





Professional Ethical Dilemma Scale: A Study of Validity and Reliability on Teachers

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ABSTRACT

This study aims to develop a Scale of Professional Ethical Dilemmas for Teachers and verify the reliability and validity of the questionnaire. The goal is to provide an objective and effective measurement tool for evaluating the professional ethics dilemma faced by teachers. The scale may also serve as an empirical research tool for studying teachers' ethical dilemmas and assessing their level of difficulty scientifically. Methods: A literature review and teacher interviews were conducted to select the contents of the questionnaire. A pilot test and expert judgment were then used to create the experimental version of the scale. Results: This study successfully developed a scale of professional ethical dilemma specifically for Chinese teachers: 1. The total variance explained by the common factors after the axis was 57.007% based on exploratory factor analysis. 2. Confirmatory factor analysis supported the overall model fitting test index in modeling research. 3. Additionally, Cronbach's α coefficient for each factor ranged from 0.720 to 0.751, and the coefficient for the entire scale was 0.881, indicating good internal consistency, stability, and reliability. 4. Correlation analysis showed that the correlation coefficient between each factor ranged from 0.389 to 0.654, and the correlation coefficient between each factor and the total scale ranged from 0.670 to 0.889, indicating good structural validity. Therefore, the scale can be considered an effective tool for evaluating the level of the professional ethics dilemmas faced by teachers.

Keywords: Teacher, Professional Practice, Ethical Dilemma Scale, Reliability, Validity

INTRODUCTION

The work of teachers is a profession that is grounded in morality, and their professional practice is always guided by a moral framework (Wang, 2015). Consequently, teachers must deal with various moral relations in their daily work, face many ethical tensions, and even face an ethical dilemma. However, teachers are reflective moral agents, and the moral choice of teachers in a moral dilemma cannot be avoided. As Goodlad et al. (2012) said, "Our school ultimately depends on the moral capacity of teachers, no matter how strictly controlled, teaching requires continuous choices, these most difficult choices are essentially moral choices".

Teachers' ethical conflict refers to the state that it is difficult for teachers to make a choice when faced with several different and contradictory ethical values at the same time. It is the dilemma of moral choice or the conflict of moral responsibility that teachers often face. Since selecting one value over another can impact or even undermine the realization of other values, making a decision can be arduous for teachers. Sometimes, even after careful consideration, the choices made may still result in feelings of moral guilt. Ethical conflicts can therefore bring about moral decision-making and emotional distress for teachers (Peng, 2020).

In recent years, research on the professional ethics dilemma of teachers has become a hot field. In practice, there are great differences in people's understanding of the professional ethics dilemma of teachers: on the one hand, social criticism and media exposure of various immoral phenomena of teachers, such as academic

misconduct of teachers and abnormal relations with heterosexual students, these unethical behaviours do exist that are not in line with the identity of teachers and are contrary to the roles of teachers (Du, 2012). On the other hand, teachers believe that they are suffering from a moral kidnapping that is unbearable for ordinary people, such as the sage character of being willing to stay in poverty and as light as water created in society, or the noble image of teachers as moralists---sacrifice themselves and contribute to others. For this, teachers ask the external environment of society to give themselves appropriate welfare treatment and reasonable moral expectations.

At the theoretical level, scholars often utilize virtual educational scenarios to examine the professional ethics dilemmas faced by teachers and focus on their ability to resolve issues such as moral decision-making and moral reasoning (Huang, Zheng & Liu, 2019; Peng, 2020). However, the actual ethical dilemmas encountered by teachers are evidently distinct from virtual ones. The fundamental discrepancy lies between ideas and actions. In virtual ethical dilemmas, teachers confront challenges pertaining to ethical awareness. However, virtual problems do not impose expectations for ethical conduct or offer the necessary environment and circumstances for ethical behaviour to be realized. (Chen & Huang, 2020). In contrast, the real ethical dilemma is related to the vital interests of teachers, which requires teachers to make practical ethical decisions and choices. Therefore, reviewing current research on the teacher professional ethics dilemma, scholars agree that the teacher professional ethics dilemma is inevitable (Ren, 2017). One of the key links is the level of dilemma experienced by teachers, whether it is high or low. The lack of instruments to measure the level of the professional ethics dilemma of teachers leads to a lack of detailed thinking and criticism of this problem, which affects the scientific grasp of the professional ethics dilemma of teachers in teaching practice. Given this, this study synthesizes professional ethics dilemmas of teachers based on literature analysis, then develops a scale of professional ethics dilemmas for teachers, through empirical testing and revising the measurement scale, to provide a scientific reference for professional ethics dilemmas of teachers and improve moral behavior of teachers in China.

This study is proposed under such requirements:

1. What factors are considered in developing the questionnaire on professional ethics dilemmas for Chinese teachers?
2. What about the reliability and validity of the questionnaire on professional ethics dilemmas for Chinese teachers?

LITERATURE REVIEW

The current research on teachers' ethical dilemmas mainly includes the following three aspects: the definition of ethical dilemmas, types of ethical dilemmas, and factors causing ethical dilemmas.

Definition of Teachers' Professional Ethics Dilemma

Ethical dilemma is a commonly discussed concept in the field of applied ethics. It arises when individuals are confronted with a choice between two or more alternatives, and the possibility of a dilemma emerges (Wei, 2019). The situation becomes even more challenging when individuals must choose between conflicting alternatives (Weiss, 2009, p. 96). Currently, research on ethical dilemmas primarily focuses on professionals such as social workers, medical personnel, college counsellors, and teachers... However, there is a need for further research on ethical dilemmas specifically faced by teachers. Different scholars have varying interpretations of the meaning of ethical dilemmas in teaching. Yang Xiaomin and Pei Youhong (2016) argue that ethical dilemmas in teaching refer to difficult situations that teachers frequently encounter in their professional activities. Teachers often fall into the dilemma of difficult judgment and choice for two or several different kinds of contradictory moral values. Such a dilemma is real, and the impact on teachers is also obvious. According to Li Man, in a specific time-space situation, the teacher falls into a contradiction due to his/her own role responsibility or the conflict of various ethical obligations. If he/she chooses one ethical norm, he/she will violate another (Li, 2016).

Factors of Teachers' Professional Ethics Dilemma

Many researchers have explored the factors that contribute to ethical dilemmas faced by teachers. Scholars analyze the causes of these ethical dilemmas by examining teachers' professional activities. They pointed out that teachers are often required to achieve two contradictory goals in their professional activities. Xu (2019) believed that in the professional practice of teachers, justice ethics and caring ethics are not always in tacit agreement, but often present a situation of conflict. If teachers choose to prioritize and show concern for the value and well-being of disadvantaged students, they may unintentionally compromise the rights and interests of other students. Campbell's research shows that teachers in their early career, in the face of administrative orders and school climate, it is easy to give up their moral sensitivity (Campbell, 2013).

Fu and Wang (2021) sorted out three factors, namely, the contradiction between ethical values, the differences between different ethical values, the complexity of power interaction, the influence of the government, the market, parents and other social groups on teachers' professional ethics practice, the influence of power interaction between them, and the power contrast within the school, the interactive interest relationship among schools, colleagues, students and teachers will inevitably lead to dilemma in professional ethics practice. Su Shanshan's 2017 study expanded on previous research to explain the reason for the overall ethical anomie in society. The study revealed that the breakdown of the social moral system not only led teachers to exhibit unethical behaviors such as pursuing personal gains through their jobs and experiencing job burnout, but also caused internal ethical conflicts among teachers (Su, 2017).

Types of Teachers' Professional Ethics Dilemma

There are mainly two styles to study teachers' ethical dilemmas. Chinese scholars primarily focus on theoretical deduction and philosophical speculation through literature review, and they generally use virtual educational practice situations to explore professional ethics dilemmas of teachers and pay attention to the ability of teachers to solve problems such as moral decision-making and moral reasoning. Chen and Huang (2020) focused on the process of teachers' actions choices, believing that there are three kinds of moral conflict: the conflict of righteousness and interests in actions orientation, the conflict of roles in actions expression, and the psychological conflict in actions motivation, and pointed out that moral conflicts should be adjusted from three aspects: self-psychological adjustment, value orientation, and external social conditions. Xu and Wang (2015) pointed out that there are four types of professional ethics dilemmas for teachers, including explicit immoral behaviours insulting the personality of students, implicit immoral behaviors guiding students to supervise and inform each other, immoral behaviors to regard the relationship between teachers and students as an instrumental contractual relationship, cold morality of teachers who are in a negative state of mind and inaction in the process of engaging in the teaching profession, high morality of the image of a holy teacher of sacrificing oneself and illuminating others. Zou (2016) analyzed the ethical dilemma of college teachers in the period of social transformation: the ethical dilemma of professional identity: college teachers cannot understand themselves according to traditional teachers or ordinary occupations, the ethical dilemma of teaching methods, traditional teaching methods cannot meet the needs of students but update their teaching methods, they are often unable to do so, the ethical dilemma in the relationship between teachers and students, giving students more care and help but facing the legitimacy doubt, or being strict with students but worrying about being misunderstood and retaliated by students, appeasing or catering to students is not only condemned by their conscience, but also worried that students will make bad comments and accusations about it, which could impact their status, promotion, income, and development opportunities. Hu (2016) suggested that there are the following conflicts: the conflict between teaching ethics, the conflict between teaching fairness and justice, the conflict between teaching mainstream and democracy, the conflict between teachers' personal ideal interests and collective interests, the conflict between teachers' management and teachers' freedom conflict. However, the ethical dilemma that teachers face in reality is distinct from the ethical dilemma they encounter in a virtual setting. The fundamental difference between the two is between idea and action. In the virtual ethical dilemma, teachers face the problem of ethical cognition, but virtual problems do not put forward the requirements of ethical behaviours to people or provide the environment and conditions to realize ethical behaviours (Xiao, 2017). In contrast, the real ethical dilemma is related to the vital interests of teachers, which requires teachers to make practical ethical decisions and choices. Ren (2017) analyzed four conflicts, including the personal interests of teachers, the educational management system, teachers' emotions, and teachers' professional ethics. It should be said that Chinese scholars have carried out relatively rich research on the theoretical dilemma, which can provide a literature basis for the development of this research scale.

The empirical research mainly comes from international scholars, and Chinese scholars are few. In the international perspective, research on teacher ethical conflicts and ethical dilemmas is placed under the background of teaching practice and teaching specialization. Dowd (2012) made a national analysis of student conduct administrators and summarized different types of conflict: conflict of interest, conflict at work, fairness, respect for privacy and special treatment. Orly Shapira (2011) conducted coding and classification research on the cases provided by 50 teachers, and finally identified five types of ethical dilemmas: the conflict between a caring atmosphere and a rule-based atmosphere, the conflict between distributive justice and school standards, the conflict between confidentiality and school rules, the conflict between loyalty to colleagues and school norms, and the conflict between family requirements and educational standards. Based on Cooper's administrative decision-making model, Chen and Huang (2020) divided teachers' ethical conflicts into role conflicts, loyalty conflicts, and rights conflicts. Zeng, Chi, Wang, and Cai (2016) found that the teaching ethical value of teachers tends to be scattered, the conflict between scientific research and teaching is the main dilemma faced by teachers, and the second is that they don't know how to deal with the relationship with students who don't listen carefully in class or

violate discipline in exams.

Review of previous studies

Although there are many previous studies on teachers' ethical dilemmas, the researchers found that scholars attach importance to teachers' ethical dilemmas, the factors, and types, but research on the status or level of teachers' ethical dilemmas is not enough. It is a fact that teachers have dilemmas, but what is the level of dilemmas will be the basis for scholars, experts, education administrators, and policymakers to study or adopt more effective strategies. From the literature review, almost all relevant studies abroad involve empirical methods, however, most studies focus on the moral conflicts and ethical dilemmas faced by teachers in their daily work and the process of education and teaching and conduct an empirical analysis of teachers' ethical conflicts. The quantitative research on the level of teachers' ethical dilemmas is still insufficient. In China, relevant research is mostly theoretical deduction and philosophical speculation. Few literatures take the ethical conflicts encountered by teachers in practice as the direct research object, and the relevant empirical research is even scarcer.

These shortcomings will lead to some problems, such as the difficulties teachers face due to a lack of assessment resources, the situation of teachers' ethical conflict in our practice being not specific, teachers' style and strategy of dealing with ethical conflict being unclear, and the understanding of ethical conflict being unclear. The ethical conflict of teachers often occurs in the process of education and teaching practice, and it is also a subjective feeling. Therefore, to better understand the ethical dilemma faced by teachers in China, learning from empirical research conducted abroad is a valuable approach that necessitates the use of suitable survey tools.

METHODOLOGY

Teacher Interviewees

10 teachers were interviewed to collect their opinions. As front-line teachers, they have a lot of experience in ethical conflicts, ethical choices, and ethical decisions. In this way, the questionnaire compiled by listening to teachers' voice can better reflect the actual situation of teachers, which is more real than using virtual scenes directly. Adopt individual interview methods and follow standard interview procedures.

Member of Delphi Expert Group

In this study, the expert judgment method (Delphi method) was used to investigate the validity of the questionnaire content. A letter was sent to 20 school administration department leaders, experts who have long been engaged in the study of teachers' professional ethics and moral dilemmas, and educational psychologists, asking them to evaluate the importance and relevance of the items. There are 6 experts under 49 years old, accounting for 30.0%, and 14 experts over 50 years old, accounting for 70.0%; The 20 experts have senior professional titles, and the average working time is 25.6 years. They have richer teaching and research experience and can screen and recommend the questionnaire questions initially proposed by researchers. It can better reflect the scientific nature of questionnaire development.

Participants in Questionnaire

For pilot tests and formal tests, teachers in this study refer to full-time teachers engaged in teaching and scientific research in Sichuan province in China. The specific inclusion criteria of the participants include: (1) teaching age ≥ 5 years, (2) a teacher qualification certificate, (3) a master's degree or higher, (4) informed consent, voluntary participation in this study.

Research Methods

First, a comprehensive review of literature on teachers' professional ethics dilemmas, like types of teachers' ethical dilemmas, teachers' ethical defending, and teachers' ethical decision-making. A wealth of background information on the questionnaire has been collected, and a preliminary framework of questionnaire proportion has been formed. Second, consulting the information in the questionnaire on teacher professional ethics dilemmas, check the content that scholars generally value and the direction they focus on. Finally, combined with the Chinese educational background, collect the aspects of teacher professional ethics dilemmas in China. The aspects of the Chinese teacher professional ethics dilemma questionnaire are determined by comprehensively analyzing the information from the dimensional data and related materials.

Research Participants

The initial participants consist of 100 teachers from Sichuan Province. The official participants include 550 teachers from 11 cities from Sichuan province. Among these, 500 participants are considered effective, resulting in an effectiveness rate of 91%. To avoid any interference from the prediction questionnaire, the participants for the

formal questionnaire are entirely different from those involved in the prediction stage.

Research Procedure

Use the initial questionnaire (n=100) to measure the initial participants, carry out item analysis and factor analysis on the obtained data, adjust the factors and items according to the analysis results, and form a formal questionnaire on the ethical dilemma level of teachers. Then, 500 valid samples are obtained by issuing formal questionnaires in the form of cluster sampling. Adopt SPSS26 software and SPSSAU software to conduct exploratory factor analysis and confirmatory factor analysis on the officially measured data.

RESULTS

Project Analysis

The main purpose of item analysis is to test the appropriateness or reliability of the prepared scale and test individual items, which generally includes the critical ratio method, correlation analysis and homogeneity test (Fan & Qian, 2019). Firstly, the total score of the scale obtained by the Initial questionnaire is ranked high and low. Those who score in the top 27% are classified as high groups, and those who score in the bottom 27% are classified as low groups. Independent sample t-test is used to compare the differences between high and low groups of the scale, and 3 items that did not reach significant differences are deleted. Secondly, the correlation coefficient between each item and the total score of the scale is obtained by correlation analysis. The results show that the 15th and 16th items have a low correlation with the total score of the scale (the correlation coefficient is less than 0.4), so they are eliminated. After deleting these two items, Cronbach's α coefficient changes from 0.858 to 0.870, indicating that the item is different from the individual psychological attributes measured by the scale, which is suitable for deletion. 25 items of the initial test are retained as the formal questionnaire of teachers' professional ethics dilemma.

Exploratory Factor Analysis

Before exploratory factor analysis, KMO and Bartlett's Test are needed to determine whether the questionnaire is suitable for factor analysis. The results showed that KMO =0.896, Bartlett's spherical test results ($\chi^2=2306.463$, $df=136$, $p=0.000$), reaching an extremely significant level, which comprehensively indicates that the scale is suitable for factor analysis. The results are shown in Table 1.

Table 1. Result of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.896
Bartlett's Test of Sphericity	Approx. Chi-Square	2306.463
	df	136
	Sig.	.000

The common factors are extracted by principal component analysis, and the Component Matrix is obtained. The Varimax is used to rotate, and the number of factors is determined based on the Total>1. In the selection of each factor item, the statistical standard of acceptable value is that the factor Commonalities>0.2, and the factor Component Matrix>0.4 (Wu,2017). Delete items with commonality less than 0.2, the factor Component Matrix is low (less than 0.4). It shows that the items contained by teachers and society, teachers and the profession, teachers and students, teachers and themselves, teachers and colleagues have good sampling appropriateness. According to this step and principle, after twice factor analysis, a total of 5 invalid items are eliminated. The factor analysis was conducted using the principal component analysis method, and the varimax rotation technique was applied to the axes. Ultimately, four common factors were extracted. The Total Variance Explained of the four common factors after the axis is 57.007%. The results are shown in Table 2.

Table 2. Results of Exploratory Factor Analysis of Teachers' Professional Ethics Dilemma Scale

	Factor1	Factor2	Factor3	Factor4	Commonalities
1	.720				.596
3	.676				.607
6	.636				.582

	Factor1	Factor2	Factor3	Factor4	Commonalities
9	.626				.584
12	.607				.540
14	.592				.567
2		.677			.593
7		.673			.635
10		.620			.489
11		.613			.529
15		.594			.538
19		.584			.506
5			.743		.558
16			.728		.504
17			.550		.508
18			.532		.421
20			.497		.460
4				.668	.606
8				.582	.544
13				.505	.464
Total	6.259	2.237	1.531	1.373	Cumulative %
Total Variance Explained (%)	31.297	11.187	7.657	6.866	57.007

Confirmatory Factor Analysis

Carry out a confirmatory factor analysis on the formal questionnaire, and the fitting test is an important method to measure whether the model is appropriate. Use SPSSAU software to test the fitting of the structural model of teachers' professional ethics dilemma obtained through exploratory factor analysis. It includes the following indicators: RMSEA, NFI, IFI, TLI, and CFI (Table 3). The results are as follows:

Table 3. Model Fitting Test Results (n=500)

		NFI	IFI	TLI	CFI	RMSEA	
Teachers' Professional Ethical Dilemma	20	3.002	0.917	0.910	0.916	0.935	0.057

RMSEA=0.057(< 0.08), NFI, IFI, TLI and CFI are equal to 0.917, 0.910, 0.916 and 0.935 respectively, all of which are greater than 0.9 and close to 1. The data of each test result is in line with the overall model fitting test index in modelling research (Wu, 2018). It shows that the fitting degree of the model is good.

Reliability Analysis

Reliability refers to the stability and consistency of the results measured by the test or scale. The greater the reliability of the scale, the smaller the measurement error. Test the reliability of formal data, the internal consistency coefficients of each factor and total table are shown in the following table. The Cronbach's α coefficient of each factor ranges from 0.720 to 0.751, while the Cronbach's α coefficient of the whole scale is 0.881. According to the reliability criteria (Zhang & Dong, 2018), the scale of this study and its factors have good internal consistency, stability, and reliability. The results are shown in Table 4.

Table 4. Reliability Test Results of Teachers' Professional Ethics Dilemma Scale

	Profession dilemma	Rule dilemma	Interpersonal dilemma	Society dilemma	The whole scale
Cronbach's α coefficient	.751	.734	.729	.720	.881

Validity Analysis

Validity test mainly includes content validity and structure validity. Content validity refers to the consistency between the content measured by a scale and the content to be measured. To estimate the content validity of a scale is to determine the extent to which it represents the behavioural aspect to be measured (Dai & Zhang, 2018). The establishment of content validity in the preparation of the scale is mainly achieved through two stages: The development stage of the scale: including aspects definition, item generation and scale building. The evaluation stage of content validity: the working idea is to invite relevant experts to judge the consistency (correlation) between the items of the scale and the original content scope (Wu, 2018).

For the formal questionnaire prepared after measurement, the specific content of teachers' professional ethics dilemma under the dimension of teachers' professional relations has been recognized by 6 peer experts and 2 PhD psychologists, indicating that the scale has good content validity. The results are shown in Table 5.

Table 5. Content Validity Results of Experts Ratings and Evaluation

Question number	8 experts' scores								Experts number rated 3 or 4	I-CVI	P _c	K ⁿ	Evaluation
	A	B	C	D	E	F	G	H					
1	4	3	4	4	4	3	4	4	8	1	0.004	1	excellent
2	4	4	4	3	3	3	3	4	8	1	0.004	1	excellent
3	2	3	4	4	3	4	4	4	7	0.88	0.031	0.88	excellent
4	3	4	2	4	4	2	3	4	6	0.75	0.109	0.72	good
5	3	3	4	3	4	4	4	3	8	1	0.004	1	excellent
6	4	4	4	4	3	3	3	4	8	1	0.004	1	excellent
7	4	4	3	4	4	4	4	3	8	1	0.004	1	excellent
8	3	4	4	3	4	3	4	4	8	1	0.004	1	excellent
9	3	3	2	3	4	4	3	3	7	0.88	0.031	0.88	excellent
10	4	3	3	4	4	3	4	4	8	1	0.004	1	excellent
11	3	2	3	4	3	3	4	4	7	0.88	0.031	0.88	excellent
12	3	3	4	3	4	4	4	3	8	1	0.004	1	excellent
13	4	3	4	3	3	4	4	4	8	1	0.004	1	excellent
14	4	4	3	3	4	3	3	3	8	1	0.004	1	excellent
15	3	4	3	2	4	4	2	3	8	0.75	0.109	0.72	good
16	3	3	4	4	2	3	3	4	7	0.88	0.031	0.88	excellent
17	3	4	4	3	3	4	3	4	8	1	0.004	1	excellent
18	4	3	3	4	4	3	3	4	8	1	0.004	1	excellent
19	4	4	4	3	3	4	2	3	7	0.88	0.031	0.88	excellent
20	3	3	4	3	4	4	3	4	8	1	0.004	1	excellent

The structural validity of the scale is obtained by calculating the correlation between the factors of the scale and between the scale and the factors. Based on the results of the correlation analysis (refer to Table 6), the correlation coefficient between each factor ranges from 0.389 to 0.654, showing a moderate correlation. The correlation coefficient between each factor and the total scale is between 0.670-0.889, which is higher than the correlation between each factor, which indicates that there is a certain degree of independence between the total scale and each factor, and each factor can also reflect the content to be measured by the scale, with good structural validity.

Table 6. Correlation Analysis Results between Factors and between Factors and Total Scale

Factors		Profession dilemma	Rule dilemma	Interpersonal dilemma	Society dilemma	The level of ethical dilemma
Profession dilemma	Pearson Correlation	1				
	Sig. (2-tailed)					
Rule dilemma	Pearson Correlation	.654**	1			
	Sig. (2-tailed)	.000				
Interpersonal dilemma	Pearson Correlation	.630**	.580**	1		
	Sig. (2-tailed)	.000	.000			
Society dilemma	Pearson Correlation	.456**	.417**	.389**	1	
	Sig. (2-tailed)	.000	.000	.000		
The level of ethical dilemma	Pearson Correlation	.889**	.804**	.821**	.670**	1
	Sig. (2-tailed)	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

This study is based on a literature review, interviews with teachers' views, and expert opinions. First, a comprehensive review of the literature related to the existing teachers' professional ethics dilemma questionnaire in China and outside of China, selecting high-quality items. Second, interview teachers, from the perspective of teachers, in-depth understanding of the ethical dilemma experienced by teachers in daily education and teaching practice, in-depth analysis of the interview results, and further clarify the views of teachers. Finally, the researchers interviewed school administrators, Doctor of Educational Psychology, and experts engaged in research on teachers' professional dilemmas to have an in-depth understanding of the ethical dilemmas faced by teachers from the perspective of school management and profession. Liang (2021) once pointed out that the most effective approach to examining teaching work and professional ethics is to analyze the moral dilemmas that teachers face when they engage with significant stakeholders in their professional lives, such as students and other things. So, the questionnaire item category is set by relation type. Based on a comprehensive analysis of the literature and the views of teachers and experts, a preliminary scale of teachers' professional ethics dilemmas was formed (Figure 1).

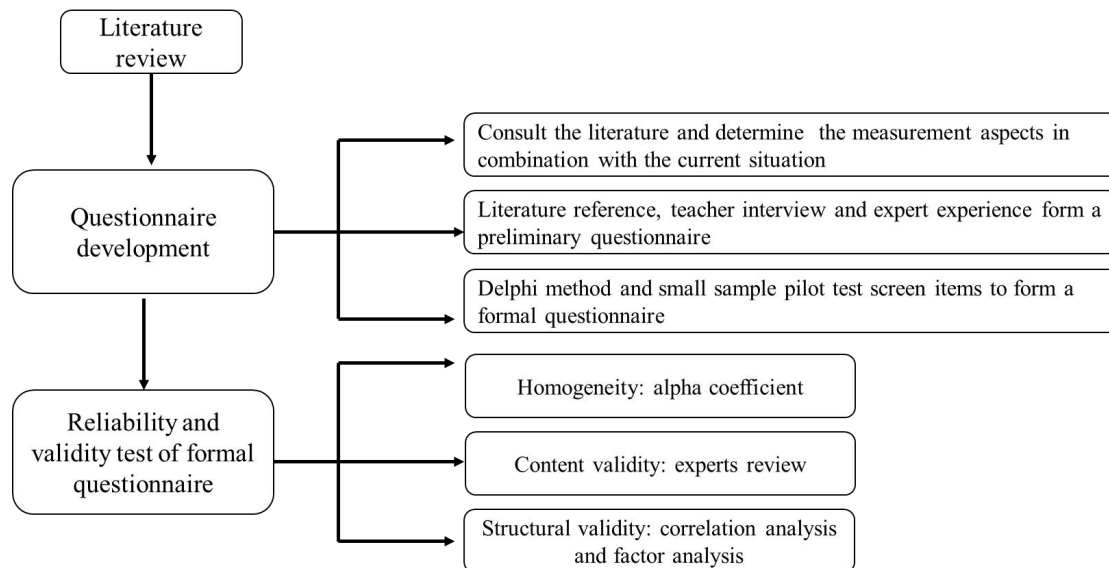


Figure 1. Research Procedure

Combined with the professional framework of teachers, this paper sorts out five major ethical relationships faced by teachers, teachers and society, teachers and profession, teachers and students, teachers and themselves, teachers and colleagues, conducts open-ended interviews with teachers in Luzhou, and holds three teacher forums to improve the questionnaire structure and compile questions. Inviting 10 experts in relevant fields and postgraduates to discuss the structure and items of the questionnaire, determine some controversial options and combine items with similar or the same meaning, eliminate and revise items that are difficult to understand, and finally form an initial questionnaire with 30 items in 5 aspects (each dimension contains 3-7 items), as shown in Table 7. The questionnaire is scored using a Likert five-point scale, ranging from "never troubled" to "always troubled," with 1-5 points assigned accordingly. A higher score indicates a greater level of ethical dilemmas experienced by teachers.

Table 7. Example of Evaluation Items of Teachers' Professional Ethics Dilemma (Part)

Items (Dilemma)	Score (never troubled---always troubled)				
	1	2	3	4	5
Seeing that colleagues treat students in an inappropriate way	1	2	3	4	5
When assessing the professional title, there is fraud in the data of colleagues	1	2	3	4	5
When the superior comes to check, you need to make some false materials (such as the curriculum inconsistent with the usual curriculum, etc.)	1	2	3	4	5
Being responsible to students or school	1	2	3	4	5
Being responsible for your profession or school teaching	1	2	3	4	5

The Scientificity of the Development Process of Teachers' Professional Ethics Dilemma Scale

Starting from the relevant relationship aspects in teachers' professional activities, this study divides the evaluation index of teachers' professional ethics dilemma into five aspects and compiles 30 items to measure the level of teachers' professional ethics dilemma. In the process of compiling the scale, it has experienced many iterations of Pilot test - Revision - Test - Analysis - Revision - Verification, which ensures the scientificity and preciseness of the compilation process of the scale and enhances the standardization of the survey scale. And 30 items are tested and analyzed many times, and some items are deleted and adjusted. After item analysis and factor analysis, the evaluation scale is finally reduced to 20 items, and the corresponding confirmatory factor analysis and reliability and validity test are carried out respectively. The final evaluation scale of the teachers'

professional ethics dilemma is established, which has a high reference value.

The Rationality of the Evaluation Structure of Teachers' Professional Ethical Dilemma

Based on theoretical analysis and empirical tests, this paper categorizes the five relationships between teachers and their profession, teachers and society, teachers and students, teachers and themselves, and teachers and colleagues based on the structure of teachers' professional relationships. Through factor analysis, it further summarizes these relationships into four types of dilemmas. The reliability and validity tests show that the self-developed teachers' professional ethical dilemma scale has good reliability, validity, and structural rationality, with an internal consistency coefficient of 0.881. The effectiveness of the hypothetical model fitting is tested using χ^2/df as an index in the absolute sense. Generally, a smaller χ^2/df value indicates a better fit of the model. It is commonly believed that when $\chi^2/df < 3$, the model fit is good. In this study, the χ^2/df value is 3.002. However, it should be noted that the χ^2/df value can be influenced by sample size, and some researchers argue that values up to 5 are reasonable (Yaar, Bayda, & Elk, 2020). In the test of relative fitting effect, the three indicators of NFI, IFI and TLI are mainly selected to compare with the hypothetical model itself to test its fitting effect. These three indicators in this study are greater than 0.9, indicating that the model-fitting effect is good. Both the absolute fitting effect index and the relative fitting effect index are based on the fitting combination of the model and the comparison of the actual survey data. Once there is a problem with the actual survey data, there will be a certain deviation between the fitting results of the hypothetical model and the comparison results of the actual survey data to reflect the advantages and disadvantages of the hypothetical model (Qiu & Lin, 2019). Therefore, alternative indicators CFI and RMSEA are needed to solve this problem. The CFI and RMSEA in this study meet the requirements, indicating that the hypothetical model has a good fitting effect. From the distribution of 20 items in four factors, the component matrix of each item on its factor is extremely significant, indicating that the scale has high structural validity. The above results show that the overall design of the framework and the compilation of the scale meet the requirements of educational metrology.

Advantages Compared with Previous Studies

This study supplements the limitation of the lack of empirical research on the ethical dilemmas of teachers in China. In previous studies, scholars focused on theoretical deduction and philosophical speculation. In addition, this study proposes to test the level of teachers' ethical dilemmas. It cannot simply explain that teachers have many ethical dilemmas, because the understanding of the current situation can provide evidence for relevant research. Compared with the existing questionnaire, it has increased its scientificity. The previous research has not verified the scientificity of the questionnaire, which is also the part where Chinese research needs to be improved. When developing the questionnaire, it can not only rely on the collation of literature, but also need more first-hand information and materials, such as experts' opinions and respondents' voices, which are reflected in this study.

CONCLUSION

The possible deficiency of this study is that the internal consistency coefficient of the society dilemma in the teachers' professional ethics dilemma scale is a little low. The possible reason is that the number of items under this factor is few, which is easy to leads to the low internal consistency coefficient of the scale. However, the internal consistency coefficients of the overall scale reach the statistical standard, which is 0.881. At the same time, the dilemma of the professional ethics of teachers will be affected by the internal and external values of teachers, and it is easy to be affected by subjective personal emotions in the actual evaluation. The application value of the new scale of teacher professional ethics dilemma composed of 20 items to measure the level of teacher professional ethics dilemma in China remains to be tested.

This research is not classified according to the education at each stage. Educators at different stages may have different views and opinions in professional practice. Future research can be explored further by stages, and researchers are expected to use this questionnaire to conduct current research to enrich research in this field. And it is hoped that future researchers use the scale developed in this study to conduct surveys to test the practicability and applicability.

DECLARATIONS

Author Contributions: The main contributions of the first author are: collecting data, analyzing data, and writing a paper, and the second author is the supervisor. Her main contributions are writing guidance and paper revision. The third author is the partner. His main contributions are collecting and reviewing literature, and data

analysis. All authors have read and approved the published final version of the article.

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Ethical Approval: Ethical approval was approved by SWMU University, and participants had informed consent.

Data Availability Statement: The datasets generated and/or analyzed during the current study are available upon reasonable request.

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