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ORIGINAL

A Study on Development of Ethical Dilemmas Scale in Teaching Profession: Validity and Reliability

Estudio sobre la compilación de la escala de dilemas éticos profesionales de los docentes: validez y fiabilidad

Ting Chen[1,2], Crendy Tan Yen Teng[3], Xin Wang[1,2]

[1]Faculty of Social Sciences and Liberal Arts, UCSI University. Kuala Lumpur, Malaysia.
[2]School of Marxism, Southwest Medical University. Luzhou, China.
[3]University of Cyberjaya. Cyberjaya, Malaysia.

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Corresponding author: Crendy Tan Yen Teng

ABSTRACT

Introduction: this study was to develop A Scale of Professional Ethical Dilemma for Teachers and verified the reliability and validity of the questionnaire, to provide an objective and effective measurement tool for the evaluation of the professional ethics dilemma of teachers. It may provide an empirical research tool for teachers' ethical dilemmas and scientifically assess the level of teachers' dilemmas.
Method: it used literature review and teachers interview to select the contents of questionnaire, did pilot test and expert judgment to form the experimental version of scale.
Results: this study developed a scale of professional ethical dilemma for Chinese teachers. 1. Cronbach' α coefficient for each factor was between 0,720-0,751, Cronbach' α coefficient for the whole scale was 0,881, the scale had good internal consistency, stability, and reliability, 2. through correlation analysis, the correlation coefficient between each factor was between 0,389 and 0,654, the correlation coefficient between each factor and the total scale was between 0,670 and 0,889, the scale had good structural validity. 3. Through exploratory factor analysis, the total variance explained of the common factors after the axis was 57,007 %, and 4. through confirmatory factor analysis, the result was in line with the overall model fitting test index in modeling research.
Conclusions: this study developed a scale, it can be used as an effective tool to evaluate the level of professional ethics dilemma of teachers.

Keywords: Teacher; Professional Practice; Ethical Dilemma; Scale; Reliability; Validity.

RESUMEN

Introducción: este estudio tenía por objeto elaborar una escala de dilemas éticos profesionales de los docentes y verificar la fiabilidad y validez del cuestionario, a fin de proporcionar un instrumento de medición objetivo y eficaz para la evaluación de los dilemas éticos profesionales de los docentes. Puede proporcionar una herramienta de investigación empírica para los dilemas éticos de los profesores y evaluar científicamente el nivel de los dilemas de los profesores.
Método: se recurrió a la revisión bibliográfica y a entrevistas a profesores para seleccionar el contenido del cuestionario, se realizó una prueba piloto y se recabó el juicio de expertos para elaborar la versión experimental de la escala.
Resultados: este estudio desarrolló una escala de dilemas éticos profesionales para profesores chinos. 1. El coeficiente **α** de Cronbach para cada factor estaba entre 0,720-0,751, el coeficiente **α** de Cronbach para

la escala total era 0,881, la escala tenía buena consistencia interna, estabilidad y fiabilidad, 2. mediante el análisis de correlación, el coeficiente de correlación entre cada factor estaba entre 0,389 y 0,654, el coeficiente de correlación entre cada factor y la escala total estaba entre 0,670 y 0,889, la escala tenía buena validez estructural. 3. Mediante el análisis factorial exploratorio, la varianza total explicada de los factores comunes tras el eje fue del 57,007 %, y 4. mediante el análisis factorial confirmatorio, el resultado estuvo en consonancia con el índice general de prueba de ajuste del modelo en la investigación de modelización.
Conclusiones: este estudio desarrolló una escala, se puede utilizar como una herramienta eficaz para evaluar el nivel de dilema de ética profesional de los profesores.

Palabras clave: Profesor; Práctica profesional; Dilema ético; Escala; Fiabilidad; Validez.

INTRODUCTION

Teachers' work is a profession that carries morality, and teachers' professional practice is always rooted in a certain morality. [1] Therefore, 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 said, "Our school ultimately depends on the moral behavior ability of teachers, no matter how strictly controlled, teaching requires continuous choices, these most difficult choices are essentially moral choices".[2,3,4]

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. Because choosing one of these values will affect or even damage the realization of other values, it is often difficult for teachers to make a choice. Sometimes, even the choices made after thinking twice are difficult to avoid moral guilt. Ethical conflict will bring moral choice and emotional distress to teachers. [3]

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 behaviors do exist that are not in line with the identity of teachers and are contrary to the roles of teachers.[4] But on the other hand, teachers believe that they are suffering from moral kidnapping that is unbearable to 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 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, such as,[3,5] however, the real ethical dilemma faced by teachers is obviously different from the virtual ethical dilemma. The fundamental difference between the two is between idea and behavior. In the virtual ethical dilemma, teachers face the problem of ethical cognition, but virtual problems do not put forward the requirements of ethical behavior to people or provide the environment and conditions to realize ethical behavior.[6] 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.[7] 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. In view of 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 are the factors considered in developing the questionnaire of professional ethics dilemma for Chinese teachers?
2. How about the reliability and validity of the questionnaire of professional ethics dilemma for Chinese teachers?

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METHOD

Research Variables

The purpose of this study is to develop a scale, necessitating the verification of its reliability and validity. The reliability and validity of the Development of Ethical Dilemmas Scale in the Teaching Profession are the research variables.

Reliability refers to the stability and consistency of measurement results obtained from the questionnaire. Specifically, it assesses whether the results from measuring the same object with the same questionnaire remain consistent over different times or contexts. Reliability reflects the dependability and stability of the measurement tool. Generally, options for assessing reliability include retest reliability and internal consistency reliability.

Validity indicates the extent to which a measurement tool accurately assesses the intended content. In other words, it examines whether the questionnaire truly reflects the goals or traits the researcher aims to measure. Validity typically encompasses content validity, construct validity, and criterion validity. This study will focus on internal consistency reliability, content validity, and construct validity to ensure the reliability and effectiveness of the questionnaire.

Literature Study

This study is based on a literature review, interviews with teachers, and expert opinions. First, a comprehensive review of the literature related to existing teachers' professional ethics dilemma questionnaires in China and abroad was conducted, selecting high-quality items. Second, teachers were interviewed to gain an in-depth understanding of the ethical dilemmas they experience in their daily educational and teaching practices. The results of these interviews were analyzed to further clarify the teachers' perspectives. Finally, the researchers interviewed school administrators, doctors of educational psychology, and experts engaged in research on teachers' professional dilemmas to gain insights into the ethical challenges that teachers face from the perspectives of school management and the profession. Liang noted that the best way to discuss teaching work and professional ethics is to study the moral conflicts teachers encounter in their interactions with significant relationships in their professional lives, such as with students and materials. [8] Therefore, the questionnaire items were categorized 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 developed.

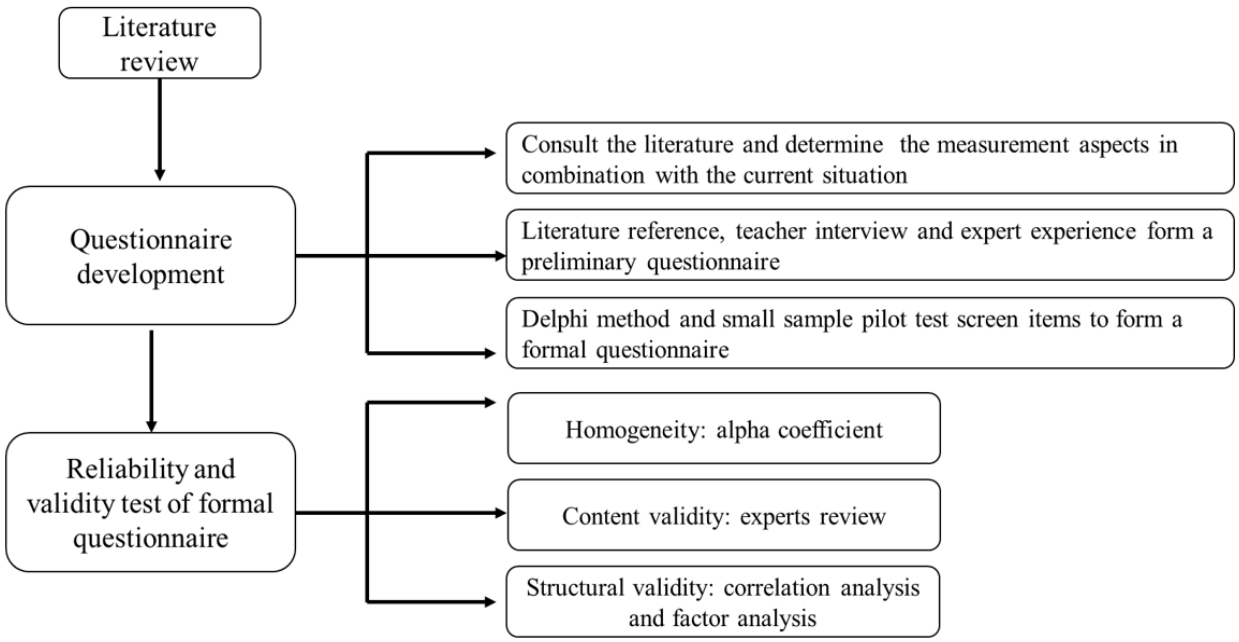

Figure 1. Research Procedure

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

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items), as shown in table 7. The questionnaire is scored with Likert five-point scale, from "never troubled" to "always troubled", which is 1-5 points in turn. The higher the score, the higher the level of ethical dilemma experienced by teachers.

Interview

First, ten teachers were interviewed to gather their opinions. As front-line educators, they possess significant experience with ethical conflicts, choices, and decisions. By compiling a questionnaire that reflects the voices of these teachers, we can gain a more accurate understanding of their actual situations, which is more authentic than relying solely on virtual scenarios. Individual interview methods were adopted, following standard interview procedures.

Second, the expert judgment method was employed to assess the validity of the questionnaire content. A letter was sent to 20 leaders of school administration departments, experts who have long studied teachers' professional ethics and moral dilemmas, and educational psychologists, asking them to evaluate the importance and relevance of the questionnaire items. Among the experts, six are under 49 years old, accounting for 30,0 %, while 14 are over 50 years old, making up 70,0 %. All 20 experts hold senior professional titles, and their average years of experience is 25,6. Their extensive teaching and research backgrounds enable them to effectively screen and recommend the questionnaire items proposed by the researchers, thereby enhancing the scientific rigor of the questionnaire development process.

Table 1. Example of Evaluation Items of Ethical Dilemmas Scale in Teaching Profession (Part)

Items (Dilemma)	Score (never---always)				
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

Questionnaire Survey

For pilot test and formal test, 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) have a teacher qualification certificate, (3) a master's degree or higher, (4) informed consent, voluntary participation in this study.

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

The initial participants are 100 teachers from Sichuan Province. The official participants are 550 teachers from 11 regions including Chengdu, Sichuan, of which 500 are effective, with an effective rate of 91 %. To avoid the interference effect of the prediction questionnaire, the participants of the formal questionnaire are completely different from those in the prediction stage.

Project Analysis

The main purpose of item analysis is to assess the appropriateness and reliability of the prepared scale and to evaluate individual items. This process generally includes the critical ratio method, correlation analysis, and homogeneity testing. Firstly, the total scores from the initial questionnaire are ranked from high to low. Those scoring in the top 27 % are classified as the high group, while those in the bottom 27 % are classified as the low group. An independent sample t-test is used to compare the differences between these high and low groups, and three items that do not show significant differences are removed. Secondly, the correlation coefficient between each item and the total score of the scale is calculated through correlation analysis. The results indicate that items 15 and 16 exhibit low correlation with the total score (with correlation coefficients less than 0,4), leading to their elimination. After removing these two items, the Cronbach's α coefficient improves from 0,858 to 0,870, suggesting that these items do not align with the individual psychological attributes measured by the scale and are thus suitable for deletion. Ultimately, 25 items from the initial test are retained as the formal questionnaire addressing teachers' professional ethics dilemmas.

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Reliability and Validity Analysis

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. Cronbach' α coefficient of each factor is between 0,720-0,751, Cronbach' α coefficient of the whole scale is 0,881. According to the reliability criteria, [9] the scale of this study and its factors have good internal consistency, stability and reliability. The results are shown in table 2.

Table 2. Reliability Test Results of Ethical Dilemmas Scale in Teaching Profession

	Profession dilemma	Rule dilemma	Interpersonal dilemma	Society dilemma	The whole scale
Cronbach' 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 actually 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 behavioral aspect to be measured.[10] The establishment of content validity in the preparation of the scale is mainly achieved through two stages: 1) the development stage of the scale: including aspects definition, item generation and scale building, 2) 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. [11]

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 3.

Table 3. Content Validity Results of Experts Ratings and Evaluation

Question number	8 experts' scores								Number of experts rated 3 or 4	I-CVI	Pc	Kn	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. From the results of correlation analysis (table 4), the correlation coefficient between each factor is between 0,389-0,654, 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.

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Table 4. Correlation Analysis Results 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).

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 (x^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 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.[12] 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 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 twice factor analysis adopt the principal component analysis method, and adopt the varimax to rotate the axis, and finally extract four common factors. The Total Variance Explained of the four common factors after the axis is 57,007 %. The results are shown in table 5.

Table 5. Results of Exploratory Factor Analysis of Ethics Dilemma Scale in Teaching Profession

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

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Confirmatory Factor Analysis

Carry out 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, CFI. The results are as follows:

Table 6. Model Fitting Test Results (n=500)

			NFI	IFI	TLI	CFI	RMSEA
Ethical dilemma in teaching profession	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 modeling research. [10] It shows that the fitting degree of the model is good.

DISCUSSION

The Scientificity of the Development Process of Ethics Dilemma Scale in Teaching Profession

Starting from the relevant relational aspects of teachers' professional activities, this study divides the evaluation index of teachers' professional ethics dilemma into five categories and compiles 30 items to measure the level of this dilemma. The scale development process underwent multiple iterations of pilot testing, revision, analysis, and verification, ensuring the scientific rigor and precision of the compilation process while enhancing the standardization of the survey. Throughout this process, the 30 items were tested and analyzed repeatedly, leading to the deletion and adjustment of certain items. Following item analysis and factor analysis, the evaluation scale was ultimately refined to 20 items. Confirmatory factor analysis, along with reliability and validity tests, were conducted, resulting in the establishment of a final evaluation scale for teachers' professional ethics dilemma that holds significant reference value.

The Rationality of the Evaluation Structure of Ethical Dilemma in Teaching Profession

Based on theoretical analysis and empirical testing, this paper identifies five relationships within the structure of teachers' professional relations: teachers and their profession, teachers and society, teachers and students, teachers and themselves, and teachers and colleagues. Through factor analysis, these relationships are further summarized into four types of dilemmas. Reliability and validity tests reveal an internal consistency coefficient of 0,881, indicating that the self-developed teachers' professional ethical dilemma scale has good reliability, validity, and structural rationality. The x^2/df ratio is used to assess the absolute fit of the hypothetical model. Generally, a smaller x^2/df indicates a better fit. It is widely accepted that a x^2/df value of less than 3 signifies a good model fit. In this study, the x^2/df value is 3,002. However, since x^2/df can be influenced by sample size, some researchers suggest that a value within 5 is reasonable. [13] For evaluating the relative fit, the study primarily considers three indicators: NFI, IFI, and TLI, which compare the hypothetical model to itself. All three indicators exceed 0,9, indicating a good model fit. Both the absolute and relative fit indices are based on the model's fit and the comparison to actual survey data. Any discrepancies in the actual survey data may lead to deviations between the hypothetical model's fitting results and the actual data comparison, reflecting the model's strengths and weaknesses. [14] Therefore, additional indicators, CFI and RMSEA, are necessary to address this issue. The CFI and RMSEA values in this study meet the required criteria, suggesting a good fitting effect for the hypothetical model. Furthermore, the distribution of the 20 items across the four factors shows that the component matrix for each item is highly significant, demonstrating high structural validity for the scale. Overall, these results indicate that the framework design and the scale's compilation meet the standards of educational metrology.

Advantages Compared with Previous Studies

This study addresses the limitation of the lack of empirical research on the ethical dilemmas faced by teachers in China. Previous studies have primarily focused on theoretical deductions and philosophical speculations. Additionally, this study aims to assess the extent of teachers' ethical dilemmas. It cannot simply assert that teachers face numerous ethical dilemmas; understanding the current situation can provide valuable evidence for related research. Compared to existing questionnaires, this study enhances scientific rigor. Previous research has not verified the scientific validity of the questionnaires used, highlighting an area where Chinese research needs improvement. In developing the questionnaire, it is essential not only to rely on literature reviews but also to incorporate more first-hand information and materials, such as expert opinions and the voices of respondents, which are reflected in this study.

CONCLUSION

This study developed a scale of professional ethical dilemma for Chinese teachers. 1. Cronbach' α coefficient for each factor was between 0,720-0,751, Cronbach' α coefficient for the whole scale was 0,881, the scale had good internal consistency, stability, and reliability, 2. through correlation analysis, the correlation coefficient between each factor was between 0,389 and 0,654, the correlation coefficient between each factor and the total scale was between 0,670 and 0,889, the scale had good structural validity, and 3. through exploratory factor analysis, the total variance explained of the common factors after the axis was 57,007 %, 4. through confirmatory factor analysis, the result was in line with the overall model fitting test index in modeling research. It can be used as an effective tool to evaluate the level of ethical dilemma of teachers in their professional activities.

Limitations and recommendations

The possible deficiency of this study is that the internal consistency coefficient for the societal dilemma in the teachers' professional ethics dilemma scale is somewhat low. This may be attributed to the limited number of items under this factor, which can lead to a lower internal consistency coefficient for the scale. However, the internal consistency coefficients for the overall scale reach the statistical standard of 0,881. Additionally, the professional ethics dilemmas faced by teachers can be influenced by both internal and external values, making them susceptible to subjective personal emotions during actual evaluations.

The applicability of the new 20-item scale measuring the level of teacher professional ethics dilemmas in China remains to be tested. This research does not categorize educators according to their specific educational stages, even though educators at different levels may have varying perspectives and opinions in their professional practice. Future research could explore these differences by categorizing participants by stage. Researchers are encouraged to use this questionnaire for current studies to enrich the field. It is hoped that future researchers will utilize the scale developed in this study to conduct surveys that test its practicality and applicability.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Chen Ting.
Data curation: Chen Ting.
Formal analysis: Wang Xin.
Research: Chen Ting.
Methodology: Crendy Tan Yen Teng.
Project management: Wang Xin.
Resources: Crendy Tan Yen Teng.
Software: Wang Xin.
Supervision: Crendy Tan Yen Teng.
Validation: Chen Ting.
Display: Wang Xin.
Drafting - original draft: Chen Ting.
Writing - proofreading and editing: Chen Ting, Wang Xin.