

Collaborative Learning: Leaders' Selection Method and Team Performance

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Abstract—Collaborative learning is a common approach in educational settings, but also in the industry, as it is an effective way to address complex tasks. The identification of the specific factors that boost team performance might have a significant impact on the job market. Group leadership has been shown to impact team performance, but the dimensions in which this happens are still unclear. To evaluate if the selection method of the group leader is related to the team performance, a study was conducted with a sample of 99 bachelor students divided by 17 teams collaborating in an 8-week long class project. The sub-scale Perceived Team Effectiveness (PTE) of the instrument Team Collaborator Evaluator (TCE) measured perceived team effectiveness. Group performance was also assessed by the final project grade given by the instructors. The perception of team effectiveness was higher in the groups which have unanimously selected their leader. These same individuals also got higher grades on their team project. Practical implications for the selection of group leaders are discussed.

Keywords—collaborative learning, learning team, leadership, selection method, team performance

I. INTRODUCTION

In educational settings, it is frequent to find students working in teams and learning from others [1]. Collaborative learning gives them the opportunity to experience cooperation, group decision making, team leadership, and team communication [2, 3, 4]. Those competences are highly sought-after in the job market [1]. Identifying the factors that boost team performance would improve team members' satisfaction levels [1, 5], but it also has the potential to affect job placement, human resources selection, training, and retention [1]. Group leaders have a relevant role, but there is a lack of a clear theory connecting specific leadership dimensions to the mediators that shape and enhance performance outcomes [6, 7].

Leadership is leading an individual, group or organization to achieve specific goals [6]. It usually includes tasks like organizing, directing, coordinating, and motivating [8]. Leadership, like other social categories, has been shown to be dynamic, changing with the specific context in which leadership is rated [6, 9]. Rater's bias makes it difficult to assess leadership effectiveness and to accurately interpret the effect of leadership on relevant outcomes [6]. Social-cognitive theory demonstrates that followers have implicit theories over the ideal leader behavior and central features [6]. Therefore, perceivers may automatically categorize leaders in terms of their implicit theories and then use the underlying structure of these categories to classify their leader [9]. Previous studies report that the better the fit between followers' perceptions of their actual leader's profile and their implicit leadership theories, the better is the quality of the member-leader exchange [10].

Team leadership is seen as the “ability to influence a group toward the achievement of a vision or set of goals” [8, p. 316]. Team leadership influences individual learning, team performance, and the perception of team collaboration [4, 5, 11, 12]. Leaders can be formally appointed or emerge from the group [8]. It has been shown that leadership is usually reserved for the most skilled and committed team player, accepted by all members [2, 4, 13].

Some authors consider that team leadership is not critical for effectiveness in collaborative learning teams, except when critical moments appear [2]. Others argue that the role of the leader is vital because they guide, monitor and frame group activities [4]. The group leader can help in the development of a shared understanding in a team, which is essential to set team goals, decide on strategies, allocate subtasks, monitor team processes adequately, and communicate effectively [14, 15].

Learning teams usually have a short lifecycle and can be defined as democratic, as a consequence of equally distributed expertise [2]. Consequently, leadership in learning teams will likely be a functional leadership, as the leaders' responsibilities include ensuring a clear team direction, providing an enabling structure and context, coaching, and assuring adequate access to resources [16]. Functional leadership influences team performance through its effects on team cognitive, motivational, and affective processes and emergent states [17, 18]. Leadership has been shown to have a significant role in positively influence team member communication processes, team cohesion, and the degree of similarity and accuracy of team member mental models [2, 8, 19], which consequently influences team performance [6]. The leadership climate has been reported as positively related to team empowerment [20]. Team members who have better relationships with their leader are more likely to perceive the climate developed by their leader as positive [20]. Consequently, it is likely that leaders who do a better job empowering the team as a whole also do a better job empowering individual team members, and vice versa [20].

Learning teams are considered to be effective to the degree that learners achieve learning goals, as their superior aim is to learn while working on a problem, a project and/or task [2]. Nevertheless, especially in *ad-hoc* learning teams, there are reports of initially ineffectiveness because team members seem to lack the necessary information about each other's competencies, what results in lack of mutual trust [2]. The social-constructivist paradigm, consistently used by collaborative learning researchers, postulates that collaborative learners should be implicated in the processes of knowledge construction in order to gain profound learning, understanding, and conceptual change, through discussion, debate, and argumentation [6].

We hypothesize that learning teams who unanimously choose the team leader report higher collaboration levels and achieve higher grades when compare to teams that use other selection methods.

II. METHOD

Subjects were 112 bachelor students that worked an 8-week long class project, in two mandatory courses, from two different majors of a University in Southern Europe. The study involved 59 students from the Computer Science major (CS) and 53 from the Psychology major (Psy).

A total of 99 students (response rate of 88%) agreed to take part in the study and fill in the questionnaires, whereas 46% were female and 54% were males, with the mean age of 21 years old. The sample had a similar number of students from both majors (49% CS and 51% Psy).

At the beginning of the semester (week 2), participants filled a paper-and-pencil survey that included sociodemographics questions (gender, age, major) and a question about the leaders' selection method. Closer to the end of the semester (week 7), participants filled another paper-and-pencil survey to self-report perceived team effectiveness. As part of the team performance assessment, instructors grade students' projects, at the end of the semester (week 8).

In the question about the group leader selection method, the options given to the responders were: *Self-volunteer*, *Elected by the majority of team members*, *Elected by all team members*, *Random choice*, or *Other methods*. In this last case, it was asked the responders to specify which approach was used and students pointed out as *Other method*: "the first in alphabetic order". Two teams reported that their leader self-volunteered, seven teams reported that the leader was elected by the majority of team members, five teams managed to unanimous choose the leader, in two groups it was a random pick, and the last team used a different approach ("the first in alphabetic order").

Team performance was assessed by the sub-scale Perceived Team Effectiveness (PTE; 3 items, $\alpha=.89$) of the Team Collaborator Evaluator (TCE) [2] and by the final project grade given by the instructors. PTE includes questions like "The extent to which you are satisfied about the quality of collaboration within your team.", that were rated using a 1 to 10 scale, from 1=*Low/Almost Never True* to 10=*High/Almost Always True*. The final project grade given by the instructors was assessed on a 20-point scale, from 1=*does do not comply with any objective* to 20=*objectives achieved entirely*.

In week 1, students freely chose their teammates with the condition to have at least four elements in each group. It resulted in a total of 17 teams, with a team size that ranged from 4 to 8 members ($M=5.79$, $SD=.89$). Subjects received their team project assignment from the instructor also in week 1. In week 2, instructors asked groups to appoint a team leader. The designation of the team leader took place in week 2, so as to students get the opportunity to work together and to better know their teammates, team dynamics, and team work methods. Subjects did not know in advance that it would be asked to pick a team leader. Still in week 2, participants were asked to fill out a questionnaire with sociodemographic questions and to disclose the method used to appoint the leader. In week 7, participants filled out

another paper-and-pencil survey with the sub-scale PTE. In week 8, instructors grade students' projects.

III. RESULTS

A two-ways between-groups analysis of variance was conducted to explore the connection between the method used to select the team leader and, both PTE and the final project grade, accounting for the major (CS and Psy).

Linking the leaders' selection method to the PTE was uncovered a main effect [$F(4,79)=6.17$, $p<.01$], with an effect size ($\eta^2=.24$). *Post-hoc comparisons* using the *Tukey HSD test* showed that the mean score for the leaders' selection method "Elected by all team members" ($M=8.77$, $SD=1.09$) was superior (Mean difference=1.04, $SD=0.24$, $p<.01$) to the selection method "Elected by the majority of team members" ($M=7.73$, $SD=1.25$). The relationship between PTE and the remaining leaders' selection methods, namely Self-volunteer ($M=7.73$, $SD=0.76$), Random choice ($M=7.42$, $SD=1.75$), and Other methods ($M=6.83$, $SD=0.71$), did not meet the 95% confidence threshold.

A correlation between the leaders' selection method and the final project grade was established and revealed an interaction effect [$F(3,79)=6.1$, $p<.01$] with an effect size ($\eta^2=.19$). Still linking these two variables was disclosed a main effect [$F(4,79)=4.01$, $p<.01$], with effect size ($\eta^2=.17$). *Post-hoc comparisons* using the *Tukey HSD test* indicated that the mean score for the selection method "Elected by all team members" ($M=17.86$, $SD=1.48$) was superior (Mean difference=1.19, $SD=0.35$, $p<.01$) to the selection method "Elected by the majority of team members" ($M=16.67$, $SD=1.93$). The liaisons between the final project grade and the selection methods Self-volunteer ($M=16.67$, $SD=1.93$), Random choice ($M=17.25$, $SD=0.50$), and Other methods ($M=17.50$, $SD=0.71$) were statistically non-significant.

IV. DISCUSSION

Learning teams are conveyed to establish a functional leadership, where the leader will likely ensure that the team has a clear direction, provide an enabling structure and context, coach the team members, and assure adequate access to resources [16]. Such leadership is reported to influence team performance through its effects on team cognitive, motivational, and affective processes and emergent states [17, 18].

Our study shows that teams which leaders were unanimously elected perceived their team effectiveness on a higher level, but also achieved higher project grades. It confirm claims that leadership is usually reserved for the most skilled and committed team player, accepted by all team members [2, 5, 13]. Whereas, group leaders that were not accepted by all team members (i.e., leaders elected by the majority of team members, self-volunteered, randomly chosen, and other selection methods) might have experienced more leadership challenges, higher team conflict levels, and less mutual trust. These factors, as reported in the literature [2], can be translated into lower team performance. Furthermore, leaders that were unanimously elected might be more prone to establish better communication patterns, democratically led the team, and reinforce cohesion which has a positive effect on team performance [2, 6, 8, 19].

In our study, teams with higher performance clearly agree on the individual that was elected as leader. This fact might have created a positive ambiance that made the team members easily respect the leader's authority, conform with his/her decisions, commit to the success of group discussions, and just direct their focus on the task. The favorable leadership climate might have conducted the team to a better-perceived team effectiveness and, consequently, better team performance. It confirms previous findings that positively correlate leadership climate to team empowerment [20] and the good relationship members-leader to positive perceptions of the leadership climate [20]. The unanimous election of the leader might mean that team members recognized right from the start, within their team, an individual that complies with their implicit theories over leaders' behavior and central features, making it easier for the leader to fulfill followers' expectations and act according to his/her authority.

The positive leadership climate that might have been created within the teams that unanimously have chosen their leaders may have facilitated the development of a shared understanding. According to the literature, the shared understanding is essential to support the process of setting team goals, deciding on strategies, allocating subtasks, adequately monitoring team processes, and communicating effectively [14, 15]. All these factors ease team dynamics, individual performance, and team performance.

Teams with leaders unanimously elected reported higher perceived team effectiveness. Positive perception over team performance have shown to increase all team members' satisfaction levels [1, 5] which, in returned, might have enhanced team effort, commitment and, finally, boost performance. Our study seems to confirm that team leadership may influence team performance and, consequently, individual learning and the perception of team effectiveness, corroborating previous findings [4, 5, 11, 12].

Educators working with collaborative learning teams should consider the outcome of our study and encourage teams to select their leaders' unanimously, as it might augment team members satisfaction, perceived team effectiveness, and team performance. Companies and other organizational units can also learn from our findings and support their teams in the process to unanimously appoint group leaders, as it may guarantee them higher individual and team achievements.

V. CONCLUSION

Group leadership is one of the features that influences team performance. Though, the dimensions in which this takes place are vague. Identifying the factors that boost team performance should impact human resources management policies, but also other policies and selection methods (e.g., policies for college admission). In our study, the method used to select the group leader showed to predicted higher perceived team effectiveness and higher team performance.

Data show that, when comparing the selection methods of the group leaders, the approach that guarantees higher performances is through a unanimous decision of the team members. This selection method appears to be related to a higher perception of team effectiveness and higher performance evaluation.

The select method elected by the majority of the team members proved to originate inferior team scores when compared to teams with leaders that have been unanimously chosen. The results from the teams were the leader was a self-volunteer, picked randomly, or selected by other methods showed not to meet the expected statistical significance of 95%.

Team members should be encouraged to select their leader unanimously, as it could predict higher satisfaction and group performance.

Authors identify some limitations on the work like the small size of the sample (99 students that were divided by 17 teams), from one unique university. When data was collected, the instrument used to assess the perceived team effectiveness (PTE) was not validated to the Portuguese student population. Despite this fact, it has revealed high validity. Results should be read, interpreted, and generalized taking into consideration these constraints.

This study was a first approach to explore the relationship between group leaders' selection methods and team performance. Further research should further investigate this connection, controlling for other factors as leadership styles, leaders' individual characteristics, and team dynamics. Students' academic records can be considered, as they should aid in the measure of cognitive abilities and past performances.

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