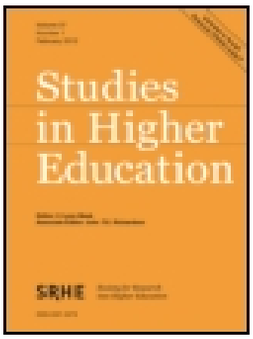

Studies in Higher Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cshe20

The formation of self-management teams in higher education institutions. Satisfaction and effectiveness

Carlos Alberto Perez, Marta F. Arroyabe, Francisco Ubierna, Carlos F.A. Arranz & Juan Carlos Fernandez de Arroyabe

To cite this article: Carlos Alberto Perez, Marta F. Arroyabe, Francisco Ubierna, Carlos F.A. Arranz & Juan Carlos Fernandez de Arroyabe (2023): The formation of self-management teams in higher education institutions. Satisfaction and effectiveness, Studies in Higher Education, DOI: 10.1080/03075079.2023.2172565

To link to this article: https://doi.org/10.1080/03075079.2023.2172565

Published online: 31 Jan 2023.

STUDIES IN HIGHER EDUCATION
https://doi.org/10.1080/03075079.2023.2172565

The formation of self-management teams in higher education institutions. Satisfaction and effectiveness

Carlos Alberto Perez [a], Marta F. Arroyabe [b], Francisco Ubierna[c], Carlos F.A. Arranz [d] and Juan Carlos Fernandez de Arroyabe [b]

[a]ESIC Business and Marketing School, ESIC University, Madrid, Spain; [b]Essex Business School, University of Essex, Essex, UK; [c]CIS University Endicott International, Madrid, Spain; [d]Greenwich Business School, University of Greenwich, Greenwich, UK

ABSTRACT

This paper explores *how self-management work groups are formed in higher education institutions and how this affects the effectiveness of the teams*. For this, we investigated the experiences of 560 students who were members of self-management learning teams, using factorial analysis, cluster analysis and ordinal logit regression. We focus on self-management teams, where students form work groups autonomously, and making decisions with whom to collaborate. Thus, students influence the composition of their groups, which will condition the internal dynamic of teams, and its subsequent effect on the effectiveness of the groups. Our paper contributes to the literature on student-centred perspectives highlighting how the formation of self-management teams has an impact on their satisfaction and effectiveness. Moreover, we identify four criteria (*competencies, academic level, social relationships, and ad hoc*) during the formation of self-management teams that have a differential impact on the effectiveness and potential conflict in the team. Additionally, our results reveal three groups of students, regarding the formation criteria of self-management teams: a first group where the academic level criteria prevails, a second group based on competencies, and finally, a group that combines social relationships and ad hoc criteria. Moreover, we find that self-management teams based on the competencies and academic level criteria have a higher level of effectiveness and satisfaction than the formation of self-management teams based on social relations and ad hoc decisions. Moreover, the results show that the exclusive use of academic level as a formation criteria is potentially a source of conflict in the self-management team.

ARTICLE HISTORY
Received 20 July 2022
Accepted 20 January 2023

KEYWORDS
Self-management teams; higher education institutions; formation; satisfaction; effectiveness

1. Introduction

Team-based learning in higher education institutions (HEIs) is gaining significant impulse, derived, on the one hand, from the importance of facilitating the academic success of students (Bravo, Catalán, and Pina 2019; Kalfa and Taksa 2015), and on the other hand, from the growing demand by employers for graduates with collaborative skills (Dunbar et al. 2018; Bravo, Catalán, and Pina 2019). Previous research has shown that team learning has facilitated improvements in students' academic grades, knowledge acquisition, and the development of group work skills (Entwistle 2009; Senior et al. 2012; Lopes et al. 2022; Anghel 2022). Furthermore, Bravo, Catalán, and Pina (2019)

CONTACT Carlos Alberto Perez carlosalberto.perez@esic.university ESIC Business and Marketing School, ESIC University, Cam. Valdenigriales, S/N, 28223 Pozuelo de Alarcon, Madrid, Spain

and Kalfa and Taksa (2015) point out that teamwork has become a key element in business management, implying that HEIs must include teamwork in the curriculum of university degrees to improve their employability. Dunbar et al. (2018) conclude that with the growing emphasis on group work in the academic environment, it is necessary to explore the development of these skills in higher education, and there is a need to investigate the factors that influence team effectiveness.

In this context, in HEIs, self-management teams can be highlighted as a learning mechanism (self-management teams), where students can decide and organize themselves to achieve team performance (Lizzio and Wilson 2006). Thus, the educational priority is not only to help students acquire team competencies but also to help them develop the ability to become effective collaborators in self-management work teams. This emphasis on self-regulation is reinforced by recent research on the factors that influence the satisfaction and effectiveness of student learning groups (Gamlath et al. 2022; Dunbar et al. 2018; Söderhjelm et al. 2018; Senior et al. 2012; Lizzio and Wilson 2006). Previous research has analyzed factors such as the cohesion of the team and its effectiveness, emotional intelligence in the performance of team behaviours (Lizzio and Wilson 2006; Druskat and Wolff 2001), the task-load and task-complexity and their effect on the effectiveness of the teams (Bravo, Catalán, and Pina 2019; Söderhjelm et al. 2018), leadership and efficacy in the teams (Vogel 2022; Söderhjelm et al. 2018; Dunbar et al. 2018) and the students' choices and participation in the teams (Lizzio and Wilson 2006), among others.

One of the biggest challenges that self-management teams have faced is how to select and organize the groups (Lizzio and Wilson 2006). Thus, understanding the creation and functioning of self-management teams is key to understanding their success or failure (Bravo, Catalán, and Pina 2019; Söderhjelm et al. 2018; Senior et al. 2012; Lizzio and Wilson 2006). Previous literature has provided some insights in this regard. Lizzio and Wilson (2006) already highlighted the familiarity of group members as an initial element of cohesion for students to form teams since it can have a positive impact on performance. More recently, Bravo, Catalán, and Pina (2019) find that input factors should affect group interaction processes, which in turn will affect group efficacy. Åkerlund et al. (2021) point out that the members of a group must establish and build roles and relationships between the members of the team, where the formation of the group is a key element. However, there is still a lack of understanding in the selection and organization of the workgroups. In fact, Lizzio and Wilson (2006) highlight the importance of understanding and exploring the criteria on which students should base such choices.

This paper addresses this gap by exploring *how these work groups are formed and how this affects the effectiveness of self-teams*. We focus on self-managing teams, in which under a self-regulation perspective students form work groups autonomously, making decisions with whom to collaborate. Students influence the composition of their groups, which will condition the internal dynamic of teams, and its subsequent effect on the effectiveness of the groups (Lizzio and Wilson 2006; Jobidon et al. 2017). Despite the fact that self-management teams are a common mechanism used in HEIs for both learning and student assessment, few studies have addressed how they are constituted. Moreover, unlike previous works, both in the field of HEIs (see for example, Bravo, Catalán, and Pina 2019) and companies (see for example, Guenter et al. 2016), which have fundamentally studied factors ex-post to the creation of the group, such as cohesion and motivation, we focus on h ow the criteria for the formation of self-management teams affects the satisfaction and effectiveness of the self-management teams. Therefore, the paper extends previous literature on the self-management teams, firstly, by analyzing what criteria for self-management team formation are used by students in the HEIs, and secondly by analyzing how this criteria influence the satisfaction and effectiveness of self-management teams.

2. Literature review and research questions

2.1 Conceptual framework: self-management team in HEI

Research on teaching approaches in higher education suggests a distinction between teacher-centred and student-centred perspectives (Kember 2009; Senior et al. 2012). More specifically,

HEIs adopt the student-centred perspective, with the aim of creating learning environments based on students working collaboratively on learning tasks, facilitating understanding and conceptual development (Senior et al. 2012). Thus, teamwork has become a common form of learning in HEIs (Senior et al. 2012), providing the student with a deep approach to learning, the development of critical thinking skills, and interpersonal communication skills (Senior et al. 2012; Lizzio and Wilson 2006). In this paper, we follow the conceptualization of Judge and Robbins (2017) of teamwork as the set of people who interact and are interdependent, and who have come together to achieve common goals.

We focus on the self-management team, which are not only learning mechanisms but also the basis of the assessment system (Dunbar et al. 2018; Kember et al. 2009). This type of teamwork differs from traditional teams, in terms of creation, assignment of tasks, management, and monitoring, and has self-management as their main characteristic (Balkema and Molleman 1999; Lizzio and Wilson 2006). Jobidon et al. (2017, pages 3 and 4) point out that *self-organizing teams represent an adaptive, flattened, rapidly reconfigurable, and distributed organizational structure, assuming to allow increased empowerment, shared awareness and understanding, and freely flowing information*. According to Highsmith (2009), self-management teams are made up of people who are capable of managing their work autonomously and performing these tasks collaboratively.

In this context, Martínez-González and Mejía-López (2013) consider self-management teams as a small group of people (2–15 people), who have skills and abilities that complement each other and that constitute a consistent working operational unit. These authors note that hierarchies are not identifiable characteristics of self-management teams since these type of teams work with great autonomy and with open and fluid communication and high levels of responsibility for the results obtained. Moreover, the members of the self-management teams influence the teamwork so that the members of the group must have complementary knowledge, skills and competencies to efficiently and effectively achieve the objectives of the teamwork.

Self-management teams have been used both by HEIs and businesses, but with certain differences. In the business environment, self-management teams arise as a direct consequence of the flattening of the company structure, the decrease in supervisory personnel and the computerization of companies through which organizations have sought to provide flexible, fast and adaptive responses to the demands of higher levels of productivity, competitiveness and technological updating (Siangchokyoo and Klinger 2022). In the HEIs institutions, the self-management teams arise with the double objective of facilitating the student's learning, and the insertion of the graduate in the labour market. More particular, it has been empirically confirmed that teamwork has facilitated improvements in students' academic qualifications (Michaelsen 2013), knowledge acquisition (Currey et al. 2015) and skills development (Lau et al. 2014; Lopes et al. 2022). Also, as teamwork has become a key factor in business management (Lau et al. 2014), the acquisition of teamwork competencies and skills has been integrated into the curriculum as a learning and professional development method (Napier and Johnson 2007; Chiriac 2008).

A peculiarity of teams in the business environment is that the members of a teamwork must work both autonomously and aligned (Romero 2000). That is, they must operate with a certain degree of autonomy, but at the same time they must remain aligned with the objectives of the organization. However, in the case of HEIs, self-management teams operate under independent circumstances. In this sense, the educational priority is not only to help students in their learning process, but also to acquire group skills, developing competencies to become effective collaborators in teamwork (Bravo, Catalán, and Pina 2019). Therefore, this gives rise to differences in both literatures; while the business literature is emphasizing team cohesion and management, the HEI literature is more diverse, emphasizing both ex-post factors, such as teamwork cohesion and working, and ex ante factors, the creation of self-management teams. In fact, Söderhjelm et al. (2018) pointed out that to become a team, the members of a group must first establish, and build roles and relationships, before being able to fully concentrate on the tasks at hand, which is expected to have an impact on the efficiency of the team.

2.2 Research questions: formation of self-management teams and team performance

As we have pointed out, the main characteristic of self-management teams is that students in HEIs have the ability to form the teams. In this context, the criteria for choosing team-mates should be an important question, derived from various criteria that can be found in the literature for choosing team members.

The first group of works indicate that the choice of the members of the theme is *contingent*. Balkema and Molleman (1999) argued that the level of self-management teams should be contingent on the organization's tasks and environment. Stempfle et al. (2001) and Duncan and Jobidon (2008) specified the importance of establishing a relationship between roles and tasks and the skills and preferences of group members. Therefore, the structure of the team must be adapted to the demands and limitations of thei r environments and tasks (Lizzio and Wilson 2006; Bravo, Catalán, and Pina 2019). These works emphasize that the formation of teams must identify the tasks to be carried out and the availability of team members to carry out these tasks based on their abilities and preferences.

A second group of research points out that teams are formed based on the competencies of their members. Sánchez (2006) defines competencies as a set of knowledge, skills and attitudes that affect performance. This criterion has been widely used to form groups in companies, emphasizing team competencies, with the aim of thinking, feeling and acting as a unit (Sánchez 2006; Jobidon et al. 2017). In fact, Jobidon et al. (2017) suggest that without some prerequisite knowledge, the team will not be effective, and this will likely have a negative impact on team performance. Sánchez (2006) classifies the competencies required for teamwork as professional or technical, social and psychological. The first group of competencies, professional competencies, constitute an essential to developing the task. The second group of competencies provide the conditions for cooperative behaviour, flexibility, communication skills and entrepreneurship, among others. The third one is closely related to mental health, stability or emotional balance, which is positively related to the effectiveness of the team. Members with greater emotional stability contribute to a relaxed atmosphere and facilitate cooperation. Therefore, according to this current, the work teams will be formed based on the competencies of the members.

A final group of criteria for team formation is based on the theory of social capital, for which interpersonal trust and trustworthiness, overlapping identities, and feelings of closeness or interpersonal solidarity are key constructs (Granovetter 1992; Nahapiet and Ghoshal 1998; Subramaniam and Youndt 2005; Mitsuhashi and Min 2016; Mayfield and Valenti 2022; Sjølie, Espenes, and Buø 2022). This approach establishes that greater interaction between individuals creates social capital, which facilitates the exchange of information, creating an adequate feeling and trust between people that facilitate joint work. Sánchez (2006) highlighted the synergy created by social relations between members of the group, where each subject has a series of links that describe an internal structure with an important implicit value. Mantilla and García (2016) highlight the relationship between behaviours of team members, which promote group cohesion in self-management teamwork. For their part, Nahapiet and Ghoshal (1998) pointed to experience as a factor of cohesion where the history of interactions have created personal relations. This last point is crucial in self-management teams, where prior experience is a motivator for team formation. Therefore, social relations not only facilitate group work but are also a criterion for the formation of self-management teams. Individuals will choose to work with other individuals where previous experiences and ease of work are the unifying elements.

Therefore, our first research question explores the criteria that HEI students employ when forming a self-management team.

RQ1: What criteria do HEI students employ when forming a self-management team?

Our research also explores the relationship between team formation and its performance. It is important to consider, from the HEIs point of view, that self-management teams are an assessment

mechanism, and therefore, the effectiveness and satisfaction of teamwork will have an impact on the performance of students (see for example, Bravo, Catalán, and Pina 2019).

First, the implementation of self-management teams in HEI means that students are involved in a series of choices about how to form, participate and maintain their group. Second, in terms of team performance, the members of a self-management team must operate with a certain degree of autonomy, but at the same time, they must remain aligned with the team's objectives. Sánchez (2006) points out that in every team two fundamental dimensions affect performance, the task to be carried out and the social factors that influence the working of the team. In this sense, one of the greatest challenges posed by team dynamics consists in forcing individuals to find a point of balance between their commitment to the team's objective and their involvement in their own individual goals (Bolduc, Knox, and Ristroph 2022; Lizzio and Wilson 2006; Sánchez 2006).

In this context, it is expected that the criteria followed for the formation of the group will have an impact on the subsequent performance of the team. Thus, students can choose the members of the group, and it is expected that the criteria used for the formation of the group should have a significant impact on the performance of the team. On the one hand, Sánchez (2006) and Somech, Desivilya, and Lidogoster (2009) highlighted group competencies, where when forming a team, the members need possess a correct mix of knowledge, abilities and complementary skills, which allow them to efficiently and effectively achieve the proposed goal. On the other hand, Lizzio and Wilson (2006) point out that the formation of the group will determine the interactions, which are cognitive processes that are more critically linked to the effectiveness of the team than knowledge itself. In this line, Jobidon et al. (2017), pointed out that team members can have an adequate distribution of knowledge, but if team members do not interact or coordinate effectively, it can lead to team failure. Finally, students' choices regarding the social norms for their groups may also be related to overall efficacy. Thus, Arciniega et al. (2008) point out that the similarity of the characteristics of the members will be the strength of the team, helping the interaction between them to be motivating.

Therefore, the second research question raises the relationship between the criteria for team formation and its influence on performance.

RQ2: How do the various criteria for forming a self-management team influence the performance of the team?

3. Empirical study

To empirically explore the research questions, a survey was conducted among students at two Spanish business universities, in line with previous research that highlights that teamwork is a common practice in this type of universities (Orlitzky and Benjamin 2003; Lizzio and Wilson 2006; Standifer et al. 2015; Bravo, Catalán, and Pina 2019). In fact, Bravo, Catalán, and Pina (2019) point out that teamwork is an important learning and assessment tool in business and MBA courses, given the need to manage collaborative projects in their professional future, which makes teamwork a key skill not only for the learning but also for employers (Azevedo et al. 2012; Arranz et al. 2017).

Prior to the survey, we tested the questionnaire with 10 experts from HEI to ensure its adequacy, both in the content of the questions and structure. The survey was distributed from January to December 2018 in three waves, and includes 560 participants in the study. To avoid possible sample bias, the existence of significant differences in the distribution of the sample is analyzed, observing that there have been no significant differences between the three waves.

The sample includes first, second and third-year students of the Business Administration and Management, Advertising and Public Relations and Digital Business bachelor degrees. Regarding the sample profile, of the total number of students, 59% were male and 40% female. The age that is repeated the most is 20 years, being 85% of the total respondents between 20 and 22 years old. All the students in the sample were working in self-management teams, which mostly consisted of five to six people (77%), in which students freely choose their teammates and manage the team

autonomously. The only restriction imposed on the team formation by the teacher was not to exceed the maximum number of students allowed per group.

The objectives of the self-management team was to carry out a business case, which was part of the academic year assessment system. The students must search the information and develop a business case, applying tools learned in the corresponding academic module. This assessment lasted approximately six to ten weeks. In all the bachelor programmes, the students had specific training in management and personal competencies and skills. More particular, in the students' curricula included personal skills (for example, presentations or effective time management), management skills (for example, management teams), and interpersonal skills (for example, teamwork and solving conflicts). Moreover, the faculty members are available to provide with guidance to students during the development of teamwork.

3.1. Measures

The first variable of our research model captures *the criteria for forming the team*. To do this and in line with the literature, we pose a multi-item question, including competency criteria, social norms and contingents approach (Sánchez 2006; Jobidon et al. 2017; Duncan and Jobidon 2008; Lizzio and Wilson 2006; Subramaniam and Youndt 2005; Mitsuhashi and Min 2016). The question posed is: *could you say to what extent the following criteria were used to select team members?* (see Table 1).

The second measure was the performance of the team. To do this, following Napier and Johnson (2007), and Bravo, Catalán, and Pina (2019) we measure performance in terms of effectiveness. Thus, teamwork effectiveness is measured in terms of perceived learning, satisfaction with teamwork, and expected quality, being a retrospective evaluation of the learning experience (Bravo, Catalán, and Pina 2019). For this we have posed two questions. First, we measure the *degree of satisfaction* with the functioning of the team, asking the following question; *at what level were you satisfied with the work of the team in which you participated?*. Second, we measure the performance of the group's work as a whole in terms of *effectiveness*. For this we have built a multi-item question based on previous literature. That is, in the first place, we follow the work of Hackman (1987), who stated that the effectiveness of teams can be measured with the results of the team in terms of satisfaction, the desire of the team members to stay together, and also the achievement and satisfaction of the personal needs of the team members. Moreover, following the literature on the effectiveness of teamwork, our measure also includes team cohesiveness and collaborative behaviour and satisfaction with teamwork (Bravo, Catalán, and Pina 2019). For this we ask, *what opinion do you have of the performance of the team's work once the work is finished?* (see Table 2).

4. Analysis and results

Regarding the first research question (RQ1), on the criteria for forming work groups, the results of the factorial analysis show four factors (KMO: .808, sig.: .000) which explain approximately 60% of the variance (59%) (Table 1). The first factor brings together six variables that relate to the criteria for group formation that have to do with the competencies required for its operation (*competencies*). The second factor includes three variables that specify the student's academic level as the selection criteria (*academic level*). The third factor, including four variables, refers to the criteria of relationship, experience and friendship (*social relationship*). Finally, another factor that contains two variables refers to the formation of the group following ad hoc criteria (*ad hoc*).

Regarding the second research question (RQ2), how the criteria for forming the self-management team affect its performance, we have analyzed both the satisfaction obtained and the effectiveness. First, regarding satisfaction, Table 2 shows the regression analysis, relating the group formation criteria with the level of student satisfaction. Model 5 shows that the competency criteria ($\beta = .434$; p

Table 1. Factor analysis: criteria for the formation of the self-management team.

Factor analysis[a]	Cronbach Alpha	factor's 1	2	3	4
• Very creative people.	.692	.728			
• Very understandable people who knew how to understand one without having to make an extensive explanation.		.631		.	
• Very rational and logical people		.609			
• People with knowledge different from mine and who complemented me.		.579			
• Being very flexible people.		.556			
• People who had a great sense of knowing how to be and how to behave.		.543			
• The high level of intelligence.	.704		.753		
• People who already had very good grades in previous evaluations.			.751		
• Be very hardworking and hardworking people.			.702		
• Because they were the people with whom I had the best relationships.	.679			.808	
• He was one of the first people with whom I worked as a team.				.749	
• Very funny people with a great sense of humour				.614	
• People with principles and values very similar to mine				.534	
• Because several colleagues were without a group and for those we decided to get together.	.761				.887
• Because there were colleagues who did not have a group and that is why it seemed to me that it was the most correct thing to select them for my team.					.886

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 7 iterations.
[a]All extraction variables >0.6 (Communality table).

< .001) and academic level (β = .337; $p < .001$) of the students have a positive impact on satisfaction in the functioning of the workgroup. However, relationship criteria such as ad hoc do not have a significant impact on the degree of satisfaction.

Table 3 displays the results of the factorial analysis of the measure of effectiveness. The factorial analysis shows a high level of robustness (KMO: .883; sig.: .000), explaining 60% of the variance. The first factor includes seven variables, which refers to the *effectiveness* of carrying out group work. The second factor, including two variables, relates to the sources of *conflict* in the group, such as

Table 2. Regression analysis (RQ2).

	Satisfaction				
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Competencies	.405***				.434***
Academic Level		.291***			.337***
Social Relationship			.116		.099
Ad hoc				-.063	-.092
-2 Log-Likelihood	1306.519	1314.997	1323.519	1324.717	1291.284
Chi-Square	18.679	10.201	1.679	481	33.914
Sig.	.000	.001	.195	.488	.000
Cox and Snell	.043	.024	.004	.001	.077
Nagelkerke	.045	.025	.004	.001	.080
Mcfadden	.014	.008	.001	.000	.026

*$p < 0.05$, **$p < 0.01$, *** $p < 0.001$.

prioritizing their personal goals over those of the group, or a lack of motivation and involvement in the group.

Table 4 shows the regression analysis results on the effectiveness of the working groups based on the criteria used for the formation of these groups. Model 5 shows that the competency criteria (β = .661; $p < .001$), academic level (β = .370; $p < .001$), and social relationship criteria (β = .1980; $p < .05$) of the students have a positive impact on effectiveness in the functioning of the workgroup. However, ad hoc criteria does not have a significant impact on the degree of effectiveness.

Complementary, and with the objective of deepening the analysis of the degree of satisfaction, we have carried out a second analysis, using the K-mean cluster, analyzing how HEI students use the team criteria, and how it affects the degree of satisfaction. From the analysis we have obtained three

Table 3. Factor analysis: effectiveness and conflict in the self-management team.

		Factor's	
Factor analysis[a]	Cronbach Alpha	1	2
• Team members did their tasks with quality.	.906	.874	
• The team members fulfilled the assigned tasks.		.801	
• The team was productive in terms of use of time.		.797	
• I learned a lot from the contributions of the team members.		.789	
• Team members actively helped other team members.		.789	
• The team had common objectives and they were maintained throughout the work.		.779	
• Agreeing the meetings was relatively easy.		.723	
• Some team members tried to prioritize their goals above those of the team.	.610		.818
• Some members of the team did not defend their opinions with the necessary force.			.799

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 3 iterations.

[a]All extraction variables >0.6 (Communality table).

Table 4. Regression analysis (RQ2).

	Effectiveness				
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Competencies	.614***				.661***
Academic Level		.291***			.370***
Social Relationship			,239**		.198*
Ad hoc				.040	.025
-2 Log-Likelihood	5036.497	5072.379	5074.973	5082.240	5013.455
Chi-Square	45.948	10.066.002	7.472	.206	68.990
Sig.	.000		.006	.650	.000
Cox and Snell	.103	.024	.018	.000	.151
Nagelkerke	.103	.024	.018	.000	.151
Mcfadden	.009	.002	.001	.000	.014

*$p < 0.05$, **$p < 0.01$, *** $p < 0.001$.

groups of students (clusters): the first was formed by 141, the second was formed by 195 students, and the last group contained 109 students. Figure 1 shows the differences between the three clusters of students depending on the criteria for forming the workgroups. While Cluster 1 uses the competencies of the members as the fundamental criterion for team formation, Cluster 2 uses the academic level of the students as the main criterion, and finally, Cluster 3 is based on social relations to create the teams.

Figure 2 shows the results of the regression analysis indicating which cluster has the greatest impact on performance satisfaction. Thus, using Cluster 3 as a reference variable, we see that both Cluster 1 (β = . 816; $p < .001$) and Cluster 2 (β = . 969; $p < .001$) have a positive and significant impact on satisfaction compared to Cluster 3. Figure 2 also shows the representation of the relationship between the mean degree of satisfaction and cluster membership.

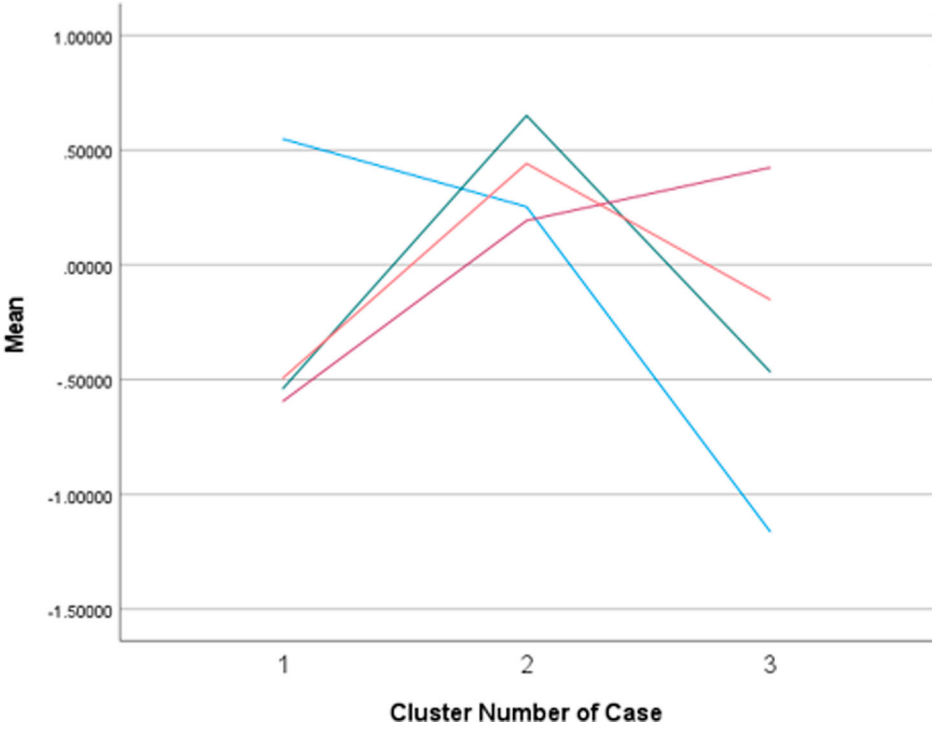

Figure 1. Criteria for group formation and Cluster of the HEI students.

In terms of work efficiency, the results show that belonging to Cluster 1 (β = .828; $p < .001$) or Cluster 2 (β = 1.039; $p < .001$) has a greater impact than belonging to Cluster 3, used as a reference. Additionally, the results show the probability of the existence of conflicts in the functioning of the self-management team (Table 5). While the students included in Cluster 1 (β = -.171; $p < .001$) have a lower probability of having conflicts with respect to Cluster 3, students in Cluster 2 have a greater probability of having conflicts than Cluster 3. Also, we have made a representation of the effectiveness and conflict variables based on the cluster membership, and we see that both Cluster 2 and Cluster 1 have greater efficiency in terms of work, however, we see that Cluster 2 shows conflict higher probability than cluster 3 and 1 (Figure 3).

5. Discussion and conclusion

This paper analyzes the formation of the team and how it affects the satisfaction and efficiency of the teams. Regarding the first research question (RQ1), i.e. which factors determine the formation of self-management teams in HEI, our analysis reveals four factors. The first factor includes six variables corresponding to the competencies required for its operation, which is in line with previous research highlighting team competencies as a fundamental element (Sánchez 2006; Jobidon et al. 2017). More specifically, our results show a broad portfolio of competencies, from personal competencies to group relationship skills. These results are in line with Sánchez (2006), who noted that teams should incorporate individual competencies on the ability to develop tasks, competencies that allow cooperative behaviour, and competencies related to stability or emotional balance. The second factor includes variables that specify the academic level of the student as a criterion for choosing the self-management team. Unlike previous work in the business context (Sánchez 2006), we find that this criterion is specific to HEIs. In line with Senior et al. (2012), our results

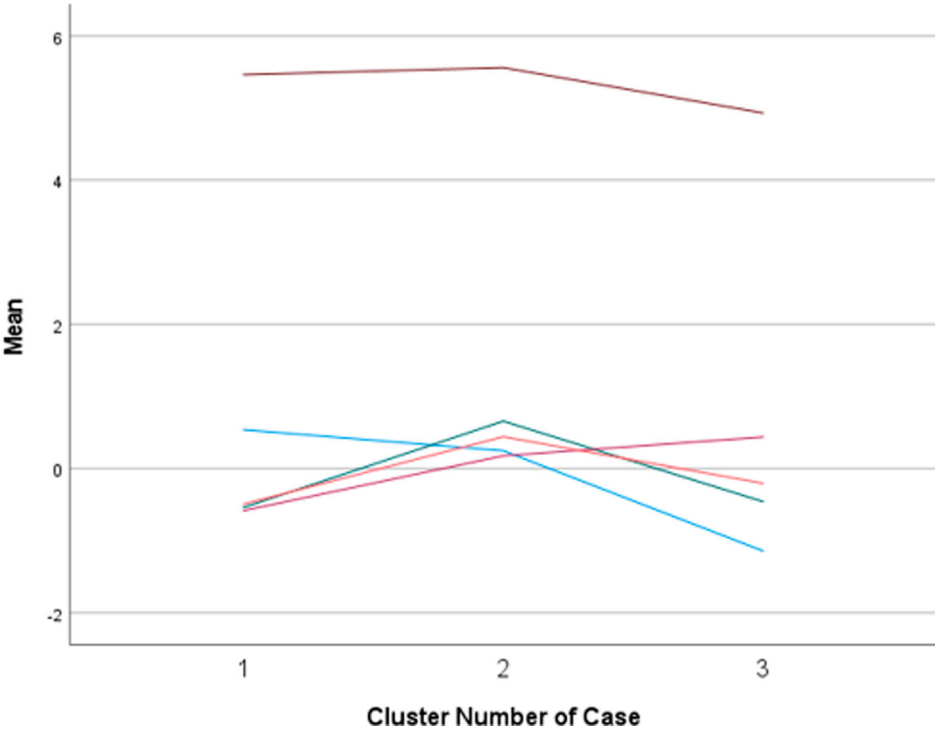

Figure 2. Satisfaction and cluster.

Table 5. Ordinal logit regression analysis (RQ2).

Variables	Effectiveness Model 1	Conflict Model 2
Cluster 1	.828***	-.171***
Cluster 2	1.039***	.224**
Cluster 3	0[a]	0[a]
-2 Log-Likelihood	371.203	149.283
Chi-Square	23.577	4.148
Sig.	.000	.001
Cox and Snell	.053	.010
Nagelkerke	.053	.010
Mcfadden	.008	.002

*$p < 0.05$, **$p < 0.01$, *** $p < 0.001$.

highlight that students value the qualification of the team members to develop academic tasks, considering that students with good academic qualifications are more suitable for teamwork. The third factor, including four variables, refers to criteria of social relationship, experience and friendship. The results show how social capital is a variable that affects the formation of groups in HEI. Thus, in line with prior work in the context of firms, previous experiences and relationships of trust, allows them to exchange information and facilitate group work (Lizzio and Wilson 2006). This approach establishes that the greatest interaction between individuals creates social capital, which allows them to exchange information, creating an adequate feeling among members, through the creation of the trust, and acting as social norms that facilitate group work (Mantilla and García 2016; Sánchez 2006). Early work from Lizzio and Wilson (2006) argued that the familiarity of group members, or their prior acquaintanceship, provides an initial base of cohesion that could be beneficial for the team. Therefore, the results show that social relationships are a motivator to form teams with

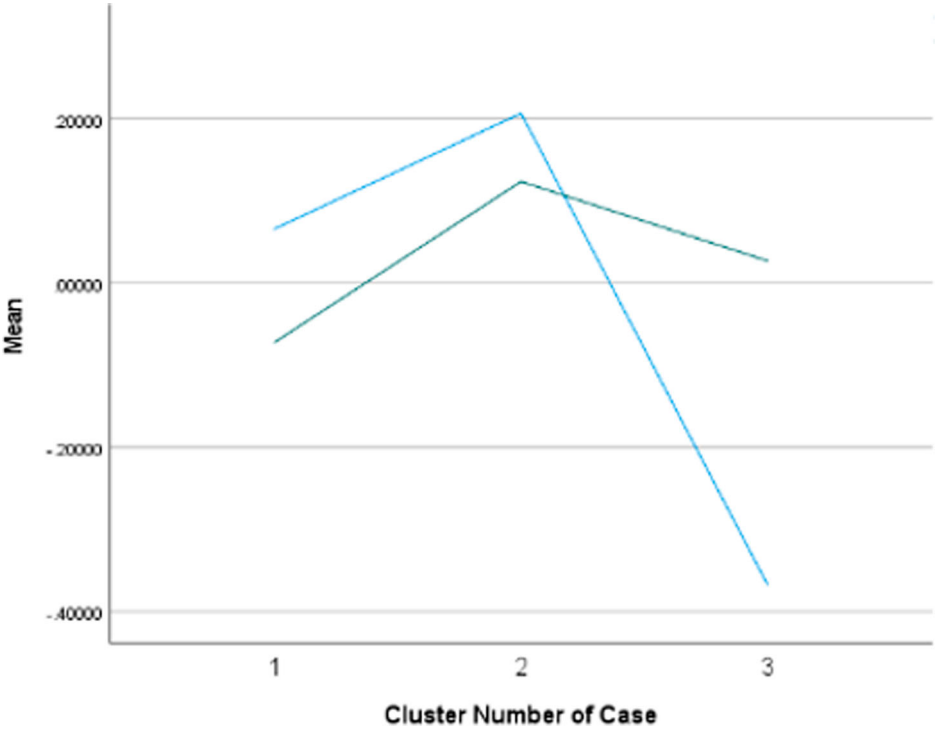

Figure 3. Effectiveness and conflict in self-management teams.

other students. The results also show the last criterion corresponds to an ad hoc factor. Thus, students create their teams, grouping themselves based on the limitations of the number of students. Unlike previous studies of the business world, this criterion is specific to HEIs.

The second research question (RQ2), explored whether the criteria for choosing students in the self-management teams affects the degree of satisfaction and effectiveness of the team. First, our results show a positive response, extending previous works that highlight how the characteristics of the students affect the satisfaction and functioning of the teams (Lizzio and Wilson 2006; Jobidon et al. 2017; Siangchokyoo and Klinger 2022). Thus, in line with the literature, we can point out that the choice of students will have an impact on satisfaction, through mechanisms such as group cohesion (Bravo, Catalán, and Pina 2019), the ability to develop works (Mantilla and García 2016; Sánchez 2006), and conflict avoidance (Vogel 2022). Second, the results show that the four factors for the formation of a self-management team have a differential impact on the degree of satisfaction. While the team formation criteria based on competencies and academic level have a positive impact, the social relationship and ad hoc criteria have no impact on the level of satisfaction. These results are in line with previous works, which have recognized the positive effect of teams organized according to competencies, which not only facilitate the resolution of projects, but also facilitate communication, and the coordination of the team (Sánchez 2006; Jobidon et al. 2017). Moreover, we can highlight the importance of academic level as a criterion for choosing students in their teamwork. In line with Stempfle et al. (2001), and Duncan and Jobidon (2008), students with a high academic level can show competencies and capacity in teamwork, as well as an ability to adapt to the team. Finally, unlike previous works, which highlight social relationships affects group interaction processes (see, for example, Bravo, Catalán, and Pina 2019; Mayfield and Valenti 2022; Sjølie, Espenes, and Buø 2022), we find that the social-relational factor does not affect team's satisfaction. Finally, we see that ad hoc criteria, in which students are chosen based on class size constraints, show a null impact on satisfaction.

Second, with respect to the use of formation criteria by HEI students, we find three groups (clusters). The first group is composed of students where the criteria for forming the self-management team is the competencies of the teams. The second group is fundamentally based on the academic level of the students, combined, to a lesser extent, with ad hoc criteria. Finally, the third group of students is based on previous relationships. Thus, the first group and third cluster have similar criteria to other areas such as teams formation in companies (Jobidon et al. 2017; Sánchez 2006), where competencies or social relationships are elements considered critical for the formation of the team. The second cluster, on the other hand, is follows a criterion typical of HEIs. Students choose the formation of the team is a combination of academic level and restriction of the number of students. Moreover, regarding the degree of satisfaction, our results show a differential impact on the measure of team satisfaction. Thus, the first and second clusters have a greater impact on satisfaction than the third cluster being formed exclusively by students who have been chosen with the criteria of friendship, previous experiences and feelings (social relationship).

Regarding the perception of the effectiveness of the students in the functioning of the self-management team, our results show that the first cluster (competencies) and the second cluster (academic level), perceive the effectiveness of teamwork at a similar level, compared to the third cluster (social relationship). However, the results show that students perceive a greater potential for conflict in the second cluster, and that the choice of students is based on the academic level and on ad hoc relationships, which can have a negative impact on the performance of the team. More in detail, the results show two types of conflict sources that can occur in the second cluster, such as conflicts of interest between members, and low involvement in group work. First, while Sánchez (2006) points out the existence of personal and team competencies to develop teamwork, and avoids conflicts of interest, the use of an academic level as a criterion for choosing team-mates, can be characterized by a conflict of interest between members and personal conflicts in their group work. Thus, in line with Somech, Desivilya, and Lidogoster (2009) who consider that team conflict can influence teamwork to transform the relationships from cooperative to competitive, students with a

higher academic level can compete with each other, which can result in a lower level of effectiveness in the team. Moreover, we observe that the students that form the second cluster, which sometimes uses ad hoc criteria, could produce a potential conflict of interest in the group. That is, combining academic level with ad hoc criteria in a group may imply a lack of involvement of certain students in teamwork. In this sense and line with Jobidon et al. (2017), the ambiguity in the definition of roles in the team is a source of conflict. Finally, our results show that in the third cluster, in which social relationships is used as a criterion for choosing team members, there is less probability of conflict, since the previous experience, as well as trust, decreases the potential for conflict between members.

From the point of view of the policy-maker in HEI, our paper contributes by determining what criteria the students employ to create a self-management team, and how these affect the effectiveness and satisfaction of the teamwork. First, while the academic level and competencies of the students have an important effect on the effectiveness of the team, we must consider that the other criteria such as social relationships and ad hoc have no impact on satisfaction. Second, the HEIs must guide the student in the use of criteria to form teams, seeking a balance between the four criteria, and the impact that these have on the effectiveness and conflicts of the groups. Teams must be created, seeking that each member has an active role, based on their competencies and academic level, as well as previous experiences and familiarity among members, considering the non-exclusion of any student. Third, to obtain an adequate level of effectiveness and satisfaction, in addition to managing the criteria for forming the self-management team, other aspects must be considered, which affect not only the members of the team, but also involve both the faculty members and the HEIs. Thus, at the level of the members of the self-management teams, aspects related to the level of commitment, the rules of operation, communication channels and the organization of the

Table 6. Others factors to consider in self-management teams.

Self-management team	
Commitment of team members	• Contribution of self-management team members.
Self-management team operating rules	• Consensus rules. • Conflict resolution.
Communication Channels	• Interactions mechanisms.
Organization del self-management team	• Planning of team work. • Organization of team work. • Control systems.
Faculty members	
Task motivation	• Connect the teamwork with personal experiences of the students or current issues. • Show the practical relevance of teamwork.
Information about the work	• Description the work, objectives and relevance.
Assessment system	• Assessment of self-management teams.
HEI	
Curricula	• Integration of the team competencies and skills in the curricula.
Infrastructure	• Facilities to teamwork.

group must be considered for the achievement of an adequate level of effectiveness and satisfaction of the self-management team. Moreover, the faculty members involved must develop a focus on motivating the student in teamwork, and report on the assessment systems of the self-management team. Lastly, HEIs must promote teamwork in their curriculum, and create adequate infrastructures for the optimal development of self-management teams. Table 6 shows a description of these aspects.

Finally, like any other, the study is not free from limitations. In the first place, the study has focused on the field of business, future work should address the creation and management of self-management teams in other academic areas. Moreover, although we consider that the measures of our study are robust, considering the various tests carried out, future works should consider diversifying the items of the survey, especially both in the criteria of group formation, and in determining the criteria of effectiveness. Additionally, our work has focused on the factors that affect the creation of self-management teams; however, future research should focus on aspects that may influence self-management teams, such as, for example, the influence of group heterogeneity, previous experiences, and the contribution of team reviews to mitigating the impact of formative processes.

Disclosure statement

No potential conflict of interest was reported by the author(s).

ORCID

Carlos Alberto Perez http://orcid.org/0000-0002-9739-5023
Marta F. Arroyabe http://orcid.org/0000-0003-3223-0268
Carlos F.A. Arranz http://orcid.org/0000-0002-6866-0684
Juan Carlos Fernandez de Arroyabe http://orcid.org/0000-0003-1451-3782

References

Anghel, E. 2022. "Let's do This Together: Do the Quantity and the Quality of Collaborative Learning Predict Achievement among College Students?" *Active Learning in Higher Education*. doi:10.1177/14697874221120783.

Arciniega, L. M., D. J. Woehr, and Taylor Poling. 2008. "El impacto de la diversidad de valores en los equipos sobre las variables de proceso y el desempeño de la tarea." *Revista latinoamericana de psicología* 40 (3): 523–538.

Arranz, N., F. Ubierna, M. F. Arroyabe, C. Perez, Fdez De Arroyabe. 2017. "The Effect of Curricular and Extracurricular Activities on University Students' Entrepreneurial Intention and Competences." *Studies in Higher Education* 42 (11): 1979–2008.

Azevedo, A., G. Apfelthaler, and D. Hurst. 2012. "Competency Development in Business Graduates: An Industry-Driven Approach for Examining the Alignment of Undergraduate Business Education with Industry Requirements." *The International Journal of Management Education* 10 (1): 12–28.

Balkema, Ageeth, and Eric Molleman. 1999. "Barriers to the Development of Self-Organizing Teams." *Journal of Managerial Psychology* 14 (2): 134–150. http://dx.doi.org/10.1108/02683949910255205.

Bolduc, S., J. Knox, and E. B. Ristroph. 2022. "Evaluating Team Dynamics in Interdisciplinary Science Teams." *Higher Education Evaluation and Development, (Ahead-of-Print)*. doi:10.1108/HEED-10-2021-0069.

Bravo, R., S. Catalán, and J. M. Pina. 2019. "Analysing Teamwork in Higher Education: An Empirical Study on the Antecedents and Consequences of Team Cohesiveness." *Studies in Higher Education* 44 (7): 1153–65. doi:10.1080/03075079.2017.1420049

Currey, J., P. Eustace, E. Oldland, D. Glanville, and I. Story. 2015. "Developing Professional Attributes in Critical Care Nurses Using Team-Based Learning." *Nurse Education in Practice* 15 (3): 232–238.

Druskat, V. U., and S. B. Wolff. 2001. "Building the Emotional Intelligence of Groups." *Harvard business review* 79 (3): 80–91.

Dunbar, R. L., M. J. Dingel, L. F. Dame, J. Winchip, and A. M. Petzold. 2018. "Student Social Self-Efficacy, Leadership Status, and Academic Performance in Collaborative Learning Environments." *Studies in Higher Education* 43 (9): 1507–23. doi:10.1080/03075079.2016.1265496

Duncan, M., and M. E. Jobidon. 2008. "Spontaneous Role Adoption and Self-Synchronization in Edge Organizations Using the ELICIT Platform." *Proceedings of the 13th International Command and Control Research and Technology Symposium* 17–19.

Entwistle, N. J. 2009. *Teaching for Understanding at University: Deep Approaches and Distinctive Ways of Thinking*. New York: Palgrave Macmillan.
Gamlath, Sharmila, and Therese Wilson. 2022. "Dimensions of Student-to-Student Knowledge Sharing in Universities." *Knowledge Management Research & Practice* 20 (4): 542–56. doi:10.1080/14778238.2020.1838961
Granovetter, M. 1992. *Problems of Explanation in Economic Sociology. Networks and Organizations: Structure, Form, and Action* 25–56.
Guenter, H., H. Van Emmerik, B. Schreurs, T. Kuypers, A. Van Iterson, and G. Notelaers. 2016. "When Task Conflict Becomes Personal: The Impact of Perceived Team Performance." *Small Group Research* 47 (5): 569–604.
Hackman, J. R. 1987. *Handbook of Organizational Behavior*, 315–342. New York, NY: Prentice-Hall.
Hammar Chiriac, Eva. 2008. "A Scheme for Understanding Group Processes in Problem-Based Learning." *Higher Education* 55 (5): 505–518. http://dx.doi.org/10.1007/s10734-007-9071-7.
Highsmith, J. 2009. *Agile Project Management: Creating Innovative Products*. Upper Saddle River, NJ: Pearson Education.
Jobidon, M. E., I. Turcotte, C. Aubé, A. Labrecque, S. Kelsey, and S. Tremblay. 2017. "Role Variability in Self-Organizing Teams Working in Crisis Management." *Small Group Research* 48 (1): 62–92. doi:10.1177/1046496416676892
Judge, T. A., and S. P. Robbins. 2017. *Organizational Behavior*. London: Pearson.
Kalfa, S., and L. Taksa. 2015. "Cultural Capital in Business Higher Education: Reconsidering the Graduate Attributes Movement and the Focus on Employability." *Studies in Higher Education* 40 (4): 580–95. doi:10.1080/03075079.2013.842210
Kember, David. 2009. "Promoting Student-Centred Forms of Learning Across an Entire University." *Higher Education* 58 (1): 1–13. http://dx.doi.org/10.1007/s10734-008-9177-6.
Lau, P., T. Kwong, K. Chong, and E. Wong. 2014. "Developing Students' Teamwork Skills in a Cooperative Learning Project." *International Journal for Lesson and Learning Studies* 3 (1): 80–99.
Lizzio, A., and K. Wilson. 2006. "Enhancing the Effectiveness of Self-Managed Learning Groups: Understanding Students' Choices and Concerns." *Studies in Higher Education* 31 (6): 689–703. doi:10.1080/03075070601004309
Lopes, C., Ó Bernardes, M. J. A. Gonçalves, A. L. Terra, M. M. da Silva, C. Tavares, and I. Valente. 2022. "E-Learning Enhancement Through Multidisciplinary Teams in Higher Education: Students, Teachers, and Librarians." *Education Sciences* 12 (9): 601. doi:10.3390/educsci12090601
Mantilla, M., and D. García. 2016. "Trabajo en equipos autodirigidos en función de los motivos sociales: logro, poder y afiliación." *Revista Interamericana de Psicología Ocupacional* 28 (2): 101–119.
Martínez-González, J., and D. Mejía-López. 2013. "Un estudio longitudinal en una empresa manufacturera del Valle de México." *Hitos de Ciencias Económico Administrativas* 19 (53): 33–38.
Mayfield, C. O., and A. Valenti. 2022. "Team Satisfaction, Identity, and Trust: A Comparison of Face-to-Face and Virtual Student Teams." *Active Learning in Higher Education*, doi:10.1177/14697874221118861.
Michaelsen, L. 2013. "Team-Based Learning: Extending the Practice and the Community." *12th Annual Team-based Learning Collaborative (TBLC) Conference*.
Mitsuhashi, H. 2016. "Embedded Networks and Suboptimal Resource Matching in Alliance Formations." *British Journal of Management* 27 (2): 287–303.
Nahapiet, J., and S. Ghoshal. 1998. "Social Capital, Intellectual Capital, and the Organizational Advantage." *Academy of management review* 23 (2): 242–266.
Napier, N. P. 2007. "Technical Projects: Understanding Teamwork Satisfaction In an Introductory IS Course." *Journal of Information Systems Education* 18 (1).
Orlitzky, M., and J. D. Benjamin. 2003. *The effects of sex composition on small-group performance in a business school case competition*. Vol. 2, 128–138. Academy of Management Learning and Education.
Romero García, Oswaldo. 2000. *Liderazgo en Equipos autodirigidos*. Mérida: Ediciones ROGYA.
Sánchez, A. 2006. *Modelo de Evaluación por Competencias Laborales*. SA: Publicaciones Cruz O.
Senior, C., C. Howard, P. Reddy, R. Clark, and M. Lim. 2012. "The Relationship Between Student-Centred Lectures, Emotional Intelligence, and Study Teams: A Social Telemetry Study with Mobile Telephony." *Studies in Higher Education* 37 (8): 957–70. doi:10.1080/03075079.2011.556719
Siangchokyoo, N., and R. L. Klinger. 2022. "Shared Leadership and Team Performance: The Joint Effect of Team Dispositional Composition and Collective Identification." *Group & Organization Management* 47 (1): 109–40. doi:10.1177/10596011211019928
Sjølie, E., T. C. Espenes, and R. Buø. 2022. "Social Interaction and Agency in Self-Organizing Student Teams During Their Transition from Face-to-Face to Online Learning." *Computers & Education* 189: 104580. doi:10.1016/j.compedu.2022.104580
Söderhjelm, T., C. Björklund, C. Sandahl, and K. Bolander-Laksov. 2018. "Academic Leadership: Management of Groups or Leadership of Teams? A Multiple-Case Study on Designing and Implementing a Team-Based Development Programme for Academic Leadership." *Studies in Higher Education* 43 (2): 201–16. doi:10.1080/03075079.2016.1160277
Somech, A., H. S. Desivilya, and H. Lidogoster. 2009. "Team Conflict Management and Team Effectiveness: The Effects of Task Interdependence and Team Identification." *Journal of Organizational Behavior* 30 (3): 359–378. doi:10.1002/job.537.

Standifer, R. L., A. M. Raes, C. Peus, A. M. Passos, C. M. Santos, and S. Weisweiler. 2015. "Time in Teams: Cognitions, Conflict and Team Satisfaction." *Journal of Managerial Psychology* 30 (6): 692–708.

Stempfle, J., O. Hübner, and P. Badke-Schaub. 2001. "A Functional Theory of Task Role Distribution in Work Groups." *Group Processes and Intergroup Relations* 4: 138–159.

Subramaniam, M., and M. A. Youndt. 2005. "The Influence of Intellectual Capital on the Types of Innovative Capabilities." *Academy of Management journal* 48 (3): 450–463.

Vogel, S. 2022. "Shared Leadership in Higher Education: An Exploration of the Composition of School Leadership Teams and School Performance." *Journal of Higher Education Policy and Management* 44 (5): 486–97. doi:10.1080/1360080X.2022.2109560