

Critical Review in Computer Science: Identification of the Relationship of the Social and Human Factors Related to Teamwork with Software Development Team's Productivity

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Abstract

This research aims to explore crucial matters related to software development team collaboration that affects productivity. The collaboration component will be discussed in this research including attitude competencies, skill competencies, and knowledge competencies. The results of this study indicate that the components and relationships and human factors influence the productivity of the software development team.

Keywords: Software Development; Teamwork; Teams; Productivity; Social Factors.

1. Introduction

This study is triggered by a Systematic Literature Review with the title "Gamification for Improving Software Project Management Processes: A Systematic Literature Review", that there is an important topic concerned with the identification of social relations and human factors on the productivity of the development team [1]. A deeper and further study of important issues relating to teamwork is being presented to fill the gap on the current research..

2. Factors of Productivity of a Team Cooperation

Cooperation or teamwork can lead to competition in achieving goals as well as the objectives and increasing productivity [35]. There are several things that affect competence rather than teamwork; ready competency, skill competency, and knowledge competency [2]. Attitude competencies consist of cohesion, commitment to work in a team, trust, psychological security, and team's ability to work together.

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Skills competence consists of coordination, communication, problem solving, shared leadership, and backup behavior. Finally, knowledge competence consists of situation awareness, group thoughts and a team's thought process.

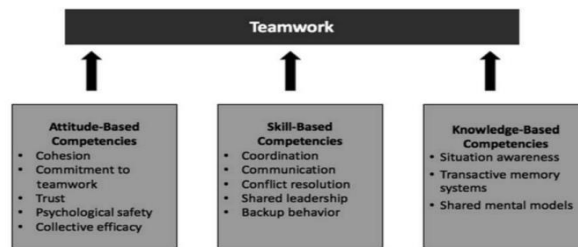


Figure 1: Components of collaboration / teamwork competence

3. Attitude Competencies

Group or cohesion unity is a concept that contains sub-components of performance and relationships between one team and another [3]. Conditions under pressure can reduce the level of cohesion of a team; (a) can increase interpersonal tension and cause more negative effects, (b) large interpersonal friction can produce low commitment to team work, (c) conditions under pressure can weaken the relationship and loyalty to the team [6]. Functional Diversity functions to encourage innovation from the software development team by including people with different types of expertise and skills (graphic design, marketing, strategy, etc.) in the software development team. Task cohesion (commitment to the task / work of a group) is something that can affect relationships in the software development team. When the task cohesion conditions are high, the relationship between functional diversity with creativity and the implementation of ideas is negative [4]. Commitment can be an important role in influencing the relationship between trust (trust) and knowledge sharing in a project team [5]. In teamwork, a commitment also affects the performance of the job / task and this is also influenced by 2 factors; goal difficulty and goal clarity [7]. Goal difficulty (goal difficulty level) can increase creativity by providing motivation to respond [8]. While goal clarity means the concern of the team's objectives / goals felt by the team [10]. Team trust has the power to strengthen the concepts of my behavior and teamwork beliefs, as well as to empower individual personalities and develop their skills and talents [11]. In the case of a software development team, trust influences the process of the team such as the process of providing information, feedback and in managing the time. Team members will communicate more openly and will provide more free information when they trust other members [12]. Psychological security is a cognitive condition that appears as a key in helping the learning process, organizational change and employee interference [13]. Psychological safety influences positive results from the workplace side. The importance of connecting with supportive behavior, connecting with members, and providing direction for building psychological security while working for a manager is part of the positive outcome of psychological security [14]. The ability (efficacy) together can benefit emotional commitment (interpersonal relations). If the level of shared ability is high, employees tend to provide support to other employees who have difficulties in completing their tasks, in order to complete the tasks together in the organization / team [15]. In a collective way, an educator / member who gives influence can influence other members towards the results they want to achieve. An educator / member who can influence this

will show greater effort, try other new methods and help members who need help [16].

4. Skills competence

Coordination of cooperation is important when working on large scale projects and involves many teams [17]. Project coordination consists of 2 components; vertical coordination (communication between end users and project teams through formal channels such as through managers) and horizontal coordination (formal communication between end users and team members) [19]. Coordination is seen as similar to collaboration, only that coordination requires shared accountability as well as clarity of roles, jobs / tasks and goals / goals [18]. Communication patterns occur among all those involved in the company. This happens because the ultimate goal of the company is to provide the company's service / product [20]. Improved performance requires communication, because communication can affect the performance in a positive direction. Understanding, actions, influences on attitudes and good relationships influence the relationship between members, members and leaders in a better direction [21]. Soft skills (such as communication, coordination, etc) can support conflict resolution skills in the software development team [22]. Effective conflict management can help progress in increasing trust and professional relations, which can also increase productivity [23]. In addition, team members can also compete in conflict (in a good direction); when members reach their goals, others will see the conflict as a win-lose struggle; if others win, they lose [24]. Implementation of gamification [1] plays an important role in matters of conflict like this. Shared Leadership is a distributed leadership style that comes from team members [27]. When the nature of leadership is shared, the educator or leader and other members may adopt leadership roles at different times, the exchange of supportive methods / practices occurs, and capabilities are likely to increase [25]. In the case of information system development projects, Shared leadership can partially mediate / mediate the negative impact of value diversification / diversity of values on system quality [26]. Backup behavior can bring additional resources (such as time, manpower) to team members when work / task exceeds the capacity of the deadline to be completed [28]. Backup behavior is one of the core components of teamwork research. Where these components require a mechanism to become one; shared mental models, mutual trust and closed-loop communication [29].

5. Knowledge competence

Situation awareness is the perception of environmental elements in the time and space, understanding of their meaning and projections of their near future status [30]. From the team's perspective, situation awareness can be interpreted as the extent to which each team member has the situation awareness needed for their responsibilities [31]. In the case of a software development team, this can be enhanced through self-monitoring [32]. Transactive Memory System allows members to understand other members' specialties. The aim is to create confidence in the knowledge of the team and to coordinate and integrate team knowledge smoothly [33]. Therefore, this can increase the overall level of team coordination. Many industries emphasize the need for individual employees to work as coordinated units. Therefore, team members must create a scheme for the work they are doing, this is the meaning of Shared Mental Models [35]. Shared Mental Models are crucial to coordinating actions so that they are effective. As a software development team that works together effectively, teams must have a clear understanding of the work processes, tasks, and other team capabilities [34].

6. Conclusions and future works

Team collaboration requires aspects / components of the collaboration itself. These components are things that can affect the product overall software development team activity. Things that are both human factors and social relations can influence how the software development team moves / functions. In the future, other aspects besides collaboration need to be identified in depth so that the team's influence can be explained further.

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