# Research on the Influencing Factors and Countermeasures on the Effectiveness of Students' Evaluation of Teaching in Colleges and Universities

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**Abstract:** Student evaluation of teaching is an important part of evaluating teaching effectiveness. The evaluation of teaching results is the basis for teacher improvement and an important way for teaching units to understand the teaching level of teachers. The evaluation results directly affect the professional title evaluation of teachers and the acquisition of various learning and competition opportunities. Therefore, evaluation plays a crucial role in the teaching system of universities. How to design the evaluation process, timing, and content directly affects the authenticity of evaluation. This study explores the factors that affect the evaluation results from four dimensions: students, teachers, curriculum, and teaching system through research interviews, finds the logical relationship between them, constructs a structural equation model, conducts questionnaire surveys, data collection and organization, and model fitting optimization to identify important factors and mediating variables that affect the evaluation results. Based on the analysis results, strategies to improve the effectiveness of evaluation are proposed, to further effectively evaluate the teaching quality of teachers, improve the level of teaching quality in universities, and fully leverage the role of student evaluation.

## 1. Introduction

Due to the cognitive bias between students and teachers and the evaluation unit, the motivation of the students and the attitude of the evaluation of teaching seriously deviates from the original intention of the teaching management unit and the teacher, and finally the evaluation results can not truly reflect the real level of the teacher, the excellent teacher does not stand out, and the teachers who are not serious are not effectively identified, and the fish and dragons are seriously mixed. After seeing the evaluation results, teachers will not only not improve their teaching based on the evaluation results, but will have a negative mentality, which will seriously discourage their enthusiasm for teaching. The student evaluation system aims to reflect the teaching quality of college teachers with the principle of truth and fairness, and to provide a strong reference and objective basis for the selection of college teachers' professional titles. However, there are some problems in the effectiveness of teaching evaluation, so this paper analyzes and demonstrates the influencing factors affecting the effectiveness of college students' evaluation through the method of structural equations, and finds that the main factors affecting the evaluation results include student factors, teacher factors, academic affairs system factors and curriculum factors. Taking a university in Inner Mongolia as an example, this study analyzes the relevant data, puts forward the problems existing in the influencing factors of the effectiveness of college students' evaluation, and proposes corresponding solutions to improve the effectiveness of college students' evaluation, so as to improve the effectiveness of college students' evaluation.

## 2. Literature review

Teaching evaluation in colleges and universities is an important part of the teaching management

of universities in China, and colleges and universities allow students to evaluate the teaching level of teachers, and then evaluate and evaluate the quality and content of teachers' lectures. However, whether the effectiveness of the current university evaluation is sufficient and reasonable, and whether it can truly reflect and improve the teaching level and quality of teachers is worthy of in-depth study.

## 2.1 Research on factors influencing the outcome of the evaluation

In the relevant literature research, the literature review of the factors affecting the evaluation results is shown in Table 1.[1-5]

Table 1 A literature review of factors that affect the results of teaching evaluation.

| Author | Factors influencing the outcome of the evaluation |
|---|---|
| Morrison | Evaluation format, evaluation purpose, student factors |
| Drago | Teaching content, curriculum design, classroom teaching |
| Han Yingxiong | Student factor |
| Li Pandao | Student factors, teacher factors, school factors, and curriculum factors |
| Jiang Hongchi | Learning input, syllabus, teaching content and methods, teaching effect, and comprehensive evaluation of teaching |

Data source: CNKI literature collation

## 2.2 Research on teaching evaluation methods

In the relevant literature research, the literature review of the evaluation research methods is shown in Table 2.Most of the research methods at home and abroad tend to use spss and other software analysis methods to test the reliability and validity, and few people use the Amos structural equation model for analysis, so this research method is used for relevant analysis and discussion.[6-12]

Table 2 Literature Review of Teaching Evaluation Research Methods.

| Author | Research Methods |
|---|---|
| Clayson | The rater reliability method reflects the effectiveness of student evaluation by the consistency of the evaluation results of different students in the same course |
| Daniela | Multi-level cross-classification statistical model and variance component method |
| Baoshuimei | Questionnaire surveys and SPSS software were used to analyze reliability and validity |
| Pan Yunhua | Ologit regression and elasticity coefficients |
| Cai Yaduan | Descriptive statistics and analysis of variance |

Data source: CNKI literature collation

Teaching evaluation has played an important role in promoting the improvement of teaching quality in colleges and universities, but there are still many deficiencies. In order to improve the effectiveness of teaching evaluation, it is necessary to establish a scientific evaluation system and evaluation standards, and actively promote the participation of students and teachers, improve the objectivity and fairness of evaluation, and finally promote the continuous improvement of teaching quality in colleges and universities.

## 3. Research design

## 3.1 Research object

For the research on the influencing factors of the effectiveness of student teaching evaluation in colleges and universities, the research object of this study is all teachers and students in a university in Inner Mongolia as the questionnaire distribution object, and the student evaluation work is relatively mature, but there are still some problems that need to be improved, and it is necessary to collect and analyze the data, and further hypothesis and verification are carried out to draw relevant conclusions.

## 3.2 The index system and related assumptions for the evaluation and effectiveness of teaching evaluation in colleges and universities

Nowadays, through literature reading and expert interviews, this study concludes that the relevant factors affecting the evaluation results mainly include the academic affairs system variables, teacher variables, student variables and curriculum variables, and the structural relationship model is shown in Figure 1, the observation model is shown in Figure 2, and the codes of the relevant variables are shown in Table 3.
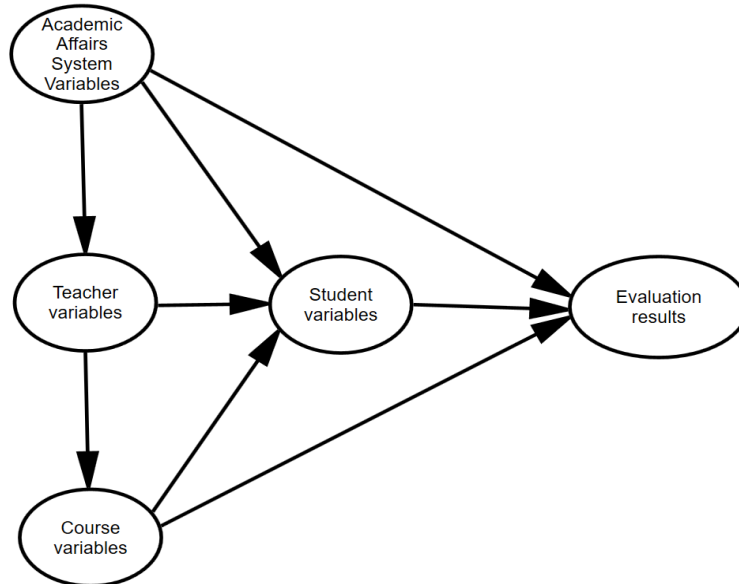


Figure 1 Relational model of factors influencing the effectiveness of teaching evaluation in colleges and universities.
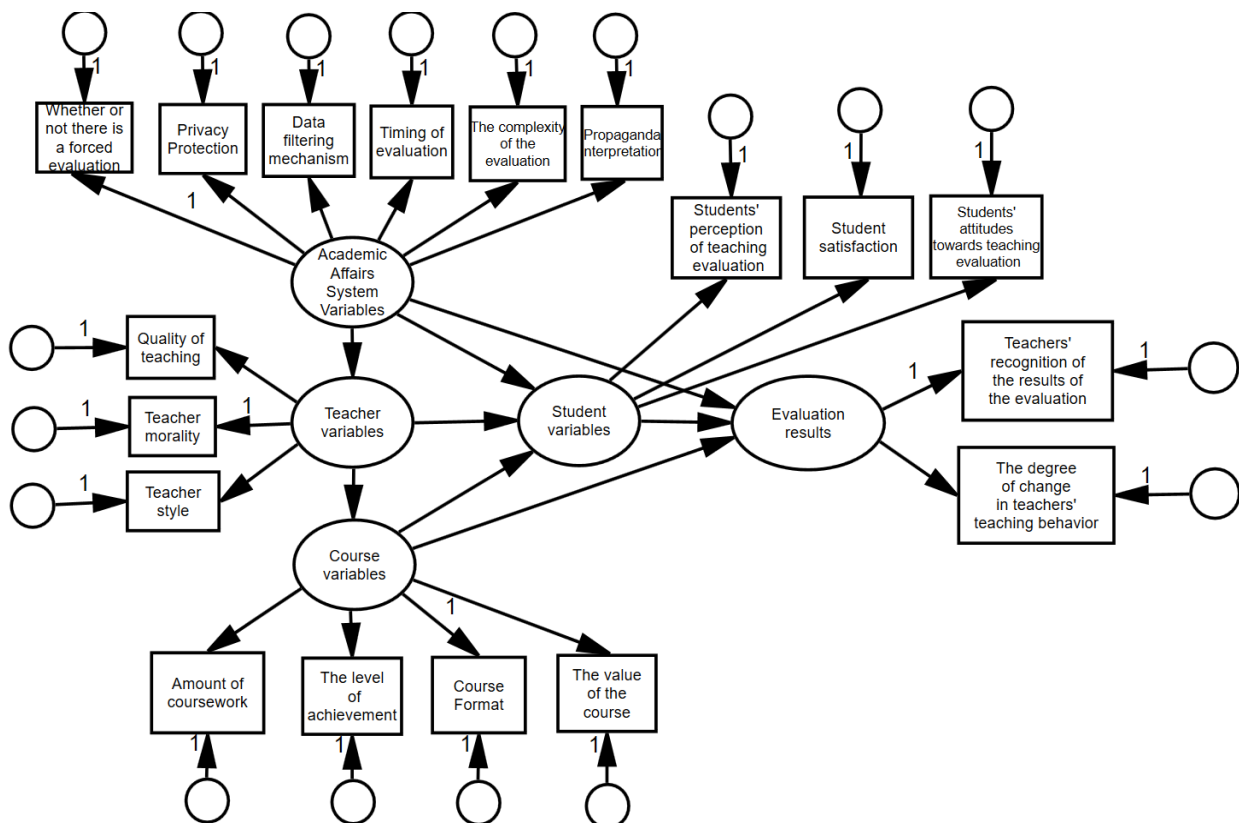


Figure 2 Index System of Factors Influencing the Effectiveness of Teaching Evaluation in Higher Education Institutions: Structure Model of Level 2 and Level 3 Indicators.

Together, these variables influence the evaluation results, and the codes of each variable are shown in Table 3.

Table 3 Correlation variable encoding.

| Latent variables | Observed variables |
|---|---|
| Student variablesη₁ | Students' perception of teaching evaluation Q1 |
| | Student satisfaction Q2 |
| | Students' attitudes towards teaching evaluation Q3 |
| Teacher variablesη₂ | Quality of teaching Q4 |
| | Teacher Teacher Virtue Q5 |
| | Teacher Style Q6 |
| Course variablesη₃ | Amount of coursework Q7 |
| | The high and low of the score Q8 |
| | The course is carried out in Q9 |
| | The value of the course Q10 |
| Academic Affairs System Variablesξ₁ | Whether it is mandatory to evaluate Q11 |
| | Privacy Protection Q12 |
| | Timing Q13 |
| | Complexity of the evaluation Q14 |
| | Propaganda interpretation Q15 |
| Evaluation resultsη₄ | Teachers' recognition of the evaluation results Q16 |
| | Degree of change in teachers' teaching behavior Q17 |

And then the following eight related hypotheses were proposed in Table 4.

Table 4 Relevant assumptions.

| Hypothesis | Assume the specifics |
|---|---|
| Hypothesis 1 | There is a positive correlation between the influence of the academic system variables on the teacher variables. |
| Hypothesis 2 | There is a positive correlation between the impact of academic system variables on student variables. |
| Hypothesis 3 | There is a positive correlation between the impact of teacher variables on student variables. |
| Hypothesis 4 | There is a positive correlation between the influence of teacher variables on curriculum variables. |
| Hypothesis 5 | The impact of curriculum variables on student variables is positively correlated. |
| Hypothesis 6 | There is a positive correlation between student variables and the impact of teaching outcomes. |
| Hypothesis 7 | There is a positive correlation between the influence of academic affairs system variables on teaching evaluation results. |
| Hypothesis 8 | There is a positive correlation between the impact of curriculum variables on the evaluation results |

## 3.3 Research results and discussion

### 3.3.1 Reliability Analysis

Firstly, the internal consistency of each dimension was analyzed by the clonnbach coefficient reliability test. In the analysis of the overall study, the results of reliability analysis are shown in Table 5, and the reliability coefficients of student variables, teacher variables, curriculum variables, academic affairs system variables and the secondary dimensions of teaching evaluation results are all in the range of 0.85-1, which indicates that the scales used in this study have good internal consistency and good reliability.

Table 5 Reliability analysis of the scale of influencing factors on the effectiveness of university teaching evaluation.

| variable | Clonbach coefficient (Alpha) | Number of items |
|---|---|---|
| Student variables | 0.924 | 3 |
| Teacher variables | 0.926 | 3 |
| Course variables | 0.940 | 4 |
| Academic Affairs System Variables | 0.955 | 5 |
| Evaluation results | 0.853 | 2 |

### 3.3.2 Validity Analysis

Table 6 Adaptability test of the CFA (validation factor analysis) model for the effectiveness of university teaching evaluation.

| index | Reference standards | Measured results |
|---|---|---|
| CMIN/DF | 1-3 is excellent and 3-5 is good | 1.831 |
| RMSEA | < 0.05 is excellent and < 0.08 is good | 0.055 |
| IFI | > 0.9 is excellent and > 0.8 is good | 0.907 |
| TLI | > 0.9 is excellent and < 0.9 is good | 0.885 |
| CFI | > 0.9 is excellent and > 0.10 is good | 0.906 |

According to the results of the model adaptation test in Table 6, it can be seen that the CFA model of university evaluation effectiveness has a good adaptability.

Table 7 Convergence validity and combined reliability testing of various dimensions of the effectiveness of university teaching evaluation.

| Path relationships | | | Estimate | AVE | CR |
|---|---|---|---|---|---|
| Whether or not there is a forced evaluation | <--- | Academic Affairs System Variables | 0.866 | | |
| Privacy Protection | <--- | Academic Affairs System Variables | 0.916 | | |
| Timing of evaluation | <--- | Academic Affairs System Variables | 0.904 | 0.803 | 0.9533 |
| The complexity of the evaluation | <--- | Academic Affairs System Variables | 0.916 | | |
| Propaganda interpretation | <--- | Academic Affairs System Variables | 0.878 | | |
| Students' understanding of teaching evaluation | <--- | Student variables | 0.948 | | |
| Student satisfaction | <--- | Student variables | 0.889 | 0.926 | 0.9311 |
| Students' attitudes towards teaching evaluation | <--- | Student variables | 0.940 | | |
| Teacher quality | <--- | Teacher variables | 0.912 | | |
| Teacher morality | <--- | Teacher variables | 0.933 | 0.916 | 0.94 |
| Teacher style | <--- | Teacher variables | 0.904 | | |
| Amount of coursework | <--- | Course variables | 0.897 | | |
| High or low grades | <--- | Course variables | 0.910 | | |
| Course Format | <--- | Course variables | 0.878 | 0.893 | 0.94 |
| The value of the course | <--- | Course variables | 0.885 | | |
| Teachers' recognition of teaching evaluation | <--- | Evaluation results | 0.869 | | |
| The degree of change in teachers' teaching behavior | <--- | Evaluation results | 0.856 | 0.863 | 0.853 |

Under the premise that the CFA model of college evaluation effectiveness has a good adaptability, the convergence validity (AVE) and combined reliability (CR) of each dimension of the scale will

be further tested. The CFA model is used to calculate the standardized factor load of each measurement item in the corresponding dimension. According to the standard, the minimum AVE value is 0.5 and the CR value is 0.7, which can be shown to have good convergence validity and combination reliability.

It is calculated as follows:

$$AVE= (x1 + x2 + ... + xn) / n \tag{1}$$

$$CR=(n / (n-1)) * (1 - (\Sigma SD / \Sigma X)^2) \tag{2}$$

According to the analysis results in Table 7, it can be seen that in the validity test of the University Evaluation Effectiveness Scale, the AVE value of each dimension reached more than 0.5, and the CR value reached more than 0.7, which can show that each dimension has good convergence validity and combination reliability.

### 3.3.3 Hypothesis test results of SEM model path relationship for influencing factors of university teaching evaluation

Table 8 SEM model path relationship test results of influencing factors on university teaching evaluation.

| Path relationships | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| Teacher variables | <--- | Academic Affairs System Variables | 1.035 | 0.061 | 18.097 | *** |
| Course variables | <--- | Teacher variables | 0.998 | 0.055 | 18.857 | *** |
| Student variables | <--- | Teacher variables | 0.462 | 0.075 | 5.506 | *** |
| Student variables | <--- | Academic Affairs System Variables | 0.331 | 0.075 | 4.162 | *** |
| Student variables | <--- | Course variables | 0.214 | 0.061 | 3.308 | ** |
| Evaluation results | <--- | Student variables | 0.422 | 0.089 | 4.910 | *** |
| Evaluation results | <--- | Academic Affairs System Variables | 0.439 | 0.089 | 4.800 | *** |
| Evaluation results | <--- | Course variables | 0.192 | 0.065 | 2.640 | * |

According to the analysis results of the measurement model diagram in Table 8 and Figure 3, it can be seen that in the path assumptions of this study,the assumptions H1-H8 have been verified and the assumptions are true. It is assumed that H1 has a strong positive correlation.
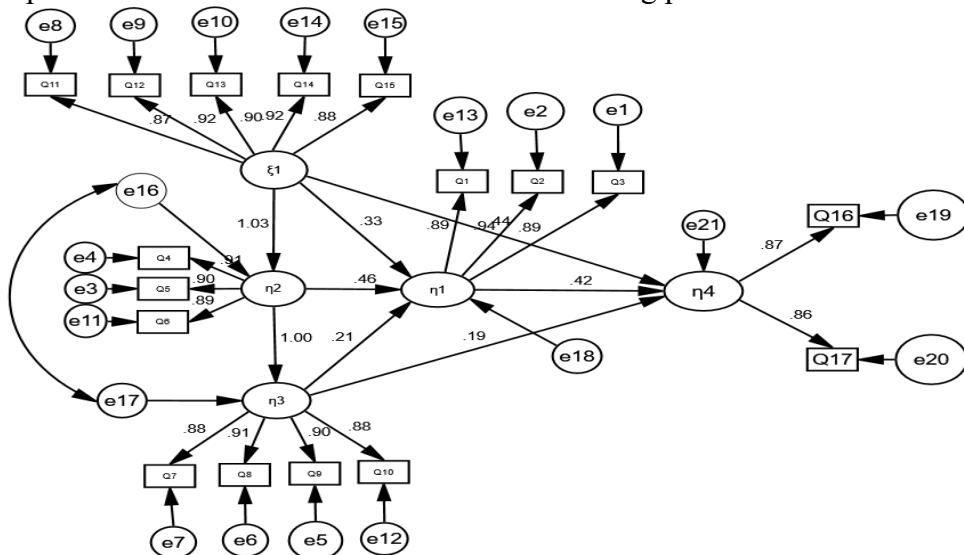


Figure 3 SEM analysis model of influencing factors on the effectiveness of university teaching evaluation.

## 4. Relevant countermeasures to improve the effectiveness of the evaluation system of colleges and universities

Based on the above relevant data collection and analysis, relevant countermeasures are proposed

from different observation variables, so as to provide support for better improving students' effectiveness in college teachers' evaluation.

## 4.1 Student level

### 4.1.1 Strengthen students' awareness of teaching evaluation

First of all, it is necessary to enhance students' awareness of teaching evaluation and improve their understanding of teaching evaluation. One is to increase the publicity of teaching evaluation and improve students' awareness of the importance of teaching evaluation, that is, it can be achieved through theme class meetings, announcements, bulletin boards, etc. The second is to conduct collective evaluation and training for students through counselors, class cadres and other relevant management personnel.

### 4.1.2 Improve teaching satisfaction

They can formulate personalized learning plans, cultivate practical talents, and cultivate students in many aspects, not only knowledge input, but also determine the training objectives and methods, and then carry out personalized training for students with different interests on different foundations.

## 4.2 Teacher level

### 4.2.1 Cultivate good teacher ethics

In terms of teachers' morality, teachers should be deeply aware of the wide influence of their behavior. First of all, it is necessary to carry out a good source, that is, in order to enhance the entrance education of teachers, when training new teachers, it is necessary to let teachers have a sense of awe, cultivate teachers' professional quality, let teachers have their own professional sentiments, every teacher can cherish every minute of teaching students, and then teachers will realize the importance of teachers' ethics and style at the beginning, and have the internal drive of teachers.Second, we can establish a diversified mechanism for teacher evaluation and mutual supervision in the future education.

### 4.2.2 Teacher quality

In terms of the teaching quality of teachers, it is necessary to develop from two aspects: teachers' professional skills and teaching skills. First, in terms of professional knowledge and professional technology, teachers will also have many blind spots, so they can feed back teaching through scientific research, cultivate teachers' scientific research ability, go into enterprises to learn more, let teachers do more projects in various innovative forms such as Internet +, organize and guide students to participate in papers and competitions. In order to allow teachers to improve their professional skills, the school needs to provide teachers with more opportunities to visit enterprises to learn from actual combat, and provide more competition mechanisms. Second, in terms of teachers' teaching ability and teaching technology, teachers are required to have a certain ability to accurately express the content of the course, so the school can organize various competitions to promote teaching and force teachers to grow in the form of competitions, such as young teacher competitions.

## 4.3 Curriculum variables

### 4.3.1 Strengthen and improve teaching objectives, teaching content, and teaching evaluation

In terms of curriculum variables, it is necessary to design relevant curriculum objectives in terms of teaching objectives, so that students can reach a certain level and have a certain motivational effect on students after the course is effective enough. Second, in terms of teaching content, it is necessary to reconstruct the teaching content according to the needs of students and the society's demands for the development of first-class talents, disrupt the order of the original textbook chapters, and extract interested and valuable knowledge for relevant teaching according to the logic of students' needs. Thirdly, in terms of teaching evaluation, it is necessary to use scientific teaching

evaluation to recognize or encourage students' learning attitudes and behaviors in a timely and effective manner. As well as the Internet and other ways of learning in today's society, redesign the teaching mode, and insert some new teaching modes such as practice, virtual simulation, and AI, so as to mobilize students' enthusiasm in the classroom, teach students according to their aptitude.

### 4.3.2 Emphasizing the "quality" of work

In terms of course assignments, the "quality" of homework should be emphasized first. Homework is an effective test of classroom learning and teacher teaching quality. How to assign homework can detect teaching effectiveness, and it is extremely important to detect students' level. It is necessary to match homework with learning content, and teachers should clarify the role of homework in the entire teaching activity. Therefore, the form of assigning homework should be appropriate.For example, the coursework of the press conference requires students to practice their communication skills accordingly, and after everyone completes the course and assignments, they can flexibly respond to the media and carry out a certain degree of crisis public relations, which plays a corresponding role. When the classwork is effective, students will be more impressed by the lesson, and will be evaluated carefully and reasonably.

### 4.4 Variable level of the academic affairs system

### 4.4.1 Accurate publicity from multiple angles

In terms of publicity and interpretation, colleges and universities can give correct guidance to students through meetings when they first enter the school, so that everyone can realize the importance of teaching evaluation for students and teachers. At the same time, you can also use the rewards and punishments of credits to make everyone realize the importance of teaching evaluation and the closeness to their own academic development.

### 4.4.2 Conduct timely evaluations

In terms of the timing of evaluation, many students have been impressed by the course and the teacher for a long time after the end of the course, which has caused the phenomenon of random evaluation, so we should let everyone start to evaluate the teaching at the end of the course, and you can simply set up a QR code for everyone to scan the QR code to start direct evaluation, which will greatly improve the effectiveness of the evaluation.

### 4.4.3 Simplify assessment questions and processes

In terms of the complexity of teaching evaluation, the evaluation problem and its number of teaching problems in a university in Inner Mongolia are relatively complex, which will consume students' patience, resulting in students starting to evaluate randomly after carefully evaluating a few teachers, making it difficult to reflect the real level of some teachers, and also very unfair to the evaluation of some teachers.

### 4.4.4 Enhance information security awareness and management

In terms of privacy protection, first of all, information security management can be strengthened, and colleges and universities should establish a sound information security management system to strengthen the protection of students' personal information. Second, to strengthen technical safeguards, colleges and universities should adopt advanced technical means, such as data encryption and access control, to ensure the security of students' personal information. At the same time, colleges and universities should establish a variety of complaint channels such as hotlines and online platforms to facilitate students' complaints.

### 4.4.5 SPSS is used to effectively screen relevant data and use it reasonably

It is necessary to effectively screen the collected evaluation results, calculate the reliability and validity of the data, delete the relevant invalid evaluation results, and improve the authority and fairness of the evaluation of the teaching affairs system.

## 5. Conclusion

Through the above theories and the empirical analysis of the impact of student effectiveness research on a university, we understand that student variables, curriculum variables, and academic affairs system variables all have a positive correlation on the evaluation results, and will have a direct correlation with the effectiveness of teaching evaluation, among which the strongest correlation is the positive correlation between the teaching system on teachers and the positive correlation between teachers and courses, which will be conducive to further providing relevant support and suggestions for colleges and universities to improve the evaluation system. The study of the effectiveness of teaching evaluation based on structural equation model is conducive to the analysis of the causal relationship and variable relationship that affect the effectiveness of teaching evaluation in colleges and universities, so as to provide a theoretical basis for colleges and universities to improve the effectiveness of teaching evaluation.

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