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Psychological Safety Climate Context: The Beneficial Effects of Teacher-student Conflict

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Abstract: Previous studies mainly focused on the negative effects of teacher-student conflict, and the positive effects of conflict had rarely been mentioned. This paper suggests encouraging conflict could act as a teaching method to improve students' innovative competence. Using evidence of 1207 university students, the hierarchical regression analysis outcomes indicated that conflict related to intellectual knowledge enhanced students' innovative competence, while conflict involving personal attacks did not. Specifically, the results revealed that Cognitive Conflict had significant positive effects on students' innovative competence, whereas Affective Conflict had a significant negative effect on students' innovative competence. In addition, we clarified psychological safety climate as the boundary condition for the relationship between conflict and students' innovative competence. This study has three objectives: (1) Describe the process of two kinds of teacher-student conflicts and explain the features and different situations during teacher-student interaction; (2) Exam how various types of teacher-student conflicts affect students' innovative competence; (3) Identify the mediating role of psychological safety climate in the association between conflict and students' innovative competence

Keywords: Teacher-student relationship; Cognitive Conflict; Affective Conflict; Students' innovative competence; Psychological Safety Climate;

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1. Introduction

The Students' innovation competence has been identified as an important learning goal at the university level [1, 2]. How to improve students' innovative competence is emphasized and debated in university pedagogy [2, 3]. Innovation is "the intentional introduction and execution within a group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, designed to significantly benefit the individual, the group, the organization or wider society" [1]. The embodiment of students' innovative competence is the new viewpoint [1, 2].

Conflict is a common and inevitable occurrence among teacher-student interactions in university [4]. Previous studies concluded that conflict is harmful because it causes students' academic risk, disengagement, withdrawal, and failure at school [5-7]. Considering the detrimental consequences of conflict, researchers have developed a series of management methods to avoid or suppress it [8, 9]. However, in team studies, it has been proved that cognitive conflict is conducive to enterprise performance and employees' creativity [10-12]. Previous studies have identified a variety of predictors of students' innovative competence, such as student-teacher trust, student-teacher

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relationship [5, 6, 13-15]. However, few research have considered that conflict is conducive to innovative competence. Could we suppose that teacher-student conflict is a way to stimulate students' innovative competence?

Conflict is defined as a difference of opinion between two or more people or groups [16-18]. As prior research mentioned, conflict can be divided into two forms: Cognitive Conflict and Affective Conflict [10, 19-22]. During the teacher-student interaction, Cognitive Conflict refers to disagreement about the knowledge in viewpoints, ideas, and opinions during the teacher-student interaction [23, 24]. Affective Conflict is defined as disagreements related to interpersonal emotional incompatibilities induced by differing personalities and values [25, 26]. For the sake orderly, disciplined teaching environment and positive teacher-student relationships were recommended, and students were allowed to comply with school rules, and conflict has always been considered as disruptive and aggressive behavior [26, 27].

However, in the case of knowledge innovation, these over emphases on the negative consequences may detract attention away from the beneficial effects that cognitive conflict may have. Through the Cognitive Conflict, students can debate openly and voice dissenting views during the interaction with teachers. It is likely to promote divergent thinking and the sharing of a broader range of thoughts, which can benefit students' innovative competence. Hence, this paper attempts to reveal the beneficial influence of cognitive conflict and proposes an innovative teaching method.

In addition, the key that using conflict to improve innovative competence is enhancing students' willingness to express their objections [28, 29]. Therefore, a positive psychological safety climate between teachers and students is essential. Psychological safety is an individual's shared belief about whether it is secure to engage in risk-taking [30, 31]. Studying in a psychological safety environment, students could feel a sense of openness, which allows them to question the teacher without worries and then contribute more diverse ideas [32, 33].

According to the above, we found that the types of teacher-student conflicts remain ambiguous. And there is a paucity of empirical evidence governing the positive effects of teacher-student conflict. Previous literature has emphasized the importance of psychological safety climate in the classroom [32, 34], but the role of psychological safety climate in the relationship between conflict and innovative competence has not been investigated. Hence, this study has three objectives: (1) Describe the process of two kinds of teacher-student conflicts and explain the features and different situations during teacher-student interaction; (2) Exam how various types of teacher-student conflicts affect students' innovative competence; (3) Identify the mediating role of psychological safety climate in the association between conflict and students' innovative competence.

~~2. Literature Review~~ [1]

[2] ### *~~2.1.~~ Conflict between teacher and student*

Differences in attitudes, beliefs, values, or needs induce conflict [16-18]. The previous studies demonstrated the obvious and observable characteristics of conflict, such as angry words, oppositional behavior, or fierce objection [7, 33]. However, these studies mentioned only one type of conflict: Affective Conflict [7, 25, 33]. Compared to affective conflict, Cognitive Conflict has received less attention.

Originated from team management, conflict studies might transform its connotation in the classroom environment. Therefore, it's necessary to clarify the conflict concept in teacher-student interaction situations. In team studies, Cognitive Conflict occurs when team members debate different views about a task [10, 12, 21], Affective Conflict involves disagreements of a personal nature, such as power struggles or personal incompatibilities [10, 12, 21].

Cognitive conflict happens during the teacher-student interaction when there are arguments over knowledge differences in viewpoints [21, 23]. Conflict is an unavoidable occurrence [24]. Because teachers and students play distinct roles in the classroom, and

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their knowledge backgrounds, experiences, and priorities are different [35]. It induces their understanding of class content may be subversive, students do not always completely understand the theory and knowledge, nor do they always fully accept all of the teachers' opinions entirely.

On the other hand, affective conflict arises from interpersonal incompatibilities [21]. The incompatibilities could be the differences in personality, value, personal taste, political preferences, or interpersonal style [36]. Affective conflict is often accompanied by intense behavior and negative emotions [25]. For example, teachers may arbitrarily interrupt students' speech, ignore their questions, and even criticize them because of students' contrary ideas [37], in these situations, Affective conflict may occur between student and teacher.

2.2. *Psychological safety climate*

A psychological safe climate was characterized as open, authentic, and direct [30, 38]. "Open" refers to that individual addressing concerns and disagreements publicly in the organization [30, 38]. "Authentic" was defined as people transparently expressing and behaving according to their personal values without others' judgment [30, 38]. "Direct" was explained as members of the team didn't need to choose their words overly cautiously before they started a conversation [31, 39].

The psychological safety climate was suggested to have significant positive effects on students' motivation, engagement, long-term memory, and academic achievement [40]. The positive psychological safety climate is student-centered, which is warmth, respect, and responsiveness [41]. In the contrast, the negative psychological safety climate is related to high levels of anger, sarcasm [42]. A psychological safety climate helps students to take the risk with a low concern about embarrassment, rejection, or punishment from teachers [43]. It allows students to focus on their learning rather than being distracted by worries of being ridiculed [44].

Evidence demonstrated that psychological safety was a context-shifting state, which could have a buffering effect that supported learning in high-stress situations [39]. In addition, psychological safety climate has been proved that correlated with better academic achievement and less disruptive behaviors [34]. Hence, we reasonably expect that a psychological safety climate can amplify the advantage of conflicts. Therefore, this paper will explore the mediate role of psychological safety climate in conflict situations.

3. Hypothesis

In order to achieve objective 2 (Examine how various types of teacher-student conflicts affect students' innovative competence), H1 and H2 were demonstrated based on conflict theory. For objective 3 (Identify the mediating role of psychological safety climate in the association between conflict and students' innovative competence), H3 and H4 were demonstrated based on the previous literature about psychological safety climate.

Table 1. Theoretical Model.

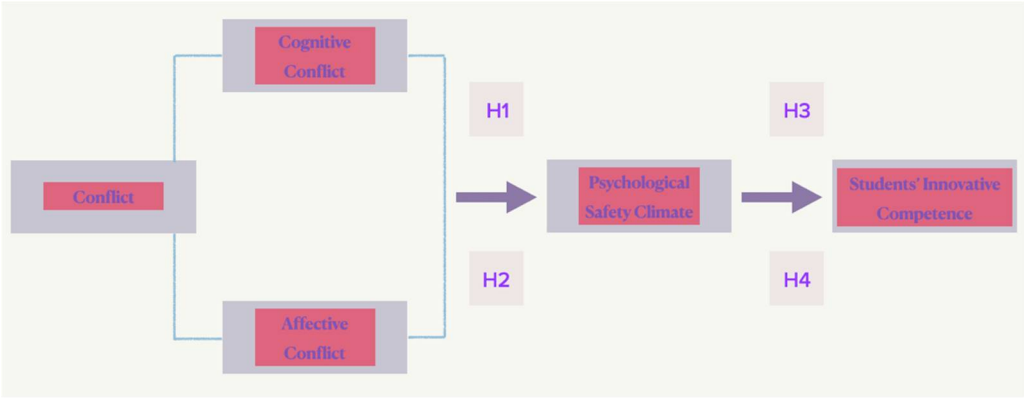
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Figure 1
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Briefly indicate hypothesis content
Place after hypothesis in text



~~3.1.~~ The relationship between Cognitive Conflict and students' innovative competence

Cognitive conflict occurs when the teacher and students discuss various preferences and opinions about the knowledge issue [11, 23]. The constructive debate and exchange of perspectives may help students to understand knowledge from different angles and evaluate other solutions to the problems. Cognitive conflict also provides a chance to create affordances for students, to receive justify, evaluate, and refine their ideas from teachers. Asking questions to teachers can enhance students' learning initiative and improve students' class involvement [6, 45]. Even if these different questions are not helpful or disruptive, the behavior of putting forward questions is also valuable [46]. Because it is an outcome of students' deep thought, which can also enhance students' innovative competence. Rather than the students' excessive conformity with teachers, cognitive conflict may improve the judgments and interpretation of the knowledge.

In sum, cognitive conflict promotes divergent perspectives which benefit students' innovative competence. Accordingly, we propose ~~Hypothesis 1;~~

During teacher-student interaction, Cognitive Conflict is positively correlated with students' innovative competence.

~~3.2.~~ The relationship between Affective Conflict and students' innovative competence

Affective Conflict is often accompanied by negative attitudes and emotions, and it creates tensions between teachers and students, as well as anxiety and unpleasant feelings [21, 36]. These negative emotions may induce students' misbehavior and problematic behavior, such as students' aggression toward teachers [36, 47]. It reduces classroom efficiency, and even induces skipping classes and dropping out of school [37, 47, 48].

Affective conflict also reduces teacher-student trust [37, 48]. It decreases the communication frequency, which inhibits student-teacher interaction and reduces knowledge sharing. During Affective conflict, even though the student is interested in the topic of the discussion, they choose to avoid it or give a silent response to teachers. As a result, the misunderstandings deepen between student and teacher, and it causes conflict escalations [49].

Based on the discussion, we propose Hypothesis 2:

During teacher-student interaction, Affective Conflict is negatively correlated with students' innovative competence.

~~3.3.~~ The relationship between Psychological Safety Climate and students' innovative competence

Psychological safety climate affects how people perceive conflict [29, 47], it may reduce the possible risks and hazards of cognitive conflict. A psychological safety climate relieves pressure on students fearing the negative consequences, for example, being ignored or punished by teachers, feeling embarrassed in the classroom [32]. In a

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Hypothesis 1 (H1):

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psychological safety climate, students don't have to be concerned about self-image and saving face [32]. Hence, we suppose that a psychological safety climate helps students to engage in conflict or confrontation without worries. As a result, it may help students better able to express different or risky ideas in the case of cognitive conflict.

In addition, psychological safety climate can reassure students in a way that conflict does not include personal judgment, but only relates to knowledge issues [47]. In a psychological safety climate, teacher respect students' suggestions and encourage them to raise objections, which provide an open communication environment [34]. Psychological safety climate increases the teacher-student trust, it makes both student and teacher increase their willfulness to communicate and express their true thoughts [39]. In this way, the misunderstandings between students and teachers can be eliminated. A psychological safety climate may weaken or solve affective conflict, which also enhances students' innovative competence.

In the above cases, we propose the following hypotheses:

~~H3:~~ 1\ Psychological safety climate mediates the positive relationship between teacher-student Cognitive Conflict and students' innovative competence.

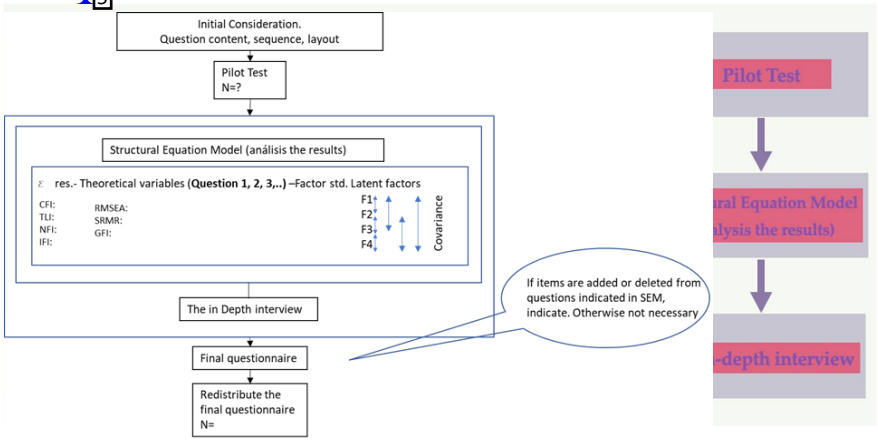
~~H4:~~ 2 Psychological safety climate mediates the negative relationship between teacher-student Affective Conflict and students' innovative competence.

~~4.~~3 Materials and methods

~~4.1.~~ 4 Data Collection

The following two methods were used to assess hypothesis 1-4: Questionnaire survey and In-depth interviews. And the flow chart was shown in Table 2.

~~Table2.~~ 5 low Chart.



To begin, we perform a questionnaire along with classic scales to assess hypothesis 1-4 (Details on measurements).

Secondly, as a preliminary step in the research, we disseminate a pilot survey to evaluate the research's effectiveness.

Thirdly, the data from the pilot survey was analyzed using the Structural Equation Model. The effective items (Cronbach's alpha > 0.80) were maintained, while the lesser validation items (Cronbach's alpha < 0.30) were eliminated. In-depth interviews were performed to refine the left items (0.30 < Cronbach's alpha < 0.80), resulting in a higher Cronbach's alpha (over 0.80) (All of the elements are effective; check the Table3 for further information.)

For example, pilot tests of the survey revealed that 91.8% of students chose "strongly agree" or "agree", in response to the item "I will make friends with my teacher" However, the in-depth interviews indicated that students don't like their teacher and they would not recommend this course to other classmates (79.1%). We found the reason mainly because those students thought that teacher will read their response to the survey, and it is related to their grades in this course. Hence, we added an explanation in the instruction

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Hypothesis 3 (H3):

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Hypothesis 4 (H4):

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Figure 2.

to clarify that all the identifying information was hidden, and all your teachers and classmates didn't have the right to read it. In this way, students can respond to the questionnaire truthfully and the interpretive validity of the survey was increased.

Finally, the pretesting questions were refined or adapted in the final questionnaire, and we distributed it again. Teachers and volunteers administered the survey, as a result, with 22.4% of the students filling out a paper version of the survey in their classrooms and 87.6% of the students completing an electronic version of the questionnaire via Email. As a result, the final data set consists of 1027 entries (response rate = 92.9%). Student's ages ranged from 17 to 24 years. And 53.9% of the 1027 students were female. Confidentiality and anonymity were ensured, and all participation was voluntary and anonymous. After submitting the assessment, each student was provided a gift as a participation incentive.

1 ~~1.2~~ Sample Description

The sample was obtained non-randomly and through convenience sampling in this study. The final sample consists of 1183 university students from seven American universities who are majoring in a variety of subjects (Arts, Science, Business, Engineering and Technology, Literature, Language, and Social Science). 78 questionnaires were discarded because the students did not complete the survey or completed it in less than 8 minutes with inadequate information. As a consequence, 1105 surveys were completed and returned.

The following were the questionnaire's inclusion criteria:

Students are full-time undergraduates from 1st to 5th grade,

All of the students are over 18 years old.

All the students have the experience of offline class (The object of this study did not refer to the virtual teacher-student interaction).

For In-Depth Interviews, the following criteria were used:

1. Students who volunteered for the interviews (at the end of the questionnaire, ther e was a suggestion to "Leave your email address if you want to be interviewed").

2 ~~1.3~~ Data Process

Firstly, the reliability of the questionnaire was ~~analyzed. The factors (Factor Loading, Cronbach's alpha, CR, AVE, VIF) were shown in Table 3.~~ 3

Secondly, a descriptive analysis of the obtained results was carried out to report the means, standard deviations, and inter-scale correlations between all of the study variables (Table 4). The results of the correlation analysis revealed that all the variables had significant associations, which supporting the use of regression and mediating analysis in the following steps.

Subsequently, Hypotheses 1-4 are then supported by the Structural Equation Model (SPSS 26).

Finally, to further test the mediating effect (H3, H4), we estimate the indirect, direct, and total effects as well as their 95% bias-corrected confidence intervals (CI), the 5,000-replication bootstrapping procedure was used based on the PROCESS macro adapted from Hayes. And H3 and H4 were also supported.

4 ~~1.4~~ Measures

To measure students' innovation competence, we adapted the scales by Ovbiagbonhia [1]. It comprises three different types of competencies: leadership, solving ambiguous problems, and risk tolerance. For example, the students were asked to reply to the item, "I am excited by unanswered questions".

Cognitive conflict: It was assessed using the scale developed by Mooney [21]; a sample item is "Teacher and I frequently have disagreements about the knowledge issue".

Affective conflict was assessed using the scale adopted by Mooney [21]; a sample item is "I will make friends with my teacher".

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analyzed (Cronbach´s alpha, Composite reliability -CR-, Mean variance extracted -AVE- and Variance Inflation Factor-VIF-) (Table 3).

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Psychological safety climate was assessed using the scale developed by Newman [47]; a sample item is "It is easy to put forward different ideas in the class".

~~The factors (Factor Loading, Cronbach's alpha, CR, AVE, VIF) were shown in Table 3.~~ 1

Table 3. The validation of measurements.

Construct	Item	Factor Loading	Cronbach's alpha	CR	AVE	VIF
innovation competence	S1	0.683	0.858	0.9	0.77	1.82
	S2	0.783				
	S3	0.784				
	S4	0.801				
	S5	0.734				
	S6	0.699				
	S7	0.733				
	S8	0.775				
	S9	0.814				
	S10	0.812				
	S11	0.807				
	S12	0.698				
Cognitive conflict	C1	0.677	0.801	0.9	0.8	2.03
	C2	0.731				
	C3	0.742				
	C4	0.683				
Affective conflict	A1	0.672	0.829	0.8	0.76	1.98
	A2	0.765				
	A3	0.838				
	A4	0.699				
Psychological safety climate	P1	0.723	0.815	0.8	0.62	2.01
	P2	0.699				
	P3	0.721				
	P4	0.753				

5. Results

2 ~~Table 4 reports the means, standard deviations, and inter-scale correlations between all of the study variables~~. Cognitive conflict was positively correlated with students' innovative competence ($r = 0.771$, $p < 0.01$). Affective conflict negatively predicted students' innovative competence($r = -0.582$, $p < 0.01$). Cognitive conflict had positive effects on PSC ($r = 0.358$, $p < 0.01$), and affective conflict negatively predicted PSC ($r = -0.454$, $p < 0.01$). We also found that psychological safety climate and students' creativity were positively correlated ($r = 0.690$, $p < 0.01$).

The results of the correlation analysis revealed that all the variables had significant associations, supporting the use of regression and mediating analysis in the following ~~steps.~~ 3

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steps (Table 4).

Table 4. Means, standard deviations, and correlations.

Variable	M	SD	1	2	3	4	5	6
1.G1	1.52	0.782	1					
2.G2	2.22	0.838	0.568	1				
3.CC	2.54	0.704	0.576	0.663	1			
4.AC	2.46	0.622	0.323	0.248	0.232	1		
5.PSC	2.78	0.677	0.317**	0.269**	0.358**	-0.454**	1	
6.SIC	2.97	0.789	0.797	0.590**	0.771**	-0.582**	0.690**	1

Note: $^{*}p < 0.05$; $^{**}p < 0.01$ (two-tailed) G1 = Gender; G2 = Grade; CC = Cognitive conflict; AC = Affective conflict; PSC = Psychological safety climate; SIC = Students' innovative competence.

The results of the hierarchical regression ~~shown in Table 5~~ (M4) support Hypotheses 1 and 2, which achieved the ~~objective 2,~~ cognitive conflict had significant positive effects on students' innovative competence (β = 0.319, $p < 0.01$). Affective conflict was significantly negatively related to students' innovative competence (β = -0.505, $p < 0.01$).

~~As shown in Table 5 (M2),~~ cognitive conflict had significant positive effects on PSC (β = 0.275, $p < 0.01$), and affective conflict had a significant negative effect on PSC (β = -0.209, $p <$ ~~0.01).~~ ~~As shown in Table 5 (M5),~~ PSC was significantly and positively correlated with students' innovative competence (β = 0.227, $p <$ ~~0.01).~~ These patterns are consistent with Hypotheses 3 and 4, ~~which resulted in the achievement of Objective 3.~~

Table 5. Hierarchical regression analysis.

Variable		PSC		Students' innovative competence		
		M1	M2	M3	M4	M5
CV	G1	0.049**	0.020	0.088	0.046	0.048
	G2	0.431**	0.162**	0.167	0.124	0.069
IV	CC		0.275**		0.319**	0.391
	AC		-0.209**		-0.505**	-0.301
MV	PSC					0.227**
	R2	0.122	0.403	0.161	0.443	0.594**
	Δ R2	0.128	0.281	0.161	0.282	0.151**
	F	27.868 ***	119.031***	26.261***	297.451***	128.883***

Note: $^{**}p < 0.01$; *** p < 0.001 (two-tailed) CV = Control variable; IV = Independent variable; MV = Mediating variable; G1 = Gender; G2 = Grade; CC = Cognitive conflict; AC = Affective conflict; PSC = Psychological safety climate; SIC = Students' innovative competence.

To further test the mediating effect, we estimate the indirect, direct, and total effects as well as their 95% bias-corrected confidence intervals (CI), the 5,000-replication bootstrapping procedure was used based on the PROCESS macro adapted from Hayes [49] As shown in Table 6, the indirect effects of CC and AC on PSC were significant (indirect effect= 0.052, LLCI= 0.037, ULCI= 0.065; indirect effect= 0.983, LLCI= 0.692, ULCI= 0.767, respectively). However, the direct effects were statistically insignificant (i.e., the 95% CIs included zero) for two types of conflict.

These results thus support the hypothesized mediation model (H3 and H4), indicating that only in a PSC can Cognitive Conflict promote students' innovative competence and only in a PSC can Affective Conflict be reduced, which also enhancing students' innovative competence.

Table 6. Result of mediation models.

				Effect	LLCI	ULCI
Direct effect 1	CC	→	SIC	0.074	-0.039	0.108

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objective 2 (Table 5).

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0.01) (M2).

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(0.01) (M5)

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which resulted in the achievement of verifying the relationship between Psychological Safety Climate and students' innovative competence (objective 3).

Indirect effect 1	CC	→PSC	SIC	0.052	0.037	0.065
Direct effect 2	AC	→	SIC	0.073	-0.041	0.091
Indirect effect 2	AC	→PSC	SIC	0.983	0.692	0.767

Note: G1 = Gender; G2 = Grade; CC = Cognitive conflict; AC = Affective conflict; PSC = Psychological safety climate; SIC = Students' innovative competence.

6. Discussion

This study contributes to nascent literature that seeks to understand how teacher-student conflict affects students' innovative competence, and the buffering effect of psychological safety climate under conflict situations.

Firstly, our findings supported that cognitive conflict promoted students' innovative competence. Cognitive conflict facilitates the surfacing of different ideas and viewpoints. It helps students reconsider the knowledge from various angles. In contrast to students' silence or blind acceptance of knowledge, cognitive conflict increases learning feedback and in more extensive debates which results in new understanding and more perspectives.

Secondly, consistent with the studies of negative outcomes of affective conflict [3, 36, 37], the results indicated that affective conflict was negatively correlated with students' innovative competence. Affective conflict results in the discussion that is off-topic for class content. And it evokes negative emotions and amplifies aggression. And these findings achieved the first and second goals mentioned early.

Thirdly, we found that a psychological safety climate strengthened the advantages of cognitive conflict and weakened the disadvantages of affective conflict. And it proved the third goal. Psychological safety climate transforms the tense communication environment in cognitive conflict into an open communication environment. The conversation in cognitive conflict is unusually direct and confrontational, it is easy to trigger intense behavior or negative emotion [21, 23]. However, a psychological safety climate relieves pressure and negative emotion, it provides students with a secure feeling to share embarrassing or contrary ideas. By freeing them from worrying about being ignored or being punished, students don't need to focus on self-protection.

At the same time, psychological safety climate transforms the tense interpersonal atmosphere into a warm and respectful environment. A psychological safety climate increases the trust between teachers and students, which allows or solves the interpersonal contradictions.

7. Limitations and Suggestions for Future Research

This study has a few limitations that should be highlighted for future research. The link between cognitive conflict and affective conflict was not considered. And regarding the measurement, the evaluation of students' innovative competence is self-evaluation, the teachers' reports can be added. For the future study, we recommend exploring the impact of different conflicts on teachers' behavior and cognition. And researchers can also explore other factors that may help cognitive conflict boost students' innovative competence.

8. Conclusions

The results have important theoretical implications for teacher-student conflict research. Firstly, few studies have systemically assessed two types of teacher-student conflict. The present study investigated how different types of conflict are associated with students' innovative competence. Different from previous studies which only focused on affective conflict and advocated how to avoid conflict [6, 25], this research provided empirical evidence for the positive effects of cognitive conflict on students' innovative competence. Although a growing body of research has operationalized positive psychological safety climate as a predictor of academic achievement, effective violence

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prevention, and students' healthy development, the mediator role of psychological safety climate under conflict situations has not been clarified. We explored psychological safety climate as the boundary condition between conflict and students' innovative competence. Furthermore, psychological safety climate reduces the energy needed to regulate affective conflict and to deal with other distracting issues. It assures that cognitive conflict does not include personal judgment but relates only to knowledge issues.

We envision that the current research will assist and guide teachers by clarifying how conflict can benefit in improving students' innovative competence. Considering the positive association between cognitive conflict and students' innovative competence, teachers should guide and encourage cognitive conflict and take it as an opportunity to cultivate students' innovative competence. In contrast, due to the detrimental effects of affective conflict, teachers should strive to avoid it and resolve it as early as possible when it arises.

In university, coping with conflict is not only the chief responsibility but also the toughest challenge for teachers. However, our findings imply that the conflict could be beneficial when a psychological safety climate is fostered. Thus, in order to capitalize on the benefits of conflict and stimulate students' innovative competence, teachers should seek to cultivate and maintain the development of psychological safety climate.

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References

1. Ovbiagbonhia: A.; Kollöffel, B.; den Brok, P., Educating for innovation: students' perceptions of the learning environment and of their own innovation competence. *Learning environments research* **2019,** 22, (3), 387-407. https://doi.org/10.1007/s10984-019-09280-3
2. McPhillips, M.; Licznerska, M., Open Innovation Competence for a Future-Proof Workforce: A Comparative Study from Four European Universities. *Journal of Theoretical and Applied Electronic Commerce Research* **2021,** 16, (6), 2442-2457. https://doi.org/10.3390/jtaer16060134
3. Martín-Hernández, P.; Gil-Lacruz, M.; Gil-Lacruz, A. I.; Azkue-Beteta, J. L.; Lira, E. M.; Cantarero, L., Fostering University Students' Engagement in Teamwork and Innovation Behaviors through Game-Based Learning (GBL). *Sustainability* **2021,** 13, (24), 13573. https://doi.org/10.3390/su132413573
4. Martin, A. J.; Collie, R. J., Teacher–student relationships and students' engagement in high school: Does the number of negative and positive relationships with teachers matter? *Journal of Educational Psychology* **2019,** 111, (5), 861. https://doi.org/10.1037/edu0000317

Esta página no contiene comentarios

5. Hajovsky, D. B.; Chesnut, S. R.; Jensen, K. M., The role of teachers' self-efficacy beliefs in the development of teacher-student relationships. *Journal of school psychology* **2020,** 82, 141-158. https://doi.org/10.1016/j.jsp.2020.09.001
6. Hajovsky, D. B.; Oyen, K. A.; Chesnut, S. R.; Curtin, S. J., Teacher–student relationship quality and math achievement: The mediating role of teacher self-efficacy. *Psychology in the Schools* **2020,** 57, (1), 111-134. https://doi.org/10.1002/pits.22322
7. Marengo, D.; Fabris, M. A.; Prino, L. E.; Settanni, M.; Longobardi, C., Student-teacher conflict moderates the link between students' social status in the classroom and involvement in bullying behaviors and exposure to peer victimization. *Journal of Adolescence* **2021,** 87, 86-97. https://doi.org/https://doi.org/10.1016/j.adolescence.2021.01.005https://doi.org/10.1016/j.adolescence.2021.01.005
8. Akhtar, N.; Hassan, S. S., Conflict Management Styles as Predictors of Organizational Commitment in University Teachers. *Journal of Behavioural Sciences* **2021,** 31, (1), 99-123. https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=150273423&site=eds-live
9. Vallone, F.; Dell'Aquila, E.; Dolce, P.; Marocco, D.; Zurlo, M. C., Teachers' multicultural personality traits as predictors of intercultural conflict management styles: Evidence from five European countries. *International Journal of Intercultural Relations* **2022,** 87, 51-64. https://doi.org/10.1016/j.ijintrel.2022.01.006
10. Um, K.-H.; Oh, J.-Y., The mediating effects of cognitive conflict and affective conflict on the relationship between new product development task uncertainty and performance. *International Journal of Project Management* **2021,** 39, (1), 85-95. https://doi.org/10.1016/j.ijproman.2020.11.003
11. Yi, Y.; Chen, Y.; He, X., CEO Leadership, Strategic Decision Comprehensiveness, and Firm Performance: The Moderating Role of TMT Cognitive Conflict. *Management and Organization Review* **2021**, 2, 1-36. https://doi.org/10.1017/mor.2021.10
12. Guo, H.; Zhang, L.; Huo, X.; Xi, G., When and how cognitive conflict benefits cross-functional project team innovation: The importance of knowledge leadership. *International Journal of Conflict Management* **2019**. 30, 4, 514-537. https://doi.org/10.1108/IJCMA-02-2019-0031
13. West, M. A.; Farr, J. L., Innovation at work: Psychological perspectives. *Social behaviour* **1989**. 4, (1), 15–30. https://scholar.google.com/scholar_lookup?hl=en&volume=4&publication_year=1989&pages=15-30&author=M.+A.+West&author=J.+L.+Farr&title=Innovation+at+work%3A+Psychological+perspectives
14. Keinänen, M.; Ursin, J.; Nissinen, K., How to measure students' innovation competences in higher education: Evaluation of an assessment tool in authentic learning environments. *Studies in Educational Evaluation* **2018,** 58, 30-36. https://doi.org/10.1016/j.stueduc.2018.05.007
15. Kistyanto, A.; Rahman, M. F. W.; Wisandiko, F. A.; Setyawati, E. E. P., Cultural intelligence increase student's innovative behavior in higher education: the mediating role of interpersonal trust. *International Journal of Educational Management* **2021**. ahead-of-print https://doi.org/10.1108/IJEM-11-2020-0510
16. Weingart, L. R.; Behfar, K. J.; Bendersky, C.; Todorova, G.; Jehn, K. A., The directness and oppositional intensity of conflict expression. *Academy of Management Review* **2015,** 40, (2), 235-262. https://doi.org/10.5465/amr.2013.0124
17. De Dreu, C. K. W.; Van Vianen, A. E. M., Managing relationship conflict and the effectiveness of organizational teams. *Journal of Organizational Behavior* **2001,** 22, (3), 309-328. https://doi.org/10.1002/job.71
18. De Wit, F. R. C.; Greer, L. L.; Jehn, K. A., The paradox of intragroup conflict: A meta-analysis. *Journal of Applied Psychology* **2012,** 97, (2), 360-390. https://doi.org/10.1037/a002484410.1037/a0024844
19. Rahim, M. A., Managing conflict in organizations. Routledge: **2017**. 2, 13-67. https://doi.org/10.4324/9780203786482
20. Rahim, M. A., Toward a theory of managing organizational conflict. *International journal of conflict management* **2002**. 4, 55-78. https://doi.org/10.1108/eb022874
21. Mooney, A. C.; Holahan, P. J.; Amason, A. C., Don't take it personally: Exploring cognitive conflict as a mediator of affective conflict. *Journal of management studies* **2007,** 44, (5), 733-758. https://doi.org/10.1111/j.1467-6486.2006.00674.x

Esta página no contiene comentarios

22. Jehn, K. A., ENHANCING EFFECTIVENESS: AN INVESTIGATION OF ADVANTAGES AND DISADVANTAGES OF VALUE-BASED INTRAGROUP CONFLICT. *International Journal of Conflict Management* **1994,** 5, (3), 223-238. https://doi.org/10.1108/eb02274410.1108/eb022744
23. Adnyani, L., Applying cognitive conflict strategy to develop mathematical critical thinking ability and character of students. *Journal of Mathematics Education* **2020,** 5, (1), 30-38. http://doi.org/10.31327/jme.v5i1.1174
24. Li, X.; Chen, G.; Yang, C., How cognitive conflict affects judgments of learning: Evaluating the contributions of processing fluency and metamemory beliefs. *Memory & Cognition* **2021,** 49, (5), 912-922. https://doi.org/10.1016/j.sbspro.2009.01.421
25. Huang, F. L.; Lewis, C.; Cohen, D. R.; Prewett, S.; Herman, K., Bullying involvement, teacher–student relationships, and psychosocial outcomes. *School psychology quarterly* **2018,** 33, (2), 223. https://doi.org/10.1037/spq0000249
26. Walker, S.; Graham, L., At risk students and teacher-student relationships: student characteristics, attitudes to school and classroom climate. *International Journal of Inclusive Education* **2021,** 25, (8), 896-913. https://doi.org/10.1080/13603116.2019.158892510.1080/13603116.2019.1588925
27. Civitillo, S.; Göbel, K.; Preusche, Z.; Jugert, P., Disentangling the effects of perceived personal and group ethnic discrimination among secondary school students: The protective role of teacher–student relationship quality and school climate. *New Directions for Child and Adolescent Development* **2021,** (177), 77-99. https://doi.org/10.1002/cad.20415
28. Huang, C.-Y.; Liu, Y.-C., Influence of need for cognition and psychological safety climate on information elaboration and team creativity. *European Journal of Work and Organizational Psychology* **2021**, 4, 1-15. https://doi.org/10.1080/1359432X.2021.1932815
29. Hamre, K. V.; Fauske, M. R.; Reknes, I.; Nielsen, M. B.; Gjerstad, J.; Einarsen, S. V., Preventing and Neutralizing the Escalation of Workplace Bullying: the Role of Conflict Management Climate. *International Journal of Bullying Prevention* **2021**, 3, 1-11. https://doi.org/10.1007/s42380-021-00100-y
30. Edmondson, A. C.; Lei, Z., Psychological safety: The history, renaissance, and future of an interpersonal construct. *Annu. Rev. Organ. Psychol. Organ. Behav.* **2014,** 1, (1), 23-43. https://doi.org/10.1146/annurev-orgpsych-031413-09130510.1146/annurev-orgpsych-031413-091305
31. Nembhard, I. M.; Edmondson, A. C., Making it safe: The effects of leader inclusiveness and professional status on psychological safety and improvement efforts in health care teams. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior* **2006,** 27, (7), 941-966. https://doi.org/10.1002/job.413
32. Weiner, J.; Francois, C.; Stone-Johnson, C.; Childs, J. In *Keep safe, keep learning: principals' role in creating psychological safety and organizational learning during the COVID-19 pandemic*, Frontiers in Education, **2021**, 5, 282. https://doi.org/10.3389/feduc.2020.618483
33. Vandenbroucke, L.; Spilt, J.; Verschueren, K.; Piccinin, C.; Baeyens, D., The classroom as a developmental context for cognitive development: A meta-analysis on the importance of teacher–student interactions for children's executive functions. *Review of Educational Research* **2018,** 88, (1), 125-164. https://doi.org/10.3102/0034654317743200
34. Woodson, A. N., Don't let me be misunderstood: Psychological safety, Black girls' speech, and Black feminist perspectives on directness. *Journal of Educational Psychology* **2020,** 112, (3), 567. https://doi.org/10.1037/edu0000458
35. Bereczki, E. O.; Kárpáti, A., Technology-enhanced creativity: A multiple case study of digital technology-integration expert teachers' beliefs and practices. *Thinking Skills and Creativity* **2021,** 39, 100791. https://doi.org/10.1016/j.tsc.2021.100791
36. Roorda, D. L.; Jak, S.; Zee, M.; Oort, F. J.; Koomen, H. M., Affective teacher–student relationships and students' engagement and achievement: A meta-analytic update and test of the mediating role of engagement. *School Psychology Review* **2017,** 46, (3), 239-261. https://doi.org/10.17105/SPR-2017-0035.V46-3

Esta página no contiene comentarios

37. Snijders, I.; Wijnia, L.; Rikers, R. M.; Loyens, S. M., Building bridges in higher education: Student-faculty relationship quality, student engagement, and student loyalty. *International Journal of Educational Research* **2020,** 100, 101538. https://doi.org/10.1016/j.ijer.2020.101538
38. Edmondson, A. C.; Higgins, M.; Singer, S.; Weiner, J., Understanding psychological safety in health care and education organizations: a comparative perspective. *Research in Human Development* **2016,** 13, (1), 65-83. https://doi.org/10.1080/15427609.2016.1141280
39. Williams, J. D.; Woodson, A. N.; Wallace, T. L., "Can we say the n-word?": Exploring psychological safety during race talk. *Research in human development* **2016,** 13, (1), 15-31. **https://doi.org/10.1002/jcop.22526**
40. Caridade, S. M. M.; Pimenta Dinis, M. A., The mediating effect of parental involvement on school climate and behavior problems: School personnel perceptions. *Behavioral Sciences* **2020,** 10, (8), 129. https://doi.org/10.1080/15427609.2016.1141279
41. La Salle, T. P.; Rocha-Neves, J.; Jimerson, S.; Di Sano, S.; Martinsone, B.; Majercakova Albertova, S.; Gajdošová, E.; Baye, A.; Deltour, C.; Martinelli, V., A multinational study exploring adolescent perception of school climate and mental health. *School psychology* **2021,** 36, (3), 155. https://doi.org/10.1037/spq0000430
42. Fantus, S.; Newman, P. A., Promoting a positive school climate for sexual and gender minority youth through a systems approach: A theory-informed qualitative study. *American journal of orthopsychiatry* **2021,** 91, (1), 9. https://doi.org/10.1037/ort0000513
43. Charlton, C. T.; Moulton, S.; Sabey, C. V.; West, R., A systematic review of the effects of schoolwide intervention programs on student and teacher perceptions of school climate. *Journal of Positive Behavior Interventions* **2021,** 23, (3), 185-200. https://doi.org/10.1177/1098300720940168
44. Sullivan, K.; Zhu, Q.; Wang, C.; Boyanton, D., Relations among peer victimization, aggression, and school climate among elementary school students in China. *School Psychology Review* **2021**, 3, 1-13. https://doi.org/10.1080/2372966X.2021.1898290
45. Tang, S.; Long, M.; Tong, F.; Wang, Z.; Zhang, H.; Sutton-Jones, K. L., A Comparative Study of Problem-Based Learning and Traditional Approaches in College English Classrooms: Analyzing Pedagogical Behaviors Via Classroom Observation. *Behavioral Sciences* **2020,** 10, (6), 105. https://doi.org/10.3390/bs10060105
46. Carless, D., From teacher transmission of information to student feedback literacy: Activating the learner role in feedback processes. *Active Learning in Higher Education* **2020**, 14, 33-67. https://doi.org/10.1177/1469787420945845
47. Bradley, B. H.; Postlethwaite, B. E.; Klotz, A. C.; Hamdani, M. R.; Brown, K. G., Reaping the benefits of task conflict in teams: the critical role of team psychological safety climate. *Journal of Applied Psychology* **2012,** 97, (1), 151. https://doi.org/10.1037/a0024200
48. Newman, A.; Donohue, R.; Eva, N., Psychological safety: A systematic review of the literature. *Human resource management review* **2017,** 27, (3), 521-535. https://doi.org/10.1016/j.hrmr.2017.01.001
49. Hayes, A. F.; Rockwood, N. J., Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. *Behaviour research and therapy* **2017,** 98, 39-57. https://doi.org/10.1016/j.brat.2016.11.001

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