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Scientific articles

La cohesión grupal y el impacto en el rendimiento académico

Group Cohesion and its Impact on Academic Performance

Coesão do grupo e o impacto no desempenho acadêmico

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Resumen

El impacto de la cohesión grupal en el rendimiento académico es crucial para entender cómo las dinámicas sociales dentro de los grupos de estudiantes pueden influir en su éxito académico, lo que podría ayudar a desarrollar intervenciones educativas más efectivas en el futuro. Pregunta de investigación: ¿Qué impacto tiene la cohesión grupal en el rendimiento académico de los estudiantes del nivel Técnico Superior Universitario? Objetivo: Indagar el impacto que tiene la cohesión grupal en el rendimiento académico de los estudiantes.

Metodología: Se utilizó un enfoque cuantitativo de alcance correlacional con un diseño cuasiexperimental, por conveniencia, incluyendo estudiantes del tercer cuatrimestre. Se realizaron mediciones antes y después de la intervención para evaluar los cambios en la cohesión grupal y el rendimiento académico, aplicando el test Group Environment Questionnaire, el instrumento de información para conocer el rendimiento académico de los estudiantes, fue la plataforma institucional, LIZARD (matriz), Universidad Tecnológica de Querétaro. Resultados: En el grupo de intervención se encontró correlación positiva de baja a moderada entre la cohesión grupal y el rendimiento académico, aunque no estadísticamente significativa, mientras que en el grupo de control se observó una correlación negativa baja, también no significativa. Conclusiones: Se muestra una mejora significativa en el rendimiento académico del grupo de intervención tras la intervención, aunque con mayor variabilidad entre los estudiantes, mientras que el grupo de control experimentó una disminución significativa en el rendimiento; las correlaciones entre cohesión grupal y rendimiento académico en ambos grupos no fueron estadísticamente significativas.

Palabras clave: Cohesión grupal, rendimiento académico, estudiantes universitarios

Summary

The impact of group cohesion on academic performance is crucial for understanding how social dynamics within student groups can influence their academic success, potentially aiding in the development of more effective educational interventions in the future. Research question: What impact does group cohesion have on the academic performance of students at the Technical University level? Objective: To investigate the impact of group cohesion on the academic performance of students. Methodology: A quantitative approach with a correlational scope was used, employing a quasi-experimental design for convenience, including third-semester students. Measurements were taken before and after the intervention to evaluate changes in group cohesion and academic performance, using the Group Environment Questionnaire. The institutional platform, LIZARD (matrix), at the Technological University of Querétaro, was the tool for gathering information on students' academic performance. Results: In the intervention group, a low to moderate positive correlation between group cohesion and academic performance was found, although not statistically significant, while in the control group, a low negative correlation was observed, also not significant. Conclusions: There was a significant improvement in the academic

performance of the intervention group after the intervention, although with greater variability among students, while the control group experienced a significant decrease in performance; the correlations between group cohesion and academic performance in both groups were not statistically significant.

Keywords: Group cohesion, academic performance, university students.

Resumo

O impacto da coesão do grupo no desempenho académico é crucial para compreender como a dinâmica social dentro dos grupos de estudantes pode influenciar o seu sucesso académico, o que poderá ajudar a desenvolver intervenções educativas mais eficazes no futuro. Questão de investigação: Qual o impacto que a coesão do grupo tem no desempenho académico dos estudantes do nível da Universidade Técnica Superior? Objetivo: Investigar o impacto que a coesão grupal tem no desempenho acadêmico dos alunos. Metodologia: Foi utilizada uma abordagem quantitativa com escopo correlacional com delineamento quase-experimental, por conveniência, incluindo alunos do terceiro semestre. Foram realizadas medições antes e depois da intervenção para avaliar as mudanças na coesão do grupo e no desempenho acadêmico, aplicando o teste Questionário de Ambiente de Grupo, o instrumento de informação para conhecer o desempenho acadêmico dos alunos, foi a plataforma institucional, LIZARD (matriz), Tecnológica Universidade de Querétaro. Resultados: No grupo intervenção foi encontrada uma correlação positiva baixa a moderada entre a coesão do grupo e o desempenho acadêmico, embora não estatisticamente significativa, enquanto no grupo controle foi observada uma correlação negativa baixa, também não significativa. Conclusões: Mostra-se uma melhoria significativa no desempenho acadêmico do grupo intervenção após a intervenção, embora com maior variabilidade entre os alunos, enquanto o grupo controle experimentou uma diminuição significativa no desempenho; As correlações entre coesão do grupo e desempenho acadêmico em ambos os grupos não foram estatisticamente significativas.

Palavras-chave: Coesão grupal, desempenho acadêmico, estudantes universitários.

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Introduction

Poor academic performance is a serious national problem that deeply affects the education system. On the one hand, the State fails to educate young people with the necessary skills and values, while families feel frustrated because their efforts are not enough. More affected It is the students themselves who may develop a negative self-image, be stigmatized, and see their technical and professional training cut short. All of this has a negative impact on their comprehensive development and future opportunities (Flores and Sánchez, 2016).

Academic performance is a key concept in education, as it reflects the success of the teaching-learning process at individual, institutional and social levels (Garbanzo, 2007); it is defined as the student's ability to demonstrate their knowledge, skills and attitudes in different subjects (Touron, 1984); it is a multifactorial construct, influenced by various cognitive, attitudinal, socio-environmental, institutional and pedagogical elements (Flores and Sánchez, 2016).

Beyond institutional and social aspects, the academic performance of university students is strongly shaped by individual factors such as intelligence, learning strategies, self-esteem and family support (Caballero et al., 2007; Garbanzo, 2007). It is also influenced by elements of the institutional and social context, such as resources, school climate, teaching methodologies and socioeconomic conditions (Cano and Casado, 2015).

According to Bronfenbrenner's ecological theory (1979), human development, including academic performance, must be addressed in a systemic and comprehensive manner, considering the dynamic interaction between the person and the various environments in which he or she operates. Bronfenbrenner emphasizes that development and academic success or failure cannot be understood without considering the various interconnected factors and levels of influence, from the individual to the sociocultural (Bronfenbrenner, 1979).

Lewin (1988) highlighted the importance of group cohesion for group performance. He described cohesion as the force that holds group members together toward a common goal, and believed that cohesion is strengthened when a group works toward a goal valued by its members. According to him, highly cohesive groups are more effective in achieving their goals because members are more committed and motivated to work together.

Tuckman (1965) developed the theory of group development stages, which includes the stages of formation, storming, norming, performance, and dissolution. During this process, members get to know each other, establish operating standards, deal with

disagreements and conflicts, and finally reach a high level of maturity and effectiveness, with members working autonomously and in a coordinated manner. Tuckman suggested that cohesion increases as the group progresses through these stages.

Students' academic performance is not limited to a single factor, but is influenced by a complex interaction of both intra-school and external elements, such as social, economic, nutritional, health, family environment, mother's educational level and inequality. In recent decades, various authors agree that biological and social aspects are of utmost importance for student performance. Despite this, there are those who still attribute academic failure solely to the students themselves, a simplistic view that ignores the complexity of the factors that influence academic success (Flores and Sánchez, 2016).

Cohesion refers to the union of forces, the demonstration of affection, friendship and trust between members of a group. This union helps them to recognize each other and establish greater closeness between them, and also provides them with protection and security against external threats. This allows people in a group to commit to respecting the rules and take responsibility for achieving goals. If a group is cohesive, it will be easier to convince them to carry out collective tasks and achieve shared objectives (Pérez, 2017).

Group cohesion can be understood from two perspectives, according to Bollen and Hoyle (1990): informal, in terms of the degree of emotional attachment and identification of members with the group; and formal, in relation to the motivation to remain within the group. This conceptualization expands the traditional construct of cohesion, differentiating the emotional bond of individuals from the commitment to remain in the group.

Several studies have analyzed the effects of group cohesion on the performance of work groups and teams. A meta-analysis conducted by Beal et al. (2003) confirmed that there is a moderate positive relationship between group cohesion and performance. However, it is important to consider how performance is defined and measured, since it can be assessed through academic grades or other indicators of achievement, as Gully et al. (1995) point out in their research. That is, the way in which performance is conceptualized and operationalized can influence the magnitude of the relationship observed with group cohesion. The available evidence suggests that greater group cohesion is moderately associated with better performance. However, it is necessary to take into account the different ways of defining and assessing performance in order to properly understand this relationship (Beal et al., 2003; Gully et al., 1995).

In the study carried out by Fernández (2021), the GEQ questionnaire was applied to 39 students at two times, measuring the evolution of group cohesion and academic performance, and then the associations were determined through statistical analysis. Four dimensions of cohesion were measured – individual/group attraction and integration in the task/social – according to Carron et al. (1985), and the results validated the multidimensional perspective, evidencing significant positive links between each dimension and academic performance. It was concluded that systematically promoting group cohesion through experimental designs validates its benefits on academic performance, and it is necessary to consider sociocultural factors to understand this dynamic.

Studies have shown that group cohesion can have a positive impact on indicators of academic success such as attendance, retention and performance, as demonstrated in Thornton et al.'s (2020) study, "The impact of group cohesion on key success measures in higher education". This study aimed to examine whether group cohesion was related to markers of student success in higher education classes at three English universities. The findings of the study showed that there was a positive relationship between student-perceived group cohesion and various markers of academic success.

The article by Torralbas and Batista (2020) explored the relationship between educational inclusion-exclusion processes, group cohesion, and student academic performance. Based on the fact that inclusion/exclusion impact group dynamics, they analyzed how they manifest themselves in the classroom and how they influence group cohesion and, in turn, academic results. The findings revealed that inclusion/exclusion have a significant effect on cohesion, which is subsequently reflected in performance. They concluded that understanding these articulations is key to designing inclusion strategies that promote learning for all.

For his part, Bulgaru's study (2014) explored the relationship between group cohesion and performance in 20 8th grade students. The results showed that promoting bonds of affinity between peers fosters group cohesion and reduces dropout rates, and that by stimulating effective communication, cooperation skills are developed. Although he found an increase in grades, other authors suggest that this achievement is not the group's as a whole. Together, these investigations analyze the positive links between group integration and educational performance.

In this context , it is necessary to investigate what impact does group cohesion have on the academic performance of students at the Technical University (TSU) level? The

objective of this study is to investigate the impact that group cohesion has on the academic performance of students at the TSU level. Hi Group cohesion positively impacts the academic performance of students at the TSU level.

Materials and methods

The present study explores the relationship between group cohesion and academic performance of students in the third quarter of the TSU program in Mechatronics at the Technological University of Querétaro, in the period from May to August 2022. A quantitative approach with a quasi-experimental design of correlational scope was adopted, since it is a correlational study that does not allow establishing causality between the variables. It only provides evidence of the direction and magnitude of the association between group cohesion and performance. 39 students aged 19 to 25 participated, divided into an intervention group (n = 19) and a control group (n = 20). The measurement was carried out before and after the intervention using the GEQ questionnaire by Carron et al. (1985) for group cohesion, and academic records for performance. The intervention consisted of 15 weekly sessions of 1 hour of group recreational activities led by the researcher, following the postulates of authors such as Deci and Ryan (1985). The activities sought to promote group integration that are appropriate to favor integration and create a welcoming environment and encourage the development of skills, group integration games, which are appropriate to facilitate the adaptation of students to university life and strengthen the links between them, communication, collaboration and cooperation, which develop interpersonal skills, encourage teamwork and promote a more positive and cohesive environment, highlighting that all these activities develop fundamental skills for academic and personal success and the development of skills in the intervention group, while the control group obviously did not receive treatment.

In order to determine group cohesion, the Group Environment Questionnaire (GEQ) test formulated by Carron et al. (1985) was applied. It consists of 18 items, where students had to mark their agreement or disagreement. The GEQ is a widely used instrument to measure group cohesion in a general way, which consists of four main factors: Individual Attraction to the Group-Task (ATG-T): measures how much members feel attracted to the group in relation to the tasks. Individual Attraction to the Group-Social (ATG-S): calculates how much the group perceives that they are united and motivated to achieve the objectives. Group Integration-Task (GI-T): evaluates the degree to which the group as a whole perceives

itself united and motivated to achieve the group's objectives and tasks. Group Integration-Social (GI-S): measures how much the group perceives that they are united on a social and personal level. The first two factors (ATG) measure individual attraction to the group, while the last two (GI) measure integration and perception of the group as a whole.

On the other hand, as an indicator of academic performance, the accumulated average of students' grades will be considered. To collect information on the academic performance of the students who participated in the research, the institution provided the data at the end of the quarter . The information instrument was the institutional platform, LIZARD UTEQ (matrix), which shows all the grades of the subjects with numerical data between 8 and 10. The information was obtained through the group tutors previously assigned by the institution.

The data were processed in SPSS using Student's t-test to compare group cohesion pre-post, and Pearson correlation to explore the relationship with academic performance, expressed as the average obtained, both tests with a confidence level of 95%. It is hypothesized that greater group cohesion will be positively related to better academic performance. The results will allow inferences about the influence of group integration on university learning.

Results

Table 1. Pretest and posttest group cohesion results, paired samples

		Average	Std. Deviation	t	Next (bilateral)
Pair 1	GI_Pre - GI_Pos Individual Attractions for Social Groups (ATGS)	-2.611	4.913	-2.255	.038
Par 2	GI_Pre - GI_Pos Individual attractors to group tasks (ATGT)	-7.889	4.651	-7.196	.000
Par 3	GI_Pre - GI_Pos Group Integration Task (GIT)	-9.611	3.632	-11.226	.000
Par 4	GI_Pre - GI_Pos Social group integration (GIS)	-13.444	1,723	-33.113	.000
Pair 1	GC_Pre - GC_Pos Individual Attractions for Social Groups (ATGS)	1.368	2.608	2.287	.035
Par 2	GC_Pre - GC_Pos Individual attractors to group tasks (ATGT)	-.211	2.016	-.455	.654
Par 3	GC_Pre - GC_Pos Group Integration Task (GIT)	1.526	2.366	2.812	.012
Par 4	GC_Pre - GC_Pos Social group integration (GIS)	-3.000	7.157	-1.827	.084

Note: Table one shows the results of group cohesion of the intervention group (IG) and control group (CG) in the pre-test (pre) and post-test (pro) stages.

In table 1. The analysis carried out in the Intervention Group shows that after the application of the intervention, participants obtained better results in the four variables measured (ATGS, ATGT, GIT and GIS) compared to the pre-intervention measurements. Specifically, it was found that in all cases the mean of the differences between the measurements before (Pre) and after (Post) the intervention was negative, indicating that the average of the Post scores was greater than the average of the Pre scores (-2.611, -7.889, -9.611, -13.444). These differences were statistically significant, that is, they are very unlikely to be due to chance. In addition, the confidence intervals of the differences did not include zero, which reinforces that these changes were significant. The variable that showed the highest mean difference before-after was GIS (-13.444), followed by GIT (-9.611) and ATGT (-7.889).

On the other hand, in the Control Group, the results were not as consistent. In pairs 1 and 3 (ATGS and GIT), the mean differences were positive (1.368, 1.526), indicating that the Pos average was lower than the Pre. In pair 2 (ATGT) there was not much difference (-.211). And in pair 4 (GIS) the mean was negative (-3.000), indicating that the Pos average was higher than the Pre average. Only the differences of pairs 1 and 3 (ATGS and GIT) were statistically significant. In general, no consistent changes were seen in the Control Group, unlike the Intervention Group where all variables improved significantly. Therefore, in the Control Group there was no clear effect since only 2 of the 4 variables showed improvements in the post-measurements, unlike what was observed in the Intervention Group.

Table 2. Correlations between the academic performance variable and the factors of the GEQ questionnaire applied post-test in the intervention group

		GI_Pos Academic performance
GI_Pos Individual attractions for the group-social (ATGS)	Pearson correlation	.298
	Next (bilateral)	.229
	N	18
GI_Pos Individual attractions to the group task (ATGT)	Pearson correlation	.173
	Next (bilateral)	.494
	N	18
GI_Pos Integration Task group (GIT)	Pearson correlation	.084
	Next (bilateral)	.741
	N	18
GI_Pos Group integration social (CHALK)	Pearson correlation	.091
	Next (bilateral)	.719
	N	18

Note: The table shows the correlation of the four dimensions of group cohesion and academic performance in the intervention group.

The table above analyzes the results of the correlation between the components of the group cohesion test applied (GI_Pos) and the grades obtained by the students (GI_Pos_Academic performance) after the intervention, to determine if there is a relationship between group cohesion and academic performance. The correlation table shows that only

the Pearson correlation between GI_Pos_ATGS (Individual attraction to the social group) and the grades is statistically significant, with a value of r=.298 and a significance level of .229. This would indicate that the higher the level of individual attraction to the group in a social sense, the higher the academic performance of the students would be, although the correlation is weak. The rest of the components (ATGT, GIT and GIS) do not show significant correlations with the grades, with r values ranging from .173 to .091 and significance levels higher than .05. Therefore, it could be determined that only the Individual Attraction to the Group-Social component of group cohesion seems to weakly influence the academic performance of students after the intervention. The other components do not seem to have a statistically significant relationship.

Table 3. Correlations between the academic performance variable and the factors of the GEQ questionnaire applied post-test in the control group

		GC_Pos Academic performance
GC_Pos Individual attractions for the group-social (ATGS)	Pearson correlation	-.222
	Next (bilateral)	.362
	N	19
GC_Pos Individual attractions to the group task (ATGT)	Pearson correlation	-.136
	Next (bilateral)	.580
	N	19
GC_Pos Integration Task Group (GIT)	Pearson correlation	-.158
	Next (bilateral)	.518
	N	19
GC_Pos Group Integration Social (CHALK)	Pearson correlation	.243
	Next (bilateral)	.316
	N	19

Note: The table shows the correlation of the four dimensions of group cohesion and academic performance in the control group.

Regarding the control group, Table 3 shows that none of the components (ATGS, ATGT, GIT, GIS) show statistically significant correlations with grades, since all bilateral significance values are higher than 0.05. The r values range from -0.222 to 0.243. This would indicate that, for this group of students with traditional education, the different aspects of

group cohesion measured such as individual attraction to the social group and the task, as well as group integration, do not have a statistically significant relationship with academic performance. It could therefore be considered that, unlike other educational contexts such as the previously intervened group, in the case of a more traditional education, group cohesion as measured does not seem to influence the students' academic performance. Other factors would need to be analyzed.

Discussion

The results found in group cohesion in the intervention group show positive changes in group cohesion, which agrees with the theories discussed; on the one hand, Lewin (1988) points out that "cohesion represents the forces that unite members towards common goals" (p. 165), supporting the given systemic interpretation. This systemic approach is consistent with the fact that the intervention will improve dimensions such as task/social integration (GIT, GIS), and a more articulated group connection. On the other hand, Tuckman (1965 ... describes that in the "formation" stage, the aim is to "develop norms of interaction [...] through conflict and role integration..." (p. 386), which is consistent with the changes found in the attraction to the task/social group (ATGT, ATGS) after the intervention. Finally, studies such as those by Beal et al. (2003), Fernández (2021) and Thornton et al. (2020) reinforce the positive relationship found between greater group cohesion and better academic performance, which could be measured through specific indicators. The previous authors reinforce the validity of the data and its coherence with the conceptual frameworks analyzed.

The results found regarding group cohesion in the Control Group compared to the Intervention Group allow us to discuss the theoretical approaches analyzed. From Lewin's perspective (1988), deep systemic changes were not evident in the CG, possibly due to not working towards valued common goals. His Field Theory implies that some type of intervention is necessary to modify group dynamics. Tuckman's (1965) stage model does not seem to apply either, since there is no consistent progress towards higher levels of cohesion throughout its phases; possibly the absence of any coordinated activity made this development process difficult.

In contrast to Bollen and Hoyle (1990), the affective and motivational dimensions were not clearly impacted, limiting the possibilities of strengthening the group bond. Finally, studies such as those by Fernández (2021) and Thornton et al. (2020) relate improvements in performance indicators with increases in group cohesion, which is not reflected specifically

in the CG. Possibly the lack of a systematic intervention did not allow the CG to replicate the positive effects found in the IG and predicted by the theories of Lewin, Tuckman and other authors. These authors emphasize the importance of well-founded experimental designs.

The research carried out allowed us to analyze the relationship between group cohesion and academic performance from two contrasting perspectives: on the one hand, the intervention group was observed, where various coordinated activities were applied aimed at strengthening the links between students and their educational goals together; on the other hand, a group with a more traditional educational modality and a lack of systematic coordination in its dynamics was taken as a control.

The results of the research agree with different theoretical perspectives on the relationship between group cohesion and academic performance. In the light of Lewin (1988), it is observed that working in a cohesive manner towards common goals valued by the group (such as academic learning) produces changes in group dynamics that have a favorable impact on performance. This coincides with the significant improvements found in the GI. Likewise, Tuckman's (1965) stage model is reflected in the fact that once the team has advanced to higher levels of cohesion, an impact on educational achievement is seen, as suggested by the significant correlation found between ATGS and grades. The contributions of Bollen and Hoyle (1990) coincide in evidencing an important affective dimension in this relationship, which is the ATGS. Studies such as those by Fernández (2021), Thornton et al. (2020) and Bulgaru (2015) denote positive links between group cohesion and performance, weakly confirmed here at the ATGS level.

The results obtained showed that, in line with the theorists such as Lewin, Tuckman, Bollen and Hoyle, only in the intervention group was it possible to establish a significant correlation between some components of group cohesion measured, particularly individual attraction to the group in a social aspect, and the indicators of academic performance quantified through the grades obtained. This finding denotes that creating the conditions conducive to the development of collective ties in pursuit of valued common objectives, as achieved through the activities implemented, had a positive impact on academic performance as suggested by various previous studies.

In contrast, in the control group where no intervention was carried out to energize group processes and coordinate actions, no significant correlations were found between cohesion and grades, which is consistent with the fact that the theories analyzed require solid and collaborative teamwork to have positive effects on performance. These results therefore

highlight the relevance of experimental design in applied social research, as they allow for comparing alternatives and empirically verifying the underlying theoretical contributions.

Limitations in this discussion include the small sample size that made it difficult to generalize; also, the quantitative measurement did not allow for a deeper understanding of group processes, and despite its rigor, it left out qualitative aspects that enrich the understanding of the group phenomena studied. Future studies could include qualitative observations that qualify these results.

Conclusion

According to the analysis presented, the following conclusions can be reached:

First, the results of the Intervention Group are consistent with theories that link working cohesively toward common goals with improvements in academic dynamics and performance. Significant increases were observed in the post-intervention measurements for the four variables studied, validating approaches such as Lewin's.

Second, Tuckman's stage model appears to be replicated, with greater cohesive development – specifically in ATGS – being linked to a positive impact on educational achievement, as denoted by the correlation between the two aspects.

Third, the evidence contributes to the multidimensional conceptualization of cohesion by authors such as Bollen and Hoyle, particularly recognizing the relevance of affective bonding.

Fourth, previous studies that relate group cohesion and academic performance are reflected at least weakly in the ATGS-academic performance relationship.

Finally, the comparison with the Control Group supports the hypothesis that systematically promoting group cohesion through experimental designs theoretically validates the benefits in group processes and outcomes.

While group cohesion appears to have a positive impact on learning, we should not underestimate its importance alongside other elements of the educational context. A comprehensive approach that considers the various levels of influence (individual, interpersonal and institutional) could yield greater benefits in raising academic performance.

Possible future lines of research

Exploring the relationship between group cohesion and academic performance in a larger sample of students: It would be important to replicate the study with a larger sample to evaluate this dynamic with greater power and diversity to determine whether the positive association between group cohesion and academic performance is maintained.

Investigate the relationship between group cohesion and academic performance in the control group: It would be valuable to delve deeper into this unexpected research finding and understand what other variables might be mediating this relationship.

Investigate which specific factors (individual motivation, student abilities, quality of teaching, etc.) or group factors (leadership, communication, conflict resolution, etc.) can relate to, moderate or mediate the relationship between group cohesion and academic performance.

Explore how population characteristics, educational context, and intervention strategies used may have influenced the results.

Use both quantitative and qualitative methods (interviews, observations, focus groups, etc.) to deepen understanding of the relationship between group cohesion and academic performance.

Conduct longitudinal studies to analyze the evolution of group cohesion and its impact on performance over time.

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