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A study on the correlation of educators' housing conditions on the improvement of education quality and teachers' job satisfaction

Hui Wang[1,2,*] and PUTERI ROSLINA BINTI ABDUL WAHID[3]
[1] Shandong Youth University of Political Science, Jinan, Shandong, 250100, China
[2] City Graduate School, City University Malaysia, Selangor Darul Ehsan, 06010, Malaysia
[3] Faculty of Education & Liberal Studies, City University Malaysia, Selangor Darul Ehsan, 06010, Malaysia
Corresponding authors: (e-mail: m15964017167@163.com).

Abstract If schools want to be invincible in the fierce competition in education, they need to focus on the housing conditions and sustainable development of educators, so as to improve their satisfaction in order to promote the quality of education. This paper constructs an analytical model of educators' housing conditions on education quality and teachers' job satisfaction through multiple linear regression model, and tests the difference between education quality and teachers' job satisfaction under different educators' housing conditions. Both educational quality and teacher job satisfaction are significantly affected by educators' housing conditions at the 1% level. For every 1 unit increase in educators' housing conditions, the level of educational quality can be increased by 0.176 units. Teachers' job satisfaction has a significant mediating effect of 22.81 per cent of the mediating effect of educators' housing conditions on the improvement of education quality. Adequate consideration of housing conditions of educators can achieve sustainable development of educators, which can help to improve teachers' job satisfaction, and then improve the level of education quality.

Index Terms housing conditions, sustainable development, educators, multiple linear regression, education quality

I. Introduction

China's housing prices over the years housing prices have risen all the way, especially after entering the 21st century, housing prices across the country have risen by different margins, although in the past two years the government has increased its efforts to regulate and control, the national housing prices have declined [1], [2]. However, most of the cities have certain development limitations, and their housing prices have not decreased significantly, and the price of housing around schools is even more expensive than residential areas, making it difficult for teachers to achieve good housing conditions [3]-[5]. In view of the current income of teachers in China, the current high housing prices basically cut off the teachers' dream of owning their own private housing in the short term by their salary, which has a significant impact on their life and work [6]-[8].

Teachers, as an important force in nurturing the country's future, are the backbone of social development. However, in recent years, the problem of teachers' housing in China's teaching force has been particularly serious. In order to solve this problem, governments at all levels have introduced teacher housing subsidy policies to improve teachers' living conditions and work motivation [9]-[12]. The emergence of teachers' housing subsidy policy, on the one hand, reflects the low level of teachers' housing security. In first-tier cities, teachers' salaries can only support basic living, and it is difficult for them to rent spacious and comfortable housing [13]-[15]. In rural areas, teachers' salaries are even more meagre, and in many places, teachers still live in dilapidated housing. The plight of teachers' housing not only affects their living conditions, but also adversely affects their teaching quality, job satisfaction and even family life [16]-[19].

This paper explores the correlation between educators' housing conditions as the independent variable and teachers' job satisfaction as the mediator variable, and explores the correlation between the two and the improvement of education quality through multiple linear regression modelling.

Effective motivational strategies are satisfied to improve teachers' job satisfaction, and improving educators' housing conditions is an important way, which also lays the foundation for teachers to implement teaching strategies to improve teaching quality. This paper is based on the data of CGSS library, and the research data are obtained through the Teaching Quality Scale, Teacher Job Satisfaction Scale, and the questionnaire related to the housing conditions of educators. A model of the influence of educators' housing conditions on improving education quality

was established using a multiple linear regression model, and the mediating effect of teachers' job satisfaction between educators' housing conditions and improving education quality was investigated using teachers' job satisfaction as a mediating variable. The specific effects of educators' housing conditions on improving education quality and teachers' job satisfaction were verified through difference-in-differences tests, benchmark regression, mediating effects and robustness tests.

II. Study design

Effectively improve the housing security conditions of education workers, for solidifying the foundation of education, make up the short board of education, enhance the quality of education is of great significance, is to promote the urgent need for the construction of a strong education province, is the ardent hope of the majority of education workers. To conscientiously implement the relevant housing security policies for education workers, to ensure that good things are done. Scientific planning and layout, adhere to the construction standards, strengthen the synergy, and do a good job of publicity and guidance. We should do it with feelings and heart, fulfil the original intention of serving educators with practical actions, reflect the mission of giving priority to the development of education, and provide a solid foundation of material conditions to enhance the job satisfaction of educators as well as the quality of education.

II. A. Data Sources and Study Population

II. A. 1) Data sources

This paper uses the China General Social Survey (CGSS) as the data for analysing the individual factors of educators, and the data used are from the CGSS2017 survey, the most recent one in this database. As the earliest national, comprehensive, and continuous academic survey project in China, the CGSS was started in 2003 and has been conducting continuous cross-sectional surveys of about 10,000 households once a year since 2003, which is implemented by the China Survey and Data Centre of Renmin University of China.

In addition, for the data on the housing conditions of educators, some indicators were selected for inclusion in the model based on data from the Education Statistical Yearbook of China's provinces. The vast majority of the data came from the CSMAR Cathay Pacific database, while the missing data from the Cathay Pacific database were manually extracted from the provincial education statistical yearbooks.

II. A. 2) Research Objectives

In this study, the correlation between housing conditions, quality of education and teachers' job satisfaction is investigated by selecting teachers from various colleges and universities in various provinces (municipalities and autonomous regions) of China as the research subjects. The impact of housing conditions on educators varies from one situation to another, and educators rely on good housing conditions in order to be more fully engaged in their work, to effectively improve their job satisfaction, and then to achieve the improvement of education quality. Providing educators with good living environments and housing conditions not only helps to improve their sense of well-being, but also promotes the smooth socialisation of educators.

II. B. Research hypotheses and variable selection

II. B. 1) Research hypothesis

(1) Housing conditions for educators

The income level of teachers in colleges and universities is more and more in the form of a pyramid, and the attractiveness of the teaching profession is declining. The income level of young teachers is lower, the income level difference between key universities under the ministry and provincial universities is large, and the income level of teachers with the same title in universities in the same region also has a large difference. The housing conditions of teachers in colleges and universities have large regional differences, and young teachers have greater pressure to pay off their debts [20]. In the face of greater loan pressure, some young teachers choose to leave colleges and universities, changing careers to engage in other industries. Teachers' housing conditions cannot be improved in a timely manner, which is not conducive to teachers engaging in their own work without distraction. The in-depth interviews found that there are three main aspects of the crux of the problems plaguing the housing conditions of teachers in colleges and universities, as follows:

First, teachers receive unequal state benefits in terms of housing; teachers who joined the workforce earlier basically enjoy state welfare housing and monetised subsidies, while young and middle-aged teachers receive low amounts of monetised subsidies compared to their actual purchasing power, and some teachers who have just joined the workforce do not have the ability to purchase housing.

Secondly, the remuneration of university teachers as a whole is on the low side, so they are unable to buy housing with their existing income levels and welfare benefits, and even if they change their homes, their geographical locations, transport and other conditions are not as good as before, and they have to pay more money.

Third, urban housing prices have risen too much. Although the country has many rounds of regulation, but Beijing, Shanghai and other places still high prices, college teachers' income growth rate is far from the rate of increase in housing prices.

(2) Education quality improvement

In terms of the current situation of colleges and universities, it can be said that education quality improvement is the foundation of the deep-seated breakthrough of colleges and universities. As the education quality improvement must rely on the academic talent team to achieve, so in terms of education quality improvement, mainly rely on academic masters and their academic team led to support. Among them, the academic team is the foundation of education quality improvement, and the teachers are the central figures of the universities to form their own disciplinary advantages and characteristic research fields. Without a high-level talent team, it is impossible to achieve educational quality improvement [21].

Currently the main factors for universities to attract talents to move in are manifested in four aspects, namely, career development, housing placement, spouse employment, and children's schooling. In the current situation, housing placement has become a more prominent problem, which, together with spouse employment and children's schooling, determines the final flow of talents. In recent years, due to the housing problem in universities and colleges, the introduction of outstanding talents is insufficient, the loss of existing outstanding talents is more prominent, which leads to the influence of some speciality disciplines of universities and colleges is weakening or even gradually shrinking. In terms of the current increasing level of housing prices, it is safe to say that the housing problem of universities has become one of the main constraints on the improvement of the quality of education in universities, and it is difficult to solve.

(3) Teachers' job satisfaction

Existing research shows that the pressure of material security of college teachers is higher, and the lower income level of college teachers is one of the most important factors leading to their low job satisfaction [22]. It is necessary to strengthen the attention to college teachers to ensure that they enjoy stable income with continuous growth as well as good housing conditions, in order to enhance their work motivation and job satisfaction, and reduce the excessive work pressure.

College teachers' housing conditions are still generally poor, a considerable number of teachers still do not have on-campus housing, and there are many teachers whose housing conditions do not meet the corresponding title matching the low job satisfaction of teachers who do not meet the standard, and the job satisfaction of teachers whose housing meets the standard is relatively high, and the housing does not match the standard of the title. This to a certain extent affects the college teachers' work motivation and satisfaction, which further increases the work pressure they feel, making the quality of education can not be effectively improved.

Comprehensively analysing the above, this paper puts forward the following hypotheses:

H1: There is a significant effect of educators' housing conditions on the quality of education.

H2: There is a significant effect of educators' housing conditions on teachers' job satisfaction.

H3: Educators' housing conditions contribute to the quality of education by enhancing teachers' job satisfaction.

II. B. 2) Variable selection

(1) Independent variable

The research independent variable in this paper is educator housing conditions (EWHC), which is based on the CGSS survey data given in the previous section and the survey questionnaire distributed using the Survey Star questionnaire platform. The main body of the questionnaire includes the actual situation of teachers' housing, teachers' satisfaction with the housing situation and desired policy support, covering four major areas. That is, teachers' existing housing conditions, the impact of teachers' housing on teaching, teachers' satisfaction with existing housing, and teachers' opinions and views on housing policies. A total of 5,000 questionnaires were distributed and 4,827 valid questionnaires were recovered, with a validity rate of 96.54%, and the validity meets the requirements of the survey.

(2) Dependent variable

The research dependent variable of this paper is education quality level (EQL). It is mainly obtained through the teaching quality evaluation index system in existing research, which mainly contains learning knowledge, teaching atmosphere, learning interest and teaching methods. The EQL scale consists of 16 questions, which is specifically used to measure the level of education quality in colleges and universities, and adopts a five-point Likert scale, with the options set as 'very non-compliant, non-compliant, average, relatively compliant, and very compliant', which are

scored as 1-5 points, respectively. A total of 5,000 questionnaires were distributed, and 4,769 valid questionnaires were recovered, with a validity rate of 95.38%, which is in line with the requirements of the survey.

(3) Mediating variables

The mediating variable chosen in this paper is teacher job satisfaction (TJS), and the job satisfaction survey scale was designed to obtain the teacher job satisfaction situation. The Teacher Job Satisfaction Scale is mainly quantified from four dimensions: emotional exhaustion, low achievement, depersonalisation and job burnout, and the scale contains a total of 20 entries; the scale is scored on a 7-point scale, with higher scores indicating lower job satisfaction. The internal consistency reliability coefficient of the scale is 0.924, which meets the survey demand. A total of 5,000 survey scales were distributed, and 4,896 valid questionnaires were recovered, with an effective rate of 97.92%.

(4) Control Variables

In order to better compare the degree of influence of educators‘ housing conditions on the improvement of education quality and teachers’ job satisfaction, this paper chooses gender (SEX), age (AGE), education (EDU), job title (JOB), and teaching experience (TE-AGE) as control variables. Controls were also made for time and area effects as a way of circumventing the effects of the remaining variables on the quality of education and teachers' job satisfaction. The source of data for the control variables was CGSS survey data, and interpolation was used to fill and complement the data.

II. C.Multiple linear regression modelling

II. C. 1) Linear regression

(1) Multiple linear regression theory

Linear regression analysis is a method of predicting the future value of a dependent variable associated with it based on the movement of an independent variable or a group of independent variables.Regression analysis requires the establishment of a regression equation that describes the correlation between the variables. If the regression function is a linear function, the variables are said to be linearly correlated. When there is a linear relationship between multiple independent variables and the dependent variable, the regression analysis performed is multiple linear regression [23].

(2) Multiple linear regression model

Let y be the dependent variable and $x_1, x_2, \cdots, x_k$ be the independent variable and there is a linear relationship between the independent variable and the dependent variable, then the multiple linear regression model is:

$$y = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_k x_k + e \tag{1}$$

Where b_0 is the constant term, $b_1, b_2, ..., b_k$ is the regression coefficient, b_1 is the effect of each additional unit of x_1 on y when $x_2, x_3, ..., x_k$ is fixed, i.e. the partial regression coefficient of x_1 on y. Similarly, b_2 is the partial regression coefficient of x_2 on y for the effect of each additional unit of x_2 on y when $x_1, x_3, \cdots, x_k$ is fixed, and so on. e represents the error term. If two independent variables x_1, x_2 are linearly related to the same dependent variable y, a binary linear regression model can be constructed as:

$$y = b_0 + b_1 x_1 + b_2 x_2 + e \tag{2}$$

When establishing a multiple linear regression model, in order to ensure that the regression model has excellent explanatory ability and predictive effect, attention should first be paid to the selection of independent variables, the guidelines are as follows:

a. The independent variables have a significant effect on the dependent variable and are closely linearly related.

b. The linear correlation between the independent variables and the dependent variable must be real, not formal.

c. The independent variables should be mutually exclusive, i.e., the degree of correlation between the independent variable and any of the other independent variables should not be higher than the degree of correlation between it and the cause of the dependent variable.

d. The independent variables should have complete statistical data and their predictive values can be easily determined.

Parameter estimation of the multiple linear regression model is to solve the parameters by the least squares method under the requirement that the sum of squares of the errors ($\sum e^2$) is minimised [24]. Taking the binary linear regression model as an example, the standard set of equations for solving the regression parameters is:

$$\begin{cases} \sum y = nb_0 + b_1 \sum x_1 + b_2 \sum x_2 \\ \sum x_1 y = b_0 \sum x_1 + b_1 \sum x_1^2 + b_2 \sum x_1 x_2 \\ \sum x_2 y = b_0 \sum x_2 + b_1 \sum x_1 x_2 + b_2 \sum x_2^2 \end{cases} \tag{3}$$

Solve this equation to find the value of b_0, b_1, b_2.

The following matrix method can also be used:

$$b = (x'x)^{-1} \cdot (x'y) \tag{4}$$

To wit:

$$\begin{bmatrix} b_0 \\ b_1 \\ b_2 \end{bmatrix} = \begin{bmatrix} n & \sum x_1 & \sum x_2 \\ \sum x_1 & \sum x_1^2 & \sum x_1 x_2 \\ \sum x_2 & \sum x_1 x_2 & \sum x_2^2 \end{bmatrix}^{-1} \cdot \begin{bmatrix} \sum y \\ \sum x_1 y \\ \sum x_2 y \end{bmatrix} \tag{5}$$

(3) Multiple linear regression model test

Goodness of fit refers to the degree of fit of the regression line to the observations, and is evaluated by the coefficient of determination R^2, and the closer the coefficient of determination R^2 is to 1, the better the fit of the model.

Significance test is a test of whether the hypothesis of the functional relationship between the response variable and the regression variable in a regression model is significant. Its test whether the independent variable actually affects the fluctuation of the dependent variable.

Coefficient test is to test whether the effect of the independent variable on the dependent variable is significant or not. In a univariate linear regression model, if the regression coefficient is $\beta_i = 0$, the regression line is a horizontal line, indicating that the value of dependent variable y does not depend on independent variable x, i.e. there is no linear relationship between the two variables. If the regression coefficient is $\beta_i \neq 0$, it cannot be concluded that there is a linear relationship between the two variables, depending on whether the relationship is statistically significant.

II. C. 2) Modelling

In order to determine the most appropriate type of model, the paper conducts Hausman tests on the sample data before the empirical analysis. The results show that the original hypothesis of establishing a random effects model does not hold, and a fixed effects model should be established to control for individuals and time. Therefore, this paper selects the fixed effect model for regression analysis.

(1) Benchmark model

In order to study the impact of educators' housing conditions on the improvement of education quality, this paper designs the benchmark regression model as follows:

$$EQL_{i,t} = \alpha_0 + \alpha_1 EWHC_{i,t} + \alpha_2 Control_{i,t} + \varepsilon_{i,t} \tag{6}$$

where i is the region, t is the year, $EQL_{i,t}$ is the level of education quality, $EWHC_{i,t}$ is the housing conditions of educators, $Control_{i,t}$ is the control variable, $\alpha_1 \sim \alpha_2$ is the regression coefficient of each variable, and α_1 mainly reflects the degree of influence of the housing conditions of educators on the level of education quality, which is the focus of attention in this paper.

(2) Mediating effect model

In order to further examine the mediating effect of teachers' job satisfaction in the enhancement of education quality level by educators' housing conditions, the mediating effect model is constructed with reference to the existing research and tested by the method of sequential test. Then:

$$TJS_{i,t} = \beta_0 + \beta_1 EWHC_{i,t} + \beta_2 Control_{i,t} + \varepsilon_{i,t} \tag{7}$$

$$EQL_{i,t} = \gamma_0 + \gamma_1 EWHC_{i,t} + \gamma_2 TJS_{i,t} + \gamma_3 Control_{i,t} + \varepsilon_{i,t} \tag{8}$$

where $TJS_{i,t}$ represents teacher job satisfaction. When $\alpha_1, \beta_1, \gamma_2$ is significant at the same time, it indicates that the transmission mechanism of educators' housing conditions contributing to the level of education quality through teachers' job satisfaction is established, and γ_1 is significant as a partial mediator and vice versa as a full mediator.

III. Findings

Housing is a frequent problem in the introduction of talents to colleges and universities in recent years, and the management of housing conditions for educators is related to the immediate interests of college teachers, the stability of the college and university faculty and job satisfaction, and more importantly, the sustainable development of college and university education and the enhancement of the level of education quality. For this reason, this paper establishes a regression analysis model of educators' housing conditions with education quality and teachers' job satisfaction based on multiple linear regression model, aiming at exploring the correlation between the three, and providing references for improving the quality of education and teachers' job satisfaction in colleges and universities.

III. A. Analysis of differences in housing conditions for educators

III. A. 1) Analysis of differences in the quality of education

For the housing conditions of educators, this paper sets them into five categories: no housing, below 70m², 70~110m², 110~150m², and above 150m², and combines the data from the education quality scale in the previous section to test the differences in the quality of education under different housing conditions. The results of the test of differences in the quality of education are shown in Table 1, where ***,**,* denotes significance at the 1 per cent, 5 per cent, and 10 per cent levels, and the same as later.

As can be seen from the table, as the housing conditions of educators increased from no housing to housing over 150m², the scores of all indicators of quality of education increased, and the scores of knowledge of learning, teaching atmosphere, interest in learning, and teaching methods as a whole increased by 59.61 per cent, 75.60 per cent, 45.69 per cent, and 69.30 per cent, respectively. Among them, the score of teaching atmosphere increased from 1.68±1.36 when there was no housing to 2.95±1.09 when there was more than 150m² housing. And from the results of one-way ANOVA, it can be seen that there is a significant correlation between the indicators of education quality and the housing conditions of educators, which will significantly affect the level of education quality. The extent of the impact of educators' housing conditions on improving the quality of education will be further explored and analysed in the following article.

Table 1: The difference test results of the education quality (M±SD)

Type	Learning knowledge	Teaching atmosphere	Study interest	Teaching method
Unhousing	2.03±1.47	1.68±1.36	2.32±0.79	2.15±0.85
Under 70m²	2.63±1.28	1.94±1.27	2.65±0.83	2.47±0.72
70~110 m²	2.74±1.06	2.08±1.65	2.92±0.65	2.96±0.68
110~150 m²	2.91±1.25	2.42±1.28	3.14±0.72	3.24±0.76
Above 150 m²	3.24±0.94	2.95±1.09	3.38±0.57	3.64±0.51
F value	7.815***	3.735***	2.691**	6.015***
P value	0.007	0.002	0.013	0.008

III. A. 2) Analysis of differences in teachers' job satisfaction

For educators' housing conditions, the test of differences in teachers' job satisfaction across housing conditions was conducted, following the categorisation in section 3.1.1, and combining the data from the Teacher Job Satisfaction Scale given in the previous section. Table 2 shows the results of the difference test for teachers' job satisfaction.

As can be seen from the table, teachers with housing area of 70-110m² have the highest level of emotional exhaustion (2.83±0.94), and teachers without housing have the lowest level of emotional exhaustion (2.51±1.26). Teachers with a housing area of 70m² or less had the lowest level of fulfilment (2.37±1.22) and those with a housing area of 70-110m² had the highest level of fulfilment (1.85±1.06). Teachers with housing area of less than 70m² had the highest depersonalisation score (1.94±1.11) and teachers with housing area of 70 to 110m² had the lowest depersonalisation score. Teachers with housing area of 70m² or less had the highest burnout score (2.47±0.93) and teachers with housing area of 150m² or more had the lowest burnout score (2.02±0.87). The lower the low-achievement score, the higher the teachers' sense of achievement, and further post-hoc test results in the sense of achievement, teachers with housing area of 70m² or less had significantly lower sense of achievement than teachers with no housing and housing area of 150m² or more. And the results of one-way ANOVA showed that the indicators of teachers' job satisfaction in different housing conditions are significantly different at 5% or 1% level, indicating that different educators' housing conditions are relevant factors affecting teachers' job satisfaction. As a result, different housing conditions significantly affect teachers' emotional exhaustion, achievement, personalisation and burnout, which in turn leads to lower job satisfaction and an inability to be more fully engaged in teaching, which may have an impact on the quality of education, as will be discussed further in the following section.

III. B. Regression results and analyses

III. B. 1) Stability tests

The use of multiple linear regression models for data analysis requires that the data series be smooth, but because of the usual instability of the data on educators' housing conditions, quality of education, and teachers' job satisfaction itself, this may result in pseudo-regression in the results produced by the regression model. Therefore, a unit root test is performed on the variables involved to determine the smoothness of the data series. If the data series of a variable varies with changes in mean or covariance, then the variable is an unsteady data series. If the data series of the variable becomes smooth after first-order differencing, then it is a first-order single-integrated series. If it is smooth after nth order then it is nth order single integer series. In this paper, the ADF test is used to test the smoothness of the three data series of EWHC, EQL, and TJS, and the results of the smoothness test

obtained by running through EViews software are shown in Table 3. In the table, Δ indicates the first-order difference of the variables for the smoothness test, and Δ2 indicates the second-order difference of the variables for the smoothness test.

Table 2: Differences in job satisfaction of teachers (M±SD)

Type	Emotional depletion	Low achievement	Depersonalize	Job burnout
Unhousing	2.51±1.26	2.05±1.23	1.82±1.25	2.13±1.05
Under 70m²	2.74±1.05	2.37±1.22	1.94±1.11	2.47±0.93
70~110 m²	2.83±0.94	1.85±1.06	1.57±0.89	2.15±0.78
110~150 m²	2.61±1.15	2.03±1.07	1.74±1.03	2.21±0.95
Above 150 m²	2.54±1.13	1.94±1.15	1.68±1.15	2.02±0.87
F value	3.815**	5.735***	2.691**	5.015***
P value	0.027	0.009	0.013	0.002

From the ADF test values in the table, it can be concluded that the original time series and the first-order difference time series of ln(EWHC), ln(EQL), and ln(TJS) are not smooth, while the second-order difference series of these three variables are all smooth series. So there will be no for regression for these three variables in the regression analysis and the data can be used to continue to the next step of the regression analysis.

Table 3: ADF stability test results

Variable	ADF test statistics	Threshold at 5%	Stability
ln (EWHC)	-3.124	-5.515	Uneven stability
ln (EQL)	-1.503	-5.298	Uneven stability
ln (TJS)	-2.469	-6.364	Uneven stability
Δln (EWHC)	-3.158	-5.586	Uneven stability
Δln (EQL)	-2.172	-5.579	Uneven stability
Δln (TJS)	-4.335	-5.842	Uneven stability
Δ2ln (EWHC)	-7.587	-6.316	Stability
Δ2ln (EQL)	-6.169	-5.837	Stability
Δ2ln (TJS)	-5.742	-5.524	Stability

III. B. 2) Benchmark regression results

In the previous paper, it was analysed that the housing conditions of educators have a certain influence on the level of education quality and teachers' job satisfaction, and in order to further clarify the extent of their influence, this paper uses the multiple linear regression model constructed in the previous paper to analyse the data. China is also divided into three different regions, i.e., the eastern region, the central region, and the western region, to explore the heterogeneity of the regional impact of educators' housing conditions on the quality of education in different regions. Table 4 shows the results of the baseline regression of educators' housing conditions on education quality, where models (1) to (4) are the results of the tests for the overall, eastern, central and western regions, respectively, with t-values in parentheses.

Model (1) reflects the impact of educators' housing conditions on the level of education quality from the whole, and the coefficient of the independent variable educators' housing conditions (EWHC) is 0.176 and significant at the 1% level, i.e., for every one unit increase in the housing conditions of educators, the level of education quality can be realised as an increase of 0.176 units. This indicates that the growth of educators' housing conditions effectively contributes to the upgrading of education quality level. Models (2) to (4) show the effects of housing conditions of educators in the eastern, central and western regions on the upgrading of the level of education quality in the region, respectively. After controlling for relevant variables, the coefficient of educators' housing conditions (EWHC) in the eastern region is 0.237 and significantly positive at the 1% level. This indicates that the housing conditions of educators in the eastern region better promote the level of education quality in the region, and that the system related to the housing conditions of educators in the eastern region is more complete and has significant achievements. Although the housing conditions of educators in the central region positively affect the quality of education, it is only significant at the 10 per cent level, which may be related to the reality of the current development of the region. The central region is gradually undertaking the transformation of traditional education, which to a considerable extent will hinder the implementation of policies related to the housing conditions of educators, and

will not be able to effectively realise the upgrading of the quality of education in a short period of time. The regression coefficient is 0.093 and is significant at the 5% level. The effective role of the policy of housing conditions for educators in the western region is more due to the implementation of the national policy of tilting educational resources in the region in recent years, which has strengthened the construction of high-quality teaching environments and infrastructures in the western region, and to a large extent, these policies have influenced the positive role of the housing conditions of educators in the western region in the enhancement of the level of education quality. In general, the housing conditions of educators have a significant positive effect on the improvement of education quality, and H1 is verified.

Table 4: The result of Benchmark regression

Variable	Model (1)	Model (2)	Model (3)	Model (4)
EWHC	0.176***	0.237***	0.085*	0.093**
	(3.213)	(5.798)	(1.247)	(2.765)
SEX	0.095***	0.071***	0.103***	0.059
	(4.637)	(3.751)	(4.951)	(1.042)
AGE	0.079***	0.063***	0.342***	0.063*
	(5.182)	(4.295)	(6.648)	(1.893)
EDU	0.157***	0.129***	0.283***	0.101***
	(4.276)	(3.951)	(5.792)	(3.037)
JOB	0.106***	0.093***	0.061***	0.059***
	(5.493)	(4.915)	(3.795)	(3.278)
TE-AGE	0.083***	0.072***	0.059***	0.041***
	(4.738)	(4.266)	(3.831)	(3.069)
(Con_)	-1.247***	-0.932***	-0.514	-1.196***
	(-5.248)	(-4.965)	(-1.038)	(-3.874)
Time effect	YES	YES	YES	YES
Individual effect	YES	YES	YES	YES
R2	0.958	0.972	0.913	0.926

III. B. 3) Analysis of intermediation effects

After clarifying the contribution of educators' housing conditions to the level of education quality, in order to examine whether educators' housing conditions affect the level of education quality through teachers' job satisfaction, teachers' job satisfaction was further selected as the mediating variable for the mediation effect test. Table 5 shows the results of the mediation effect test, where model (1) is the effect of educators' housing conditions on teachers' job satisfaction, and model (2) is the effect of both on the level of education quality, with robust standard errors in parentheses.

In section 3.2.2, it has been concluded that educators' housing conditions have a facilitating effect on the level of education quality and its coefficient is 0.176, which has satisfied the first step of the mediation effect test from the mediation model testing process. Model (1) in Table 5 is the second step of the test, testing the impact of educators' housing conditions on teachers' job satisfaction, according to the regression results can be found that educators' housing conditions in the 1% statistical level is significantly positive, and its regression coefficient is 0.106, which indicates that educators' housing conditions can promote teachers' job satisfaction, and at this time H2 can be verified. Model (2) in Table 5 is the third step of the test, which examines the effects of educators' housing conditions and teachers' job satisfaction on the level of education quality. From the results, it can be seen that the regression result of teachers' job satisfaction on the improvement of education quality level is significantly positive at 1% statistical level, and its regression coefficient is 0.651, and the regression result of educators' housing conditions on the improvement of education quality level is significantly positive at 1% statistical level, and its coefficient is 0.342. It indicates that teachers' job satisfaction plays a mediating effect in the process of educators' housing conditions for the improvement of education quality level, and H2 can be verified at this time. It plays a mediating effect in the process of promoting education quality level and is an important path for educators' housing conditions to promote education quality level. According to the empirical results, for every one unit increase in the housing conditions of educators, teachers' job satisfaction can be increased by 0.651 units, and for every one unit increase in teachers' job satisfaction, the level of education quality will be increased by 0.342 units. That is, according to the fifth step of the mediation model test, the housing conditions of educators can promote the level of quality of education through the enhancement of teachers' job satisfaction, and then the mediation effect accounted for 22.81%. Thus, H3 is

verified, which shows that the housing conditions of educators can promote teachers‘ job satisfaction by enhancing teachers’ psychological expectations, which makes teachers more fully engaged in the teaching process and promotes the level of education quality.

Table 5: The test result of the intermediary effect

Variable	Model (1)	Model (2)
EWHC	0.106***(0.035)	0.651***(0.074)
TJS	-	0.342***(0.058)
SEX	0.103***(0.027)	0.275***(0.082)
AGE	0.087***(0.148)	0.116***(0.074)
EDU	0.119***(0.259)	0.138***(0.095)
JOB	0.132***(0.306)	0.089***(0.116)
TE-AGE	0.074***(0.543)	0.093***(0.709)
(Con_)	-1.309***(-0.143)	-0.296***(-1.237)
Time effect	YES	YES
Individual effect	YES	YES
R2	0.9217	0.7645

III. B. 4) Robustness Tests

In order to verify the reliability of the benchmark regression results and possible endogeneity issues, the following robustness tests are conducted in this subsection. Table 6 shows the results of the robustness tests.

(1) Replacement of core explanatory variables. The level of education quality is replaced with teaching method (TM) in the level of education quality scale. The regression results of model (1) show that the coefficient of TM is significantly positive, which is consistent with the results of the benchmark regression.

(2) Replacement of explanatory variables. A robustness test was conducted by replacing educator housing conditions with the logarithm of educator housing conditions (lnEWHC). Model (2) shows that the benchmark regression results are robust.

(3) Excluding municipalities. Due to the special characteristics of the data of China's municipalities, this paper re-runs the benchmark regression on the samples after removing the four municipalities. The regression results of model (3) show that educators' housing conditions still significantly and positively affect the level of education quality.

(4) Endogeneity error. This study uses the instrumental variable method to test whether the regression model has an endogeneity problem. Referring to the existing correlation, the ratio of educators‘ housing area to the overall area of colleges and universities is selected as the instrumental variable for educators’ housing conditions, and the regression is conducted using the two-stage least squares (2SLS) method. Model (4) shows that the results of the benchmark regression are robust regardless of whether the endogeneity problem is considered or not.

Table 6: Robustness test results

Variable	Model (1)	Model (2)	Model (3)	Model (4)
EWHC	0.145***(0.098)	-	0.127***(0.083)	0.121***(0.076)
lnEWHC	-	0.132***(0.087)	-	-
SEX	0.072***(0.427)	0.113***(0.516)	0.131***(0.074)	0.117***(0.069)
AGE	0.158***(0.328)	0.126***(0.165)	0.129***(0.051)	0.123***(0.042)
EDU	0.097***(0.516)	0.085***(0.072)	0.076***(0.063)	0.031***(0.057)
JOB	0.075***(0.239)	0.091***(0.048)	0.082***(0.082)	0.046***(0.063)
TE-AGE	0.116***(0.074)	0.074***(0.051)	0.093***(0.075)	0.078***(0.056)
(Con_)	-1.308*(-0.138)	-1.015*(-0.217)	-1.589*(-0.234)	-1.535*(-0.127)
Time effect	YES	YES	YES	YES
Individual effect	YES	YES	YES	YES
R2	0.674	0.079	0.532	0.863
K-PLM test	-	-	-	<0.001
K-P wald f statistic	-	-	-	48.513
10% Critical value	-	-	-	16.479
15% Critical value	-	-	-	8.562

Conclusion

The article analyses the extent to which educators' housing conditions influence the improvement of the level of quality of education and teachers' job satisfaction using a multiple linear regression model. The score of teaching atmosphere in the level of quality of education is 1.68±1.36 when there is no housing, and its score reaches 2.95±1.09 when the housing conditions of educators are changed to housing of 150m² or more. There is a significant difference between the housing conditions of educators on improving the quality of education at the 1% level, with a regression coefficient of 0.176, and for every 1% increase in the housing conditions of educators, the job satisfaction of teachers can increase by 0.651%, and for every 1% increase in the job satisfaction of teachers, the level of the quality of education can increase by 0.342%. Overall, educators' housing conditions significantly improve the quality of education, and there is a significant mediating effect of teachers' job satisfaction between the two. Therefore, fully improving and optimising the housing conditions of educators can better meet the psychological needs of education, make them fully devoted to teaching, and help improve the quality of education.

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References

[1] Du, Z. , & Zhang, L. . (2015). Home-purchase restriction, property tax and housing price in china: a counterfactual analysis. Journal of Econometrics, 188(2), S0304407615000871.
[2] Wei-Da, K. , & Business, S. O. . (2016). Rent to price ratio and the housing bubble in urban china. Economic Theory and Business Management.
[3] Lu, W. , & Shen, J. . (2022). Urban leverage and housing price in china. JRFM, 15.
[4] Zhe, G. , Jiayi, Q. , Jiayi, Y. U. , & Yuanyuan, Z. . (2022). Influence of school districts on housing prices and the effect on socio-spatial restructuring:taking wuchang district of wuhan city as a case. Progress in Geography.
[5] Feng-Fu, M. , Gang-Fei, L. , Jia-Shun, P. , Economics, S. O. , & University, Z. G. . (2014). The effect of elementary education on the price of hangzhou school district housing. Urban and Environmental Studies.
[6] Shadmanova, S. , & Sharipova, N. . (2021). Problems of housing provision for school teachers of the fergana valley in the 60-80-ies of the xx century. Asian Journal of Research in Social Sciences and Humanities.
[7] de, Wit, & Dylan. (2018). Ab 45: addressing california's teacher shortage with affordable housing. University of the Pacific Law Review.
[8] Zhang, C. . (2014). Analysis on the problems in teachers' salary in university and college and the strategy to encourage the teachers. Atlantis Press.
[9] Li, H. , Chen, Y. , & Lin, Y. . (2013). A comparison of kindergarten teacher compensation between shenzhen, hong kong and taipei. Early Childhood Education, 577.
[10] Taeuber, K. E. . (2016). Housing, schools, and incremental segregative effects. The ANNALS of the American Academy of Political and Social Science.
[11] Sintayehu, B. , & Hussien, A. A. . (2021). Living standard of academic staff at haramaya university. Education Research International, 2021(1), 1-11.
[12] Li, H. , Echen, E. , Ahn, C. , Yin, H. , Akita, K. , & Chau, L. . (2013). A comparison of kindergarten teacher compensation in five east asian cities. Early Childhood Education, 580(4), 3-6.
[13] Kamere, I. M. , Makatiani, M. I. , & Nzau, A. K. . (2019). Policy interventions for attraction and retention of female teachers in rural secondary schools. Msingi Journal(2).
[14] Wambia, J. K. . (2012). Housing primary school teachers in lugali division, kakamega district, kenya. Teachers--Residence requirements.
[15] Ferris, S. . (2012). Housing teachers. Governing.
[16] De-Fang, S. , & Zheng-Fan, L. . (2014). Investigation of the present situation of rural teachers' survival and development and policy recommendations. Teacher Education Research.
[17] Temam, S. , Billaudeau, N. , & Vercambre, M. N. . (2019). Overall and work-related well-being of teachers in socially disadvantaged schools: a population-based study of french teachers. BMJ Open, 9(9), e030171.
[18] Li-Juan, P. , Li-Min, Z. , & Ying-E, X. . (2013). Policy suggestions on promoting the balanced allocation of early childhood education teachers between urban and rural areas. Teacher Education Research.
[19] Mbonea, T. J. , Eric, A. , Ounga, O. , & Nyarusanda, C. . (2021). Factors affecting secondary school teachers' job satisfaction in lushoto district, tanga region in tanzania. Open Journal of Social Sciences.
[20] Shadmanova Sanavar,Sharipova Nargiza & Mukhtorova M. (2021). Problems of housing provision for school teachers of the fergana valley in the 60-80-ies of the xx century. Asian Journal of Research in Social Sciences and Humanities(11),194-199.
[21] Miaoxian Guo,Weicheng Guo & Zishan Ding. (2024). Teaching capacity and quality improvement in engineering education based on scientific research projects. International Journal of New Developments in Education(7),
[22] Yangyang Li,Yuan Tian,Wei Zhao,Mohamed Oubibi & Yunnian Ding. (2024). Teaching in China's Heartland: A qualitative exploration of rural teacher job satisfaction. Heliyon(18),e38092-e38092.

[23] Hinpetch Daungsupawong & Viroj Wiwanitkit. (2024). A comment on manuscript Comparison of machine learning algorithms and multiple linear regression for live weight estimation of Akkaraman lambs. Tropical Animal Health and Production(8),338-338.
[24] Liqing Wei. (2024). A multiple linear regression-based study of the effect of college teachers' teaching training on teaching performance. Applied Mathematics and Nonlinear Sciences(1).