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Differentiated Instruction by Hong Kong Chinese Language Teachers for Non-Chinese

Speaking Students in Mainstream Classrooms: The Roles of Teacher-Student

Relationships and Teacher Motivation

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Differentiated Instruction by Hong Kong Chinese Language Teachers for Non-Chinese Speaking Students in Mainstream Classrooms: The Roles of Teacher-Student Relationships and Teacher Motivation

Abstract

With more and more non-Chinese speaking (NCS) students learning in Hong Kong mainstream classrooms, differentiated instruction has been called for application in Chinese language education to consider the diverse learning needs of all students. However, factors influencing Chinese language teachers' use of differentiated instruction remain unclear. This study aimed to examine the influence of teacher-student relationships and teachers' work motivation on differentiated instruction, as well as the mediating role of work motivation in the relationships between teacher-student relationships and differentiated instruction. Two hundred and ninety Chinese language teachers from Hong Kong primary schools participated in the survey. The results showed that after controlling for demographic factors (i.e., gender, length of service, years of teaching NCS students, and in-service training), both dimensions of the teacher-student relationships (i.e., closeness and conflict) positively predicted differentiated instruction. Autonomous motivation positively predicted differentiated instruction, while controlled motivation did not significantly predict differentiated instruction. Furthermore, autonomous motivation partially mediated the positive effect of closeness on differentiated instruction. Contributions, implications, and limitations are discussed.

Keywords: differentiated instruction, teacher-student relationships, work motivation, Chinese language teachers, non-Chinese speaking students

Introduction

Since 1997, following Hong Kong's new status as the Hong Kong Special Administrative Region, the number of South and Southeast Asians (e.g., Indians, Filipinos, Pakistanis, Thais, and Nepalese) has dramatically increased (Gao et al., 2019). The government has recognized this community by categorizing them in the education system as "Non-Chinese Speaking (NCS) children of the ethnic minorities" (Education Department of the Government of the HKSAR, 2001). While the second and subsequent generations of ethnic minorities may be conversant in spoken Cantonese (the local Chinese dialect), many of them have limited proficiency in written Chinese (Gao et al., 2019). Thus, Chinese language education for NCS students has always been an educational issue that the government pays close attention to.

Traditionally, NCS students were placed in designated schools or classes to learn the Chinese language. To ensure equal educational opportunities and adapt to mainstream society more quickly, the Hong Kong government canceled designated schools in 2004 and NCS students entered mainstream schools to learn the Chinese language together with local Chinese-speaking students (Loh et al., 2023). However, due to reasons such as cultural differences and language habits, it is inevitably difficult for NCS students to keep up with the learning pace of Chinese-speaking students through one-size-fits-all teaching (Shum et al., 2016). Therefore, it is urgent to explore how to provide effective teaching for both NCS students and Chinese-speaking students in mainstream classes.

Differentiated instruction is considered to be one of the effective teaching strategies to meet diverse learning needs (Vantieghem et al., 2020). It refers to utilizing effective

classroom strategies to tailor the curriculum according to the diverse readiness levels, interests, and learning profiles of students (Tomlinson et al., 2003). Differentiated instruction practices encompass diverse approaches, including task and homework differentiation, flexible grouping, assessment adjustments, and personalized feedback provision (Lindner & Schwab, 2020).

Differentiated instruction has been found to have a positive impact on students' learning performance, self-efficacy, engagement, and motivation (Lai et al., 2020; Massaad & Chaker, 2020; Reis et al., 2011), especially for students in mixed-ability classrooms (Valiandes, 2015). As such, it is necessary to explore how to promote differentiated teaching strategies for Chinese language teachers who teach NCS students in mainstream classes. Notably, although differentiated instruction has been widely researched in educational contexts involving low-achieving students, students with learning difficulties, and students with disabilities (Smale-Jacobse et al., 2019), there is a lack of research when it comes to Chinese language education for NCS students in Hong Kong. Hence, the present study filled this research gap. The implementation of differentiated instruction by teachers is not automatic; it requires specific conditions such as their attitudes, beliefs, and autonomous climate (Bi et al., 2024; Roose et al., 2024). This study focused on the influencing mechanism of teacher-student relationships and work motivation in Chinese language teachers' differentiated instruction.

Teacher-Student Relationships and Differentiated Instruction

Teacher-student relationships are typically understood as comprising two interconnected dimensions – conflict and closeness (Rudasill et al., 2010). Conflict denotes

the presence of negativity in the interactions between the teacher and student, while closeness signifies the degree of support, warmth, and the student's readiness to approach and interact with the teacher (Hajovsky et al., 2017). When teachers establish positive relationships with their students, they are more able to understand students' individual needs, learning styles, strengths, and weaknesses. These traits are crucial for implementing differentiated instruction which requires teachers to tailor their teaching methods and materials to meet the diverse needs of students in the classroom (Gregory, 2013; Tomlinson & Allan, 2000). However, the relationship between language teachers and students who learn a second language (L2) is worrying (Sun, 2012). For example, English teachers experience more negative emotions (e.g., anger, anxiety, and disappointment) when interacting with L2 English students (Xie & Jiang, 2021). In Hong Kong, NCS students are a minority group that often faces the risk of being excluded due to labels of language and academic deficiencies (Gao et al., 2019), making it more difficult to establish a positive teacher-student relationship. Therefore, it is crucial for this study to examine the influence of teacher-student relationships on teachers' use of differentiated instruction.

Although the relationship between teacher-student relationships and differentiated instruction has not yet been examined previously, existing research still provides implications for this study. For instance, teacher-student relationships were found to influence the teaching-learning process (Syahabuddin et al., 2020). Positive teacher-student relationships were positively correlated with teachers' participative teaching style (Cardenal et al., 2023) and conducive to promoting complex teaching practices (Li et al., 2022). Therefore, compared with negative teacher-student relationships (e.g., conflict), positive teacher-student

relationships (e.g., closeness) are deemed to be more likely to promote differentiated instruction.

Work Motivation and Differentiated Instruction

Teacher work motivation is defined as the internal or external drive that leads individuals to choose and persist in teaching (Han & Yin, 2016). In this research, work motivation refers to Chinese language teachers' internal or external drive to teach NCS students. Due to the challenges of lacking competence in teaching L2 Chinese and limited knowledge of the culture of NCS students, Chinese language teachers are at risk of being under-motivated to teach NCS students (Loh & Hung, 2020; Tse et al., 2020). Thus, in the context of education for diverse learners in Hong Kong, it is crucial to investigate the role of teachers' motivation to teach NCS students in their use of differentiated instruction.

The self-determination theory (SDT; Gagné & Deci, 2005) regards work motivation as a multidimensional construct, and one of the common classifications of work motivation is autonomous motivation (internal-based) versus controlled motivation (external-based). Autonomous motivation (including identified regulation and intrinsic motivation) involves engaging in activities driven by enjoyment, personal significance, challenge, or inherent interest, while controlled motivation (including external regulation and introjected regulation) entails undertaking tasks due to external pressures to uphold self-esteem based on conditions, obtain rewards, or evade negative outcomes (Eyal & Roth, 2011; Gagné & Deci, 2005). According to the theory of planned behavior (Ajzen, 1991), individuals' motivation to do a specific task directly affects their behavior. As such, teachers' motivation to teach NCS students may affect their usage of differentiated instruction strategies. Existing studies have

suggested the influence of teacher motivation on teaching behavior. For example, Thoonen et al. (2011) found that teachers' motivation positively predicted their teaching practices such as process-oriented instruction. Autonomous motivation to teach was found to positively predict the student-centered teaching approach (Orsini et al., 2020), whereas controlled motivation was found to positively predict need-thwarting teaching behavior (Van den Berghe et al., 2013). Only one study was found to examine the relationship between teacher motivation and differentiated instruction and the results showed that German teachers' motivation positively predicted differentiated instruction (Hartwig & Schwabe, 2018). However, the influence of different types of teacher motivation (e.g., autonomous and controlled) on Hong Kong teachers' differentiated instruction needs further exploration. The present study fills this gap and it is conducive to deeply understanding the relationships between the two variables and providing implications for enhancing teachers' use of differentiated instruction strategies.

The Mediating Role of Work Motivation

In addition to the possible direct links between teacher-student relationships and differentiated instruction as well as those between work motivation and differentiated instruction, work motivation may serve as a mediator between the relationship between teacher-student relationships and differentiated instruction. According to the SDT framework, adaptive work motivation is driven by the satisfaction of the three types of psychological needs (i.e., the need for competence, the need for autonomy, and the need for relatedness) and leads to desirable outcomes (Gagné & Deci, 2005). Among the three psychological needs, the need for relatedness refers to feeling connected to others and establishing caring inter-person relationships (Ryan, 2017). Thus, when the need for relatedness is met in specific contexts,

such as the positive relationships between Chinese language teachers and NCS students, teachers' work motivation will be increased, thereby enhancing their adaptive work behavior, such as the employment of differentiated instruction strategies.

The influence of teacher-student relationships on motivation has been widely examined among students (Li et al., 2022). For example, Zou et al. (2024) investigated both secondary school teachers and students and found that positive teacher-student relationships positively predicted students' intrinsic motivation. After interviewing teachers and L2 students, Henry and Thorsen (2018) revealed that positive teacher-student relationships enhanced students' second language motivation. However, as Spilt et al. (2011) concluded in their review article, much attention has been paid to the importance of teacher-student relationships in students' learning motivation, whereas much less is known about how the relationships impact teachers' motivation. The only empirical study in this regard indicated that relationships with students were important sources of teachers' enjoyment and motivation (Hargreaves, 2000). The influence of teacher-student relationships on teachers' motivation still needs further exploration, and this study contributed to the existing literature on this topic. Overall, based on the SDT and considering the three direct effects among the three variables, it is likely that Chinese language teachers' work motivation plays a mediating role in the influence of teacher-student relationships on differentiated instruction.

The Present Study

The objectives of this study are to examine the effects of teacher-student relationships and work motivation on differentiated instruction and the mediating role of work motivation among Chinese language teachers of NCS students in Hong Kong. Based on the existing

literature, three research questions were proposed.

1. Do teacher-student relationships influence Chinese language teachers' differentiated instruction?
2. Does work motivation influence Chinese language teachers' differentiated instruction?
3. Does work motivation mediate the effect of teacher-student relationships on differentiated instruction?

Method

Participants and Procedure

Ethics approval of this study was obtained from the University with which the first author is affiliated. Wenjuanxing platform (<https://www.wjx.cn/>) was used to design the online survey which includes the consent form and the questionnaires. In the consent form, participants were informed that their participation was entirely voluntary and they could terminate this survey at any time. To protect their privacy, no personal data would be identified or disclosed.

Taking the opportunity of the teacher training programs (Professional Development Project on Enhancing Non-Chinese Speaking Students' Language Competency) organized by the Hong Kong Education Bureau, the online survey was sent to Chinese language teachers. During the training programs, 290 teachers who teach Chinese language in Cantonese from primary schools participated in the survey. Of them, 242 were female teachers and 48 were male teachers. Their length of service varied from 1 to 40 years ($M = 10.00$, $SD = 9.42$) and their years of teaching NCS students ranged from 1 to 23 years ($M = 2.62$, $SD = 3.28$). Before

this training, 104 Chinese language teachers had participated in in-service training concerning teaching NCS students while 186 had no such experience.

Inventories

Student-Teacher Relationship Scale r Short Form (STRS-SF)

Pianta's (2001) STRS-SF, a psychometrically sound instrument widely utilized in previous studies, has been translated into Chinese for assessing teacher-student relationships in the Chinese educational context (e.g., Fabris et al., 2023). It contains 15 items with two dimensions: closeness (eight items, sample item "This child values his/her relationship with me") and conflict (seven items "This child and I always seem to be struggling with each other"). When the scale was used in this study, the words "This child" in each item were replaced with "The NCS student". Since one reverse scoring item ("This child is uncomfortable with physical affection or touch from me") from the closeness dimension did not show adequate factor loading in this study, it was deleted. Thus, the final STRS-SF had 14 items in total. Teachers rated each item on a 7-point Likert scale ranging from 1 (completely disagree) to 7 (completely agree).

Multidimensional Work Motivation Scale (MWMS)

Gagné et al. (2015) developed the MWMS and it showed good psychometric properties in later research when assessing teachers (Neves & Coimbra, 2018). The Chinese version of the MWMS (Xie et al., 2024a) was adopted in this study. It comprises four dimensions: intrinsic motivation (three items, sample item "Because I have fun doing my job"), identified regulation (three items, sample item "Because putting efforts in this job aligns with my personal values"), introjected regulation (four items, sample item "Because

otherwise I will feel ashamed of myself”), and external regulation (six items, sample item “To get others’ (e.g., school leaders, colleagues, families, and students) approval”). Following existing studies (e.g. Eyal & Roth 2011), the score of autonomous motivation was calculated by averaging the scores of identified regulation and intrinsic motivation, and the score of controlled motivation was calculated by averaging the scores of external regulation and introjected regulation. Participants were invited to evaluate the items on a seven-point Likert scale (1 = “not at all” and 7 = “completely”).

Differentiated Instruction Scale (DIS)

The DIS is a subscale of the DI-Quest (Coubergs et al., 2017) and it has been used to measure Hong Kong teachers’ differentiated instruction (Yuen et al., 2022). It has eight items rated on a seven-point Likert scale (1 = “never” and 7 = “always”). The sample item is “During my lessons, different students work on different tasks with a different level of difficulty”.

The Demographic Information Sheet

Because previous studies showed that teachers’ gender, length of service, years of teaching NCS students, and in-service training had influences on the main research variables (e.g., teacher-student relationships, teacher motivation, and differentiated instruction; Melesse, 2015; Robinson, 2022; Xie et al., 2024b; Xie et al., 2024c), they were selected as potential controlled variables in this study. The participants were invited to provide their information on gender (1 = male and 2 = female), length of service (e.g., 20 years), years of teaching NCS students (e.g., 5 years), and whether they had attended in-service training regarding teaching NCS students (1= yes, 2 = no).

Data Analysis

SPSS 26.0 and Amos 23.0 were utilized to analyze data. Internal consistency for each scale was examined with Cronbach's (1951) alphas and a confirmatory factor analysis (CFA) was run to test the validity of the three inventories. Descriptive statistics including means, standard deviations, and zero-order correlations were calculated. The main research hypotheses were examined by running path analysis in Amos 23.0. The goodness-of-fit of the mediation model was evaluated using the Tucker–Lewis index (TLI), comparative fit index (CFI), standard root mean residual (SRMR), and root mean square error of approximation (RMSEA). Following Hu and Bentler (1999), the acceptable values for TLI and CFI are equal to or larger than .90 and those for SRMR and RMSEA are equal to or smaller than .08. The specific indirect effects were tested using the bias-corrected bootstrapping procedure (N = 5000).

Results

Preliminary Analyses

The Cronbach alpha coefficients of all the variables were greater than .91 (see Table 1). The results of CFA showed good model fit indices for teacher-student relationships ($\chi^2 = 205.91, p < .001, df = 71, TLI = .93, CFI = .95, RMSEA = .08, \text{ and } SRMR = .06$), work motivation ($\chi^2 = 261.61, p < .001, df = 91, TLI = .95, CFI = .96, RMSEA = .08, \text{ and } SRMR = .06$), and differentiated instruction ($\chi^2 = 44.02, p < .001, df = 15, TLI = .97, CFI = .99, RMSEA = .08, \text{ and } SRMR = .03$).

[Insert Table 1 about here]

Table 1 also displays the values of means, standard deviations, kurtosis, skewness,

and zero-order correlations of the variables. The results showed that the data were normally distributed. Two dimensions of the teacher-student relationships (i.e., closeness and conflict) and two dimensions of work motivation (i.e., controlled and autonomous motivation) were positively correlated with differentiated instruction. In terms of the relationship between teacher-student relationships and work motivation, closeness was positively associated with autonomous motivation, and both closeness and conflict were positively associated with controlled motivation.

Regarding the demographics (gender, length of service, years of teaching NCS students, and in-service training), female teachers tended to have higher levels of conflict ($r = .15, p < .05$) and autonomous motivation ($r = .15, p < .05$); the length of service was negatively correlated to controlled motivation ($r = -.12, p < .05$); the year of teaching NCS students was positively associated with closeness ($r = .27, p < .001$) and controlled motivation ($r = .13, p < .05$); teachers with in-service training experience showed higher levels of closeness ($r = .14, p < .05$), autonomous motivation ($r = .12, p < .05$), and differentiated instruction ($r = .16, p < .001$). Therefore, the four demographics were controlled in the following mediation analysis.

The Mediating Role of Work Motivation between Teacher-Student Relationships and Differentiated Instruction

To examine the mediating role of work motivation in the effect of teacher-student relationships on differentiated instruction, a mediation analysis was performed using Amos 23.0. All variables in the mediation model (see Figure 1) were handled as observed variables. Two dimensions of the teacher-student relationships (i.e., closeness and conflict) were listed

as independent variables, two dimensions of work motivation (i.e., controlled and autonomous motivation) served as mediators, and differentiated instruction was treated as the dependent variable. Additionally, four demographic factors (i.e., gender, length of service, years of teaching NCS students, and in-service training) were controlled in the mediation model. Specifically, the direct paths from the four demographics to both mediators (controlled and autonomous motivation) and the dependent variable (differentiated instruction) were allowed. For the aesthetics of the Figure, they were not shown. The results suggested that the model fit indices for the mediation model were $\chi^2 = 23.86, p < .05, df = 14$, TLI = .96, CFI = .98, RMSEA = .05, and SRMR = .05.

[Insert Figure 1 about here]

Among the direct effects in the model, closeness positively predicted controlled motivation ($\beta = .41, p < 0.05$), autonomous motivation ($\beta = .64, p < 0.05$), and differentiated instruction ($\beta = .25, p < 0.05$). Conflict positively predicted controlled motivation ($\beta = .34, p < 0.05$) and differentiated instruction ($\beta = .14, p < 0.05$). Autonomous motivation positively predicted differentiated instruction ($\beta = .35, p < 0.05$). However, the effect of conflict on autonomous motivation and that of controlled motivation on differentiated instruction were not significant. Thus, the research questions one and two were answered.

The results of bias-corrected bootstrapping using maximum likelihood estimates and 5000 samples showed that the indirect effect of closeness on differentiated instruction was significant (see Table 2). Specifically, autonomous motivation partially mediated the effect of closeness on differentiated instruction (indirect effect = .23, $p < 0.05$), with the indirect effect explaining 47.92% of the variance (total effect = .48, $p < 0.05$). Hence, the research question

three was answered.

[Insert Table 2 about here]

Discussion

The present study found that after controlling for demographic factors, both dimensions of the teacher-student relationships (i.e., closeness and conflict) positively predicted differentiated instruction. Autonomous motivation positively predicted differentiated instruction, while controlled motivation did not significantly predict differentiated instruction. Furthermore, autonomous motivation partially mediated the positive effect of closeness on differentiated instruction. The findings are discussed below.

Regarding the relationship between teacher-student relationships and differentiated instruction, on the one hand, closeness positively predicted differentiated instruction. This aligns with existing research showing that a positive relationship between teachers and students is one of the vital preconditions for teachers' use of effective instruction (Cardenal et al., 2023; Li et al., 2022). In this study, establishing close connections with NCS students may enable teachers to gain deeper insights into these students' needs, individual traits, strengths, and weaknesses in Chinese language learning relative to Chinese-speaking students. All of these help Chinese language teachers tailor teaching methods and materials to match the unique attributes of each student, which are fundamental principles of differentiated instruction (Lindner & Schwab, 2020; Tomlinson et al., 2003). On the other hand, somewhat unexpectedly, conflict also positively predicted differentiated instruction. This unexpected result could be explained by the role of cognitive conflicts in teacher change (Calleja & Formosa, 2020). Cognitive conflict often emerges from interpersonal or

intrapersonal conflicts, leading to an unpleasant or disequilibrium state (Zaslavsky, 2005). A chance for personal growth emerges when a new experience clashes with and cannot be reconciled with one's existing knowledge schemas (Piaget, 1985). Thus, it is likely that conflictual relationships with NCS students trigger teachers' cognitive conflicts, prompting them to reevaluate the suitability of their teaching approaches in meeting students' needs and differences, thereby facilitating the implementation of differentiated instruction. This finding suggests that a conflictual teacher-student relationship may not necessarily be maladaptive; instead, it offers teachers opportunities for reflection on their teaching practices and further enhancements. Further research is advised on this issue.

Concerning the relationship between work motivation and differentiated instruction, autonomous motivation was found to positively predict differentiated instruction. This result supports the SDT, emphasizing that autonomous motivation fosters favorable work outcomes (Gagné & Deci, 2005). It is also consistent with the findings of previous studies suggesting that autonomous motivation drives teachers to adopt effective teaching practices, such as a student-centered teaching approach (Orsini et al., 2020). Within the scope of this study, Chinese language teachers in Hong Kong have limited experience in teaching L2 Chinese (Loh & Hung, 2020), and thus teaching NCS students brings them unexpected difficulties and challenges. As noted by Tadić Vujčić et al. (2017), when teachers face a more challenging environment, their motivation plays a more prominent role in their work. Consequently, it is reasonable that teachers who truly realize the meaning and value of their work and derive enjoyment from their work (i.e., key characteristics of autonomous motivation; Gagné & Deci, 2005) are more predisposed to proactively confront challenges and surmount obstacles.

By virtue of their intrinsic drive, teachers are inclined to actively explore the diverse needs of students and provide them with personalized teaching.

Furthermore, autonomous motivation played a mediating role in the positive effect of closeness on differentiated instruction. This finding echoes the SDT, which argues that satisfaction with the need for relatedness is an important source of autonomous motivation, thereby driving individuals to produce positive work outcomes (Gagné & Deci, 2005).

Empirically, to the authors' best knowledge, this study may be the first one to use quantitative methods to examine the influence of teacher-student relationships on teachers' work motivation. The finding that closeness positively predicted autonomous motivation is in line with previous research examining the effect of teacher-student relationships on students' learning motivation (Opdenakker et al., 2012; Zou et al., 2024). This suggests that positive teacher-student relationships are beneficial to the adaptive motivation of both teachers and students. Specific to Chinese language teachers in Hong Kong, it is likely that when teachers establish caring, intimate, and friendly relationships with NCS students, they naturally become more invested in students' performance in Chinese language learning and further acknowledge the value of their work. This intrinsic drive motivates teachers to actively engage in their work related to NCS students. As discussed earlier, teachers' autonomous motivation contributed to their use of differentiated instruction. Thus, positive teacher-student relationships may cultivate teachers' autonomous motivation, which ultimately promotes their differentiated teaching behaviors.

Limitations and Future Directions

This study has four limitations that need future research to overcome. First, all

teachers of this study were Hong Kong Chinese language teachers who teach NCS students in their classrooms. The findings could not be over-generalized to wider regions. Future research could investigate teachers outside Hong Kong. Second, in the sample of this study, 242 were female teachers and 48 were male teachers. The gender imbalance might introduce gender bias into the results. Future research is advised to collect a more gender-balanced sample to examine the relationships among the variables of this study. Third, all instruments adopted in this study were self-report inventories, which might lead to social desirability bias. Future research is encouraged to incorporate observational data or feedback from NCS students. Fourth, this study employed a cross-sectional research design; however, the statistical causality cannot be established. Future studies could use longitudinal research designs (e.g., cross-lagged panel modeling) to explore the relationships among teacher-student relationships, work motivation, and differentiated instruction.

Contributions and Implications

Despite the limitations, this study has theoretical contributions and practical implications. Theoretically, this study extends the research on differentiated instruction to the context of L2 Chinese education in Hong Kong and identifies two important influencing factors of differentiated instruction: teacher-student relationships and teachers' work motivation. It also bridges gaps by illustrating how teacher-student relationships influence teachers' work motivation. That is, positive teacher-student relationships (e.g., closeness) enhance teachers' both controlled and autonomous motivation and negative teacher-student relationships (e.g., conflict) enhance controlled motivation. The study further supports the SDT by revealing the mediating role of work motivation between teacher-student

relationships and differentiated instruction. Lastly, this study enriches the literature on the three key variables, especially within the domain of second language education.

Additionally, this study provides practical implications for enhancing Chinese language teachers' differentiated instruction behavior when they teach NCS students. First, given the influence of teacher-student relationships on differentiated instruction, establishing close relationships between Chinese language teachers and NCS students is important. For instance, schools could organize cultural exchange activities where both teachers and NCS students can enhance cross-cultural understanding and deepen their relationships. Teachers are advised to establish a supportive and trusting relationship with NCS students through open communication, empathy, and respect for students' cultural identities and linguistic challenges. NCS students are encouraged to build positive relationships with their Chinese language teachers by actively engaging in classroom activities, showing interest and eagerness to learn the Chinese language, express gratitude for teachers' support, and behaving in a respectful manner during classes.

Second, considering the influence of teachers' work motivation on differentiated instruction, boosting teachers' autonomous motivation is vital. According to SDT (Ryan, 2017), in addition to the need for relatedness (e.g., teacher-student relationships), the need for competence and autonomy are crucial for cultivating autonomous motivation. Therefore, to improve teachers' competence in teaching NCS students, Chinese language teachers could actively participate in workshops and training sessions focusing on the necessary skills and knowledge for educating NCS students. Accordingly, the government is suggested to enact explicit policies concerning implementing teacher training programs for teaching NCS

students. One of the training topics could be using differentiated instruction strategies for NCS students to teach the Chinese language. To meet teachers' need for autonomy, schools are suggested to allow teachers to design and personalize lesson plans, incorporating methods that cater to the diverse learning styles of NCS students.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t)
- Bi, M., Letzel-Alt, V., Pozas, M., Zhu, C., & Struyven, K. (2024). Chinese version of the teachers' attitudes towards differentiated instruction scale: An adaptation study. *Cogent Education*, 11(1), 2380166. <https://doi.org/10.1080/2331186X.2024.2380166>
- Calleja, J., & Formosa, L. (2020). Teacher change through cognitive conflicts: The case of an art lesson study. *International Journal for Lesson & Learning Studies*, 9(4), 383-395. <https://doi.org/10.1108/IJLLS-05-2020-0028>
- Cardenal, M. E., Díaz-Santana, O., & González-Betancor, S. M. (2023). Teacher-student relationship and teaching styles in primary education: A model of analysis. *Journal of Professional Capital and Community*, 8(3), 165-183. <https://doi.org/10.1108/JPC-09-2022-0053>
- Coubergs, C., Struyven, K., Vanthournout, G., & Engels, N. (2017). Measuring teachers' perceptions about differentiated instruction: The DI-Quest instrument and model. *Studies in Educational Evaluation*, 53, 41-54. <https://doi.org/10.1016/j.stueduc.2017.02.004>
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- Education Department of the Government of the HKSAR. 2001. *School Education for Children of Ethnic Minorities*. Legislative Council Paper No. CB(2)46/01-02 (01).
- Eyal, O., & Roth, G. (2011). Principals' leadership and teachers' motivation: Self-

determination theory analysis. *Journal of Educational Administration*, 49(3), 256-275.

<https://doi.org/10.1108/09578231111129055>

Fabris, M. A., Lin, S., & Longobardi, C. (2023). A cross-cultural comparison of teacher-student relationship quality in Chinese and Italian teachers and students. *Journal of School Psychology*, 99, 101227. <https://doi.org/10.1016/j.jsp.2023.101227>

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331-362. <https://doi.org/10.1002/job.322>

Gagné, M., Forest, J., Vansteenkiste, M., Crevier-Braud, L., Van den Broeck, A., Aspel, A. K., ... & Westby, C. (2015). The Multidimensional Work Motivation Scale: Validation evidence in seven languages and nine countries. *European Journal of Work and Organizational Psychology*, 24(2), 178-196.
<https://doi.org/10.1080/1359432X.2013.877892>

Gao, F., Lai, C., & Halse, C. (2019). Belonging beyond the deficit label: The experiences of 'non-Chinese speaking' minority students in Hong Kong. *Journal of Multilingual and Multicultural Development*, 40(3), 186-197.
<https://doi.org/10.1080/01434632.2018.1497042>

Gregory, G. (2013). *Differentiated instructional strategies professional learning guide*. Corwin Press.

Griful-Freixenet, J., Struyven, K., & Vantieghem, W. (2021). Exploring pre-service teachers' beliefs and practices about two inclusive frameworks: Universal Design for Learning and differentiated instruction. *Teaching and Teacher Education*, 107, 103503.
<https://doi.org/10.1016/j.tate.2021.103503>

Hajovsky, D. B., Mason, B. A., & McCune, L. A. (2017). Teacher-student relationship quality and academic achievement in elementary school: A longitudinal examination of gender differences. *Journal of School Psychology, 63*, 119-133.

<https://doi.org/10.1016/j.jsp.2017.04.001>

Han, J., & Yin, H. (2016). Teacher motivation: Definition, research development and implications for teachers. *Cogent Education, 3*(1), 1217819.

<https://doi.org/10.1080/2331186X.2016.1217819>

Hargreaves, A. (2000). Mixed emotions: Teachers' perceptions of their interactions with students. *Teaching and Teacher Education, 16*(8), 811-826.

[https://doi.org/10.1016/S0742-051X\(00\)00028-7](https://doi.org/10.1016/S0742-051X(00)00028-7)

Hartwig, S. J., & Schwabe, F. (2018). Teacher attitudes and motivation as mediators between teacher training, collaboration, and differentiated instruction. *Journal for Educational Research Online, 10*(1), 100-122. <https://doi.org/10.25656/01:15415>

Henry, A., & Thorsen, C. (2018). Teacher–student relationships and L2 motivation. *The Modern Language Journal, 102*(1), 218-241. <https://doi.org/10.1111/modl.12446>

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55.

<https://doi.org/10.1080/10705519909540118>

<https://doi.org/10.1080/10705519909540118>

Lai, C.-P., Zhang, W., & Chang, Y.-L. (2020). Differentiated instruction enhances sixth-grade students' mathematics self-efficacy, learning motives, and problem-solving skills.

Social Behavior and Personality: An International Journal, 48(6), 1-13.

<https://doi.org/10.2224/sbp.9094>

Li, X., Bergin, C., & Olsen, A. A. (2022). Positive teacher-student relationships may lead to better teaching. *Learning and Instruction, 80*, 101581.

<https://doi.org/10.1016/j.learninstruc.2022.101581>

Lindner, K.-T., & Schwab, S. (2020). Differentiation and individualisation in inclusive education: a systematic review and narrative synthesis. *International Journal of Inclusive Education, 1-21*. <https://doi.org/10.1080/13603116.2020.1813450>

Loh, E. K. Y., Chan, S. P. T., & Fung, W. Y. R. (2023). Dynamic enrichment learning mode: A new way to facilitate the learning of Chinese as a second language in the mainstream curriculum. In J. F. Hong & C. M. Si (Eds.), *Teaching Chinese language in the international school context* (pp. 75-100). Springer Nature Singapore.

Loh, K. Y. E., & Hung, O.-Y. (2020). *A study on the challenges faced by mainstream schools in educating ethnic minorities in Hong Kong [research report]*. Oxfam Hong Kong.

Massaad, M., & Chaker, L. (2020). The influence of differentiated instruction on Lebanese students' motivation, knowledge, and engagement. *International Journal of English Literature and Social Sciences, 5(3)*, 755-774. <https://doi.org/10.22161/ijels.53.31>

Melesse, T. (2015). Differentiated instruction: Perceptions, practices and challenges of primary school teachers. *Science, Technology and Arts Research Journal, 4(3)*, 253-264. <https://doi.org/10.4314/star.v4i3.37>

Opendakker, M.-C., Maulana, R., & den Brok, P. (2012). Teacher-student interpersonal relationships and academic motivation within one school year: Developmental changes and linkage. *School Effectiveness and School Improvement, 23(1)*, 95-119.

<https://doi.org/10.1080/09243453.2011.619198>

Orsini, C. A., Tricio, J. A., Segura, C., & Tapia, D. (2020). Exploring teachers' motivation to teach: A multisite study on the associations with the work climate, students' motivation, and teaching approaches. *Journal of Dental Education*, 84(4), 429-437.

<https://doi.org/10.1002/jdd.12050>

Piaget, J. (1985), *The equilibrium of cognitive structures*, University of Chicago Press, Chicago.

Pianta, R. C. (2001). *Student-Teacher Relationship Scale: Professional Manual*. Odessa, FL: Psychological Assessment Resources, Inc.

Reis, S. M., McCoach, D. B., Little, C. A., Muller, L. M., & Kaniskan, R. B. (2011). The effects of differentiated instruction and enrichment pedagogy on reading achievement in five elementary schools. *American Educational Research Journal*, 48(2), 462-501.

<https://doi.org/10.3102/0002831210382891>

Robinson, C. D. (2022). A framework for motivating teacher-student relationships.

Educational Psychology Review, 34(4), 2061-2094. <https://doi.org/10.1007/s10648-022-09706-0>

Roose, I., Vantieghem, W., Vanderlinde, R., & Van Avermaet, P. (2024). Professional vision as a mediator for inclusive education? Unravelling the interplay between teachers' beliefs, professional vision and reported practice of differentiated instruction.

Educational Review, 76(3), 483-505. <https://doi.org/10.1080/00131911.2022.2054957>

Rudasill, K. M., Reio Jr, T. G., Stipanovic, N., & Taylor, J. E. (2010). A longitudinal study of student-teacher relationship quality, difficult temperament, and risky behavior from

childhood to early adolescence. *Journal of School Psychology, 48*(5), 389-412.

<https://doi.org/10.1016/j.jsp.2010.05.001>

Ryan, R. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Shum, M., Gao, F., & Ki, W. W. (2016). School desegregation in Hong Kong: Non-Chinese linguistic minority students' challenges to learning Chinese in mainstream schools. *Asia Pacific Journal of Education, 36*(4), 533-544.

<https://doi.org/10.1080/02188791.2015.1005048>

Smale-Jacobse, A. E., Meijer, A., Helms-Lorenz, M., & Maulana, R. (2019). Differentiated instruction in secondary education: A systematic review of research evidence.

Frontiers in Psychology, 10, 2366. <https://doi.org/10.3389/fpsyg.2019.02366>

Spilt, J. L., Koomen, H. M., & Thijs, J. T. (2011). Teacher wellbeing: The importance of teacher–student relationships. *Educational Psychology Review, 23*, 457-477.

<https://doi.org/10.1007/s10648-011-9170-y>

Sun, Z. (2012). An empirical study on new teacher-student relationship and questioning strategies in ESL classroom. *English Language Teaching, 5*(7), 175-183.

<https://doi.org/10.5539/elt.v5n7p175>

Syahabuddin, K., Fhonna, R., & Maghfirah, U. (2020). Teacher-student relationships: An influence on the English teaching-learning process. *Studies in English Language and Education, 7*(2), 393-406. <https://doi.org/10.24815/siele.v7i2.16922>

Tadić Vujčić, M., Oerlemans, W. G., & Bakker, A. B. (2017). How challenging was your work today? The role of autonomous work motivation. *European Journal of Work and*

Organizational Psychology, 26(1), 81-93.

<https://doi.org/10.1080/1359432X.2016.1208653>

Thoonen, E. E., Slegers, P. J., Oort, F. J., Peetsma, T. T., & Geijsel, F. P. (2011). How to improve teaching practices: The role of teacher motivation, organizational factors, and leadership practices. *Educational Administration Quarterly*, 47(3), 496-536.

<https://doi.org/10.1177/0013161X11400185>

Tomlinson, C. A., & Allan, S. D. (2000). *Leadership for differentiating schools & classrooms*. Association for Supervision and Curriculum Development.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted*, 27(2-3), 119-145.

<https://doi.org/10.1177/016235320302700203>

Tse, S.-K., To, H., Pang, E. Y., Tsui, P.-F., Lam, L.-S., Laing, V., & Wu, K.-F. (2020). Using the home-school-community model to enhance the Chinese language proficiency of non-Chinese speaking children. *Creative Education*, 11(10), 2069-2095.

<https://doi.org/10.4236/ce.2020.1110151>

Valiandes, S. (2015). Evaluating the impact of differentiated instruction on literacy and reading in mixed ability classrooms: Quality and equity dimensions of education effectiveness. *Studies in Educational Evaluation*, 45, 17-26.

<https://doi.org/10.1016/j.stueduc.2015.02.005>

Van den Berghe, L., Soenens, B., Vansteenkiste, M., Aelterman, N., Cardon, G., Tallir, I. B.,

& Haerens, L. (2013). Observed need-supportive and need-thwarting teaching behavior in physical education: Do teachers' motivational orientations matter? *Psychology of Sport and Exercise, 14*(5), 650-661.

<https://doi.org/10.1016/j.psychsport.2013.04.006>

Vantieghem, W., Roose, I., Gheysens, E., Griful-Freixenet, J., Keppens, K., Vanderlinde, R., Struyven, K., & Van Avermaet, P. (2020). Professional vision of inclusive classrooms: A validation of teachers' reasoning on differentiated instruction and teacher-student interactions. *Studies in Educational Evaluation, 67*, 100912.

<https://doi.org/10.1016/j.stueduc.2020.100912>

Xie, X., & Jiang, G. (2021). Chinese tertiary-level English as a foreign language teachers' emotional experience and expression in relation to teacher-student interaction. *Frontiers in Psychology, 12*, 759243. <https://doi.org/10.3389/fpsyg.2021.759243>

Xie, Z., Zhang, L. F., & Deng, M. (2024a). Self-efficacy and work motivation among inclusive education teachers in China. *International Journal of Disability, Development and Education, 71*(2), 236-250.

<https://doi.org/10.1080/1034912X.2022.2094900>

Xie, Z., Yao, Y., & Zhu, X. (2024b). *Motivation profiles of Hong Kong Chinese language teachers of non-Chinese speaking students*. The Paris Conference on Education, Paris, France.

Xie, Z., Zhu, X., Cao, F., Yuan, W., & Yao, Y. (2024c). Work motivation profiles among inclusive school teachers of students with intellectual and developmental disabilities: A mixed-method study. *Teaching and Teacher Education, 151*, 104761.

<https://doi.org/10.1016/j.tate.2024.104761>

Yuen, S. Y., Leung, C. C. Y., & Wan, S. W. Y. (2022). Teachers' perceptions and practices of differentiated instruction: Cross-cultural validation of the differentiated instruction questionnaire in Hong Kong. *International Journal of Educational Research*, *115*, 102044. <https://doi.org/10.1016/j.ijer.2022.102044>

Zaslavsky, O. (2005). Seizing the opportunity to create uncertainty in learning mathematics. *Educational Studies in Mathematics*, *60*, 297-321. <https://doi.org/10.1007/s10649-005-0606-5>

Zou, H., Yao, J., Zhang, Y., & Huang, X. (2024). The influence of teachers' intrinsic motivation on students' intrinsic motivation: The mediating role of teachers' motivating style and teacher-student relationships. *Psychology in the Schools*, *61*(1), 272-286. <https://doi.org/10.1002/pits.23050>

Table 1*Descriptive Statistics and Zero-order Correlations among Key Variables*

| Variable | M | SD | S | K | 1 | 2 | 3 | 4 | 5 |
|------------------------------|------|------|------|------|------------|------------|------------|------------|------------|
| 1 closeness | 5.02 | .90 | -.21 | -.17 | .92 | | | | |
| 2 conflict | 3.85 | 1.17 | .06 | -.15 | .09 | .91 | | | |
| 3 controlled motivation | 4.55 | 1.09 | -.36 | .68 | .42** | .40** | .93 | | |
| 4 autonomous motivation | 5.38 | .95 | -.64 | .70 | .60** | .06 | .52** | .93 | |
| 5 differentiated instruction | 5.17 | .83 | -.39 | .80 | .54** | .23** | .45** | .59** | .93 |

Note. S = skewness, K = kurtosis. Cronbach's alpha coefficients were shown in bold on the diagonal line.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2

Total Effect, Direct Effect, and Indirect Effect of Teacher-Student Relationship on

Differentiated Instruction via Work Motivation

| | Coefficient | SE | 95% CI |
|-----------------|-------------|-----|--------------|
| Total effect | .48*** | .07 | [.342, .598] |
| Direct effect | .25*** | .08 | [.106, .407] |
| Indirect effect | .23*** | .04 | [.152, .308] |

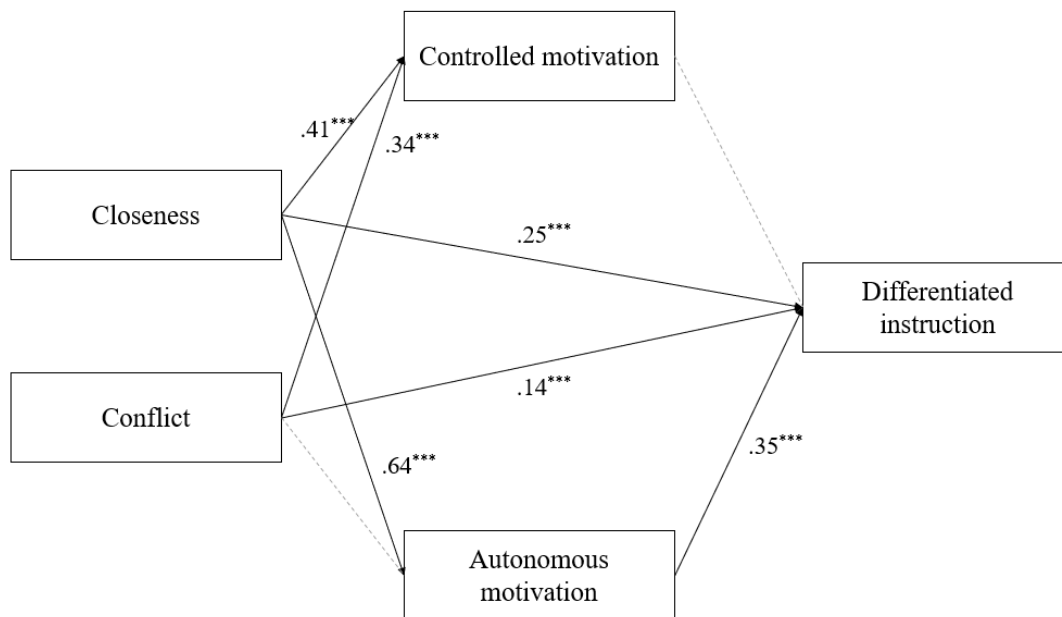


Figure 1

The Mediation Model of Work Motivation in the Relationship between Teacher-Student Relationship and Differentiated Instruction.

Note. The effects of demographics are not presented. All path coefficients are standardized values.
 * $p < .05$, ** $p < .01$, *** $p < .001$.