

Causality among Teacher-Student Relationship, Emotion Regulation, and Class Flow in Physical Education Class

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Abstract

An amicable teacher-student relationship is related to academic achievement, emotional regulation, class flow, and class participation, as found in studies. This study aimed to analyze the causal relationship between perceived teacher and student relationships, emotional regulation, and class flow in a physical education class. It involved 374 middle school students using reliable measurement tools. The correlation between the variables was analyzed using Pearson's correlation analysis and the mediating effects of emotion regulation were analyzed using the bootstrap method. The goodness-of-fit of a structural equation model was also verified. The following conclusions were drawn based on correlation and confirmatory factor analyses among variables. First, there is a significant positive correlation between the teacher-student relationship, and emotion regulation. Second, there is a significant positive correlation between the teacher-student relationship, and class flow. Third, emotion regulation has a direct effect on the teacher-student relationship and class flow and serves as a partial mediator with significance in indirect effects. Teachers must form an emotional bond with students to develop emotion regulation skills and be better engaged in class, creating a safe learning environment for them to experience positive emotions in a physical education class.

Keywords: *Teacher-student, Relationship, Emotion regulation, Class flow*

1. Introduction

The valuable relationships between teachers and students serve as a cornerstone of successful class management. The teacher-student relationship refers to the level of connection between the two, which represents a human psychological need [1]. Teachers and students desire mutual trust, respect, and support from each other. In class, teachers and students influence each other as they continue to develop relationships.

Despite the fact that teachers' roles and relationships in physical education classes are a recently-emerging theme, teacher-student relationships are neglected in the school environment [2]. Positive emotional experiences and active participation in physical education classes among students occur as a result of effective communication between teachers and students, and mutual and social interactions between teachers and students [3]. Teaching behaviors that support relationships are socio-environmental factors that can directly satisfy students' relationship needs [1][4]. When an amicable teacher-student relationship in a physical education class is formed, where teachers and students

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communicate, interact with each other, and develop a bond of empathy, students experience positive emotions [5], thereby improving their emotion regulation, skills, and task performance. Based on these rationales, this study focused on verifying the effects of teacher-student relationships in physical education classes on emotion regulation and class flow in students. An approach by which teachers understand, empathize, and respect students in physical education classes is an important antecedent for predicting learning behaviors such as learning motivation, flow, and performance in students [6].

The research hypotheses to achieve this aim are as follows. First, the teacher-student relationship in the physical education class will affect emotion regulation. Second, the teacher-student relationship in the physical education class will affect class flow. Third, emotion regulation in the physical education class will play a mediating role in the relationship between teacher and student relationships and class flow.

2. Background

2.1 Teacher-student relationship

The teacher-student relationship is a component of relationships, as one of the basic psychological needs of human beings [6], and refers to the degree of teacher-student relationship. Relationship refers to the desire to receive trust, attention, respect, care, and support from others within a social context. In the process of satisfying these desires, individuals develop learning progression and feel psychologically stable [1]. A supportive teaching method used by teachers, as one of the key social factors based on understanding, empathy, respect, and care from students' point of view, can satisfy students' relationship needs [7]. This plays an important role in promoting learning motivation, developing positive emotions, and regulating emotions [1]. Positive teacher-student relationships are the basis for students to overcome their challenges and achieve educational goals [8]. In addition, when their relationship needs are satisfied, the boredom of participation and efforts regarding learning is alleviated, and emotional stability is achieved [9]. Recent studies regarding teacher-student relationships include research on emotional support [10], teachers' relationship support [11], Teachers' interpersonal relationships [12] and teaching behaviors and methods [13] that support relationships. Teaching methods that support the need for teacher-student relationships in class can contribute greatly to improving learning motivation and task performance in students.

2.2. Emotion regulation

The teacher-student relationship also has a significant relationship with students' emotion regulation. Emotion regulation refers to the ability to effectively control one's own or others' emotional experiences and affects the formation of relationships and interactions with others [14]. Teachers and students sometimes fail to control their emotions in a class situation when there are emotional responses and exchanges [15]. Consequently, they may experience negative emotions such as anxiety, shame, and depression—damaging the relationships they have formed. When teacher-student relationships are positive, students smoothly control their emotions [16], and support from teachers has a positive effect on academic progress and social growth. Emotion regulation is positively related to various variables (e.g., motivation, academic achievement, class attitude, self-regulation, etc.), and it is associated with increased concentration and classroom immersion [17].

2.3. Class flow

Teacher-student relationships thus affect class flow. Class flow is the optimal psychological state - when students are immersed and focused on what is happening in the classroom. When examining prior studies concerning class flow, positive teacher-student relationships as perceived by students had a positive effect on students' immersion and goal orientation [18]. Student engagement affects intrinsic motivation and leads students to fully devote themselves to learning activities by inducing interest in and amusement toward given assignments [19]. When teachers approach students in a friendly manner with genuine interest, allowing students to experience psychological stability, students' academic motivation and concentration levels increase. When teachers construct lesson plans based on students' desires and interests, the level of academic engagement in students can be improved [17]. There is also a positive correlation between emotion regulation and class and students' concentration and immersion in class situations cannot exclude the effects of emotion regulation.

3. Methods

3.1. Participants

We collected data using a self-reporting questionnaire survey method, using measurement tools that met reliability and validity tests in previous research, and were judged as appropriate for the purpose of this study. The researcher and research assistants visited the participating schools to explain the purpose of this study to the participants. The questionnaires consisted of items regarding the general characteristics of the participants (e.g., school year, gender, etc.), teacher-student relationship, emotion regulation, and class flow.

3.2. Measures

First, the teacher-student relationship was measured using a tool developed by [20]. The teacher-student relationship scale consists of questionnaire items on understanding and empathy (5 items), intimacy (5 items), and trust (3 items). This scale uses a 5-point Likert scale (1=not at all, 5=very so), and higher scores indicate better teacher-student relationships. The subscales are reliable: Cronbach's α s=.922 (empathy), .885 (intimacy), and .949 (trust). A confirmatory factor analysis assessing the validity of the scale ($\chi^2=238.994$, $df=74$, $p < .001$, CFI=.963, NFI=.948, TLI=.955, RMSEA=.077, SRMR=.0451) showed that its goodness-of-fit was acceptable.

Second, Emotion regulation was measured using a tool developed by [14]. The emotion regulation scale consists of questionnaire items on one's own emotion regulation (6 items) and the emotion regulation of others (4 items). This scale uses a 5-point Likert scale (1=not at all, 5=very so), and higher scores indicate better emotion regulation. The subscales are reliable: Cronbach's α s=.892 (one's own emotion regulation) and .873 (others' emotion regulation). A confirmatory factor analysis assessing the validity of the scale ($\chi^2=110.329$, $df=34$, $p < .001$, CFI=.966, NFI=.952, TLI=.956, RMSEA=.078, SRMR=.0360) showed that its goodness-of-fit was acceptable.

Third Class flow was measured using a tool developed by [21]. The class flow scale consists of questionnaire items on autotelic experience (6 items), class content (5 items), and sense of challenge and control (4 items). This scale uses a 5-point Likert scale (1=not at all, 5=very so), and higher scores represent better class flow. The subscales are reliable: Cronbach's α s=.905 (autotelic experience), .868 (class flow), and .773 (sense of challenge

and control). A confirmatory factor analysis assessing the validity of the scale ($\chi^2=272.105$, $df=87$, $p < .001$, $CFI=.947$, $NFI=.924$, $TLI=.936$, $RMSEA=.076$, $SRMR=.0351$) showed that its goodness-of-fit was acceptable.

3.3. Data analyses

In order to analyze the relationship between teacher and student relationships, emotion regulation, and class flow in the physical education class, a reliability analysis was performed, and the correlation between the variables (Pearson’s product-moment correlation coefficient) was tested using the IBM SPSS 23.0 program. Confirmed factor analysis and path analysis were performed using AMOS 18.0. The goodness-of-fit of the model was tested based on CFI (.90 or more), TLI (.90 or more), RMSEA (.08 or less), and SRMR (.08 or less), and χ^2/df [22]. The effects of mediating variables were tested using [23] approach, and the significance test was performed using bootstrapping. In addition, 5,000 bootstrap samples generated from the raw data were used for parameter estimation, and the confidence interval was set at 95%. Based on this data, we investigated the indirect effects of teacher-student relationships on class flow through emotional control. Since the participants were minors, we obtained approvals from teachers in charge, principals at the concerned schools, and their parents. In addition, students and parents were informed that the personal data collected for statistical purposes would not be used for any purpose, other than statistical.

4. Results

4.1. Correlations between variables

[Table 1] shows the correlation between teacher-student relationship perceived by students, emotion regulation, and class flow. All sub-factors of teacher-student relationship, class flow, and emotion regulation showed significant positive correlation ($p < .01$). The teacher-student relationship perceived by the student was found to have a positive relationship between class flow and emotion regulation.

Table 1. Correlation between variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Understanding and empathy	1							
2. Intimacy	.673**	1						
3. Trust	.500**	.570**	1					
4. One’s own emotion regulation	.524**	.594**	.500**	1				
5. Others’ emotion regulation	.492**	.600**	.506**	.683**	1			
6. Autotelic experience	.511**	.579**	.487**	.650**	.571**	1		
7. Class flow	.480**	.582**	.536**	.526**	.549**	.638**	1	
8. Sense of challenge and control	.350**	.385**	.361**	.393**	.357**	.574**	.549**	1

** $p < .01$.

4.2. Goodness-of-fit first-order headings

[Table 2] shows the results of analyzing the goodness-of-fit of the proposed model. The model satisfied the criteria providing by [22] above, indicating that the proposed model can be established as a theoretical model.

Table 2. Result of the goodness-of-fit test and causal relationship test

	Path		Est.	SE	C.R(t)	p	Effects		
							Total effect	Direct	Indirect
Emotion regulation	←	Teacher-student relationship	.800	.063	12.777	.001	.800	.800	
Class flow	←	Teacher-student relationship	.279	.083	3.349	.001	.593	.279	.314
Class flow	←	Emotion regulation	.392	.090	4.346	.001	.392	.392	

$\chi^2=50.408, df=17, CFI=.978, TLI=.965, RMSEA=.073, SRMR=.0328$
 Est.=estimate, SE=standard error.

According to [Table 2], the direct effect of teacher-student relationship on emotion regulation, the direct effect of teacher-student relationship on class flow, and the direct effect of emotion regulation on class flow were all significant. Emotion regulation played a partial mediating role in the association between teacher-student relationship and class flow.

5. Discussion

We examined the effect of emotion regulation on the relationship between teacher-student relationship and class flow in physical education. Results revealed that emotion regulation had a partial mediating effect in the relationship between teacher-student relationship and class flow.

In physical education, the teacher-student relationship was directly correlated with emotion regulation. This result supports previous findings [17][24] - that students who have formed a relationship of trust with teachers can effectively control their emotions when faced with conflicts or stressful situations. Students who have a close relationship with their teacher are less likely to develop psychological maladjustment symptoms such as anxiety, depression, or problem behaviors [25]. In addition, students who display emotion regulation have excellent social adaptability. Perceived social support from teachers is related to students' psychological stability and emotion control. Positive teacher-student interactions are also associated with positive student-peer interactions [26]. Formation of teacher-student relationships inevitably requires emotional understanding. For healthy teacher-student relationship, teachers must understand students and their emotion regulation abilities.

In physical education, the teacher-student relationship also had a direct positive relationship with class flow. Positive teacher-student relationships are likely to have positive effects throughout the class. This finding supports prior studies that showed that the level of trust students' gain from teachers affects students' perceived class flow, active class participation, and academic achievement [16]. According to Self-determination Theory [1], the formation of effective relationships with peers, teachers, and parents is meaningful to students. Students who have formed positive relationships with teachers display more effort, patience, and immersion in class. Positive teacher-student relationships also contribute to students' participation and continuity in class activities and class flow [27], as well as students' engagement and internal learning motivation [8]. Students develop when lessons are

provided in such an environment that goes beyond the simple education of skills and knowledge and teachers' provide education that students can appreciate.

In the relationship between teacher-student relationship and class flow, emotion regulation was found to play a partial mediating role. In class, emotion regulation is important in that it promotes students' psychological stability and learning ability [24]. The positive emotional experience of students in class broadens the range and scope of attention, allowing them to be better focused and immersed in the class [28]. Providing positive feedback from teachers can help control student behavior and improve the level of emotion regulation [29]. In contrast, if a teacher gives a student negative feedback, it can cause negative emotions such as helplessness and anxiety [28], which hinders students' focus and immersion. However, when teachers give positive feedback to students, students can develop emotion regulation skills and it enhances class flow.

In physical education, student perform physical activities, experience various emotions, and share emotional empathy with teachers. When a physical education teacher disciplines a student owing to safety requirements or instructional goals, the student will experience negative emotions [30]. Students' negative emotional experiences can disrupt class flow and damage teacher-student relationships. In physical education, teachers need to understand students' emotional regulation and express emotional empathy to promote class flow.

5. Conclusion

Students' emotion regulation has a direct effect and a partial mediating role on teacher-student relationship and class flow. In class, students' emotional experiences are important. Classes do not consist solely of teaching skills, and teachers must communicate and empathize with students. Teachers' relationships with students are key to classroom management, and teachers cannot attain students' focus and immersion in the class without winning the hearts of students. Teachers need to build and develop emotional rapport with students in physical education so that students can develop emotion regulation skills, which may result in better class flow. Furthermore, with empathic and emotional understanding, teachers can create a safe classroom environment in which students can experience positive emotions in physical education.

Based on the results of this study, suggestions for future research are as follows. This study investigated the mediating effects of positive aspects of emotion regulation on teacher-student relationship and class flow, but it does not provide indications to identify how the negative aspects of emotion regulation might affect teacher-student relationships and class flow. Further studies that consider both the positive and negative aspects of emotion regulation should be conducted. Moreover, although the role of teachers as a social factor in promoting students' motivation is significant, relationships between students or peers also have an important influence. Therefore, if multiple studies regarding relationships between peers and teacher-student relationships affecting students' socialization processes were conducted, the quality of class learning may be further improved.

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