The Development of a Model to Enhance Teacher Leadership in Middle Schools in Shanxi Province, China

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Abstract

Teacher leadership is the heart of the transformation of a school. Teacher leaders are essential in driving change, supporting colleagues, and helping students towards academic success. Education reform in China has included strategies for developing teacher leadership. However, at the school level, there still needs to be more research and understanding of the concept in many areas. This study aimed to develop a teacher leadership model for middle school teachers in Shanxi Province, China. The study utilized exploratory mixed methods with both qualitative and quantitative analysis to develop an instrument that was subsequently used for data collection from 825 middle school teachers. By using regression analysis and interviews, elements of the model were confirmed, and it was found that to develop teacher leadership in the target middle schools, the following concepts need to be encouraged: principal leadership, peer relationships, professionalism, and leadership skills. In addition, promoting teacher leadership requires the cooperation and support of teachers, school principals, and governmental regulators. Recommendations included promoting decentralized leadership structures within schools to provide opportunities for teacher input into school policy, curriculum, and professional development. For teachers, it is essential to recognize their dual roles as "teachers" and "leaders" to encourage their participation in school management.

Keywords: Teacher leadership, Factors, Competencies, Model

Introduction

Teacher leadership is considered one of the core practices of successful school change because teachers are critical in the teaching process (Huang, 2016). The success of school reform depends not only on the principal but also on the teachers' input. To encourage teachers to participate in school reform and development, it is necessary to change teachers' traditional role as passive followers and encourage them to assume more leadership responsibilities (Li et al., 2013). Teacher leaders are significant in the teaching workforce as role models for novice teachers, leading to better school outcomes (Zhou & McLaren, 2021). However, teacher leaders are also agents of change. This role should be nurtured and explored so teachers can lead initiatives, challenge the school status quo, and pursue excellence in teaching and learning (Grant et al., 2010).

The Professional Competency Standards for Middle Schools enacted by the Ministry of Education of the People's Republic of China in 2021, calls for developing teacher leadership in schools. The standards ask teachers to be competent in joining the decision-making process, building the collaborative culture, accessing and using research, facilitating improvements in instruction, and effective communication and collaboration with families and the community. As a result, teacher leadership has become one of the education reform trends that many sectors have been coordinating (Weng, 2016). Nowadays, teaching is one of the most stressful professions in China. High-stress levels affect teachers' health and job satisfaction, leading to burnout, lack of engagement, job dissatisfaction, poor performance, and high turnover rates (Li & Ye, 2021). Therefore, it is essential to fully trust the professionalism of teachers and give full use of their leading role in education reform, develop a cadre of willingness and ability to engage in change activities, and influence other teachers (Ye & Zhu, 2018).

Additionally, there needs to be more study in this area. Most literature focuses on the rationale behind western research findings. The research on teacher leadership in China mainly focuses on teachers with formal positions, and there is little literature on teacher leadership development in China (Wang & Zhu, 2020; Zhong & Xu, 2011). However, teacher leadership research is urgently needed to cultivate the field (Qi et al., 2021).

This study focuses on developing a model to increase teacher leadership in middle schools in Shanxi, China. The following research objectives were addressed through an exploratory mixed-methods design: 1). What competencies are needed for teacher leadership in schools? 2). What are the current levels of teacher leadership in the three middle schools in Shanxi Province, China? 3). What are the significant factors that affect teacher leadership development at the three middle schools in Shanxi Province, China? 4). What is a model to enhance teacher leadership for teachers in middle schools in Shanxi Province, China?

Literature Review

Definition of Teacher Leadership

The definition of teacher leadership in the academic community has been interpreted from various angles. It focuses on out-of-class roles, supports professional peer learning, influences policy and school decisions, and ultimately targets student learning (Wenner & Campbell, 2017). Active teacher leadership means working with others to build a culture of collective leadership for well-being through formally designated leadership positions or informally defined as a deliberate intention to work with others to achieve positive change (Cherkowski, 2018). Teacher leadership consists of three primary behaviors: teacher involvement in educational improvement efforts, teacher learning in the community of practice, and teacher influence outside the classroom. York-Barr and Duke (2004) posited that teacher leaders are both teachers and leaders; they are or have been teachers with significant teaching experience, are known to be excellent teachers, and are respected by their peers. Teacher leaders' roles include coordination and management, school or district curriculum work, professional development of colleagues, participation in school change and improvement, parent and community involvement, contributions to the profession, and preservice teacher education.

Leadership in schools has expanded from formal administrative leadership to informal leadership. Teacher leadership is no longer limited to administrative leadership but to professional influence, which refers to leading others through professional knowledge, skills, and other aspects of literacy. Consequently, the teacher leadership space is no longer limited to the classroom. However, it extends to the learning community of teachers and even the community, with teacher leaders taking on the role of leaders of various learning communities (Li et al., 2013).

Factors Influencing Teacher Leadership

To date, several studies have looked at factors influencing teacher leadership (Lou, 2015; Murphy, 2007; Murphy, 2005; Nguyen et al., 2019; Harris & Muijs, 2005; Sebastian et al., 2016; Wang & Sally, 2017; Wenner & Campbell, 2017; York-Barr & Duke, 2004; Zeng, 2020; Zinn, 1997; Zhou & Guo, 2014). It is found that the factors that promote or hinder the effectiveness of teacher leadership can be divided into two categories: *extrinsic factors* and *intrinsic factors*. The extrinsic factors include the principal leadership, the peer relationship, the school culture, the institutional structure of schools, and role conflict and ambiguity. The intrinsic factors mainly include the teachers' professional leadership skills and personality (Wang & Sally, 2017). Similarly, York-Barr and Duke (2004) also summarized the factors that affect teacher leadership: principal support, school culture, roles and relationships, and structure. School culture is widely regarded as the dominant factor influencing the success of school improvement. Zinn (1997) also noted that critical factors supporting teacher leadership include climate or culture that supports teacher empowerment. Primary school support through words and actions, mutual support among teachers; support from the principal or senior management of the school; and intrinsic support for the development of the teaching profession. Both intrinsic and extrinsic factors may promote or hinder teacher leadership development.

Barriers to Teacher Leadership in China

There are four barriers to teacher leadership in China, which are 1). Uneven distribution of resources; 2). A culture that leads to passive competition; 3). Emphasis on teacher leadership only in formal positions, and 4). Teachers lack the willingness to take the leading role (Chen & Lu, 2010; Zeng, 2020). The first barrier is related to what the Chinese literature refers to as the backbone teachers. Backbone teachers refer to outstanding teacher representatives in the teacher group who have excellent moral cultivation, excellent professional teaching skills, are well-known and recognized in the academic community (Wang & Sally, 2017). They have rich educational experience, have taken on a heavy workload in teaching activities of the school, have outstanding ability in educational research, and have a certain exemplary role and have a driving effect on teachers in general. Because preference is given to backbone teachers, this leads to the uneven distribution of professional development resources (Wang, 2018; Wang & Sally, 2017).

Moreover, the training opportunities and quality of backbone and other teachers are quite different. Therefore, the elite orientation in the professional development of teachers is unreasonable. In this sense, the overdevelopment of formal teacher leadership has a negative

side (Chen & Lu, 2010; Zeng, 2020). For the culture that leads to passive competition, because the quota of backbone teachers is minimal, the competition for the selection of backbone teachers is fierce. Too intense competition leads to all sorts of negative emotions among teachers. The fierce competition leads to the teachers' fear of the teaching career, making some young teachers give up the teaching path and turn to the administration. Likewise, the existing cadre selection mechanism also results in teachers' fatalism. The teacher thinks the school only trains those few excellent people at work. Moreover, teachers feel that the awards always go to higher-quality schools (Chen & Lu, 2010).

For the third barrier, in China, the role of teacher leaders needs to be clarified, and there is no sense that teachers can become leaders. Therefore, if teachers want to play a leadership or management role, they first need to be promoted to a formal leadership position, resulting in the loss of excellent front-line teachers (Jin, 2007; Lou, 2015). At the same time, teachers who take formal leadership roles are considered superior to other teachers. Therefore, teacher leaders such as backbone teachers have unequal status with teachers. In addition, they have a mentoring relationship with colleagues, in which teacher leaders are "experts," and others are "inexperienced teachers." However, Teacher leadership is about working together to solve problems based on shared interests, not a mentoring relationship (Lou, 2015).

Lastly, teachers lack the willingness to take the leading role, and teachers in China's primary and middle schools lack conscious leadership concepts. Some teachers have expertise and credibility in the teacher community and assume the role of teacher leadership. However, these teachers need more leadership consciousness, rarely take the initiative to influence other teachers to improve teaching practices, and actively share their teaching experiences with other teachers. Their leadership of other teachers is unintended and invisible. Those teachers impact others but do not realize this (Lou, 2015). Teachers must obtain resources to survive, develop, and rely on their interpersonal relationships in such cultural backgrounds. Teacher leaders need to help teachers balance the relationship between colleagues and leaders and maintain a harmonious atmosphere in school (Li et al., 2013). As a result, some teachers are reluctant to take a leadership role to avoid conflict with colleagues, leading to a breakdown of rapport with colleagues (Jin, 2007; Ma, 2013; Zeng, 2020).

Teacher Leader Model Standards

In the U.S., The Teacher Leader Model Standards were developed to identify the roles of teacher leaders in helping to create school reform and development (Teacher Leadership Exploratory Consortium, 2011). The Teacher Leader Model Standards are a guide to developing trainee teachers in leadership roles and to developing critical inquiry, communication, and facilitation skills for preservice teachers. This standard describes the knowledge and competency base needed by teacher leaders to meet job expectations in each of the seven domains and provides detailed guidelines for action, behavior, and practice in each area (Mosley, 2012). The standards incorporate the following domains: Domain I-the fostering of a collaborative culture to support a culture of collective responsibility in schools; Domain II-the use of research findings to promote the practice and student learning; Domain III- the promotion of professional learning for continuous improvement; Domain IV-the promotion of improvements in teaching and learning; Domain V-the promotion of use assessment and data to improve schools and district environments; Domain VI-the improvement of outreach and

collaboration with families and communities; and lastly, Domain VII-increasing advocacy for student learning and the profession. The Teacher Leader Model Standards have been adopted as a central framework for developing the model in this research.

Research Methodology

Quantitative Methods

The researchers used two questionnaires to collect data in this paper. The research instrument used in Objective Two was an adapted questionnaire based on a questionnaire related to the Teacher Leadership Standards Model created by Shelton (2014) and then adapted to the actual situation of the district targeted for the study. The questionnaire was divided into seven domains with 31 items. The second questionnaire was developed by researchers in two factors for Objective Three, in total, 28 items. Both questionnaires used a 5-point Likert scale. In addition, the researcher used Content Validity Index to guarantee the validity of the questionnaire, the result of the Content Validity Index see Table 1. The reliability of the first part of the questionnaire was .973, and for the second part was .967. The results of reliability of questionnaires are shown in Table 2, the populations of the study are shown in Table 3 as follows.

Table 1

Summary of Questionnaire's Content Validity Approval by Experts

	Original	**Edit**
Average proportion of items judged as relevance across the 7 experts	0.92	0.99
S-CVI/Ave	0.94	0.98
S-CVI/UA	0.71	0.84

Table 2

Reliability of questionnaires of first part and second part (n=825)

Questionnaires	**Items**	**Cronbach's alpha**
Questionnaire part one	31	.973
Questionnaire part one	28	.967

Table 3

Population and Sample

Middle Schools	**Population**
School 1	338
School 2	272
School 3	244
Total	854

Qualitative Methods

A systematic literature review was used as the method of data collection. Keywords such as teacher leadership were used to search the literature published from 2000 to 2022. Following is a description of the systematic literature review process in three steps to ensure the relevance of the sample literature to the study objectives. First, the researchers carefully read and analyzed the literature for this study to extract relevant words and sentences that fit what teacher leaders should do. Next, words and sentence explanations with similar meanings were unified into a single summary term. Finally, these keywords were categorized and summarized in five areas:1) school level, 2) external level, 3) colleague level, 4) contributions to the professional level, and 5) student level. To further ensure the reliability of these extracted elements and the way they are categorized, the researchers invited experts with extensive experience to evaluate the research process to ensure that the research process and results are credible.

Statistical Analysis

For Objective Two, the researcher used Mean and Standard Deviation to assess teachers' current levels of teacher leadership in middle schools in Shanxi Province, China. The researcher used Multiple Regression for Objective Three to find the relationship between the independent and dependent variables.

Results and Discussion

Results for Objective One: To identify what competencies are needed for teacher leadership in schools.

Through the literature review, five levels were summarized: school level, external level, colleague level, contributions to the professional level, and student level. At the school level, teacher leadership needs to work on school change and improvement, coordinate the work in and out of the classroom, resolve conflicts and improve communication, and promote professional development. For the external level, teacher leadership needs to work with parents and the community participation level to develop comprehensive strategies to meet the diverse educational needs of families and the community. The colleague level needs to work with a guide and train novice teachers. For contributions to the professional level, they need to work with a plan, co-create or evaluate course modules and teaching practices in cooperation with colleagues, institutions of higher education, and other organizations engaged in research on major educational issues. Finally, for the student level, teacher leadership must work with students' academic performance, analyzing student learning outcomes, moral and ethical education, and the teacher-student relationship.

Results for Objective Two: To explore the factors that affect teacher leadership development.

The researcher sent questionnaires to full-time teachers in the three target schools; the return rate was 96.6% and 825. The total Mean for this objective was 4.054, and S.D. was .531, which shows that the current levels of teacher leadership in the three middle schools in Shanxi Province, China, were high. For seven domains: Domain One, fostering a collaborative culture,

was at a high level; Domain Two, accessing and using research, was at a high level; Domain Three, promoting professional learning, was at a high level; Domain Four, facilitating instructional improvement, was in the high level; Domain Five, promoting the use of assessments and data, was in the high level; Domain Six, improving outreach to families and community, was in the high level; and Domain Seven, advocating for students and the profession, was also in the high level. The highest Domain was Domain Two, where the Mean was 4.186, and S.D. was .540; the lowest Domain was Domain 4, where the Mean was 3.677, and S.D. was .841.

Results for Objective Three: To measure the current levels of teacher leadership in the three middle schools in Shanxi Province, China.

The researcher sent questionnaires to full-time teachers in the three target schools; the return rate was 96.6% and 825. After collecting the data, the researcher first tested the study's correlation to ensure the variables used in calculating the regression were valid to be included in the analysis. The correlation table shows that all variables were significant and that there is no multicollinearity. After that, the researcher used multiple regression analysis through SPSS to find the significant factors that affect teacher leadership development in the three middle schools in Shanxi Province, China. A significant predictive relationship was found between at least one independent variable and the dependent variable, $F(7, 817) = 425.02$, $p < .001$. A significant, predictive linear relationship between the dependent variable and independent variables were found, R=.89. The coefficient of determination obtained indicates that the independent variables account for 78.5% variance in the level of teacher leadership, R Square=.785. The results of Objective Three are shown in Table 4.

Table 4

Results of Objective Three (n=825)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
1	(Constant)	.323	.079		4.104	.000
	Principal Leadership	.152	.020	.221	7.617	.000
	Peer Relationships	.160	.029	.158	5.469	.000
	School Culture	.035	.025	.042	1.407	.160
	Institutional Structure of Schools	.009	.019	.014	.482	.630
	Role Conflict and Ambiguity	.062	.030	.064	2.092	.037
	professionalism	.147	.031	.141	4.698	.000
	Leadership Skills and Personality	.349	.029	.379	11.932	.000

Dependent Variable: Level of Teacher Leadership

The model summary shows that the adjusted R-squared is 0.785, which explains that independent variables account for 78.5% of the variance of dependent variables. The p-value is 0.000, less than 0.05, indicating a significant linear relationship between the dependent and

independent variables. Finally, the researcher focused on the Coefficients table, in particular on the "B" cells under "Unstandardized Coefficients" and on the "Sig." cells. The estimated regression equation for this objective is teacher leadership level = 0.323 + 0.152*Principle leadership + 0.160* Peer Relationships + 0.062* Role Conflict and Ambiguity + 0.147* professionalism + 0.349* Leadership Skills and Personality. The independent variables principle leadership, peer relationships, role conflict and ambiguity, professionalism, leadership skills, and personality were all significant at 0.000, which is less than 0.05, and their coefficients were all greater than 0, indicating a significant positive effect on the level of teacher leadership. In contrast, the variables of school culture and institutional structure of schools did not pass the significance test. They did not affect the level of teacher leadership in the three target middle schools.

Results for Objective Four: To find the significant factors that affects the development of teacher leadership in the three middle schools in Shanxi Province, China.

　　　Based on the results of the literature review, it can be concluded that factors that affect teacher leadership, competencies needed for teacher leadership, and the concept of Self-Leadership all play an essential role in the generation of the final model of teacher leadership development. Therefore, the researcher initially developed the following model. The model was developed and submitted to 15 experts for model validation. The model is shown in Figure 1.

Figure1

Final model
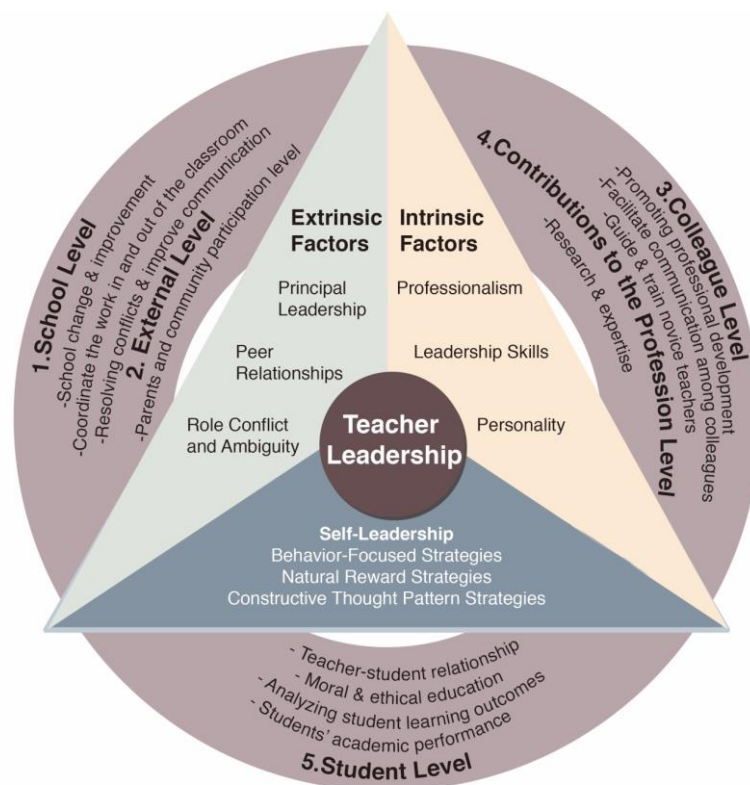
Discussions and Implications

Discussion

   Teacher leadership refers to the ability of teachers to assume leadership responsibilities that encompass both formal and informal roles and to exert influence on people and events in the school. In short, teacher leadership is a professional influence. Internationally, the concept of teacher leadership has long been proposed and widely used; but in China, the application of this leadership is still in its infancy (Li et al., 2013). There needs to be more literature examining this area of teacher leadership, especially in the regions studied by the researcher. Teacher leadership exists in many schools in China, but there is a lack of normative research and feasible concrete ways to enhance it (Wang & Wang, 2020). However, as Chinese education progresses and becomes more internationalized, the importance and necessity of teacher leadership will continue to grow. Teacher leadership may lead to improved teachers' professional status, school instruction, and student achievement, or it can become a tool and means of helping teachers to joy their work (Zeng, 2020). The model in this study was designed based on the specific situation and cultural context of China, so it can help Chinese teachers better understand the concept of teacher leadership and what they should do to improve their teacher leadership compared to other countries' teacher leadership models. It can also help schools and principals to apply the model's developmental factors and competencies to help develop policies and strategies to improve teacher leadership. The learning model is, therefore, more relevant for improving teacher leadership among middle school teachers in Shanxi Province, China.

   The work of teacher leadership in China is reflected in five main areas of work: school, colleagues, external, research and expertise, students, and classrooms (Qi et al., 2021; Sun & Cheng, 2020; Zhou & Guo, 2014), this study also found the same five areas as those studies mentioned. The collected literature shows that teachers exemplify teacher leadership by taking school-level management responsibility, collaborating with peers, engaging in reflective dialogue about teaching, and engaging in professional learning (Sebastian et al., 2016), which also agrees with the current study. In China, teacher leadership is more often defined as an ability to influence individuals, groups, and organizations (Xu et al., 2020). Teacher participation in school decision-making can break the previous model of centralized school decision-making. Research shows that when teachers are involved in school decision-making, they are more likely to make instructional changes (Gao, 2021; Ren, 2021). At the same time, teachers can take on leadership roles inside and outside the classroom, working on school development and providing constructive input and suggestions on school policies to promote school improvement (Lai & Cheung, 2015). More often than not, teacher leadership can better resolve and mitigate disputes within their teams. In this study, the result from interviews and questionnaires shows the importance of how teacher leadership helps at the school level, as in the previous studies.

   Second, the work at the colleague level was divided into three areas. A few researchers also approved the same result. The first is promoting professional development, which is reflected in planning and organizing teaching and research activities for school teachers to help improve colleagues' professional development (Ye & Zhu, 2018; Zeng, 2020). Teachers can use their extensive expertise to influence and help their colleagues improve the school's overall

professionalism (Zhang & Lu, 2010). Secondly, this study found that facilitating communication among colleagues is important content, similar to Pu's study. Teachers can encourage other teachers struggling professionally to develop self-confidence through communication with colleagues and help develop solutions to achieve instructional improvement (Pu, 2012). Finally, teachers in China demonstrate their leadership at the collegial level by mentoring and nurturing novice teachers (Li et al., 2013). Experienced teachers influence novice teachers through daily conversations and modeling and assist them in solving pedagogical problems through face-to-face interactions (Zhou & McLaren, 2021).

Third, for parents and community participation levels, teachers need to collaborate with parents and communities to promote student development (York-Barr & Duke, 2004). Teachers must understand different backgrounds and cultures and provide a positive learning environment for students through communication with parents and communities (Shelton, 2014; Teacher Leadership Exploratory Consortium, 2011). Similar content was also mentioned in the study.

Fourth, for contributions to the professional level, teachers need to collaborate with colleagues to develop lesson plans, with higher education institutions to enhance teaching and learning, and with government agencies and other relevant organizations to address issues in teaching and school (York-Barr & Duke, 2004). This study found that teacher leadership must work with research and expertise. Fifth, teachers need to work on students and guide classroom work. In China, the critical role of teachers is first manifested in classroom-specific leadership to improve students' academic performance by addressing classroom management challenges and achieving effective classroom management (Pu, 2012). Teachers improve student-teacher relationships through effective communication, use professional knowledge to facilitate student learning, and assist in analyzing student learning outcomes to help improve the overall quality of students (Wang & Wang, 2020). The researcher made the same conclusion for students' level and concluded how this level is essential in China.

Based on a summary and generalization of the literature, it mentioned the need for teachers to have opportunities to acquire new knowledge and skills, the need for in-depth feedback and support from administrators and colleagues, the need for a positive and supportive school culture to help establish channels that promote teamwork and effective communication; the opportunity to participate in decision-making at the school and district levels; the opportunity to assume new roles and responsibilities; and the need for professional opportunities that include collaboration and technology professional opportunities (Teacher Leadership Exploratory Consortium, 2011). The model developed in this study concluded the problems found by Teacher Leadership Exploratory Consortium. In terms of factors that influence teacher leadership development, they can be divided into extrinsic and intrinsic factors.

To better understand the factors that influence teacher leadership development in the target districts, the researcher first designed a semi-structured interview to collect opinions from administrators. Interviews with six school administrators and one senior researcher also yielded seven extrinsic and intrinsic influences. Afterward, five extrinsic and two intrinsic factors influencing teacher leadership development were identified through the questionnaire with teachers in the three target middle schools. Based on the data, it was found that school teachers did not believe that the school culture and institutional structure affected their teacher

leadership development.

The difference between the interviews with administrators and the teacher questionnaire results shows that administrators believe that the school culture and institutional structure can impact teacher leadership development. However, teachers do not believe that these two extrinsic factors have an impact on teacher leadership. This exciting result from interviews had greater depth than previous studies to see how different views of teachers and administrators are because the researcher talked to teachers and administrators in context.

In response to the findings of the different views of teachers and administrators about whether school culture and institutional structure of schools can impact teacher leadership development, some researchers have also discussed previous studies. Two aspects lead to this problem in the Chinese context. The first is government policy, and the second is the influence of Chinese traditional culture. First, due to government policy, Chinese middle schools maintain a centralized management model (Li et al., 2013). In his 2015 study, Lou noted that a centralized government manages overall school policy and development without autonomy. The high level of control that the government administration has over the work of schools and teachers limits the development of teacher leadership in middle schools. Second, regarding the school's management structure, teachers do not have the right to participate in the school change discourse due to the centralized management system. As a result, teachers rarely manage school policies (Lou, 2015). This cultural background can explain the teachers' perception presented in the research data that the institutional structure of schools has no impact on their teacher leadership development because of the limitations of China's national context, where teachers do not feel involved in this area and naturally disagree that institutional structure of schools can be one of the factors that affect the development of teacher leadership (Wang & Wang, 2020). The school's institutional structure is strongly influenced by Chinese culture (Zeng, 2020).

Secondly, Chinese school culture is heavily influenced by traditional Chinese culture, especially that of Confucius (Ho & Tikly, 2012). Confucius' culture emphasizes obedience to leaders, respecting their arrangements, and not disobeying superiors. As a result, teachers and leaders in schools are heavily influenced by this culture, leading to leaders not delegating authority to teachers and teachers not being involved in school management matters (Lou, 2015; Chen, 2009). In addition, Chinese culture is collectivist and emphasizes harmony among people. Therefore, teachers try to avoid conflict with colleagues by avoiding involvement in school management or taking on leadership roles (Lou, 2015; Wang & Wang, 2020; Xu et al., 2020). These cultural contexts also lead teachers to not perceive school culture as a factor that affects teacher leadership because traditional mindsets are ingrained in their consciousness.

This research showed that principal leadership, peer relationships, role conflict and ambiguity, professionalism, leadership skills, and personality were the factors affecting teacher leadership development in the target area. Similarly, Wang and Sally also noticed this result in their paper. The factor of principal leadership and peer relationships reflect a central concept, trust, in the school context. The intrinsic factors of teacher leadership include professionalism, skills, and personality, which reflect the level of teacher leadership. The higher the level, the more influential the leadership will be, and vice versa. Principal support is paramount if teacher leadership is to be successful (Wenner & Campbell, 2017). When teachers acquire new knowledge, skills, and competencies, they need a supportive environment. This support can

come from principals and colleagues (Poekert et al., 2016; Sebastian et al., 2016; Zinn, 1997). Principals and teachers must be trained to understand teacher leaders' roles and scope of authority to avoid role conflict and ambiguity (Teacher Leadership Exploratory Consortium, 2011; York-Barr & Duke, 2004). Intrinsic factors include excellent professional teaching skills, leadership skills, and personality. Teachers must demonstrate high teaching competencies to assume teacher leadership (York-Barr & Duke, 2004). There is a positive correlation between the length of teaching experience and effective teacher leadership (Nguyen et al., 2019). Personalities likewise influence teachers' leadership abilities, and a person who is responsible, takes risks, and can communicate effectively with others is better suited to be a leader (Zinn, 1997). Also, acquiring specific leadership skills can enhance teacher leadership (Harris & Muijs, 2005).

The study's results, which showed high levels of teacher leadership in the three target middle schools, were not surprising. Previous research has shown that although there is not a wealth of research on teacher leadership in China, teacher leadership still exists in China (Chen & Lu, 2010). In China, much teacher leadership exists in formal positions, and some teachers perform teacher leadership roles but are unaware of them. For example, experienced teachers tasked with training novice teachers are already taking on teacher leadership roles (Li et al., 2013). From this study, the researcher hopes that middle school teachers in Shanxi Province will have a better systematic understanding of teacher leadership and improve their teacher leadership through the model developed. By increasing their knowledge about teacher leadership, it is hoped that they will be able to work more efficiently and solve problems in their jobs, ultimately improving the school's teaching standards, student achievement, and teachers' job satisfaction.

Conclusion

The following conclusions are discussed concerning each objective. The first research objective identified five competencies needed for teacher leadership in schools. First is the school level, including school change and improvement, coordinating the work in and out of the classroom, resolving conflicts, and improving communication; works aim to solve the problem in school. Second, external level, including parents and community participation, teachers need to work with parents and the community to provide a better study environment for students. Third, colleague level, including promoting professional development, facilitates communication among colleagues, guides and trains novice teachers, and works with colleagues to improve the school. Fourth, contributions to the professional level, including research and expertise, work to plan and collaborate with other institutions in research about educational issues. Finally, student level, teachers need to work with students' academic performance, analyzing student learning outcomes, moral and ethical education, and the teacher-student relationship.

For the second research objective, two factors were explored. First, external factors include principal leadership, peer relationships, school culture, the institutional structure of the school, role conflict, and ambiguity-intrinsic factors include professionalism, leadership skills, and personality.

For the third research objective, the mean and standard deviation summary showed that the teacher leadership level in the three target middle schools in Shanxi Province was high. The

highest score was for Domain 2. The lowest score was for Domain 4. The seven domains were ranked from highest to lowest; the result is that the highest domain is Domain 2, followed by Domain 3, Domain 5, Domain 6, Domain 1, Domain 7, and the lowest Domain 4. All domains are at a high level.

For the fourth research objective, the researcher used quantitative and qualitative methods to collect data to find the significant factors that affect teacher leadership development in three target middle schools. For qualitative analysis, the use the semi-structured interview with administrators to collect their opinion on this objective. The researcher set up five questions based on the result from Objective Two. The result shows that teacher leadership exists in the school. Most teacher leadership consists of leading teamwork, leading other teachers, and managing class and students. The interview result showed that the extrinsic factors that affect teacher leadership are school culture, principal leadership, peer relationship, the institutional structure of schools, role conflict, and ambiguity; the intrinsic factors that affect the development of teacher leadership are professionalism, leadership skills, and personality. For quantitative analysis, the result from SPSS showed that extrinsic factors were principal leadership, peer relationships, role conflict, and ambiguity. The intrinsic factors were professionalism and leadership skills, and personality. Finally, the data showed that the school culture and institutional structure did not affect teacher leadership development in the three target middle schools.

For the fifth research objective, the researcher created a draft model and invited 15 experts to validate the model. Again, modifications were made by collecting suggestions from experts. The model has teacher leadership as the core module. Two crucial parts of the model are factors that affect teacher leadership and the competencies needed for teacher leadership. After the amendment, the final model was completed, and experts double-checked to ensure all details fit the study.

Declaration of competing interest

The authors report that there are no competing interests to declare.

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Appendix A: Sources of Information for Systematic Literature Synthesis of Objective One

No.	Topic/Category	Author(s)	Study title
1	What do teacher leaders do related/Dissertation	Lou (2015)	Teacher leadership research in school development
2	What do teacher leaders do related to/article	Lai & Cheung (2015)	Enacting teacher leadership: The role of teachers in bringing about change
3	What do teacher leader do related to/article	Cao & Wang (2020)	Teacher collective teaching and research from the perspective of distributed leadership
4	What do teacher leader do related/article	Sun & Cheng (2020)	Sharing, cooperation and reconstruction: New Trends in foreign teacher leadership research
5	What do teacher leader do related/Article	Qi et al. (2021)	A study on the necessity and promotion model of teacher leadership training for normal school students.
6	What do teacher leader do related/article	Pu (2012)	The leading role of teachers in school improvement
7	What do teacher leader do related/article	Zhou & McLaren (2021)	An analysis of the new leadership framework reform for primary and middle school teachers in England
8	What do teacher leader do related/ Dissertation	Jin (2007)	Research on teacher leadership in primary and middle schools
9	What do teacher leader do related/article	Cheng & Szeto (2016)	Teacher leadership development and principal facilitation: Novice teachers' perspectives
10	What do teacher leader do related/Book	Wang (2018)	Research on the development of key teachers in China from the perspective of teacher leadership
11	What do teacher leader do related/Book	Zhou & Guo (2014)	Teacher leadership
12	What do teacher leader do related/Book	Xu et al. (2020)	From Good to Excellence: 12 disciplines of teacher leadership

No.	Topic/Category	Author(s)	Study title
13	What do teacher leader do related/Book	Zeng (2020)	Teacher leadership and teacher learning: dual paths and integration of teacher professional development.
14	What do teacher leader do related/article	Wang & Wang (2020)	Teacher leadership development in school improvement: Significance and obstacles and tactics.
15	What do teacher leader do related/article	Chen & Lu (2010)	The impact of formal and informal teacher leadership on teacher professional development
16	What do teacher leader do related/article	Ren (2021)	Potential of teacher leadership in school development
17	What do teacher leader do related/Book	Li et al. (2013)	Research on contemporary teacher leadership -- Theoretical basis and teacher practice.
18	What do teacher leader do related/article	Ye & Zhu (2018)	On the value, connotation and cultivation of teachers ' leadership in the collaborative educational reform
19	What do teacher leader do related/article	Wang & Sally (2017)	An empirical study on the influential factors of core teacher leadership
20	What do teacher leader do related/article	Gao (2021)	Practical perplexity and breakthrough of teacher as Leader: A case study of the most beautiful teacher.
21	What do teacher leader do related/article	Wenner & Campbell (2017)	The Theoretical and Empirical Basis of Teacher Leadership: A Review of the Literature.
22	What do teacher leader do related/article	Cherkowski (2018)	Positive Teacher Leadership: Building Mindsets and Capacities to Grow Well-being
23	What do teacher leader do related/article	Muijs & Harris (2006)	Improving schools through teacher leadership.
24	What do teacher leader do related/article	York-Barr & Duke (2004)	What do we know about teacher leadership? Findings from two decades of scholarship
25	What do teacher leader do related/Dissertation	Shelton (2014)	Teacher leadership: Development and research based on teacher leader model standards
26	What do teacher leader do related/article	Liberman et al. (1988)	Teacher leadership, ideology and practice.
27	What do teacher leader do related/article	Teacher leadership exploratory consortium (2011)	Teacher leader model standards.
28	What do teacher leader do related/article	Nguyen et al. (2019)	A review of the empirical research on teacher leadership
29	What do teacher leader do related/article	Grant et al. (2010)	Teacher leadership: a survey analysis of KwaZulu-Natal teachers' perceptions.
30	What do teacher leader do related/ Book	Murphy (2005)	Connecting teacher leadership and school improvement
31	What do teacher leader do related/article	Nicholson et al. (2017)	Teacher Leaders Building Foundations for Data-Informed Teacher Learning in One Urban Elementary School
32	What do teacher leader do related/article	Hairon et al. (2015)	Teacher leadership enactment in professional learning community contexts: Towards a better understanding of the phenomenon.