



Analysis of Student Perception on Teacher-Student Interpersonal Relationship in Chemistry Teaching

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Abstract

The aims of this study are to analyze the interpersonal relationships between chemistry teachers and their students, to investigate chemistry teacher interpersonal behavior using Model for Interpersonal Teacher Behavior (MITB), and to identify the interpersonal behavior profile of chemistry teacher according to student's perception. The data were collected from 472 eleventh grade students of science class in 5 Public Senior High School and 5 Private Senior High School in South Tangerang Municipality who were randomly sampled using teacher-student interpersonal relationships questionnaire adapted from Questionnaire on Teacher Interaction (QTI). Data were analyzed using Rasch model in Winsteps version 3.73. Results showed that in general, it was indicated that the interpersonal relationships of chemistry teachers and their students are categorized as relatively good. The teachers were considered to have adequately dominant and very cooperative behavior with students in classroom. Meanwhile, in terms of interpersonal behavior scale, students perceived their teachers as having higher rate on leadership, helping/friendly, and understanding behavior than the hostility behavior. Then, according to interpersonal behavior profile, it showed that chemistry teachers in South Tangerang Municipality were identified as authoritative.

Keyword: *Teacher-student interpersonal relationship, chemistry teaching, senior high school*

1. Introduction

Science subjects, chemistry being one of them, is often considered as difficult for a majority of school students. This demands chemistry teachers to give more efforts to motivate their students to learn the concepts in chemistry, which would be otherwise difficult without sufficient interest and motivation (Suyanti, 2010). Thus, it is up to the chemistry teachers to design a chemistry teaching which will interests the students through various learning strategies, able to analyze the concepts in chemistry in order to give a better delivery of complicated materials, and able to visualize abstract concepts

for the students to completely understand, as well as motivating them to learn it more deeply.

Explained in The National Science Teachers Association (NSTA) Standards for Science Teacher Preparation (2003), that teachers, especially science teachers, are demanded not only competent in understanding concepts and study materials along or possessing various methods and strategies in teaching, but also able to create and maintain comfortable teaching environment which supports the students both psychologically and socially (National Science Teachers Association, 2003).

Therefore, it is crucial for chemistry teachers for not only understand the teaching materials but also able to maintain a comfortable and motivational teaching environment through their interpersonal behavior towards the students. This is because the teacher's interpersonal behavior significantly affects student's attitude towards the subject, their study results, and their motivation to study. Understanding the interpersonal relationship between teacher and student during teaching process can be an important consideration to support the student's benefit in school. This can also be used as a reflective instrument to understand the atmosphere of learning environment within the classes through measurable interpersonal behavior and profile of the teachers.

This study is aimed to analyze the interpersonal relationships between chemistry teachers and their students, to investigate chemistry teacher interpersonal behavior using Model for Interpersonal Teacher Behavior (MITB), and to identify the interpersonal behavior profile of chemistry teacher according to student's perception using survey method by distribute teacher-student interpersonal relationships questionnaire which is adapted from Questionnaire on Teacher Interaction (QTI) constructed by Maulana et al. (2011). This study will benefit in providing information to the schools to undertake a proper measure on the teaching processes, as a reflection for chemistry teachers to develop a better teaching and learning environment, and as feedback for the students to understand their perceptions against studying chemistry.

2. Research Method

Theory

Teacher-student relationship can be studied using two theoretical frameworks, those are interpersonal theory (Wubbels et al., 1985) and supplementary theory-based framework (Pianta, 2001). Interpersonal theory describes the perception of teacher's behavior towards students who interact within a given system. In this theory, teacher-

student relationship is characterized by a combination of two dimensions, namely influence dimension and proximity dimension as parts of Model of Interpersonal Teacher Behavior (MITB). Approach towards teacher-student interpersonal relationship is conceptualized through classroom conditioning based on the levels of teacher's interpersonal behavior (Wubbels et al, 2015).

Meanwhile, for supplementary theory-based framework popularized by Pianta, relationship between teacher and student can be observed using three dimensions, namely closeness, conflict, and dependency (Wubbels et al, 2015).

MITB, developed by Wubbels et al (1985), is an adaptation of Interpersonal Diagnosis of Personality developed by Leary (1957). This model distinguishes the teacher's behavior into influence dimension and proximity dimension (Maulana et al, 2012). Influence has two axes, namely dominance (D) and submission (S), while proximity is divided into cooperation (C) and opposition (O) axes. Influence dimension illustrates the person who controls or directs the communication process and its frequency in the classroom. On the other hand, proximity describes the level of cooperation or proximity between teacher and students who get involved in the learning processes (Goh, 2004).

These two coordinate dimensions are then divided into eight scales of teacher's interpersonal behavior as shown in Figure 1. Each scale is leadership behavior (DC), helping/friendly behavior (CD), understanding behavior (CS), student responsibility/freedom behavior (SC), and uncertain behavior (SO), dissatisfied behavior (OS), admonishing behavior (OD), and strict behavior (DO) (Maulana et al, 2012).

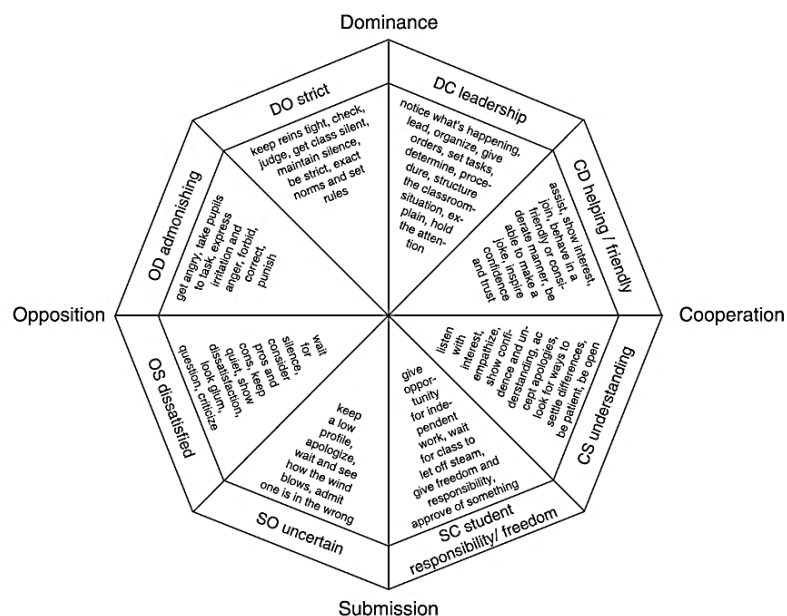


Figure 1. Model of Interpersonal Teacher Behavior (Wubbels & Brekelmans, 2005)

After completing MITB, Wubbels et al released an instrument to map the teacher-student interpersonal relationship that is Questionnaire on Teacher Interaction (QTI). The QTI is utilized to understand the inter-relationship between the teaching method and the classroom's study results. This instrument was then used to map the teacher's interpersonal behavior style in different cultures on various countries (Maulana et al, 2011). The difference in the behavioral style was then further mapped against teacher's interpersonal behavior which describes the learning environment in the classroom. Teachers, according to the model, can be categorized into eight profile types, the directive, authoritative, tolerant/authoritative, tolerant, uncertain/tolerant, certain/aggressive, repressive, and drudging (Maulana et al, 2011).

Authoritative, tolerant/authoritative, and tolerant profiles are perceived as having a relatively high in proximity, with tolerant has the lowest influence dimension. Meanwhile, for directive, uncertain/tolerant, and drudging profiles show lower level of cooperation compared to the former profiles, with uncertain/tolerant has the lowest domination. Teacher with lowest level of cooperation is characterized as repressive and uncertain/aggressive. In repressive profile, teacher has the highest level of domination above seven others (Wubbels and Brekelmans, 2005).

On the other hand, the profiles directive, authoritative, and tolerant/authoritative show a similar influence dimension. These types are characterized by a considerably dominating trait, but differ in proximity. Directive teacher possesses a lower cooperation but higher in discipline, while tolerant/authoritative possesses high cooperation trait. Tolerant teacher has identical cooperation trait with authoritative teacher, but differ in domination. Other teacher types show a lower cooperation trait and various domination level (Maulana et al, 2011).

Illustration of teacher's interpersonal behavior profile is shown in Figure 2.

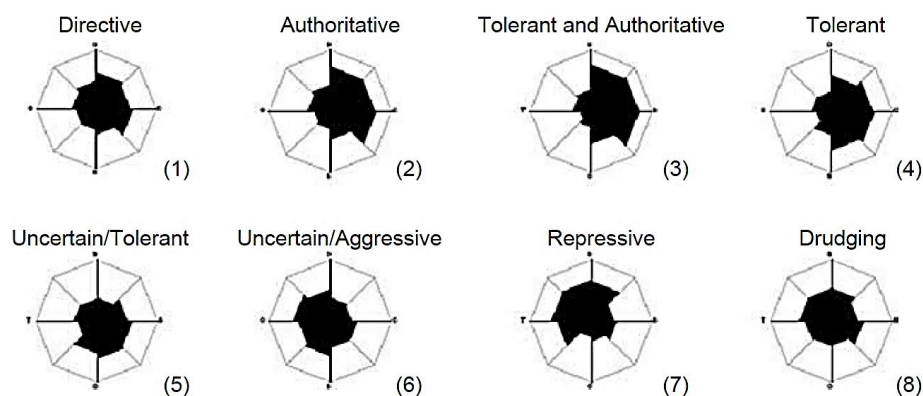


Figure 2. Teacher's Interpersonal Behavior Profile (Brekelmans, 1989)

Den Brok, Fisher, and Koul (2005) show that science teacher who has adequate control on and cooperation with the students can make the students have a positive attitude towards the teaching subject. In interpersonal behavioral scale, Reid and Fisher (2008) denoted that science teacher who possesses leadership, helping/friendly, understanding, and allowing the students to bear responsibility and freedom gives a positive impact on the student motivation in study achievement in science subjects.

Research Design

This research employs survey method to describe the interpersonal relationship between chemistry teachers and students. The sample comprised of 472 students (176 males and 296 females) from 17 eleventh grade science classes in 5 public senior high schools and 5 private high schools in South Tangerang Municipality. Data were taken by a random sampling using teacher-student interpersonal relationship questionnaire adapted from QTI Indonesian version developed by Maulana et al (2011).

QTI Indonesian version consists of 57 questions which include 8 scales of teacher interpersonal behavior scale based on MITB. The QTI was then reformulated into 53 questions and instrument testing was trialed to 70 eleventh grade science students in Senior High School 1 South Tangerang as a means of validation. The trial results were analyzed using SPSS version 20 with 5% significance ($r_{table} = 0.235$). From 53 questions, 36 items were found to be validated. Instrument reliability was tested using Alpha (Cronbach's) coefficient resulting in r_{11} value of 0.822, which according to Kaplan (1982) in (Wubbels, 2014) is reliable since the Alpha coefficient is ≥ 0.7 .

The teacher-student interpersonal relationship questionnaire was then comprised into 36 questions with 5 alternative answers ranging from 'Never' to 'Always' and distributed to 472 students in 5 public senior high schools and 5 private senior high schools in South Tangerang Municipality. Data analysis was performed using Winsteps 3.73 in accordance to Rasch modeling principle to calculate the mean score and standard deviation based on influence and domination axes as well as 8 interpersonal behavior scales of the chemistry teacher. The results were then categorized into 4 score interval groups, ranging from 'Poor' to 'Excellent.' Then, for both teacher-student interpersonal relationship and interpersonal behavior according to behavioral dimensions and scales, the interpersonal behavior profiles were then calculated into a percentage value.

3. Result

The Tendency of Teacher-Student Interpersonal Relationship

Analysis from 36 question items shows that the mean score of teacher-student interpersonal relationship in a total of 10 senior high schools in South Tangerang Municipality was 106, which is within the interval group ($72 < x < 108$). This value is categorized as Fairly Good with a percentage value of 58.89%. This shows that the chemistry teacher-student relationship in eleventh grade science class Year 2015/2016 in South Tangerang Municipality falls within Fairly Good category. In public schools, the mean value was 104.9, which falls into Fairly Good category with percentage value of 58.28%. Meanwhile in private schools, the mean value was 106, which falls into "Good" category (interval $108 < x < 144$) and percentage value of 60.56%. The results are summarized in Figure 3 and Table 1.

Table 1. Classifications of teacher-student interpersonal relationship in senior high school

No.	Ideal Score Interval	All Schools		Public Schools		Private Schools		Category
		Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	Frequency	Relative Frequency (%)	
1	> 144	1	0,21	0	0	1	0,83	Excellent
2	$108 < x < 144$	220	46,61	155	44,16	65	53,72	Good
3	$72 < x < 108$	251	53,18	196	55,84	55	45,45	Fairly Good
4	< 72	0	0	0	0	0	0	Poor

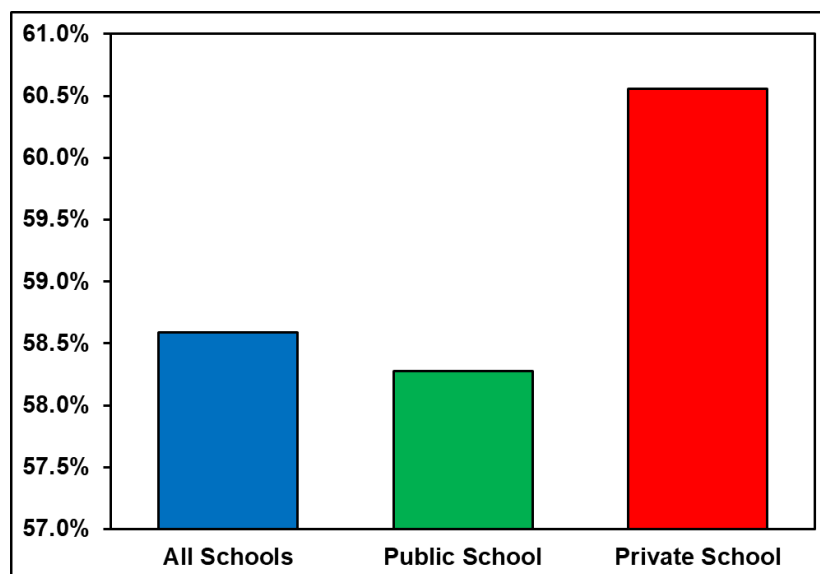


Figure 3. Score Percentage of Teacher-Student Interpersonal Relationship in Senior High School in South Tangerang

Further analysis shows that the highest percentage of interpersonal relationship was found in Darussalam Senior High School in Ciputat at 63.92%, while the lowest value

was observed in State Senior High School 8 South Tangerang at 56.04% (see Figure 4). Nonetheless, each school shows a fairly good interpersonal relationship profile, with the percentage were all scored above 50%.

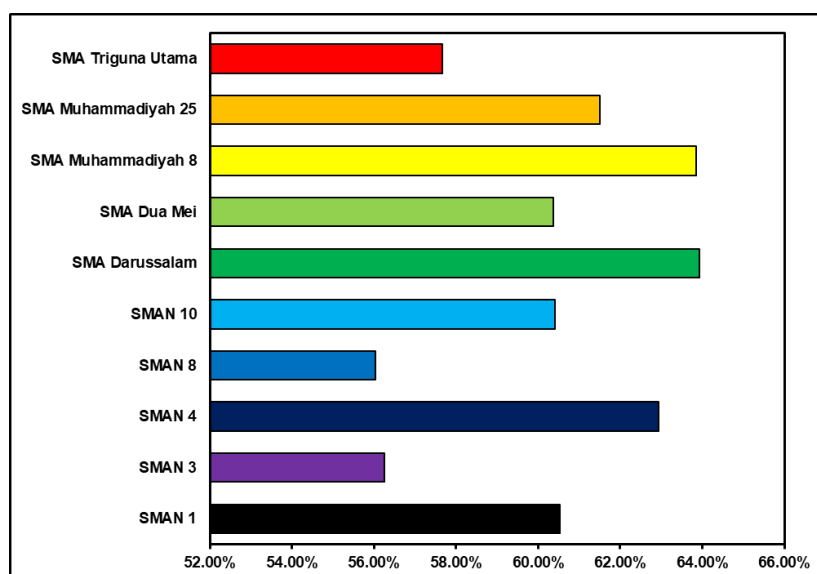


Figure 4. Score Percentage of Teacher-Student Interpersonal Relationship in for Each Senior High School

Positive interpersonal relationship is indicated by student's perception towards teacher that possesses high domination (influence) and cooperation (proximity) dimensions. Both are decisive factors in creating a positive attitude of the students towards the learning subject (den Brok, Fisher, & Koul, 2005, p. 15). The percentage of chemistry teacher's interpersonal relationship in private schools is shown to be higher than in public schools. This imply that teacher-student interpersonal relationship in private school is better than in public schools in South Tangerang. This is due to higher cooperation and domination aspects in private schools compared to public schools, so that interpersonal behavior appears to be better in the former.

Teacher's Interpersonal Behavior According to MITB

From the mapping of the interpersonal behavior, it is generally shown that the chemistry teachers in senior high schools in South Tangerang were perceived as relatively dominating (67.09%) and high cooperative (75.14%) with the students (see Figure 5).

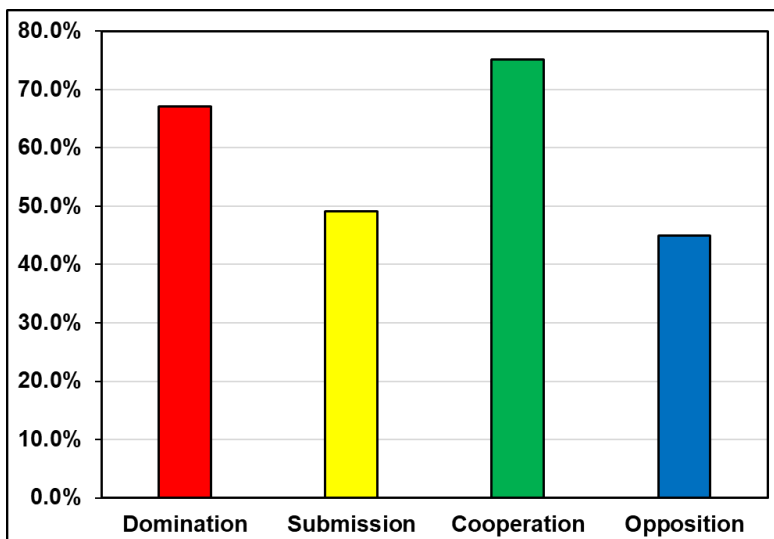


Figure 5. Interpersonal behavior of chemistry teachers according to dimension axes

In private schools, teacher's interpersonal behavior has a notably higher percentage in domination and cooperation compared to those in public schools, as shown in Figure 6. In two other dimensions, submission and opposition, the percentage are extremely close.

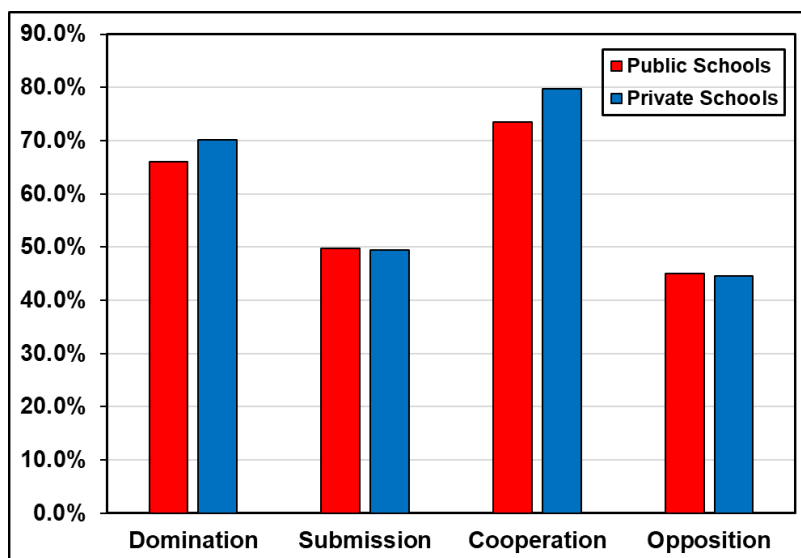


Figure 6. Comparison of interpersonal behavior of chemistry teachers in private and public schools according to dimension axes

Analysis on behavioral scale shows that the chemistry teachers are perceived as possessing leadership, helping/friendly, understanding, and student responsibility/freedom behaviors in a higher scale than uncertain, dissatisfied, and

admonishing behaviors. However, the teachers in question do not seem to possess a particularly high degree of discipline (see Figure 7).

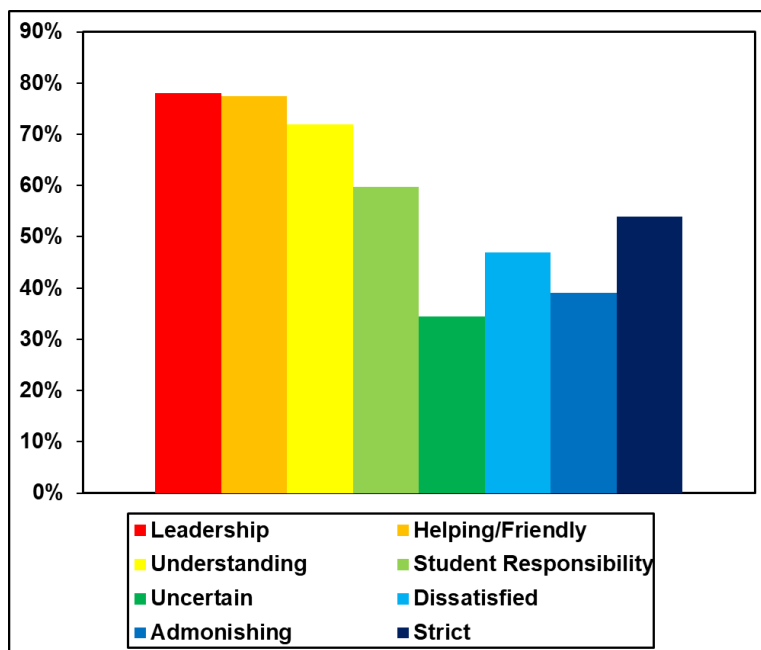


Figure 7. Interpersonal behavior of chemistry teachers in private and public schools according to behavioral scale levels

Comparison on the findings in public schools and private schools indicated that chemistry teachers in private schools tend to possess higher leadership, helping/friendly, understanding, and discipline than their public school counterparts. Private school teachers were also perceived to be higher in dissatisfied behavior and lower in student responsibility/freedom and admonishing compared to public school teachers. For uncertain behavior, the finding was almost identical with low percentage (see Figure 8).

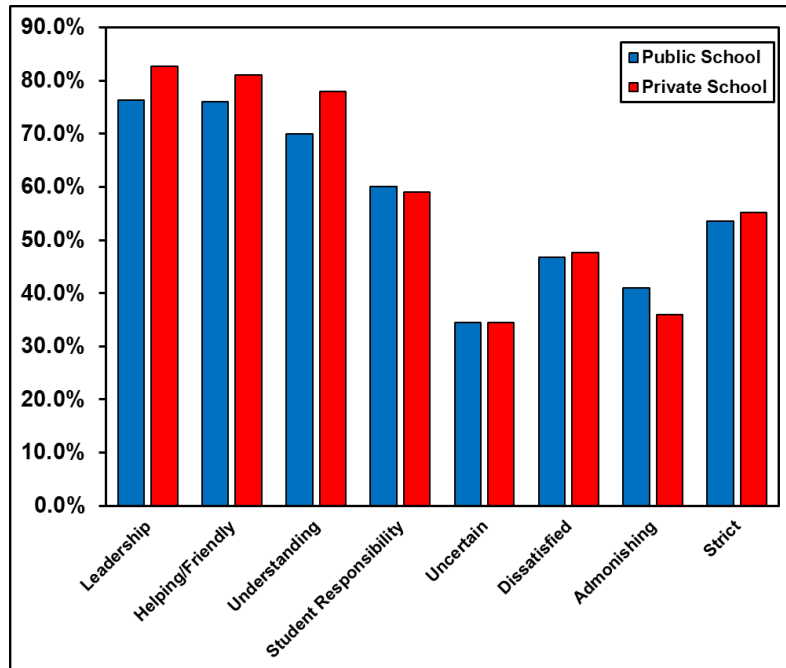


Figure 8. Comparative figure of interpersonal behavior of chemistry teachers in private and public schools according to behavioral scale levels

Profiles of Chemistry Teachers in Public and Private Schools in South Tangerang

Graphical representation of teacher’s interpersonal behavior scales are shown as radar charts in Figures 9-11.

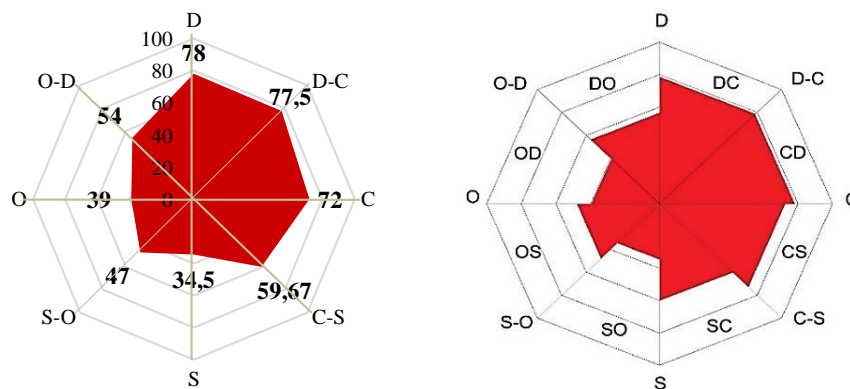


Figure 9. The Profiles of Chemistry Teacher’s Interpersonal Behavior in Senior High Schools in South Tangerang

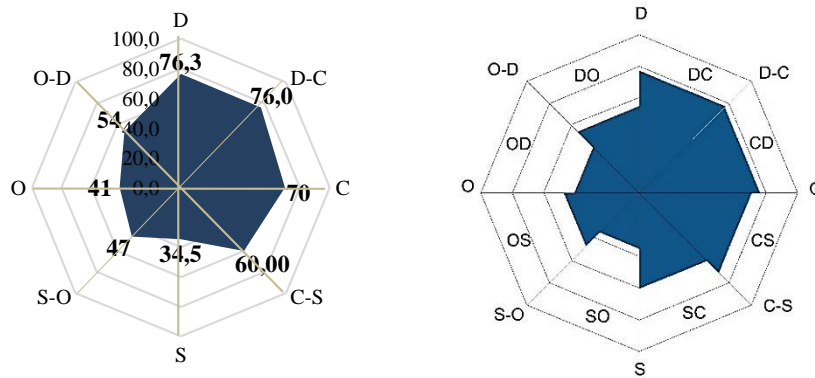


Figure 10. The Profiles of Chemistry Teacher's Interpersonal Behavior in Public Senior High Schools in South Tangerang

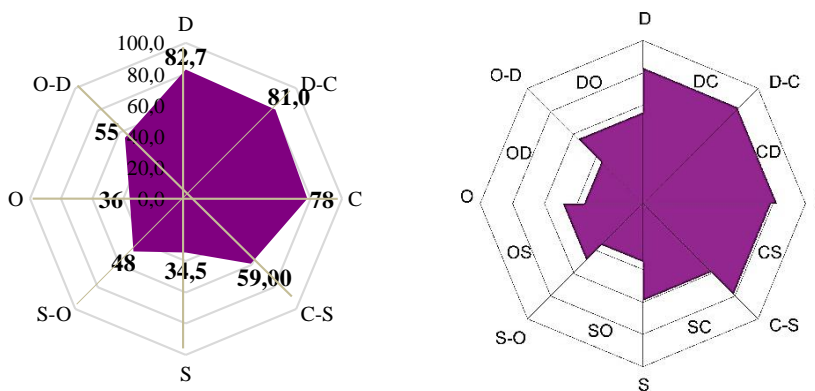


Figure 11. The Profiles of Chemistry Teacher's Interpersonal Behavior in Private Senior High Schools in South Tangerang

Interpretation of the above figures concluded that chemistry teachers in Senior High School in South Tangerang can be categorized as authoritative, either in general, in public schools, or in private schools. Regarding the profile of the teachers, around 8 out of 10 chemistry teachers are categorized as authoritative, while two others are considered as directive and drudging.

4. Discussion

Analysis on the teacher's interpersonal behavior shows that the chemistry teachers in Senior High Schools in South Tangerang are fairly influential and fairly close to their students. For further clarity, the

chemistry teachers are perceived as fairly dominating and highly cooperative (domination = 67.09%, cooperation = 75.14%). However, despite being cooperative, the teachers are also perceived as fairly strict (54%). These findings indicated that despite highly cooperative nature, the chemistry teachers are maintaining their dominating nature during the teaching process. This is in line with findings by Maulana et al (2011) in Junior High School teachers in Math and English classes. A proportionally large classroom size in Indonesian High Schools is considered as the primary factor of this finding (Maulana et al. 2011).

In term of behavioral dimension, cooperative and dominating teacher appears to contribute in shaping student's attitude towards the learning subject, while opposition and submission do the opposite (Fisher & Rickards, 1995). From the interpersonal behavior figures shown in Figures 5 and 6, in both public and private schools, chemistry teachers possess fairly high cooperation and domination but low in opposition and submission. As previously mentioned, this tends to shape a positive attitude of the students towards the subject, in this case chemistry.

Analysis in interpersonal behavior scale levels (Figures 7 and 8) indicated that the chemistry teachers tend to help motivating the students in learning and achieving good results as they possess the supporting traits, as explained by Reid and Fisher (2008). They exhibited that the teacher traits which include leadership, helping/friendly, understanding, and student responsibility/freedom positively influenced the students' motivation to succeed in science subjects, also positively affects the learning environment in the classroom (Reid and Fisher, 2008).

Meanwhile, analyzed from each school, chemistry teachers in private schools possess higher leadership, helping/friendly, and understanding (DC = 82,7%, CD = 81%, CS = 78%) behaviors than public school teachers (DC = 76,3%, CD = 76%, CS = 70%). This indicates that chemistry teachers in private schools have more potential to motivate students to perform well in chemistry subject. However, further research is needed to confirm this analysis.

Based on students' perception, chemistry teachers in Senior High Schools in South Tangerang are perceived as authoritative, which is characterized by fairly dominating behavior (Maulana et al, 2011) and fairly high cooperation (Wubbels and Brekelmans, 2005).

Authoritative teachers are described as teachers whom able to gather and focusing the students' attention the teaching subjects and possess a certain amount of humor during teaching. The teachers considerably understand the student's ability on their

understanding of concepts in chemistry and willing to help students when they found difficulties during learning process.

Students within an authoritative learning environment rarely given any chance to choose the tasks that they desire. Teachers suffice themselves with providing tasks to students in the event of their absence from the classroom, allowing the students to discuss the tasks together. When the teacher present in the classroom, the students are obliged to say greetings. Authoritative learning environment tends to appear serious as there is a supervision from the teacher during learning process. Teachers often admonish students who break the rules, although not by cynical remarks or threat of punishment.

Chemistry teachers rarely shown to be uncertain and unsure in delivering the subjects or when questioned by students; they always suitably prepared in teaching their subjects. Chemistry teachers consider the students as capable to perform the tasks properly, so that they do not feel worry whether or not the students did their homework. Notwithstanding, teachers sometimes suspects that there are students who cheats.

5. Conclusion

Based on the research presented in this paper, it can be concluded that the teacher-student interpersonal relationship in Senior High School in South Tangerang is categorized as fairly good. The chemistry teachers are perceived as fairly dominating and highly cooperative when teaching. Positive interpersonal relationship of the chemistry teachers such as leadership, helping/friendly, and understanding are perceived to be higher than the opposite behaviors (uncertain, dissatisfied, and admonishing). Chemistry teachers in Senior High Schools in South Tangerang Municipality, thus, are identified as authoritative teachers.

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