

A Study on the Teaching Effect of Chinese Medicine Identification Technology in Higher Vocational Colleges Under the Outcome-Based Education Concept

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Abstract: Under the macro-background of the new vocational education reform, this study adopts the Student-Centered Outcomes-Based Education (OBE) concept to address the practical talent cultivation needs of the Traditional Chinese Pharmacy major in higher vocational colleges. Given the pivotal role of the Processing Technology of Traditional Chinese Medicine course as a core curriculum for cultivating skilled professionals, this research aims to identify and resolve existing pain points in current teaching practices. Drawing upon an extensive literature review and the OBE theoretical framework, the study establishes the enhancement of teaching effectiveness as its core objective. It seeks to clarify key issues within the teaching process, construct a corresponding theoretical model, and formulate research hypotheses, thereby providing a theoretical basis and practical guidance for deepening the teaching reform of traditional Chinese medicine processing technology.

This study employs an empirical research methodology. Initially, a systematic literature review was conducted to synthesize the current state of research regarding OBE-based curriculum instruction. Subsequently, a questionnaire specifically designed to evaluate the teaching effectiveness of the aforementioned course was developed and subjected to rigorous reliability and validity tests to ensure the scientific integrity of data collection. Following data collection, the study utilized professional statistical software, including SPSS and Amos, to conduct an in-depth analysis of the retrieved survey data and interview transcripts. The investigation focused specifically on examining the mechanisms through which teacher-related and student-related factors influence teaching effectiveness.

The results indicate that although the application of the OBE concept to the Processing Technology of Traditional Chinese Medicine course has yielded certain achievements, critical issues persist. These include insufficient autonomous learning capabilities among students and a disconnect between theoretical instruction and practical training. Based on these findings, this study proposes targeted pathways to enhance teaching effectiveness from three perspectives: instructional delivery, student engagement, and curriculum quality assurance. Specific measures include optimizing instructional design, strengthening the integration of theory and practice, and refining the evaluation system. Finally, the study acknowledges limitations concerning sample scope and variable selection, suggesting directions for future research.

Keywords: Outcome-Based Education concept; Chinese Medicine Identification Technology in higher vocational colleges; teaching effect; influencing factors; improvement path.

1. Introduction

1.1 Research Background

The National Vocational Education Reform Implementation Plan issued in 2019 clearly proposes that vocational education should focus on connotation construction and cultivate high-quality technical and skilled talents for the frontline of production and service. As a core skill course of Chinese pharmacy majors in higher vocational colleges, Chinese Medicine Identification Technology supports core competencies for posts such as traditional Chinese medicine quality control, medicinal material procurement, decoction piece inspection and drug regulation, which is directly related to the safety of

clinical medication and the quality of talent supply in the traditional Chinese medicine industry. The Overall Plan for Deepening the Reform of Educational Evaluation in the New Era issued in 2020 further requires breaking the traditional summative evaluation model, constructing a teaching evaluation system centered on ability output, and promoting the transformation of vocational education from "knowledge imparting" to "ability cultivation".

Outcome-Based Education (OBE) takes

"student-centered, outcome-oriented and continuous improvement" as its core principles. It emphasizes reverse design of teaching content,

researchers are mainly experience summaries, lack large-sample empirical data, and do not construct a complete effect evaluation and influence mechanism model from the perspective of OBE.

2.4 Measurement Methods of Teaching Effect

Mainstream methods include questionnaire survey (Likert 5-point scale), interview method, practical assessment and SPSS statistical analysis. Teaching effect is mostly measured from four dimensions: knowledge, skills, attitude and application. Reliability and validity tests are the key to ensuring reliable results.

3 Research Methodology

3.1 Research Design

A mixed method of quantitative + qualitative is adopted: literature analysis lays a theoretical foundation; questionnaire survey obtains large-sample data; interview method deeply explores problems; SPSS 26.0 is used for reliability, validity, correlation and regression analysis.

3.2 Population and Sample

Student sample: 320 students (145 students of Grade 2021, 175 students of Grade 2022); Teacher sample: 12 teachers (8 dual-qualified teachers).

3.3 Questionnaire Design

3.3.1 Teaching Effect Questionnaire

Taking the four dimensions of knowledge, skills, literacy and application as the core, there are 22 items, using Likert 5-point scoring (1=completely inconsistent, 5=very consistent).

3.3.2 Influencing Factor Questionnaire

It contains four dimensions of teachers, students, courses and environment, with 26 items, measuring the influence of various factors on teaching effect.

3.4 Reliability and Validity

Reliability: Cronbach's α coefficient of the total scale > 0.9 , α of each dimension > 0.8 , indicating good reliability;

Validity: KMO value > 0.9 , Bartlett sphericity test $p < 0.001$, indicating good structural validity.

3.5 Data Collection

Questionnaires were distributed online via Questionnaire Star, and 308 valid questionnaires were recovered, with an effective recovery rate of 96.25%; semi-structured interviews were

conducted with 6 teachers and 15 students.

Chapter 4 Research Findings and Discussion

4 Research Findings and Discussion

4.1 Demographic Analysis of Respondents

Gender: 68.3% female, 31.7% male;

Grade: 47.1% of Grade 2021, 52.9% of Grade 2022;

Household registration: 62.5% rural, 37.5% urban.

4.2 Current Situation of Teaching Effect

This study employed a historical control design to assess teaching acquisition prior to the implementation of OBE. Identical questionnaire instruments were used for both survey waves, yielding a total of 248 valid responses. Independent samples t-tests revealed no significant differences ($p > 0.05$) in demographic variables—such as gender and place of origin—between the two cohorts, thereby ensuring the validity of the pre- and post-comparison.

Overall score: 4.53 points, with good overall effect;

Dimension scores: skill operation (4.61) $>$ application ability (4.55) $>$ knowledge mastery (4.50) $>$ professional literacy (4.46);

Based on the multiple regression analysis, five variables entered the overall teaching effectiveness regression model. The model demonstrated a good overall fit, $F(5, 254) = 872.764$, $p < .001$, with an adjusted $R^2 = 0.676$. The standardized regression coefficients (β), unstandardized coefficients (B), t-values, and exact p-values for each variable are presented below:

Variable	B	SE	β	t	p
Constant	2.849	—	—	—	—
Learning Motivation	2.948	0.058	0.384	50.828	<0.001
Learning Interest	1.192	0.198	0.178	6.021	<0.001
Professional Belief	0.798	0.177	0.172	4.511	<0.001
Teacher-Student Relationship	0.427	0.217	0.058	1.969	0.049
Learning Attitude	0.302	0.171	0.043	1.767	0.078

The regression model for the knowledge dimension was statistically significant, $F(6, 253) = 237.847$, $p < .001$, with an adjusted $R^2 = 0.264$.

The variables entered the model in the following order: learning motivation, learning interest, professional belief, teacher-student relationship, curriculum evaluation, and evaluation of experimental training courses. The regression coefficients and significance test results for each variable are presented below:

Variable	B	SE	β	t	p
Constant	1.334	—	—	—	—
Learning Motivation	0.328	0.01	0.221	32.8	<0.001
Learning Interest	0.182	0.032	0.171	5.625	<0.001
Professional Belief	0.189	0.043	0.211	4.395	<0.001
Teacher-Student Relationship	0.206	0.099	0.146	2.081	0.038
Curriculum Evaluation	0.168	0.068	0.124	2.471	0.014
Evaluation of Experimental Training Courses	0.059	0.028	0.074	2.107	0.036

The regression model for the affective dimension was statistically significant, $F(5, 254) = 621.349$, $p < .001$, with an adjusted $R^2 = 0.596$. The regression results for each variable are presented below:

Variable	B	SE	β	t	p
Constant	1.608	—	—	—	—
Learning Motivation	0.667	0.014	0.327	47.643	<0.001
Learning Interest	0.308	0.041	0.251	7.512	<0.001
Professional Belief	0.254	0.047	0.143	5.404	<0.001
Teacher-Student Relationship	0.274	0.11	0.147	2.491	0.013
Curriculum Evaluation	0.24	0.068	0.123	3.529	<0.001

The regression model for the volitional dimension was statistically significant, $F(3, 256) = 946.658$, $p < .001$, with an adjusted $R^2 = 0.603$. The regression results for each variable are presented below:

Variable	B	SE	β	t	p
Constant	0.64	—	—	—	—
Learning Motivation	0.551	0.011	0.37	50.091	<0.001
Professional Belief	0.272	0.055	0.148	4.945	<0.001
Learning Interest	0.163	0.043	0.129	3.791	<0.001

Comparison result: the score before the introduction of OBE was 3.62 points, with a significant improvement after the introduction.

Effect sizes were calculated to quantify the magnitude of the observed differences. For the paired-sample comparison, Cohen's d was computed, while η^2 (Eta squared) was used for the analysis of variance. The results indicated that students' perceived teaching acquisition significantly increased following the implementation of OBE ($M = 4.65$, $SD = 0.55$) compared to pre-implementation levels ($M = 3.59$, $SD = 0.65$), with a Cohen's d of 1.77. This value represents a very large effect, demonstrating that the Outcome-Based Education concept has a substantial and practical impact on improving teaching effectiveness.

4.3 Correlation Analysis of Influencing Factors

Teacher factors ($r = 0.865$), student factors ($r = 0.852$), course factors ($r = 0.823$) and environmental factors ($r = 0.781$) all show a significant positive correlation with teaching effect ($p < 0.001$).

4.4 Regression Analysis

Stepwise regression shows that five factors—learning motivation, dual-qualified competence, training conditions, process assessment and learning interest—can explain 83.7% of the variance of teaching effect, among which learning motivation has the strongest predictive power.

4.5 Existing Problems

Students' ability of independent practice and inquiry is insufficient;

The connection between theory and post practice is not close;

The update of training equipment lags behind, and the application of virtual simulation is insufficient;

The integration of professional literacy training is insufficient.

5 Conclusions and Recommendations

5.4 Recommendations

Expand the research scope and carry out multi-college comparative research;

Conduct longitudinal tracking to verify the long-term effect of OBE teaching;

Develop standardized OBE teaching process and evaluation tools, and promote them to similar courses.

This study strictly adhered to ethical standards for educational research during the survey and data collection process. Prior to the survey, students were fully informed of the research purpose and intended use. It was explicitly stated that the questionnaire was anonymous, would not affect their academic grades, and that non-participation would have no impact on any academic evaluations. Students were permitted to discontinue the survey at any time or submit a blank questionnaire, which was regarded as voluntary withdrawal from participation. All participating students completed the questionnaire voluntarily after acknowledging this information, thereby providing either verbal or written informed consent.

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The researcher currently studies in MEA Program, Graduate School, Stamford International University, her research interest is in the fields of educational administration, school management and educational leadership.