzed, we identified 29 factors grouped into three categories (Human Factors, Location and Infrastructure, Processes and Technology). The most-cited factors are: Cultural Differences, Language Barriers, Coordination, Visibility, Limited informal communication.

Q.2 *Which are the effects of these factors in communication in Distributed Software Development projects* ?

sought to identify the main effects. We found 25 effects associated to the factors. We highlight the following effects: Uncertainties, Misunderstandings and Misconceptions, Lack of Confidence, Quality of Communication, Limited information sharing. These effects were classified in the same categories as the factors. In addition, they were also categorized as their impact in the effectiveness of communication.

Finally Q.3 *Which factors identified in Q.1 are related to the effects identified in Q.2 in Distributed Software Development projects* ?

sought to relate the main factors that cause the effects identified in the communication. Out of the 29 identified factors, 25 were associated with 23 of the identified effects. For some cases, more than one effect related to the same factor in the relationship between factors and effects.

IV. FINAL CONSIDERATIONS AND FUTURE WORK

Most of the studies available in literature report on experiences trying to improve communication in DSD [3] [4], or discuss factors and the impact of such factors in the communication process. Although the vast literature, there is a need for consolidate knowledge on the topic. This study aimed at filling in this gap. Based on the findings, we will further this work by empirically confirming the relationships identified and proposing a process to assess the maturity of the communication process in distributed teams. A tool to support such diagnosis will be developed in the near future.

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