

# Exploring the "Key Code" of Piano Education in Higher Vocational Colleges: A Study on Teachers' Professional Quality and Students' Learning Experience (Teacher Part)

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**Abstract** – This study takes piano teachers in higher vocational colleges as the research object, aiming to explore the mechanism of the influence of teachers' professional quality on students' learning experience. Data of 100 piano teachers were collected through questionnaire survey, and empirical analysis was conducted using methods such as descriptive statistics, reliability and validity tests, difference analysis and structural equation model. The study found that the teacher group was mainly female (76%), with a master's degree or above (95%), and most of them had long-term piano education experience (63% had more than 10 years of teaching experience). Reliability and validity tests showed that the scale was highly reliable (Cronbach's  $\alpha=0.991$ , KMO=0.962). The structural equation model showed that teachers' professional sentiment and professional ability significantly positively predicted learning motivation ( $\beta=0.834$ ,  $\beta=0.562$ ) and satisfaction ( $\beta=0.594$ ,  $\beta=0.8$ ). However, there were no significant differences in gender, age, education, teaching experience and teaching methods on the professional quality dimension. It is recommended that higher vocational colleges strengthen the training of teachers' scientific research capabilities, promote the output of high-level academic results, and optimize the online and offline hybrid teaching model to improve the quality of piano education

**Keywords** – higher vocational colleges; piano education; teacher professional quality; structural equation model; learning motivation

## I. INTRODUCTION

Piano education is an important way for higher vocational colleges to cultivate applied music talents. Its quality is directly affected by the professional quality of teachers. In recent years, with the deepening of education reform, the structure of teachers' professional quality and its mechanism of action have gradually become a research hotspot. However, the existing literature focuses on teachers' professional knowledge and ability (such as teaching skills and subject knowledge), and the systematic analysis of "professional emotions" (such as teaching enthusiasm and professional values) is still insufficient (Gu Mingyuan, 1990; Xia Zhengnong, 1989). In addition, the research on how teachers' multidimensional qualities (knowledge, ability, emotion) affect students' learning experience through the transmission effect of teaching quality is still in the exploratory stage (Pintrich & Shunk, 1996; Dornyei, 2001).

This study takes piano teachers in higher vocational colleges as the research object, combines the theoretical framework of learning motivation and satisfaction, and aims

to reveal the mechanism of teachers' professional quality on students' learning experience. Specific research questions include: (1) the composition dimensions of teachers' professional quality; (2) the impact of different background variables on professional quality; (3) how professional quality affects students' motivation and satisfaction through teaching quality and direct path. Existing literature shows that the improvement of teachers' professional quality may indirectly promote learning effects by enhancing teaching quality (Saif & NI, 2015), but the synergistic effect of multidimensional quality and its specific path still need empirical verification.

The theoretical significance of this study lies in integrating the multidimensional perspective of teachers' professional emotions and abilities, and verifying its comprehensive mechanism through structural equation model; the practical significance is to provide data support for higher vocational colleges to optimize the teacher training system and improve the quality of piano education. For example, the research results can provide a basis for the formulation of teacher evaluation standards, emphasizing the development direction of giving equal importance to emotional investment and scientific research ability.

## II. PROBLEM STATEMENT

### *Research Problems*

Under explored Dimensions of Teacher Professional Quality: Existing studies on piano education in higher vocational colleges predominantly focus on teachers' professional knowledge and technical skills, while systematically neglecting the role of "professional sentiment" (e.g., teaching passion, values) in shaping student learning experiences (Gu Ming yuan, 1990; Xia Zheng nong, 1989). This gap limits the understanding of how emotional engagement and intrinsic motivation of teachers contribute to educational outcomes.

Ambiguity in the Mediating Role of Teaching Quality: Although prior research suggests that teacher professional quality enhances teaching quality, which in turn affects student motivation and satisfaction (Saif & NI, 2015), the specific pathways through which different dimensions of professional quality (e.g., competence vs. sentiment) mediate these effects remain unclear. For instance, whether professional sentiment indirectly influences satisfaction via motivation requires empirical validation.

Lack of Empirical Evidence on Multidimensional Synergy: While theoretical frameworks propose that the interplay of teachers' knowledge, competence, and sentiment may yield synergistic effects on student outcomes (Pintrich & Schunk, 1996), few studies have quantified these

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interactions or tested their comparative significance in higher vocational education contexts.

### *Research Objectives*

- I. To construct a multidimensional model of teacher professional quality that integrates professional sentiment (affective engagement) and professional ability (pedagogical and research skills) as core dimensions.
- II. To examine the mediating role of teaching quality in linking teachers' professional quality to student learning motivation and course satisfaction.
- III. To empirically test whether the combined effects of multidimensional professional quality (sentiment + ability) significantly outperform individual dimensions in predicting student outcomes.
- IV. To identify gaps in teachers' scientific research capabilities (e.g., publication outputs, project participation) and propose strategies for enhancing academic contributions in piano education.

### *Problem Statement*

Piano education in higher vocational colleges plays a pivotal role in cultivating applied music talents. However, the mechanisms through which teachers' professional quality influences student learning experiences—particularly motivation and satisfaction—remain inadequately understood. Existing literature predominantly adopts a fragmented approach, isolating teachers' competence (e.g., technical proficiency) or knowledge (e.g., music theory) while overlooking the holistic integration of affective and cognitive dimensions (Dornyei, 2001). For example, while studies acknowledge that passionate teaching may inspire students (Gu Mingyuan, 1990), the quantifiable impact of such sentiment on motivation and its subsequent effect on satisfaction lack robust empirical support.

Furthermore, although blended teaching models (online + offline) are increasingly adopted in higher vocational education, their interaction with teachers' professional quality has not been systematically explored. This raises critical questions: Do teachers' emotional engagement and technical expertise synergistically enhance blended learning effectiveness? How do deficiencies in research capabilities (e.g., limited high-impact publications) constrain the modernization of piano pedagogy? Addressing these issues is essential for designing targeted teacher development programs and improving educational outcomes. Research Gap

**Neglect of Professional Sentiment:** Most studies on teacher professional quality emphasize measurable competencies (e.g., curriculum design, performance skills) but fail to incorporate affective factors like teaching passion or ethical values into analytical frameworks (Xia Zheng nong, 1989). This omission limits the comprehensiveness of teacher evaluation systems

**Insufficient Analysis of Mediation Pathways:** While prior work hypothesizes that teaching quality mediates the relationship between teacher quality and student outcomes (Saif & NI, 2015), the structural equation modeling (SEM)

in this field rarely differentiates between direct and indirect effects of sentiment versus ability. For instance, whether professional sentiment primarily drives motivation while ability directly boosts satisfaction remains untested.

**Limited Focus on Multidimensional Synergy:** Existing research often examines individual dimensions of professional quality (e.g., competence alone) rather than their combined effects. This oversight hinders the development of holistic teacher training programs that balance emotional and technical development.

**Underrepresented Context of Higher Vocational Education:** Empirical studies on piano education predominantly target conservatories or K–12 settings, neglecting the unique challenges and opportunities in higher vocational colleges, where applied skills and industry relevance are prioritized.

### *Research Objectives*

**To Develop a Multidimensional Framework:** Integrate “professional sentiment” (e.g., enthusiasm, empathy) and “professional ability” (e.g., pedagogical innovation, research output) into a unified model for assessing piano teachers' quality in higher vocational colleges.

**To Map Mediation Pathways:** Use structural equation modeling (SEM) to quantify how teaching quality mediates the effects of teachers' sentiment and ability on student motivation (e.g.,  $\beta=0.834$  for sentiment→motivation) and satisfaction (e.g.,  $\beta=0.8$  for ability→satisfaction).

**To Validate Synergistic Effects:** Test whether the interaction of sentiment and ability significantly enhances predictive power for student outcomes compared to isolated dimensions.

**To Diagnose Research Capability Gaps:** Analyze teachers' academic productivity (e.g., publications in core journals, participation in national projects) and propose interventions to bridge gaps between pedagogical practice and scholarly contributions.

**To Recommend Policy Interventions:** Formulate evidence-based strategies for institutions to optimize blended teaching models, integrate emotional metrics into teacher evaluations, and incentivize high-impact research.

### *Theoretical Contribution:*

Advances the conceptualization of teacher professional quality by emphasizing affective-cognitive synergy.

Validates the mediating role of teaching quality through robust SEM analysis, enriching educational psychology theories.

### *Practical Implications*

Guides higher vocational colleges in designing teacher training programs that balance emotional engagement and technical excellence.

Informs policy frameworks to align piano education with industry demands and academic innovation.

### III. LITERATURE REVIEW

The word "disposition" is a focus and hot topic in my country's educational research. Disposition can be divided into broad and narrow senses (Xia Zhengnong, 1989). The narrow sense of disposition refers to the concept of disposition in psychology and physiology (Gu Mingyuan, 1998). The Education Dictionary explains that quality refers to the innate anatomical and physiological characteristics of an individual (Gu Mingyuan, 1990). As research on teacher specialization continues to deepen, research on teacher quality has gradually shifted from general quality requirements for teachers to professional quality that examines teachers as professionals (Gu Mingyuan, 1990).

Quality refers to the innate anatomical and physiological characteristics of an individual; the genetic factors that make one susceptible to certain psychological abnormalities; the basic qualities of a citizen or a certain professional talent. This shows that a person's quality is innate and cannot be transferred by personal will. The concept of quality in a broad sense refers to the reality of the entire subject, that is, the overall level of a person's physical and mental development formed by the combined effects of innate and acquired qualities. With the continuous development and progress of science and educational research, the quality that people talk about has broken through the original meaning of quality. The concept of teachers as "professionals" was established in China starting with the Teachers Law of the People's Republic of China in 1993. In 1995, the State Council promulgated the Teachers' Qualification Regulations and began to implement the teacher qualification system. The concept that teachers have a career path to a profession has gradually been accepted by people. As research on teacher specialization continues to deepen, research on teacher quality has gradually shifted from general quality requirements for teachers to professional quality that examines teachers as professionals. (Gu Mingyuan 1990.) The "Education Dictionary" points out that teacher professional quality is "the basic conditions of psychological and behavioural qualities that teachers should possess in order to complete educational and teaching tasks." The word "basic" is used here to emphasize the "bottom line" of teacher professional quality, which is to emphasize that those who lack or fail to meet these psychological and behavioural quality requirements cannot become effective teachers and cannot perform their job responsibilities well.

Motivation, derived from the Latin word *Movere*, is an important factor in determining learning outcomes and a hot topic in the field of education. Different scholars have different interpretations of motivation. For example, Huston (1985) believes that motivation is a factor that initiates and guides behaviour. Pintrich and Shunk (1996) define motivation as an internal psychological process that guides goals, motivates, and maintains personal activities. Williams and Burden (1997) argue that motivation is a stimulus to cognitive and emotional states that drives individuals to make conscious behavioural decisions. Dornyei discusses motivation as the choice of a particular behaviour, the effort to act on it, and the persistence of this effort. Motivation is when an individual starts a certain behaviour, maintains this behaviour, and determines the direction of his or her behaviour. Psychologists define motivation as a

psychological tendency that causes arousal and causes individuals to engage in a certain activity for a period of time and directs the activity toward a goal. Motivation involves three aspects: seeking the cause of species behaviour, the cause of behaviour pointing to a certain direction, and the cause of maintaining this direction. Motivation can not only stimulate individual behaviour and perpetuate individual behaviour, but also make behaviour develop toward a specific goal, thereby satisfying the needs of individuals. Motivation is the internal cause of human behaviour. Motivation includes not only internal motivation but also external motivation. Dornyei believes that motivation is the choice of a particular behaviour, the effort to act on it, and the persistence of this effort. Although there are differences in the expression of motivation among scholars, there are three parts that are the same: setting goals and then working hard to achieve them, and persistent efforts to achieve the set goals. Research shows that motivation is positively correlated with academic performance. The stronger the motivation, the higher the academic performance. Therefore, it can be seen that the poor academic performance of learning objects is caused by the low intensity of students' learning motivation.

Research shows that motivation is positively correlated with academic performance (Saif, NI 2015). "Satisfaction" is a feeling of satisfaction and pleasure when a person's needs or wishes are met (Ilyas & Arif, 2013). It is more of a state that refers to the state that an individual feels after experiencing the satisfaction of his or her expectations (Hom, 2003). Therefore, "satisfaction" can be defined as the experience of achieving the expected results of an individual (Petrzellis et al., 2006).

### IV. METHOD

#### *Descriptive statistical analysis*

#### Frequency analysis of demographic variables

According to the analysis results of the demographic variables, their numerical characteristics can be seen, which reflects the distribution of the subjects of this survey. At the same time, according to the frequency analysis results of each variable, the distribution basically meets the requirements of sampling survey.

The sample of this survey consisted of 100 people, including 24 men, accounting for 24% of the total number, and 76 women, accounting for 76% of the total number, indicating that the surveyed men were less than women.

In terms of age distribution, there are 38 people aged 23-30, accounting for 38% of the total number; 44 people aged 31-40, accounting for 44% of the total number; 12 people aged 41-50, accounting for 12% of the total number; and 6 people aged 51 and above, accounting for 6% of the total number.

In terms of education, there are 5 undergraduates, accounting for 5% of the total number; 40 postgraduates, accounting for 40% of the total number; 24 postgraduates, accounting for 24% of the total number; and 31 postgraduates, accounting for 31% of the total number.

In terms of the first degree major, 66 people majored in piano, accounting for 66% of the total number, and 34 people

majoried in piano education, accounting for 34% of the total number.

From the perspective of current academic qualifications and majors, there are 24 piano players, accounting for 24% of the total number, and 76 piano educators, accounting for 76% of the total number.

In terms of whether they have received teacher training, 85 people have received it, accounting for 85% of the total number, and 15 people have not received it, accounting for 15% of the total number.

In terms of whether the piano teacher is a full-time job, 78 people are yes, accounting for 78% of the total number, and 22 people are no, accounting for 22% of the total number.

In terms of whether they are piano teachers in other schools, 69 people, or 69 percent of the total, said yes, and 31 people, or 31 percent of the total, said no.

In terms of teaching age distribution, there are 12 people with less than one year, accounting for 12% of the total number; 29 people with 1-2 years, accounting for 29% of the total number; 39 people with 2-5 years, accounting for 39% of the total number; 8 people with 5-10 years, accounting for 8% of the total number; and 12 people with 10-15 years, accounting for 12% of the total number.

In terms of the main teaching methods, there are 13 people offline, accounting for 13% of the total number, 25 people online, accounting for 25% of the total number, and 62 people offline and online, accounting for 62% of the total number.

**TABLE 1 FREQUENCY ANALYSIS OF DEMOGRAPHIC VARIABLES**

classify	variable	rate	percent(%)
gender	male	24	24
	female	76	76
age	23-30 year	38	38
	31-40 year	44	44
	41-50 year	12	12
	51 years and older	6	6
	undergraduate	5	5
educational background	Master	40	40
	PhD student	24	24
	Doctor	31	31
First degree major	piano	66	66
	Piano education	34	34
Now my major is academic degree	piano	24	24
	Piano education	76	76
Whether they have received teacher training	yes	85	85
	no	15	15
Whether piano teacher is a full-time job	yes	78	78
	no	22	22
Whether he has served as a piano teacher in other schools	yes	69	69
	no	31	31
Your years of teaching	Under 1 year	12	12
	1-2 years	29	29
	2-5 years	39	39
	Five to ten years	8	8
	10-15 years	12	12
Your main teaching method	offline	13	13
	on-line	25	25
	Offline and online	62	62

## Reliability test

**TABLE 2. RELIABILITY ANALYSIS**

dimension	number of terms	Kronbach Alpha
ensemble	36	0.991
professional ability	11	0.972
professional sentiment	10	0.971
motivation	6	0.949
satisfaction	9	0.966

The Cronbach's  $\alpha$  coefficient is used to assess the internal consistency of a scale, which is reliability. The value range for the Cronbach's  $\alpha$  coefficient is from 0 to 1; the higher the value, the better the internal consistency of the scale. A test of overall item reliability showed that the Cronbach's  $\alpha$  was 0.991, indicating that the scale has good reliability and internal consistency. From each dimension, the Cronbach's  $\alpha$  was above 0.9, suggesting that each dimension also has good internal consistency.

## Validity test

**TABLE 3. VALIDITY ANALYSIS**

KMO and The Bartlett test		
KMO Sample appropriateness measures.		0.962
Bartlett's test of sphericity	Approximate chi-square	4848.28
	Degrees of freedom	630
	significance	<0.001

The KMO sample adequacy measure is used for the suitability analysis of factor models, with a value range from 0 to 1. A higher value indicates better suitability for factor analysis. The results show that the overall KMO value is 0.962, indicating that the data are suitable for factor analysis. Additionally, the Bartlett's test of sphericity has a P-value less than 0.05, indicating that there is correlation among the variables, making it suitable for factor analysis.

## Difference test

**TABLE 4 ANALYSIS OF GENDER DIFFERENCES IN EACH DIMENSION**

dimension	gender	Mean	Std. Dev.	t-value	p-value
professional ability	male	3.74	0.86	1.374	0.173
	female	3.41	1.05		
professional sentiment	male	3.74	0.87	1.317	0.191
	female	3.43	1.04		
motivation	male	3.85	0.90	1.730	0.087
	female	3.46	1.01		
satisfaction	male	3.76	0.80	1.468	0.145
	female	3.42	1.04		

According to the results of the above independent sample t-test, the differences in each dimension between genders can be seen. The significance test of the differences in each dimension between genders is greater than 0.05, indicating that there is no significant difference between different genders in each dimension.

**TABLE 5: ANALYSIS OF DIFFERENCES IN AGE ON EACH DIMENSION**

dimension	gender	Mean	Std. Dev.	t-value	p-value
professional ability	Age 23-30	3.50	0.96	0.081	0.970
	Age 31-40	3.46	1.15		
	Age 41-50	3.62	0.84		
	51 years old and above	3.45	0.82		
professional sentiment	Age 23-30	3.50	0.97	0.079	0.971
	Age 31-40	3.46	1.11		
	Age 41-50	3.61	0.90		
	51 years old and above	3.58	0.78		
motivation	Age 23-30	3.57	0.94	0.285	0.836
	Age 31-40	3.48	1.08		
	Age 41-50	3.78	0.96		
	51 years old and above	3.50	0.83		
satisfaction	Age 23-30	3.52	0.93	0.157	0.925
	Age 31-40	3.44	1.12		
	Age 41-50	3.66	0.84		
	51 years old and above	3.54	0.80		

According to the results of the above single-factor variance analysis, the differences in each dimension on age can be seen. The significance test of the differences in each dimension on age is greater than 0.05, indicating that there is no significant difference in each dimension among different ages.

**TABLE 6 ANALYSIS OF DIFFERENCES IN EDUCATIONAL BACKGROUND AMONG VARIOUS DIMENSIONS**

dimension	gender	Mean	Std. Dev.	t-value	p-value
professional ability	undergraduate	2.96	0.79	0.869	0.460
	Master	3.62	0.94		
	PhD student	3.56	1.17		
	Doctor	3.36	1.02		
professional sentiment	undergraduate	3.04	0.80	0.887	0.451
	Master	3.63	0.96		
	PhD student	3.59	1.12		
	Doctor	3.34	1.02		
motivation	undergraduate	3.20	0.77	0.540	0.656
	Master	3.67	0.97		
	PhD student	3.58	1.08		
	Doctor	3.44	1.00		
satisfaction	undergraduate	3.04	0.94	0.717	0.544
	Master	3.63	0.95		
	PhD student	3.54	1.07		
	Doctor	3.38	1.00		

According to the results of the above single-factor variance analysis, it can be seen that the differences in each dimension are based on educational background. The significance test of the differences in each dimension is greater than 0.05, indicating that different educational backgrounds do not have significant differences in each dimension.

**TABLE 7: ANALYSIS OF DIFFERENCES IN TEACHING EXPERIENCE AMONG VARIOUS DIMENSIONS**

dimension	of school age	Mean	Std. Dev.	t-value	p-value
professional ability	Under 1 year	3.82	0.50	0.698	0.595
	1-2 years	3.45	1.02		
	2-5 years	3.38	1.19		
	Five to ten years	3.84	0.83		
professional sentiment	10-15 years	3.40	0.85	0.320	0.864
	Under 1 year	3.70	0.53		
	1-2 years	3.50	1.03		
	2-5 years	3.39	1.18		
motivation	5-10 years	3.73	0.80	0.727	0.576
	10-15 years	3.51	0.89		
	Under 1 year	3.83	0.52		
	1-2 years	3.54	0.99		
satisfaction	2-5 years	3.39	1.13	0.874	0.483
	5-10 years	3.90	0.91		
	10-15 years	3.58	0.92		
	Under 1 year	3.80	0.55		
	1-2 years	3.56	0.99		
	2-5 years	3.30	1.16		
	5-10 years	3.79	0.84		
	10-15 years	3.54	0.81		

According to the results of the above single-factor variance analysis, it can be seen that the differences in each dimension on teaching experience. The significance test of the differences in each dimension on teaching experience is greater than 0.05, indicating that there is no significant difference in each dimension between different teaching experiences.

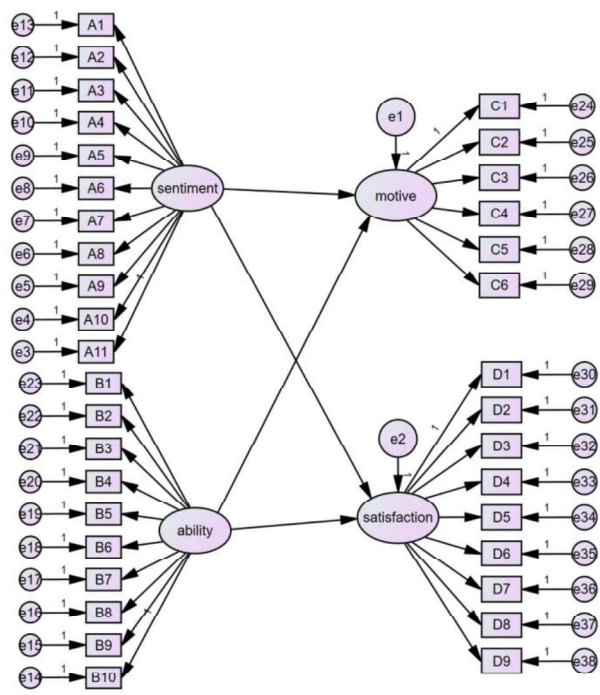
**TABLE 8 ANALYSIS OF DIFFERENCES IN TEACHING METHODS AMONG VARIOUS DIMENSIONS**

dimension	teaching method	Mean	Std. Dev.	t-value	p-value
professional ability	offline	3.90	1.08	1.757	0.178
	on-line	3.61	0.92		
	Offline and online	3.36	1.03		
professional sentiment	offline	3.78	1.05	1.272	0.285
	on-line	3.66	0.90		
	Offline and online	3.38	1.04		
motivation	offline	3.94	0.93	1.302	0.277
	on-line	3.59	0.91		
	Offline and online	3.45	1.03		
satisfaction	offline	3.84	0.97	1.417	0.248
	on-line	3.63	0.91		
	Offline and online	3.38	1.02		

According to the results of the above single-factor variance analysis, it can be seen that the differences in teaching methods in each dimension are significant. The significance test of the differences in teaching methods in each dimension is greater than 0.05, indicating that different teaching methods do not have significant differences in each dimension.

### Structural equation modelling





The hypothetical relationships among four dimensions—professional affect, professional competence, learning motivation, and satisfaction—are analyzed through path analysis, followed by hypothesis testing. The structural equation model is established using AMOS software, as shown in Figure 1. The model comprises four major components: A1 to A11 represent the 11 items of professional affect, B1 to B10 represent the 10 items of professional competence, C1 to C6 represent the 6 items of learning motivation, and D1 to D9 represent the 9 items of satisfaction.

TABLE 9 MODEL FITTING RESULTS

Indicator	X <sup>2</sup> /df	RMSEA	NFI	RFI	IFI	TLI	CFI
Measured Value	1.947	0.098	0.794	0.78	0.888	0.879	0.887
Fit Value	<3	<0.08	>0.9	>0.9	>0.9	>0.9	>0.9
Adaptability judgment	good	good	good	good	good	good	good

As can be seen from Table 9, the X<sup>2</sup>/df value of the model is 1.947 less than 3, and the RMSEA value is 0.098 less than 1. The other indicators NFI, RFI, IFI, TLI and CFI are all close to 0.9, so all the indicators of the model are at an acceptable level and the fitting effect is ideal.

TABLE 10 PATH ANALYSIS

	Estimate	S.E.	C.R.	P
satisfaction<---sentiment	0.594	0.052	8.889	***
motivation<---sentiment	0.834	0.077	9.249	***
motivation<---ability	0.562	0.047	9.431	***
satisfaction<---ability	0.8	0.053	10.599	***

According to the analysis results in Table 10, in the path hypothesis test of this study, affective disposition significantly positively predicts satisfaction ( $\beta=0.594$ ,  $P<0.05$ ), affective disposition significantly positively predicts learning motivation ( $\beta=0.834$ ,  $P<0.05$ ), professional competence significantly positively predicts learning

motivation ( $\beta=0.562$ ,  $P<0.05$ ), and professional competence significantly positively predicts satisfaction ( $\beta=0.8$ ,  $P<0.05$ ).

### Professional knowledge analysis

TABLE 11 FREQUENCY ANALYSIS OF PROFESSIONAL KNOWLEDGE

classify	variable	frequency	percentage(%)
Receive piano education	3-5 years	7	7
	5-10 years	20	20
	More than 10 years	63	63
	More than 20 years	10	10
Academic papers published in the past five years	No	9	9
	1	29	29
	2	31	31
	3	16	16
	4	7	7
Participated in academic conferences in the past five years	5 and above	8	8
	No	5	5
	1	14	14
	2	19	19
	3	33	33
Have given professional lectures or reports in the past five years	4	21	21
	5 and above	8	8
	No	7	7
	1	12	12
	2	16	16
Listen to professional lectures or reports in the past five years	3	12	12
	4	28	28
	5 and above	25	25
	No	8	8
	1	15	15
	2	14	14
	3	17	17
	4	32	32
	5 and above	14	14

As can be seen from the analysis of professional knowledge frequency in Table 11, most people have received piano education for more than 10 years, most people have published 1-3 academic works in the past five years, and the frequency of attending academic conferences in the past five years is concentrated between 1-4 times. Most respondents have experienced giving or attending professional lectures or reports, and the distribution of these experiences is evenly distributed.

**TABLE 12 MYITPLE RESPONSE ANALYSIS OF PROFESSIONAL KNOWLEDGE**

		respond		Percentage of cases
		Number of cases	percent	
Whether to continue professional study or professional training	NO	4	3.90%	4.00%
	Provincial	29	28.40%	29.00%
	211 and 985 universities of the Ministry of Education	46	45.10%	46.00%
	study abroad	9	8.80%	9.00%
	Individuals / music institutions	14	13.70%	14.00%
total		102	100.00%	102.00%
Published professional academic papers in recent five years	No	3	3.00%	3.00%
	Regular journal	26	26.00%	26.00%
	Chinese core journal	47	47.00%	47.00%
	SSCI/SSCI	24	24.00%	24.00%
total		100	100.00%	100.00%
Professional research projects in the past five years	No	7	6.80%	7.00%
	school-level	42	40.80%	42.00%
	provincial level	43	41.70%	43.00%
	national level	11	10.70%	11.00%
total		103	100.00%	103.00%
Professional projects completed in the past five years	No	7	6.80%	7.00%
	school-level	30	29.10%	30.00%
	provincial level	34	33.00%	34.00%
	ministry of education	19	18.40%	19.00%
	National Social Science Foundation	13	12.60%	13.00%
total		103	100.00%	103.00%
Scientific research awards in the past five years	No	12	11.70%	12.00%
	school-level	32	31.10%	32.00%
	city-level	39	37.90%	39.00%
	provincial level	15	14.60%	15.00%
	national level	5	4.90%	5.00%
total		103	100.00%	103.00%

As can be seen from the multiple response analysis of professional knowledge in Table 12, regarding whether to continue professional advancement or training, most people graduated from universities under the Ministry of Education's Project 211 or Project 985, or provincial universities; in terms of publishing professional academic papers over the past five years, the vast majority have published academic papers, with the most being published in Chinese core journals; concerning ongoing professional research projects over the past five years, most people are involved in university-level or provincial-level projects; regarding completed professional research projects over the past five years, most people are concentrated on university-level or provincial-level projects; in terms of research awards over the past five years, most people are concentrated on university-level or municipal-level awards.

## V. FINDINGS

This study collected data from 100 piano teachers through a questionnaire survey. Combining descriptive statistics, reliability and validity tests, difference analysis and structural equation models, the following main results were obtained:

**Sample characteristics:** The teacher group is mainly female (76%), 95% have a master's degree or above, and 63% have more than 10 years of teaching experience. Among the teaching methods, 62% use a mixed online and offline mode (Table 1).

**Reliability and validity analysis:** The overall Cronbach's  $\alpha$  coefficient of the scale is 0.991, and the KMO value is 0.962, indicating that the data has extremely high

reliability and validity (Table 2, Table 3).

**Difference analysis:** There are no significant differences in gender, age, education, teaching experience and teaching methods in various professional quality dimensions (ability, emotion, motivation, satisfaction) ( $p>0.05$ ) (Table 4-8). This result is partially inconsistent with early studies (such as Gu Mingyuan, 1990 believed that gender may affect teaching style), which may be due to the high homogeneity of the sample.

**Structural equation model:** Professional emotion ( $\beta=0.834$ ) and professional ability ( $\beta=0.562$ ) have a significant positive impact on learning motivation; the coefficients of their influence on satisfaction are 0.594 and 0.8 respectively (Table 10). The model fitting index ( $X^2/df=1.947$ , RMSEA=0.098) reached an acceptable level (Table 9).

**Current status of scientific research ability:** 63% of teachers have more than 10 years of piano teaching experience, but only 47% have published papers in Chinese core journals in the past five years, and less than 11% have participated in national scientific research projects (Table 11-12), indicating that scientific research ability still needs to be strengthened.

## VI. DISCUSSION

This study verified the direct impact of teachers' professional emotions and abilities on students' learning experience, and the emotional dimension has a stronger predictive effect on motivation ( $\beta=0.834$ ). This finding is consistent with the "emotion-driven theory" proposed by Dornyei (2001), that is, teachers' teaching enthusiasm can effectively stimulate students' intrinsic motivation. In addition, the direct impact of professional ability on satisfaction ( $\beta=0.8$ ) shows that students are more inclined to directly associate teachers' skill level with course value (Saif & NI, 2015).

It is worth noting that background variables (such as gender and age) did not show significant differences, which may be related to the high proportion of female and highly educated teachers in the sample, resulting in strong homogeneity within the group. In addition, the popularity of hybrid teaching mode (62%) may have weakened the impact of a single teaching method, and the specific effects of different modes (such as the immediacy of online interaction) need to be further explored in the future.

At the practical level, the research findings provide a clear direction for higher vocational colleges: on the one hand, it is necessary to strengthen the training of teachers' scientific research capabilities (such as encouraging participation in national projects), and on the other hand, emotional incentives (such as incorporating emotional indicators into teaching evaluation) should be used to enhance the attractiveness of the classroom. However, the study did not involve qualitative data from the students' perspective, and interviews could be used to supplement details of teacher-student interactions in the future.

## VII. CONCLUSION

This study revealed the mechanism of piano teacher professional quality through empirical analysis and

confirmed the synergistic effect of emotion and ability dimensions. However, there are the following limitations: (1) The sample is concentrated in a specific college, and the external validity is limited; (2) Cross-sectional data are difficult to capture the dynamic process of quality development; (3) The moderating effect of individual differences among students is not analyzed.

Future research can be extended to colleges in different regions, combined with longitudinal tracking design, and introduce multi-source data of student feedback. In addition, other mediating variables (such as the quality of classroom interaction) or moderating variables (such as students' musical foundation) can be explored. In practice, it is recommended that colleges and universities establish a teacher development system of "emotion-ability-scientific research" and promote high-level results through policy support (such as tilting scientific research funds).

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