TEACHER EDUCATION & DEVELOPMENT | RESEARCH ARTICLE

The role of teacher-student relationship on performance in mathematics of the eleventh graders in the Cape Coast metropolis: Critical friendship perspective

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Abstract: Drawing on Critical Friendship as a theoretical base, an investigation was carried out to find out what components of teacher-student relationship would make a difference in the performance in mathematics of the eleventh graders in the Cape Coast Metropolis. A sample size of 2,575 students was randomly chosen to fill a questionnaire on teacher-student relationship and write an achievement test in mathematics. Findings revealed that trust, fear and lack of respect negligibly and statistically correlated with achievement scores; unhealthy context and challenge correlated negligibly (but not statistically); while support did not correlate. The sub-constructs jointly shared a variance of approximately 8% with achievement scores. With a focus on developing critical minds and democratic future leaders, there is a need for pre-service and in-service training on the teacher-student relationship.

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PUBLIC INTEREST STATEMENT
This article describes a research project which tests thinking about the impact of teacher-student relationships when teaching mathematics. The impact of the teacher as Critical Friend affects both academic achievement and also interest in pursuing the subject to higher levels as well as a student’s self-esteem. The results of the research challenge all educators to ask themselves how they can better encourage learning by offering positive regard in the classroom (and school environment as a whole). It is of particular relevance when students struggle in this subject or, indeed, any other. Human flourishing happens when a person is respected, helped and encouraged. Fear of being made to look foolish, especially in front of peers, damages both academic scores and behaviour and is detrimental to the well-being of the whole school community. A good teacher-student relationship models attitudes and skills for life now and in the future.
Awareness about the teacher-student relationship in the learning of mathematics may be created through debates among students in schools.

**Subjects:** Secondary Education; Teachers & Teacher Education; Classroom Management & Organisation; Teaching & Learning; Continuing Professional Development

**Keywords:** critical friendship; mathematics; performance; senior high school; teacher-student relationship

1. Introduction

Despite the broad applicability of mathematics to everyday life, it is often considered a difficult subject in schools (Mutodi & Ngirande, 2014), especially in Ghana where students’ performance in mathematics has not been considered worthwhile (International Association for the Evaluation of Education Achievement, 2008; Ministry of Education, 2012, 2013; Mullis et al., 2012) and mathematics has not undergone much change in terms of its lack of attractiveness to students in general. The abysmal performances of students in mathematics at national examinations in the last ten years continue to send cold waves down the spines of educators, parents and other well-meaning individuals in the education sector (e.g., Fletcher as cited in Amankwa, 2016, March 17).

These stakeholders’ concern is legitimate because a credit in mathematics is one of the prerequisites for entry into every tertiary institution in Ghana and many higher institutions across the globe. This can be inferred from some researchers’ (e.g., Calder & Campbell, 2016) who claim that mathematics is a filter that prevents students from gaining admission into tertiary institutions. Secondly, the Ghanaian mathematics syllabus does not only recognize mathematics as the key for future aspirations of students in pursuit of higher education, but also for everyday use of every Ghanaian (Ministry of Education, 2018).

Table 1 presents the West African Senior Secondary Certificate Examination results in mathematics for the past 8 years in Ghana.

Table 1 shows that in 2018, about 38.33% students obtained a credit pass (i.e. A₁-C₉). This presupposes that only 38% were eligible for admission into various higher institutions in the country. This implies that weakness in mathematics is an obstacle to both individual and national development.

However, over the years, the weak performance in mathematics has been ascribed to factors such as the cognitive domain, teacher professional status, etcetera until recent decades broadened studies of performance in mathematics to include affective domains and a healthy teacher-student relationship (Cretchley, 2008; DeBellis & Goldin, 2006). In fact, Olanian and Salman (2015) discovered that

| Year | A₁ to C₉ |
|------|----------|
| 2012 | 49.90%   |
| 2013 | 36.80%   |
| 2014 | 32.40%   |
| 2015 | 25.04%   |
| 2016 | 32.83%   |
| 2017 | 42.73%   |
| 2018 | 38.33%   |
| 2019 | 64.23%   |
poor teacher-student interaction is a non-conducive environment for the learning of mathematics and it is among the major causes of math-phobia in their study. If the constant bombardment of change and reform in education, directed by successive governments, has not succeeded in resolving what Fletcher termed (as cited in Amankwa, 2016, March 17) the fluctuated performance over the last ten years and a sharp decline in the percentage aggregate of students that sat for mathematics at national examinations, there is a need to search for solutions elsewhere. Fortunately, Montuoro and Lewis (2015) discovered that collaborative research with students as key participants had the immediate impact of solving academic problems because they are an excellent source of information about classroom processes. Moreover, research have shown that a positive relationship provides a good environment for high academic performance (Nyadanu et al., 2015; Scherzinger & Wettstein, 2019), owing to the students’ increased motivation to learn (Groves et al., 2015; Rahman et al., 2020).

Many investigations (e.g., Marengo et al., 2018) have been conducted into the relationships between students and teachers but most of the investigations focused on the elementary years of schooling despite the fact that teachers have the unique opportunity to support students’ academic and social development at all levels of schooling (Marengo et al., 2018; McCormick et al., 2013). In addition, those studies adapted insights from Attachment theory, Self-determination theory, Zone of Proximal Development theory, and Social support perspective. Thus, exploring teacher-student relationship at the senior high level and using Critical Friendship as a theoretical base might provide some useful information from a different dimension. Research findings have shown the possibility of Critical Friendship among peers, headteachers and school improvement partners but not many studies have been conducted on the possibility of Critical Friendship in situations of uneven power such as among people who are different in status, competence, and age. Thus, the main purpose of this study was to determine the role of teacher-student relationship on the performance of senior high students in mathematics in the Cape Coast Metropolis, by drawing on Critical Friendship as a theoretical base.

2. Literature review

2.1. Critical friendship
Critical friendship refers to friendship that is informed by close, deep or serious examination, analysis of an existing relationship between two or more people in order to better or maximise the mutual benefits expected from the relationship. According to Ragoona and Bullock (2016), Critical Friendship is a process of renewing and revolutionizing practice based on new understandings, questioning previously held assumptions, and sharing and disseminating the new knowledge for the immediate improvement of practice. Thus, Critical Friendship is considered by some researchers (e.g., Wennergren, 2014) to be a strategy for professional feedback and feed-forward.

A Critical friend is perceived as falling between the extremes of the ‘hostile witness’ and the “uncritical lover” (Brighouse & Woods, 1999). Friends bring a high degree of unconditional positive regard. Critics are, at first sight at least, conditional, negative and intolerant of failure. Perhaps the Critical Friend comes closest to what might be regarded as “true friendship”—a successful marrying of unconditional support and unconditional critique. This probably explains the position of some authors such as Costa and Kallick (1993), Baskerville and Goldblatt (2009), Swaffield (2007), and Ragoona and Bullock (2016) that claimed that being a Critical Friend is a supportive yet challenging relationship between professionals, encouraging and cultivating constructive critique and requiring knowledge of the context of the environment.

It seems difficult to tell whether the relationship between Critical and Friendship is that of ideal partners or odd bedfellows because of the different hermeneutical lenses through which scholars perceive these concepts. For example, Gibbs and Angelides (2008) argue that linking the positive notion of friendship with the potentially negative connotation of the term “critique” often poses a contradiction for “Critical Friends”. Nevertheless, Ramnorain and Modiba (2013) show that marrying the two concepts is not unreasonable or contradictory. Similarly, the use of the word
“contradiction” seems too negative to allow a form of relationship between the two concepts. It may be more appropriate to think of a tension rather than contradiction between “Critical” and “Friendship”, because tension seems to have some level of positive connotation. That notwithstanding, the powerful tension in Critical friendship was at the starting point as discovered by Zimmerman Nilsson and Wennergren (2018) in their study.

Swaffield (2007) also supports the idea that the juxtaposition of “Critical” and “Friend” creates a tension. But this tension, she insists, may not necessarily be negative but could be seen as the point of balance along the continuum from “total friend” to “total critic”. According to Swaffield (2015) the word “Critical” denotes a constructive and informed challenge and support; it is not about fault finding but a critique that is essential for refining a professional practice. From these definitions, critique and critical appear as cognate terms designating systematic inquiry, evaluation and review of existing relational realities that aim at improvement of a practice. Costa and Kallick (1993) believe critique is a vital part in the process of quality development. Therefore, critiquing has the tendency to enhance friendship, it is not a simple trade-off between the competing roles of friend and critic, but rather a richness resulting from the combination of both.

The term Critical Friendship has been used in teacher professional learning communities for at least 20 years (Wiggins, 2018). Researchers attribute all kinds of qualities to Critical Friendship. For example, Swaffield (2005) outlines five areas to describe the work, conduct and characteristics of a Critical friend. These are roles, behaviours, knowledge and experience, skills and qualities. However, embodying these characteristics may not necessarily and sufficiently guarantee a successful Critical Friendship because a person may have these qualities, but if the person is in an environment of suspicion, mistrust and rigid hierarchical structures, developing a Critical Friendship with others is unlikely. Hence, context and trust are components to Critical Friendship.

2.1.1. Context
Considering its versatility, Critical Friendship is applicable in different contexts. These include educational institutions, research, self-support study groups, development projects, teacher training programmes etcetera. However, depending on the cultural context, Critical Friendship or critique can convey positive or negative connotations. As Swaffield and MacBeath (2005) state that within different linguistic traditions, the term “Critical” itself translates something uneasily. Wachob (2011) confirms this when she states that Egyptian culture frowns on criticism, perhaps, because this culture promotes subservience and thus perceives criticism negatively. Further, Evans et al. (2001), show how it is possible for American bosses to accept critiques from their subordinates and it is never possible for Japanese teachers to ask their bosses questions directly unless they are sure the boss has the answer. So perceptions of the word “Critical” depend on the context. Thus, Critical Friendship is a context-bound issue and different results may be obtained by researchers in various contexts (Kashi et al., 2019).

The success stories of the Critical Friendships between Baskerville and Goldblatt (2009) and members of the Carpe Vitam Leadership for Learning project (Swaffield, 2008) lend credence to contextual understanding and sensitivity of the concept. In other words, relationships do occur in a particular context. For example, a Critical Friendship for school improvement will have a particular focus such as extending the practice of distributed leadership, located within specific schools each of which has a unique combination of history, culture, resources, and pupil and staff profiles. All these factors mean that no school is like any other, and Critical Friend relationships need to adapt to each situation. According to Swaffield (2004), there is therefore no single formula for the work of Critical Friends, what works in one location may not necessarily work in another without adaptation, for instance, Van Der Geest (1998) claims that in the Ghanaian Akan culture, an elder is seen as a person who knows what is going on. He/she must receive respect and obedience. An elderly person should not be challenged. It is the duty of the elders to give advice to young people. Hence, children are not to be given too much room to operate, which presupposes that students may not be permitted to critique their teachers. Fortunately, a conducive
classroom environment emphasizes cooperation and openness between teachers and students. In fact, the teacher-student interaction is an important element to the students in the context of teaching, learning and assessment (Douglas et al., 2015; Korpershoek et al., 2020). This shows that context is an important factor for the formation of Critical Friendship.

2.1.2. Trust
Trust is to Critical Friendship as a heart is to the human body, pumping blood to the other parts of the body for its nourishment and sustenance. That may explain why Costa and Kallick (1993), Ragoonaden and Bullock (2016) and Kane (2016) emphasise that the bedrock of Critical Friendship is trust. For Coleman (2012), trust promotes effective communication between partners. It is beneficial to student achievement (Goddard et al., 2001); leadership success (Bennis, 2009); positive interpersonal relationships (Hoy & Sabo, 1998); professional co-operation (Fan et al., 2011); mutual respect and credibility between professionals (Muijs, 2007); greater ownership of change amongst staff; and managing issues of power, and control and risk (Vangen & Huxham, 2003). According to Noddings (2009), students go from fear to eagerness when in an environment of trust. The type of relationship teachers develop with students and/or are encouraged to be developed among students could directly impact positively or negatively on the latter’s learning outcomes. Students’ perceptions of a learning environment and the teacher–student relationship play an important role in their learning (Agezo, 2010; Dolton & Marcenaro-Gutierrez, 2011; Wubbels et al., 2015). Therefore, teacher–student relationship quality is related to students’ affective and cognitive outcomes and previous experiences of betrayals can serve as hindrances to development of trust.

2.1.3. Dialogue
According to Swaffield (2008), dialogue is a very particular form of conversation involving the exchange of ideas and the search for shared meaning and common understanding, quite different in form and purpose from casual chat or combative debate. These definition suggest that dialogue is a purpose-driven interpersonal rapport with the cardinal goal of achieving a common good. If educators should go with Kazepides (2012), who, in looking at education as dialogue, states that dialogue has a serious, challenging and demanding character, requiring respect, trust, open-mindedness, a willingness to listen and to risk one’s own preconceptions, fixed beliefs, biases, and prejudices, then, teachers should dialogue with students to advance understanding and students’ wellbeing. This is because the understanding of a reality is never complete, absolute, or total but a happening, a process, always on the way (Gadamer, 1983; Ragoonaden et al., 2018). Students who think that their teacher is not accommodating towards them may have a low attention span and may be participating less in the learning environment (Allen et al., 2018).

2.1.4. Support
Support plays a key role when it comes to the student-teacher relationship and there are several ways teachers can provide support to students within the context of schooling. The support teachers give to students strengthens the teacher–student relationship. There is evidence to show that when teachers support students by showing care and concern, the students in turn respect and follow classroom rules (Chiu & Chow, 2011; Longobardi et al., 2016). Similarly, when teachers encourage students to work cooperatively with others (Davidson, 2002), and shape students interaction such that it supports and challenges each student (Artzt et al., 2008), students’ learning improve. In other words, the school social context determines whether students identify with the school. The teacher–student relationship and support from teachers and peers are the basis of students’ perception of school belonging (Allen et al., 2018). On the contrary, when teachers appear hostile to students, the students remain unconcerned and becomes uncooperative with classroom norms and behaviour (Miller et al., 2000). Thus, uninvolved learners are more likely to struggle educationally, have behaviour problems, or drop out from educational institutions. Teachers must therefore strive to find out the best way of supporting their students to maximise students learning.
2.1.5. Critique
Critique plays an important role when it comes to teacher-students relationships, especially when it comes to the giving of formative feedback by the teacher. This is because formative feedback usually communicates the message that students can rely on to modify their thinking or behaviour that can lead to improvement in their learning (Shute, 2008). Formative feedback also highlights the type of thinking skills or algorithm students employ when engaging in classroom learning activities (Butakor, 2016). For the purpose of formative feedback to be realized, much depends on the classroom learning environment because the way the learning environment is structured impacts on students academics performance (Ames, 1992). According to Seitz et al. (2012), when students feel safe and secure in the classroom with a trusted teacher, they feel free and comfortable to take risks and commit errors or mistakes in their effort to learn. The feedback to be provided by the teacher can be useful and formative. Bustos (2013) supported this assertion in discovering that when teachers directly and explicitly identify and discuss the sources and importance of students’ learning errors in a conducive learning environment, students feel safe and comfortable and are motivated to improve on their learning. By explicitly discussing the sources and importance of learning errors in the classroom, students reported feelings of comfort and safety, trust in the teacher, and were motivated to learn and perform well. The author demonstrated the importance of emotional variables in the learning. This means that in a classroom with trusting teacher-student relationship, the teacher can critique students specifically on the learning errors and mistake with the aim of providing formative feedback that students can use to improve upon their learning. The critiquing can also be extended to students in the form of peer review. Students’ study groups, which is a great forum for them to talk about the material, ask each other questions, and provide each other feedback (Reynolds, 2009; Schmidt, 2020) could be seen as a Critical Friendship.

2.1.6. Challenge
When educators listen to student’s voices and use them to co-create the learning environment, students feel they are an integral part of a learning community, that they matter and that they have something of value to offer (Fielding, 2007). This empowers them to take responsibility for their own learning, and that of others, and to take risks and explore new ideas. According to Shanker, taking responsibility for their learning and that of others “is the most authentic opportunity that students can have to develop self-regulation in the classroom” (2013). In an environment where educators listen, capture and are responsive to the student voice, they have noticed that students believe they are capable and competent to learn. However, in an environment where teachers exhibit aggressive behaviour (e.g., shaming or ridiculing) teaching and learning processes can equally be impaired (Scherzinger & Wettstein, 2019).

Consequently, drawing on Critical Friendship (Hamre et al., 2012) as a theoretical base, the current study investigated the role of teacher-student relationship on performance in the Cape Coast Metropolis of Ghana, these two research questions were formulated to guide the study:

(1) What kind of teacher-student relationship exists in the mathematics classroom?

(2) Which teacher-student relationship factor predicts performance of students in mathematics?

3. Method

3.1. Research design, Population and Sample size
The quantitative research design (Hollstein, 2014) was adopted in this study, involving the administration of a questionnaire and writing of an achievement test. The population comprises 6,317 eleventh graders of 10 public senior high schools in a metropolitan area in Ghana and 69 intact classes. Out of 3,342 students that were randomly selected, 2,575 participated in the study, representing 77% of the sample. In each of the ten schools, the researcher obtained the sampling frame which consisted of the list of the population from which students were selected as units for
the study. The list consists of the Form Two students (eleventh graders) according to their class categorization which was based on the programme offered to the student. All the programmes such as General Science, Business, General Arts, Technical, Home Economics, and Visual Arts were involved in the study, with the highest representations of 34% and 28% from Science and General Arts respectively and the lowest 3% from the Technical.

Using the table of sample sizes for research activities by Krejcie and Morgan (1970), the sample size proportional to the population of Form Two in each of the ten schools was randomly selected. The selected Form Two students in the ten public senior high schools in Cape Coast Metropolis who have been taught for at least one year by the same teacher at the time of the study were requested to participate in the study. The Form Three students were exempted from the study because they were busy preparing for their regional examination (The West African Senior School Certificate Examination) and none of the headteachers of the ten schools agreed for them to be engaged at such a crucial time.

Cape Coast Metropolis is a melting pot in Ghana which attracts students everywhere. The metropolis is made up of 5 high performing schools, 2 average performing schools and 3 extremely poor performing schools. The participants were made up of 54% males and 46% females, about 88% were between the ages of 16 to 18 years. The administration of the questionnaire to the students took place between January and April 2016, while the achievement test was taken in July, 2016. The students were told about data confidentiality, voluntariness of participation in the study, and their freedom to refuse to participate or withdraw from the study whenever deemed appropriate.

### 3.2. Instruments

The teacher-student interaction questionnaire was constructed based on empirical studies on Critical Friendship. Based on the six sub-constructs that were highlighted by researchers in the reviewed literature of this study, a questionnaire containing 70 items to measure teacher-student interaction was self-constructed. The instrument was pilot-tested four times with in-between reviews by four senior scholars. The items that loaded on two or three different sub-constructs during the factor analysis were totally removed and factor loadings lower than ±0.3 were suppressed before the final administration to the participants. The final instrument had 33 close-ended items (Likert scale: ‘1’ for ‘strongly disagree’, ‘2’ for “disagree”, ‘3’ for “neutral”, ‘4’ for “agree” and ‘5’ for “strongly agree”).

The achievement test was based on the Ghana Senior High School mathematics syllabus. During the piloting of the 40 items test, it took most of the students 75 minutes to hand in their scripts, without being stopped, while few of the students finished in less than an hour. Students were asked to express their opinions after the test. Some students claimed that one of the topics
covered in the test was just taught two days prior to the test, and that they were yet to assimilate what the topic was all about. Consequently, topics covered and the extent of coverage were checked in the ten schools before finalizing the items for the main study. Thus, finding the average of the time spent during the piloting, the test contained 40 multiple item questions that were answered within 60 minutes.

4. Results and discussion

4.1. Normality test
The sample size of 2,575 (which determines the power of the test) makes it adequate for the study (Pallant, 2005, p. 199; Stevens, 1996). Consequently, the dependent variable (achievement scores) data was assessed for normality. The skewness (−.092) and kurtosis (−.708) are within the acceptable limit of ± 1 and the actual mean (53.72) is almost the same as the trimmed mean (53.90) suggesting that data is approximately normally distributed (Field, 2013). The researchers looked for normality visually by using normal plots (Altman & Bland, 1995; Field, 2009). Figure 1 present the Q-Q plot of the achievement scores. An inspection of the normal probability plots with reasonably straight line suggests a normal distribution.

Normality was finally supported by a box plot of the distribution of scores for the achievement test. The box plot shows the absence of any outlier in the data.

Furthermore, the residuals were subjected to normality check to determine their suitability for regression analysis. Inspecting the Normal Q-Q plots of the Regression Standardised Residual, the points lie in a reasonably straight diagonal line from bottom left to top right which suggest no major deviations from normality. The residual is nearly rectangularly distributed with a concentration of scores along the center. It revealed a pile-up of residuals in the centre of the plot at each value of predicted score and a normal distribution of residuals trailing off symmetrically from the center. Table 2 presents the mean score, the lower and upper scores of the achievement scores.

4.2. Factor analysis
A principal component analysis was conducted on the 33 items, (KMO = .953, Bartlett tests = 26,966.978) and six factors had eigenvalues over Kaiser’s criterion of 1 and in combination explained 49.50% of the variance. The scree plot showed inflexions that justify retaining the six factors: “support” subscale (10 items, \( \alpha = .860; M = 2.14, SD = .74 \)), “unhealthy context” subscale (7 items, \( \alpha = .755; M = 3.81, SD = .77 \)), ‘dialogue subscale (5 items, \( \alpha = .751; M = 4.04, SD = .73 \))’, ‘challenge subscale (4 items, \( \alpha = .642; M = 3.79, SD = .79 \))’, “fear” subscale (4 items, \( \alpha = .564; M = 3.43, SD = .85 \)) and “lack of respect” subscale (3 items, \( \alpha = .547; M = 4.10, SD = .79 \)).

The overall mean (\( M = 3.32, SD = .80, \alpha = 0.506^* \)) for the Teacher-student relationship variable gives an indication that the variable had a high effect on their learning of mathematics. However,

| Table 2. Descriptive Statistics for Achievement Scores |
|-------------------------------------------------------|
| Statistic | Std. Error |
| Mean | 53.72 | .400 |
| 95% Confidence Interval for Mean |
| Lower Bound | 52.94 |
| Upper Bound | 54.51 |
| 5% Trimmed Mean | 53.90 |
| Median | 55.00 |
| Variance | 411.149 |
| Std. Deviation | 20.277 |
Table 3. Samples of items in each category

| Scale Name   | Sample item                                                                 |
|--------------|-----------------------------------------------------------------------------|
| Support      | I have the opportunity to talk to my mathematics teacher about my concerns in mathematics. |
| Context      | My mathematics teacher gives a harsh response when I give a wrong answer in mathematics class. |
| Dialogue     | My mathematics teacher believes students have something good to offer in mathematics class. |
| Fear         | I am afraid to approach my mathematics teacher for help in mathematics class. |
| Challenge    | My mathematics teacher encourages students to discover new methods of solving mathematics questions. |
| Lack of respect | My mathematics teacher comes late to class most of the time. |

all the sub-constructs have high means (with the exception of “support”), within the same range of variations.

Samples of items, eigenvalues and percentage variance explained are presented in Tables 3 and 4, while the scree plot is presented in Figure 2.

4.3. Research question one

4.3.1. What teacher-student relationship exists in the mathematics classroom?

In the analysis and presentation of results, the five point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) produced: Support, Context, Dialogue, Fear, Challenge, and Lack of respect.

4.4. Support

For the support scale, the majority of the respondents (between 54% to 87%) disagreed or strongly disagreed with all the items that denote any form of support from their teachers. Each of the items recorded low mean (1 ≤ M ≤ 2, 1 ≤ SD ≤ 1.3), indicating that students were of the opinion that their teachers do not give them the necessary support. There is a need for teachers to form positive bonds with every student, in order for classrooms to become supportive spaces in which students can engage in academically and socially productive ways (Bear, 2015; Hamre & Pianta, 2001). Teachers who support students in the learning environment can positively impact their social and academic outcomes, which are important for the long-term trajectory of success in school and eventually employment (Biggs et al., 2008; O’Connor et al., 2011).

4.5. Context

The concept of developmental context in the teacher-student relationship entails providing friendly environment for students as a secure base from which they can explore the classroom and school setting both academically and socially, to take on academic challenges and work on social-emotional development (Hamre & Pianta, 2001). The concept is used to explore students perceived level of the contexts within which mathematics lessons are delivered. The context in this study is unhealthy because majority of the students (86%) agreed that their teachers are not friendly and about 70% agreed that their mathematics teachers do not pay attention to students who ask questions that have nothing to do with the topic the teacher is discussing. As many as 81% of the students claimed their teachers give harsh responses when they give wrong answers in mathematics class.
Table 4. Total Variance Explained of Teacher-student relationship Variable

| Component | Initial Eigenvalues | Extraction Sums of Squared Loadings | Rotation Sums of Squared Loadings |
|-----------|---------------------|-------------------------------------|----------------------------------|
|           | Total               | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1         | 9.778               | 29.630        | 29.630       | 9.778 | 29.630        | 29.630       | 4.297 | 13.022        | 13.022       |
| 2         | 1.726               | 5.229         | 34.859       | 1.726 | 5.229         | 34.859       | 2.914 | 8.831         | 21.853       |
| 3         | 1.301               | 3.943         | 38.802       | 1.301 | 3.943         | 38.802       | 2.607 | 7.901         | 29.755       |
| 4         | 1.282               | 3.885         | 42.687       | 1.282 | 3.885         | 42.687       | 2.298 | 6.964         | 36.719       |
| 5         | 1.157               | 3.506         | 46.193       | 1.157 | 3.506         | 46.193       | 2.276 | 6.898         | 43.616       |
| 6         | 1.092               | 3.310         | 49.503       | 1.092 | 3.310         | 49.503       | 1.943 | 5.887         | 49.503       |
| 7         | .989                | 2.998         | 52.501       |        |               |              |       |               |              |
| 8         | .929                | 2.815         | 55.316       |        |               |              |       |               |              |

Extraction Method: Principal Component Analysis.
4.6. Dialogue
For the dialogue scale, about 86% of the students agreed that their mathematics teachers believed that students have something good to offer in mathematics classes. The majority of the students (85%) were of the view that mathematics teachers had a good social relationship with them in class and also promote a relaxed atmosphere for learning (74%). However, one wonders the kind of dialogue involved. If the finding regarding dialogue is taking at face value, dialogue might be assumed to be a positive construct in this context. However, the interview results (in press), which is not delineated in this paper revealed the opposite. According to the students, as long as the students understand the concept been taught, the majority of the teachers will offer their support and encouragement. On the other hand, woe betide the student that is either slow or fails in understanding the concept at hand.

4.7. Fear
For the fear scale, about 75% of the respondents were afraid to approach their mathematics teachers, 40% claimed some of their mates were afraid to ask questions in class, while as many as 57% saw their teachers to be bossy. Unfortunately, the nature and quality of teachers’ interactions with children have a significant effect on their learning (Brophy-Herb et al., 2007). According to the authors, when the interactions are very cordial, students tend to develop more interest in teachers’ subjects and this interest has a greater influence on students’ academic wellbeing.

Regrettably, as postulated by Abudu and Gbadamosi (2009), many teachers seldom realize that how they teach, behave and interact with students can be more important than what they teach. Such teachers probably confuse the focus on accountability and standardized testing, underestimating the contribution that the social quality of the teacher—student relationships has on academic development (Hamre & Pianta, 2006). Students who perceive their relationship with their teachers as positive, warm and close are motivated to be more engaged in school and to improve their academic achievement (Hughes & Cavell, 1999).

4.8. Challenge
For the challenge scale, the majority (about 77%) claimed they are challenged by their teachers to learn mathematics. Following the advice of Swaffield (2007), teachers are to see themselves as Critical Friends of their students and as such challenge them in a manner that leads them to happiness, progress, and fulfilment of being the “second-self”, which in the words of students in this study means co-equals. The idea of seeing students as welfare dependents, incompetent, vulnerable and in need of care, protection and guidance ought to change to seeing them as “young citizens” that have strengths and capacities, and owed recognition and respect (Fielding, 2007). Although this construct aligned with dialogue as a positive construct, the negative manner in which the students are challenged brings about a distaste for mathematics as revealed during the interview (in press).
4.9. Lack of respect

The results reveal that between 73% and 91% of the students claimed that the mathematics teachers showed them no respect. This is not surprising because for adult Africans, children or young individuals are assumed to be subjects who are yet to reach biological and social maturity or simply that they are younger than adults and are yet to develop those competencies adults possess (Ndofirepi & Shumba, 2014). According to the authors, the “less than-adult” status implies that childhood is a stage in human development when children are to be developed, stretched and educated into their future adult roles. The developmental perspective of childhood is rooted in the view that children are in a position of immaturity represented by being irrational, incompetent, and a-social and a-cultural, passive and dependent beings. The elderly according to Van Der Geest (1998) is a person who knows what is going on, must receive respect and obedience and should not be challenged. It is the duty of the elders to give advice to young people.

This may be the philosophy of some teachers who often take things for granted when dealing with students but the consequences of their actions may be too costly to estimate. A teacher who often arrives late to teach or fails to apologise for his/her mistakes stands the risk of losing respect or loses the moral justification of correcting students when they go wrong (SooHoo, 1993). Courtesy demands that teachers apologise when they make mistakes and is a way of training the future leaders to be respectful, courteous and polite. Where teachers live “above the law”, they are indirectly teaching the students to be irresponsible (Abudu & Gbadamosi, 2009).

As many as 90% students claimed that their mathematics teachers did not allow them to freely make contributions. This is an indication that many find their personal interests, experience and capabilities not recognised or valued in the classroom (Flutter & Rudduck, 2004). Such teachers failed to admit that information from students not only provides a valuable resource for helping teachers to discover “what works” in the classroom but also gives them an opportunity to refocus on learners and their learning.

4.10. Research question two

4.10.1. Which teacher-student relationship factor predicts performance of students in mathematics?

Regression analysis was carried out on the teacher-student relationship (TSR) variable, which was made of six sub constructs: support, unhealthy context, dialogue, challenge, fear and lack of respect. The results revealed that “challenge” negligibly but (not significantly) correlated with achievement scores ($r_3 = .013$). While “unhealthy context”, “dialogue”, “fear” and “lack of respect” negligibly and significantly correlated with achievement scores ($r_2 = -.030$, $r_3 = .088$, $r_4 = .207$, $r_5 = .043$).

TSR variable shared a variance of approximately 8% with achievement scores ($R^2 = .079$ and Adjusted $R^2 = .077$). The model reaches statistical significance ($p < .05$). The six sub-constructs: Fear ($β = .290$, $p < .05$); unhealthy context ($β = -.187$, $p < .05$); support ($β = .133$, $p < .05$); dialogue ($β = .129$, $p < .05$); lack of respect ($β = .047$, $p < .05$) and challenge ($β = .001$, $p > .05$) uniquely and respectively explained ($s^2 = 5.8\%$, $s^2 = 1.8\%$, $s^2 = 0.71\%$, $s^2 = .80\%$, $s^2 = 0.15\%$, $s^2 = 0.0001\%$) variances, when the variance explained by all others in the model is controlled for. The $p$-value is significant for all the sub constructs ($p < .05$) with the exception of challenge. Thus, the regression model generated between TSR variable and achievement scores $F(5, 2569) = 44.138$, $p<.05$ becomes:

$$\text{Achievement scores} = 21.739 + 0.182 \text{ (support)} - 0.247 \text{ (unhealthy context)} + 0.180\text{ (dialogue)} + 0.345 \text{ (fear)} + 0.061 \text{ (lack of respect)}$$
5. Conclusion
This study contributes to a growing body of research on teacher-student relationship. One of the findings of this study is that developmental context is very crucial to the academic outcomes of students. It shows that to impact on students’ achievement, the learning environment must promote and motivate learners to learn. Students become energetic and active participants when a constructive and quality teacher-student relationship is established. In this study, as revealed by the survey data (i.e. regression analysis), the unfriendly environment made it difficult for the students to take up academic challenges, thus, culminating in a decrease (negative sign connotes a decrease) in achievement scores. Furthermore, fear characterizes the teacher-student relationship as depicted in this study. Lack of respect from the teachers and the fear of being humiliated, scolded or punished by the teacher compelled students to do their assignments, exercises, and other assessment tasks. Although, the “lack of respect” seemed to increase (positive sign connotes an increase) the achievement scores, this is likely to be at the expense of their future engagement with mathematics.

Furthermore, “challenge” is not making a significant contribution to the achievement scores because students were challenged in a way that brings a distaste to the learning of mathematics. This assertion was revealed in the interviews portion of this study (in press).

Regarding the “support” construct, the failure by the teachers to form a positive bond with students in this study may be responsible for little or no “support” for the learning of mathematics for the students. Judging from the items on support, for example, “My mathematics teacher is approachable” and 'I have the opportunity to talk to my mathematics teacher about my concerns in mathematics’, are elements of positive bonding by the teachers with the students. Approachability and opportunity to share concerns about learning may be impossible without positive bonding.

In addition, the study revealed that students experienced conditional dialogue. This is a type of dialogue that is provided for only the “smart” students. Slow or sluggish students (in the learning of mathematics) were not entitled to such a dialogue (since no contribution was made) because they cannot give what they do not have. For example, one of the items on dialogue is “My mathematics teacher allows an exchange of ideas in class”. The question is how do you exchange what you do not have?

Thus, the findings of this study could help to sensitise teachers to the importance of teacher-student relationship in learning. Teachers may need to see developing caring, supportive relationships with and among students as part of their responsibilities.

6. Recommendations and Implications
There is a need for educators and learners to develop the openness for good teacher-student interaction that would help to motivate, create a positive attitude, as well as reduce anxiety in students. Considering the importance of the working relationship required for the effective sharing of knowledge in an educational context, a healthy teacher-student relationship may be a panacea to a culture of fear and sense of dependence. It could be a fillip for the development of the spirit of initiative and creativity that should be core to any futuristic educational philosophy required for the training of critical minds in the move towards sustainable human development.

The National Teachers Council (NTC) may include the training of in-service teachers as part of a continuous development programme in the form of workshops and seminars on teacher-student relationship. Institutions of learning that are responsible for the training of teachers could integrate the development of teacher-student relationships from the Critical Friendship perspective into their training programmes. This could help pre-service teachers to accept their students as young adults who can make meaningful contributions towards learning. Teachers may be encouraged to read relationship-related literature and attend conferences on the topic in order to
develop themselves and be well equipped to help their students. Awareness about the vital importance of the teacher-student relationship in the learning of mathematics may be created through debates among students in schools, with a focus on developing critical minds and democratic future leaders.

7. Limitations
Some of the items on the questionnaire may need to be re-phrased for clarity of interpretations.

References
Abudu, K. A., & Gbadamosi, M. R. (2009). Relationship between teachers’ attitude and students’ academic achievement in mathematics in some selected senior secondary schools in south-western Nigeria. European Journal of Social Sciences, 11(3), 364–369.

Agezo, K. G. (2010). Why teachers leave teaching: The case of pretretory institutions in Ghana. International Journal of Educational Reform, 19(1), 51–69. https://doi.org/10.1177/ 106578791001900104

Allen, K., Kern, M. L., Vella-Brodrick, D., Hattie, J., & Waters, L. (2018). What schools need to know about fostering school belonging: A meta-analysis. Educational Psychoogy Review, 30(1), 1–34. https://doi.org/10.1007/s10648-016-9389-8

Altman, D. G., & Bland, J. M. (1995). Statistics notes: The normal distribution. British Medical Journal, 310(6975), 298. https://doi.org/10.1136/bmj.310.6975.298

Amankwa, C. (2016, March 17). WAEC bemoans poor performance in Maths. Ghanaian Times, p. 1. http://www.ghanaitimes.com.gh/waec-bemoans-poor-performance-in-maths/

Ames, C. (1992). Classroom: Goals, structures, and student motivation. Journal of Educational Psychology, 48(3), 261–271. https://doi.org/10.1037/0022-0663. 84.3.261

Artzt, A., Armour-Thomas, E., & Curcio, F. (2008). Becoming a reflective mathematics teacher. Lawrence Erlbaum Associates.

Baskerville, D., & Goldblatt, H. (2009). Learning to be a critical friend: From professional indifference through challenge to unguarded conversations. Cambridge Journal of Education, 39(2), 205–211. https://doi.org/10.1080/03057640902902260

Bear, G. G. (2015). Preventive and classroom-based strategies. In E. T. Emmer & E. J. Sabornie (Eds.), Handbook of classroom management (2nd ed., pp. 15–39). Routledge.

Bennis, W. (2009). On becoming a leader. A member of the Perseus Books Group.

Biggs, K. B., Vernberg, E. M., Twenarlow, S. W., Fonagy, P., & Dill, E. J. (2008). Teacher adherence and its relations to teacher attitude and student outcomes in an elementary school-based violence prevention programme. School Psychology Review, 37(4), 533–549. https://doi.org/10.1080/0022796015.2008. 1208766

Brighouse, T., & Woods, D. (1999). How to improve your school. Routledge.

Brophy-Herb, H., Lee, R., Nievar, M., & Stollak, G. (2007). Preschoolers’ social competence relations to family characteristics, teacher behaviors and classroom climate. Journal of Applied Developmental Psychology, 28(2), 134–148. https://doi.org/10.1016/j.appdev. 2006.12.004

Bustos, M. C. G. (2013). An experimental test of the Learning Errors and Formative Feedback (LEAFF) model: Creating positive learning and assessments environments for students. University of Alberta.

Butok, P. K. (2016). The role of formative feedback in promoting higher order thinking skills in classrooms: A theoretical model. African Research Review, 10(5), 147–160. https://doi.org/10.4314/arrv.v10i5.11

Caldier, N., & Campbell, A. (2016). Using mathematical apps with reluctant learners. Digital Experiences in Mathematics Education, 21(1), 50–69. https://doi.org/10. 1007/s40751-016-0011-y

Chiu, M. M., & Chow, B. W.-Y. (2011). Classroom discipline across 41 countries: School, economic, and cultural differences. J. Cross Cult. Psychol., 42(3), 516–533. https://doi.org/10.1177/002222110381115

Coleman, A. (2012). The significance of trust in school-based collaborative leadership. International Journal of Leadership in Education: Theory and Practice, 15(1), 79–106. https://doi.org/10.1080/ 13603124.2011.578755

Costa, A., & Kollick, B. (1991). Through the lens of a critical friend. Educational Leadership, 51(2), 49–51. http:// www.ascd.org/publications/educational-leadership/ oct93/vol51/num02/Through-the-Lens-of-a-Critical-Friend.aspx

Cretchley, P. C. (2008). Advancing research into effective factors in mathematics learning: Clarifying key factors, terminology and measurement. In M. Goos, R. Brown, & K. Makar (Eds.), 31st annual conference of the mathematics education research group of Australasia (pp. 147–153). Brisbane, QLD: MERGA.

Davidson, N. (2002). Cooperative and collaborative learning: An integrative perspective. In J. Thousand, R. Villa, & A. Nevin (Eds.), Creativity and collaborative learning: A practical guide for empowering teachers and students (pp. 13–30). Brookes.

DeBellis, V. A., & Goldin, G. A. (2006). Affect and meta-affect in mathematical problem solving: A representational perspective. Educational Studies in Mathematics, 61(2), 131–147. https://doi.org/10. 1007/s10649-006-9026-4

Dolton, P., & Marcenaro-Gutierrez, O. D. (2011). If you pay peanuts do you get monkeys? A cross-country
analysis of teacher pay and pupil performance. Economic Policy, 26(65), 5–55. https://doi.org/10.1111/1468-0027.2010.00257.x

Douglas, J. A., Douglas, A., McClelland, R. J., & Davies, J. (2015). Understanding student satisfaction and dissatisfaction: An interpretive study in the UK higher education context. Studies in Higher Education, 40(2), 329–349. https://doi.org/10.1080/03075079.2013.842217

Evans, P., Puck, V., & Bosaux, J. L. (2001). The global challenge. McGraw Hill.

Fan, Z.-P., Soo, W.-L., Feng, B., & Liu, Y. (2011). Trust estimation in a virtual team: A decision support method. Expert Systems with Applications, 38(8), 10240–10251. https://doi.org/10.1016/j.eswa.2011.02.060

Field, A. (2009). Discovering statistics using SPSS (3rd ed. ed.). Sage publications Ltd.

Field, A. (2013). Discovering statistics using SPSS and sex and drugs and rock 'n' roll (6th ed. ed.). SAGE publications Ltd.

Fielding, M. (2007). Beyond “Voice”: New roles, relations, and contexts in researching with young people. Discourse: Studies in the Cultural Politics of Education, 28 (3), 301–310. Retrieved from https://doi.org/10.1080/1596300701458780

Flutter, J., & Rudduck, J. (2006). Consulting pupils what's in it for schools? Routledge Falmer.

Gadamer, H. G. (1983). Reason in the age of science (F. G. lawrence, trans.). MIT Press.

Gibbs, P., & Angelides, P. (2008). Understanding friendship between critical friends. Improving Schools, 11(3), 213–225. https://doi.org/10.1177/1365480208097002

Goddard, R., Tschannen-Moran, M., & Hoy, W. (2001). Teacher trust in students and parents: A multi-level examination of the distribution and effects of teacher trust in urban elementary schools. Elementary School Journal, 102(1), 3–17. https://doi.org/10.1086/499690

Groves, M., Sellars, C., Smith, J., & Barber, A. (2015). Factors affecting student engagement: a case study examining two cohorts of students attending a post-1992 university in the United Kingdom. International Journal of Higher Education, 4(2), 27–37. https://doi.org/10.5430/ijhe.v4n2p27

Hamre, B. K., & Pianta, R. C. (2006). Student-teacher relationships. In G. G. Bear & K. M. Minke (Eds.), Children’s needs III: Development, prevention, and intervention (pp. 49–59). National Association of School Psychologists.

Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children’s school outcomes through eighth grade. Child Development, 72(2), 625–638. https://doi.org/10.1111/1467-8624.00308

Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., Crouch, J. L., Downer, J. T., . . . Little, C. S. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. American Educational Research Journal, 49(1), 88–123. doi: 10.3102/0020311311416349

Hollstein, B. (2014). Mixed methods social networks research: An introduction. In S. Dominguez & B. Hollstein (Eds.), Mixed methods social networks research: design and applications (pp. 3–35). Cambridge University Press.

Hoy, W., & Sabo, D. (1998). Quality middle schools: Open healthy. Corwin Press.

Hughes, J. N., & Covell, T. A. (1999). Influence of the teacher-student relationship on childhood conduct problems: A prospective study. Journal of Clinical Child Psychology, 28(2), 173–184. https://doi.org/10.1207/s15377442jccp2802_5

International Association for the Evaluation of Education Achievement. (2008). Findings from IEA’s trend in international mathematics and science study at the fourth and eighth grades. Paper presented at the International Association for the Evaluation of Education Achievement.

Kane, K. (2016). Back to school: Why creating classroom community is so important. https://www.naeyc.org/resources/blog/why-creating-classroom-community-so-important

Kashi, H., Isazadeh, P., & Molana, K. (2019). EFL teachers’ self-actualization through critical friendship. The Journal of Asia TEFL, 16(4), 1413–1421. http://dx.doi.org/10.18823/ajtefl.2019.6.14.1413

Kazepides, T. (2012). Education as dialogue. Educational Philosophy and Theory, 44(9), 913–925. https://doi.org/10.1111/j.1468-0327.2011.00762.x

Korpershoek, H., Caninunis, E. T., Fokkens-Bruinsma, M., & De Boer, H. (2020). The relationships between school belonging and students’ motivational, social-emotional, behavioural, and academic outcomes in secondary education: A meta-analytic research. International Journal of Educational Research, 35(6), 641–680. https://doi.org/10.1016/j.ijerc.2020.02.004

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607–610. https://doi.org/10.1177/001316447903000038

Longobardi, C., Prino, L. E., Marengo, D., & Settanni, M. (2016). Student-teacher relationships as a protective factor for school adjustment during the transition from middle to high school. Frant. Psychol, 7(1988), 1–9. https://doi.org/10.3389/fpsyg.2016.01988

Marengo, D., Jungert, T., Lotti, N. O., Settanni, M., Thornberg, R., & Longobardi, C. (2018). Conflictual student-teacher relationship, emotional and behavioral problems, prosocial behavior, and their associations with bullies, victims, and bullies/victims. Educational Psychology, 38(9), 1201–1217. https://doi.org/10.1080/01643430.2018.1481199

McCormick, M. P., O’Connor, E. E., Coppolla, E., & McClosky, S. G. (2013). Teacher–child relationships and academic achievement: A multilevel propensity score model approach. Journal of School Psychology, 51(5), 611–624. https://doi.org/10.1016/j.jsp.2013.05.001

Miller, A., Ferguson, E., & Byrne, I. (2006). Pupils' causal attributions for difficult classroom behaviour. Br. J. Educ. Psychol, 70(1), 85–96. https://doi.org/10.1348/000709900157985

Ministry of Education. (2012). Education sector annual performance report. http://www.gogmoe.espr_2012

Ministry of Education. (2013). Education sector annual performance report. http://www.gogmoes.espr_2013

Ministry of Education. (2018). National pre-tertiary-education curriculum framework for developing subject curricula. National Council for Curriculum and Assessment.

Montuori, P., & Lewis, R. (2015). Student perceptions of misbehavior and classroom management. In E. T. Ennser & E. J. Sabornie (Eds.), Handbook of classroom management (pp. 344–362). Routledge.

Mujis, D. (2007). Leadership in full-service extended schools: Communicating across cultures. School Leadership and Management, 27(4), 347–362. https://doi.org/10.1080/13633240701563296

Mullis, I. V. S., Martin, M. O., Foy, P., & Arora, A. (2012). The TIMSS 2011 international results in mathematics. TIMSS & PIRLS International Study Center, Boston College.

Mutodi, P., & Ngirande, H. (2014). Exploring mathematics anxiety: Mathematics students’ experiences.
Awoniyi, A., & Butakor, C. (2021). Cogent Education (2021), 8: 1908690. https://doi.org/10.1080/2331186X.2021.1908690

Mediterranean Journal of Social Sciences, 5(1), 283–294. doi: 10.5910/mjss.2014.v5n1p283

Ndoffrepi, A. P., & Shumbo, A. C. (2014). Conceptions of “child” among traditional Africans: A philosophical perspective. J Hum Ecol, 45(3), 233–242. https://doi.org/10.1080/09709274.2014.11906696

Noddings, N. (2009). Teaching themes of care. In A. C. Ornstein, E. F. Pajak, & S. B. Ornstein (Eds.), Contemporary issues in curriculum (pp. 64–70).

Pearson. 2014–2012–2015–2016–2018–2003–2018–2020–2013–35–36–37–24–23–22–21–20–19–18–17–16–15–14–13–12–11–10–9–8–7–6–5–4–3–2–1.

Shute, V. J. (2008). Focus on formative feedback. Review of Educational Research, 78(1), 153–189. https://doi.org/10.3102/0034654307313795

SooHoo, S. (1993). Students as partners in research and restructuring Schools. Educational Forum, 57(4), 386–393. https://doi.org/10.1080/00131729309335445

Stevens, J. (1996). Applied multivariate statistics for the social sciences. NJ: Lawrence Erlbaum.

Swaffield, S. (2004). Critical friends: Supporting leadership, improving learning. Improving Schools, 7(3), 267–278. https://doi.org/10.1177/13654802040039430

Swaffield, S. (2005). No sleeping partners: Relationships between head teachers and critical friends. School Leadership and Management, 25(1), 43–57. https://doi.org/10.136324305200317082

Swaffield, S. (2007). Light touch critical friendship. Improving Schools, 10 (3), 205–219. http://search.proquest.com/professional/britisheducationindex/docview/772157725/14F94F188DF5?accountid=9851

Swaffield, S. (2008). Critical friendship, dialogue and learning, in the context of leadership for learning. School Leadership and Management, 28(4), 323–336. https://doi.org/10.13632430802292191

Swaffield, S. (2015). Support and challenge for school leaders: Headteachers’ perceptions of school improvement partners. Educational Management Administration & Leadership, 43(1), 61–76. https://doi.org/10.1177/14767503145434884

Swaffield, S., & MacBeath, J. (2005). School self-evaluation and the role of a critical friend. Cambridge Journal of Education, 35(2), 239–252. https://doi.org/10.1080/03057640500147037

Tegoonen, K., Morajelo, L., & Kennedy, L. (2018). Critical friendship and inter-faculty collaborative inquiry: Teacher education and nursing education. education, 24 (1), 72–87. www.ineducation.ca

Van Der Geest, S. (1998). Fever: The ideal of elder in the Akan culture of Ghana. Canadian Journal of African Studies, 32 (3), 449–493. http://www.jstor.org/stable/486325

Vanroye, J., & Kruyt, B. (2016). Critical friendship: Helping youth lift as they climb together. Afterschool Matters, 27, 1–9. https://eric.ed.gov/?id=EJ1175030

Wubbelis, T., Brekelmans, M., Den Brok, P., Wijisman, L., Mainhard, T., & Van Tartwijk, J. W. F. (2015). Teacher-student relationships and classroom management. In E. T. Emmer & E. J. Sabornie (Eds.), Handbook of classroom management (2nd ed., pp. 363–386). Routledge.

Zimmerman Nilsson, M.-H., & Wennegren, A.-C. (2018). Tensions in communication—Teachers and academic facilitators in a critical friendship. Action Research, 16(1), 7–24. https://doi.org/10.1177/147675031660365
