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# Student Perception of Competence and Attitude in Middle School Physical Education

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## Abstract

*Motivation is a dynamic process that accounts for the interaction and filtration of information by the student and the effect that it has on student behavior. Perception of competence, an embedded motivational theory, posits that the influence of prior experience and information received from outside sources affects student behavior (Harter, 1982). Attitude is also a multifaceted construct that can be defined from varying dimensional viewpoints. A few specific factors have been identified as determinants of student attitude including the teacher, the curriculum, and the context. These factors are similar to those observed in perception of competence research. The purpose of this study was to examine the relationship of attitude and perception of competence in an effort to gain an understanding of the relationship between the two and their shared attributes and factors. The researchers surveyed middle school students (N = 1281) in Grades 6–8 physical education classes using the Middle School Physical Education Perception of Competence Survey (Scrabis-Fletcher & Silverman, 2010) and the Student Attitude in Middle School Physical Education Survey (Subramaniam & Silverman, 2000). Data analyses showed a significant difference for grade level, Wilks's $\Lambda$ = .948, F(10, 2542) = 6.83, p = < .0001, and a statistically significant difference for the prior experience factor among all grade levels. Results from this study suggest*

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*that although both constructs are sociocognitive in nature, they are not as highly correlated as previously believed. Low correlations were reported across the models, suggesting that the two constructs should be measured independently of each other and that one should not be used to predict the other. Attitude and perception of competence are two distinct sociocognitive concepts that share similar characteristics and factors but, as reported here, function independently of each other.*

Students enter physical education (PE) classes, with existing predispositions and feelings toward PE and physical activity that influence the experience they have in class. Those predispositions extend beyond PE class and influence their intention to participate outside of class (Beasley & Garn, 2013; Jaakkola et al., 2013). Predispositions may be based on prior experience, either successful or unsuccessful; feedback received from outside sources; societal expectations for appropriateness of engagement; perceptions of usefulness of material; and feedback received from peers and teacher. The effect of these predispositions, along with students' current experience, generates new thoughts, feelings, and behaviors rooted in social cognitive theory (Bandura, 1986). Specific constructs discussed in PE research that account for social cognitive processes and the respective affective components are motivation and attitude.

Motivation is a cognitively mediated construct that accounts for students' prior experiences and filtering of information received within a context and from outside sources to predict level of engagement (Beasley & Garn, 2013; Gehris, Kress, & Swalm, 2010). It must be considered from the perspective of the learner and his or her internalization and processing of what the teacher does and the environment the teacher creates (Taylor & Ntoumanis, 2007).

Perception of competence has been studied extensively in both education and PE, with research indicating it as a crucial factor in determining motivation of students (Bryan & Solmon, 2012; Cairney et al., 2012; Fu & Gao, 2013; Gehris et al., 2010; Solmon, Lee, Belcher, Harrison, & Wells, 2003; Stein, Fisher, Berkey, & Colditz, 2007; Trouilloud, Sarrazin, Bressoux, & Bois, 2006). Previous research has highlighted the influence of prior experience and information received from outside sources and its direct effect on student behavior (Harter, 1982; Trautwein, Gerlach, & Ludtke, 2008).

Perception of competence theory posits that the more competent a child feels about him- or herself in an activity or setting, the more likely he or she will be to participate freely (Harter, 1978). Social and personal factors play a part in forming perception of competence, such as parents (Felton et al., 2002), teachers (Trouilloud et al., 2006; Xiang, Gao, & McBride, 2011; Zhang, Solmon, & Gu, 2012), peers (Burkhalter & Wendt, 2001), prior experience (Solmon et al., 2003), autonomy (Shen, McCaughtry, & Martin, 2007, 2008; Xiang et al., 2011), societal expectations (Cairney et al., 2012), and the learning goal of the class (Guan, McBride, & Xiang, 2007; Shen, Chen, & Guan, 2007).

One factor influencing perception of competence in PE class is perceived autonomy. If students feel autonomous in choosing and planning the tasks and curriculum, they are more likely to engage in the class (Cothran & Ennis, 1999; Shen, McCaughtry, & Martin, 2007, 2008). The two, perceived competence and autonomy, work in concert with each other. From a teaching viewpoint, allowing students a voice in decision making may help to increase perception of competence and encourage participation and motivation among students (Taylor & Ntoumanis, 2007; Trouilloud et al., 2006). If a teacher creates a learning environment focused on autonomy, individual growth, and learning, perception of competence will improve (Valentini & Rudisill, 2004; Xiang et al., 2011; Zhang et al., 2012). Conversely, if a solely competitive performance environment is fostered, students may develop a low perception of competence, which is negatively related to persistence and behavioral intensity (Bryan & Solmon, 2012). Therefore, two factors the teacher controls that influence perception of competence are the amount of autonomy allotted to the students and the type of learning environment and learning goal for the class.

Attitude, like perception of competence, is a multifaceted construct that can be defined from varying dimensional viewpoints. The multicomponent viewpoint accounts for the cognitive, affective, and behavioral response also known as conation (Ajzen, 1988). Each of these viewpoints, cognitive, affective, and behavioral, can result in verbal or nonverbal responses or both, similar to the responses that competence may have in predicting future activity.

A few specific factors have been commonly identified as determinants of student attitude. They are the teacher, the curriculum, and the context (Subramaniam & Silverman, 2000, 2002; Suomi, Collier, & Brown, 2003). Other factors have been identified but not consistently across previous studies. These include parental beliefs about physical activity (Felton et al., 2002), peers (Figley, 1985), social stereotypes and influences (Suomi et al., 2003), and students' sense of belonging (Cothran & Ennis, 1999). These factors and findings are similar to those observed in perception of competence research.

Key elements have been identified as affecting student attitudes in PE. Subramaniam and Silverman (2002) found that students with positive attitudes believed PE was important in education, found it useful, had better control over their enjoyment in PE, felt they belonged to a community of learners, and had learned the material. Similar themes are reported in perception of competence research findings, especially the need for value in the activity (Cury et al., 1996; Paxton, Estabrooks, & Dzewaltowski, 2004). In contrast, students with negative attitudes felt as if they had no control in PE, had lower perception of competence, and viewed the teacher and the curriculum as obstacles to learning.

The implications of student attitude extend beyond PE to the global view of attitude toward physical activity, which may be negatively affected by poor experiences in class, therefore creating an aversion to physical activity. Attraction to physical activity is mediated by perception of competence and attitude (Paxton et al., 2004), and attitude is a key correlate of physical activity (Sallis, Prochaska, & Taylor, 2000). Therefore, student attitude, like perception of competence, has implications for the present context and learning environment within PE class and for regular participation in physical activity outside of school and throughout their lifetime.

Gender has also been identified as a factor in determining competence beliefs and student attitude. Females report lower feelings of competence and attitude when compared to males (Cairney et al., 2012; Koca, Asci, & Demirhan, 2005; Ryan, Fleming, & Maina, 2003). Gender-related differences have been reported in other subjects for competence beliefs, including math, science, and PE (Lubans, Morgan, & McCormack, 2011). Student perceptions of competence and motivation may be more strongly influenced by what society

believes is acceptable and by students' prior experience rather than by what the teacher does (Solmon et al., 2003).

The purpose of this study was twofold. First, an examination of perception of competence and student attitude was conducted on multiple levels to delineate differences in attitude and perception of competence for grade and gender. A second purpose was to explore the attitude and perception of competence relationship. As stated previously, attitude and perception of competence (or more generally motivation) are used interchangeably in the literature, because they are both sociocognitive constructs that influence behavior. The relationship of the two is unknown. Therefore, an examination of constructs and factors together will produce a better understanding of the relationship of the two factors.

## Method

### Participants

This study was part of a larger study and survey of middle school students ($N = 1{,}281$) in Grades 6–8 ($n = 313$ in sixth grade; $n = 581$ in seventh grade; $n = 387$ in eighth grade; age range = 11–15, $M = 12.5$), in seven schools, both urban and suburban, in three states in the Northeastern United States. Students were represented from 11 PE teachers' classes (six male, five female). The units of instruction during data collection varied and included softball ($n = 4$), football ($n = 2$), cooperative games ($n = 2$), volleyball ($n = 2$), and soccer ($n = 1$). All teachers were certified PE teachers and had been teaching at least 2 years (range = 2–31 years).

### Measures

**Perception of competence.** The Middle School Physical Education Perception of Competence Survey (Scrabis-Fletcher & Silverman, 2010) was used to measure Perception of Competence. It uses a 5-point Likert-type scale, and specific instrument questions focus on the factors of prior experience, social (peers), and teacher, which have been found to influence perception of competence. The three-factor model includes questions about the effect of prior experience, peers, and the teacher on development of perception of competence. Statements were designed for middle school reading level comprehension and were stated in positive and negative for-

mats. The internal consistencies of the factor subscales were tested in a validation study and were as follows: prior experience (a = .66), peers (a = .80), and teachers (a = . 85). Fit statistics in the validation study strongly suggest the construct model was valid.

**Student attitude.** To assess student attitude, the researchers used an existing scale for middle school students in PE developed by Subramaniam and Silverman (2000). The scale was designed around the dual component view of student attitude, cognitive and affective (Ajzen, 1988), with two- and four-factor models being assessed. For the purposes of this study, the two-factor model addressing perceived usefulness (a = .89) and enjoyment (a = .86) served as the attitude model for this study. The format of the survey directions and statements, including positive and negative phrasing, and the 5-point Likert-type scale were identical across the instruments.

## Data Collection

Prior to administration of the instruments and demographic sheet, the teacher and primary researcher met to discuss the study. The instruments had been distributed to the teachers before the meeting, allowing them time to review them and ask questions. During the meeting, the teachers were informed about the purpose of the study, and then together the researcher and teacher reviewed each item on the instrument, addressing any questions that arose. Protocol was discussed for completion, emphasizing the need for students to be dispersed throughout space and to work independently. Additional emphasis was placed on reminding the students that their answers had no effect on their grade in PE. Surveys took approximately 20–30 min to complete. Students were instructed and repeatedly reminded to think of PE only and not outside participation, such as on a recreational team or in club setting.

## Data Analysis

Descriptive statistics including means, standard deviations, and frequencies were calculated for each instrument holistically and its respective factors individually. Factors were examined by gender, grade, and gender by grade. A 3 (grade) × 2 (gender) multivariate analysis of variance (MANOVA) was conducted for the dependent variables, the three perception of competence factors, and the two attitude factors. It was decided to examine the scores from the per-

ception of competence and attitude instrument together because they are discussed as interchangeable terms within the literature.

For the significant grade factor, identified in the MANOVA, a stepwise discriminant function analysis was conducted to determine which dependent variables, and in what order, were responsible for the differences (Stevens, 2009). Once the order of entry was determined, an analysis of variance (ANOVA) was completed for the first dependent variable to enter the discriminant function analysis and followed by analysis of covariance (ANCOVA) for subsequent variables that were identified in the discriminant function analysis. Following the ANOVA and ANCOVA, a Student–Newman–Keuls was conducted to analyze the differences between the grade levels within the identified factors.

A variety of correlation analyses were conducted to examine the relationship of the factors of the attitude and perception of competence models along with the correlation of the overall models for both. Specifically, Pearson product–moment correlation coefficients were calculated among the perception of competence factors (prior experience, teacher, and social) and the attitude factors (perceived usefulness and enjoyment). Canonical correlation was then conducted to examine the correlation across constructs, for the two- and three-factor models of perception of competence and two-factor model of attitude.

## Results

The first step of analysis was calculating descriptive statistics for the instruments and their respective factors. Overall scores, means, and standard deviations were calculated for the entire group to gain an initial description of instrument scores. From the descriptive analyses, a decline was observed in perception of competence and attitude across most factors for each grade. There was a slight increase in the social and teacher factors of perception of competence for seventh grade female students. In the attitude analysis, there was a decline in the factors; however, there was an increase for enjoyment and perceived usefulness for eighth grade students (see Table 1 and Table 2).

**Table 1**
*Perception of Competence Scores by Grade and Gender*

| | 6th grade | | | 7th grade | | | 8th grade | | |
|---|---|---|---|---|---|---|---|---|---|
| **Competence factor** | **Male** ***n*** **= 133** ***M*****(*****SD*****)** | **Female** ***n*** **= 180** ***M*****(*****SD*****)** | **Both** ***n*** **= 313** ***M*****(*****SD*****)** | **Male** ***n*** **= 277** ***M*****(*****SD*****)** | **Female** ***n*** **= 304** ***M*****(*****SD*****)** | **Both** ***n*** **= 581** ***M*****(*****SD*****)** | **Male** ***n*** **= 217** ***M*****(*****SD*****)** | **Female** ***n*** **= 170** ***M*****(*****SD*****)** | **Both** ***n*** **= 387** ***M*****(*****SD*****)** |
| Prior Experience | 30.75 (4.0) | 29.70 (5.11) | **30.15 (4.70)** | 28.58 (4.58) | 28.84 (4.88) | **28.71 (4.74)** | 27.56 (4.87) | 27.87 (5.10) | **27.70 (4.96)** |
| Teacher | 15.13 (4.15) | 14.33 (4.03) | **14.67 (4.10)** | 15.00 (4.17) | 14.94 (4.28) | **14.97 (4.22)** | 14.61 (3.63) | 14.31 (3.88) | **14.48 (3.74)** |
| Social | 9.39 (2.40) | 9.41 (2.58) | **9.40 (2.50)** | 9.46 (3.03) | 9.78 (2.84) | **9.63 (2.93)** | 9.22 (2.58) | 9.35 (2.56) | **9.28 (2.57)** |
| Total | 55.83 (6.80) | 53.44 (7.75) | **54.22 (7.41)** | 53.05 (7.43) | 53.56 (7.60) | **53.32 (7.51)** | 51.40 (7.47) | 51.55 (7.80) | **51.47 (7.61)** |

**Table 2**
*Attitude Scores by Grade and Gender*

| | 6th grade | | | 7th grade | | | 8th grade | | |
|---|---|---|---|---|---|---|---|---|---|
| **Attitude factor** | **Male** ***n*** **= 133** ***M*****(*****SD*****)** | **Female** ***n*** **= 180** ***M*****(*****SD*****)** | **Both** ***n*** **= 313** ***M*****(*****SD*****)** | **Male** ***n*** **= 277** ***M*****(*****SD*****)** | **Female** ***n*** **= 304** ***M*****(*****SD*****)** | **Both** ***n*** **= 581** ***M*****(*****SD*****)** | **Male** ***n*** **= 217** ***M*****(*****SD*****)** | **Female** ***n*** **= 170** ***M*****(*****SD*****)** | **Both** ***n*** **= 387** ***M*****(*****SD*****)** |
| Enjoyment | 38.91 | 37.93 | **38.35** | 36.72 | 36.31 | **36.51** | 36.74 | 37.12 | **35.91** |
| | (5.85) | (6.40) | **(6.18)** | (7.07) | (7.74) | **(7.43)** | (5.99) | (6.10) | **(6.03)** |
| Perceived Usefulness | 37.98 | 37.05 | **37.45** | 35.94 | 35.87 | **35.91** | 35.71 | 36.08 | **35.88** |
| | (6.55) | (6.70) | **(6.64)** | (7.00) | (8.01) | **(7.54)** | (6.27) | (6.47) | **(6.35)** |
| Total | 76.90 | 74.99 | **75.80** | 72.67 | 72.19 | **72.42** | 72.46 | 73.21 | **72.79** |
| | (11.50) | (12.19) | **(11.92)** | (13.40) | (15.13) | **(14.32)** | (11.51) | (11.98) | **(11.71)** |

Results from the MANOVA indicated a significant difference for grade level, Wilks's $\Lambda = .948$, $F(10, 2542) = 6.83$, $p < .0001$. The gender and gender by grade level analyses were not statistically significant. The discriminant function analysis for grade showed four of the five factors entered at the .05 level. Prior experience entered first, Wilks's $\Lambda = .965$, $F(2,1277) = 22.52$, $p < .0001$, followed by enjoyment Wilks's $\Lambda = .958$, $F(2, 1277) = 4.89$, $p < .01$; teacher, Wilks's $\Lambda = .953$, $F(2, 1277) = 3.20$, $p < .05$; and peer, Wilks's $\Lambda = .949$, $F(2, 1277) = 3.05$, $p < .05$).

From the stepwise discriminant function analysis, ANOVA, ANCOVA, and Student–Newman–Keuls' analyses, a statistically significant difference was observed for the prior experience factor among all grade levels (sixth grade = 30.15, seventh grade = 28.71, eighth grade = 27.70). For enjoyment, the sixth grade students were significantly higher than the seventh and eighth grade students. The seventh and eighth grade students were not significantly different from each other (sixth grade = 38.35, seventh grade = 36.51, eighth grade = 36.91). Despite a significant discriminant function analysis entry for teacher and peer, the more conservative Student–Newman–Keuls' test indicated no significant differences by grade.

The Pearson product–moment correlation analysis resulted in relatively low correlations among the variables. The two attitude factors, enjoyment and perceived usefulness, showed a high correlation with each other, $r(1279) = .79$, $p < .01$. Conversely, the three perceptions of competence factors, prior experience, teacher, and social, showed low correlations with each other, $r(1279) = .31, .08, .02$, $p < .01$). When the factors were examined across the instruments, relatively low correlations were found, but some of the relationships (enjoyment and usefulness, teacher and enjoyment, teacher and usefulness, prior experience and usefulness, prior experience and enjoyment, social and enjoyment, social and usefulness, social and teacher, prior experience and teacher) were significant at the .01 level (see Table 3).

**Table 3**
*Correlations Between Perception of Competence and Attitude Factors*

| Factor | Enjoyment | Usefulness | Teacher | Prior experience | Social |
|---|---|---|---|---|---|
| Enjoyment | 1.0 | .79** | .08** | .21** | .10** |
| Perceived Usefulness | – | 1.0 | .14** | .31** | .09** |
| Teacher | – | – | 1.0 | .31** | -.08** |
| Prior Experience | – | – | – | 1.0 | -.02 |
| Social | – | – | – | – | 1.0 |

*Note. df* = 1,279.

**Correlation is significant at the .01 level (2-tailed).

After the individual factors were examined, a holistic canonical correlation was conducted for the overall models for perception of competence and attitude. The perception of competence model was examined using three- and two-factor models. Again, low correlations were found, three-factor model, $Rc(2, 1277) = .333$, $SE = .024$; two-factor model, $Rc(1,1278) = .175$, $SE = .027$.

## Discussion

The purpose of this study was to examine the relationship of perception of competence and attitude and how they differ by gender and grade level across the middle school years. Previous research has suggested a strong link between the two constructs, but a clear explanation of the relationship had yet to be investigated. Results from this study suggest that although both constructs are sociocognitive in nature, they are not as highly correlated as previously discussed (Beasley & Garn, 2013; Bryan & Solmon, 2012). Low correlations were reported across the models in this study, suggesting that the two constructs should be measured independently of each other and that one should not be used to predict the other. Attitude and perception of competence are distinct sociocognitive concepts that

share similar characteristics and factors but, as reported here, function independently of each other.

Although differences were observed across grade levels, little difference was observed when comparing genders. This is surprising given that researchers have found differences in both attitude and perception of competence for males and females (Bryan & Solmon, 2012; Cairney et al., 2012; Lubans et al., 2011). This may be attributed to teacher behavior in class and how they treat males and females. If the teacher allows for androgyny in activity and reduces gender bias in activity and interaction, the students will have a greater chance of not feeling the effects of gender differences or biases in class. For this study, students were asked to think of their complete PE experience, not a specific activity. Through this method, perception of competence and attitude may have been decontextualized, limiting the perceived societal expectations about certain activities on their judgment of perception of competence and attitude.

A shift in educational research and practice has placed an emphasis on decreasing gender bias, stereotypes, and disparities in achievement within schools. It is encouraging to see that perhaps gender barriers and differences that once existed in PE are now being combated through better curriculum planning and student-centered approaches to learning and instruction. Results from this study also suggest that differences in attitude and perception of competence exist at the grade level only and that boys and girls do not differ in their influences on perception of competence and attitude.

Grade level changes over the middle school years for the three- and two-factor models of perception of competence and attitude were found. Prior research on attitude and perception of competence has had similar results, showing a steady decrease in perception of competence and attitude as students progress through their PE experience (Subramaniam & Silverman, 2007; Xiang, Chen, & Bruene, 2005). Prior experience, a key factor identified in the literature as influencing perception of competence (Solmon et al., 2003; Nicaise, Cogerino, Bois, & Amorose, 2006), was found to decrease as students progressed through middle school grades.

An explanation of this decline may be that the experience, either success or failure, a student gains while progressing through the PE curriculum may have a detrimental effect on their appraisal of com-

petence. It is not surprising that as students gain experience outside of class and in previous PE classes, these experiences have less of an effect on influencing perception of competence, because mixed messages may be sent. Success during one experience may be dependent upon the teacher, the class, and the activity. Therefore, because of overexposure and inconsistent success in experiences, the importance of the experience decreases.

Another factor affecting prior experience is the amount of value the student places on the activity. If the student does not value PE and its content, perception of competence will decrease (Cury et al., 1996). This influences prior experience by directing the level of engagement within the activity related to its perceived value. If students have poor prior experience or overexposure through redundancy in curricular offerings (Cothran & Ennis, 1999) and do not value the activity, the prior experience factor becomes less influential on competence because it is not perceived worthwhile.

Socialization with peers and the increased influence placed on their approval is part of being an adolescent. Perhaps the lack of significance of the peer factor is due to the equal importance of it for all grades. If students throughout middle school valued the information received from peers, there would be no difference across grade levels. Therefore, from this study, it is difficult to definitively state the effect of peers on influencing perception of competence.

Instead of the issues of peers and the need for peer validation, another social source of information needs to be examined, specifically the teacher. This study suggests that the role of the teacher in designing the learning environment in terms of autonomy and enjoyment is crucial in promoting positive attitudes and perceptions of competence. Allowing students the opportunity to choose partners and demonstrate autonomy in choice of activities and allowing for ample practice time may allow for positive feedback and positive social interaction with peers.

Prior research has shown that the type of praise and type of interaction the teacher has with students have been shown to influence student perception of competence (Nicaise et al., 2006). A performance-based learning environment has also been found to decrease student perception of competence (Guan et al., 2007; Shen et al., 2008), along with goals that are competence based (Xiang

et al., 2005). Four of the seven participating schools in this study allow students to rotate teachers throughout the school year. This is a common practice in secondary school PE. Therefore, the effect of the teacher may be lessened because students have the possible opportunity to begin anew with a different PE teacher every marking period or school year. Because of this "clean slate," students are given the opportunity to gain new experience with different PE teachers, decreasing the importance of the role of the teacher in influencing perception of competence.

Enjoyment decreased for the students in this study from sixth to seventh and eighth grades. Only the changes between sixth and seventh grade were significant and are echoed in findings from the existing literature (Subramaniam & Silverman, 2002, 2007). Upon entering middle school, students may engage in new activities and curricula, as suggested in the goals of the Society of Health and Physical Educators (2014). These new activities may be novel and challenging, two variables indicated as strong predictors of situational interest motivation in PE (Chen & Hancock, 2006). As students progress through their experience, the novelty and challenge of new activities encountered in a middle school curriculum may wane, therefore decreasing the importance of enjoyment of the activity and perhaps placing the emphasis on another aspect. Coupled with unsuccessful experiences due to lack of practice or negative feedback received from social sources (peers and teachers), the enjoyment may decrease or be less influential because it simply does not exist.

The results from this study concur with Xiang et al.'s (2011) findings that promoting enjoyment, possibly through novelty of activity, using a variety of teaching styles, and encouraging autonomy may aid in enhancing enjoyment. When teachers plan curricula, their attempts to decrease redundancy in activity across the current school year and the entire PE career may help to increase enjoyment (Lubans et al., 2011). Enjoyment linked to overexposure compounded by poor skill and perception of competence will decrease student attitude (Subramaniam & Silverman, 2002).

This study sought to delineate the relationship between perception of competence and attitude in middle school PE. The two constructs are commonly used interchangeably. The results, however,

suggest that the relationship is not linear and the two should be examined independently. Because both attitude and perception of competence are dynamic processes, it cannot be assumed that they work in concert with each other.

These findings provide information about the cognitive processing of information during the middle school PE experience. Because sociocognitive processes are ever changing, the need for sound instruments rooted in psychometric theory are necessary to gain an accurate appraisal of student attitude and perception of competence. Once factors have been identified initially as influences of cognitive processes, further research can be conducted about the factors and their nuances. This will assist educators in creating programs that are more student centered, in accounting for existing predispositions, and in creating learning experiences that offer student autonomy and working with peers, and this could allow for an increase in student attitude and perception of competence for all students.

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