

RESEARCH ON MULTIPLE VALUE-ADDED PATHS OF NORMAL STUDENTS' LEARNING OUTCOMES BASED ON HIGH-IMPACT EDUCATIONAL PRACTICES

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The cultivation of Normal students' is essential for the development of high-quality educators in China, while High-impact educational practices are a significant factor influencing the academic achievement of Normal students. This study is based on survey data of normal students at S University and uses the standardized comparative analysis method to explore the relationship between the participation of high impact education practices by normal students and the value-added of learning outcomes. By constructing an impact model between the two, it reveals the multiple impact paths of high impact education practices on the value-added of learning outcomes of normal students.

Keywords: high-impact educational practices, normal students, learning outcomes, qualitative comparative analysis.

Introduction

The Ministry of Education of the People's Republic of China issued a notice in April 2021 on five documents, including the «Professional Ability Standards for Teachers of Secondary Education Majors (Trial)» [1], aiming at further strengthening the construction of normal majors, establishing the assessment system of Normal students' educational and teaching abilities, improving the training quality of normal professionals, and enhancing the ability of teachers to teach and educate people from the source. The document clearly reflects the new quality concept of Normal students' education evaluation, puts forward high-quality requirements for the output of Normal students' educational achievements, and makes it clear that Normal students' learning outcomes should include teachers' moral practice ability, teaching practice ability, comprehensive education ability and independent development ability. In the process of talent training, attention should be paid to the improvement of comprehensive literacy and ability in many aspects such as knowledge, emotion, will and action. This is a system innovation and standard specification for the further reform and improvement of higher normal education. By paying more attention to the acquisition of Normal students' learning outcomes, paying more attention to the academic appreciation of Normal students and focusing on the direct evidence of Normal students' learning, the training quality of normal professionals can be fundamentally and effectively evaluated. There are many factors that affect the learning outcomes of Normal students, mainly including the learning experience and social experience in the process of normal education. The design and organization of high-impact educational practice in colleges and universities have crossed the gap between academic and practice, and the important influence on the academic quality of Normal students has attracted more and more attention from researchers and practitioners [2 Based on this, this study takes S University

as a typical case, deeply analyzes the relationship between the participation of Normal students' high-impact education practice in S University and the value-added of their learning outcomes, constructs an influence model between them, conducts multi-factor configuration analysis, and reveals the characteristics of different types of high-impact education practice affecting Normal students' learning outcomes, so as to provide some reference for the innovation of talent training path in normal universities.

Research Review

The concept of «outcomes» was officially proposed by American scholar Eisner in 1979 [3]. Since then, the research on "learning outcomes" has gradually emerged and expanded. Some scholars at home and abroad believe that learning outcomes refers to students' various gains after receiving education [4], including personal changes and benefits caused by learning [5], which is reflected in the growth of knowledge, skills, attitudes, emotions and acquired abilities, and this growth is concrete and measurable [6, 7, 8]. The Association of American Colleges & Universities (AAC&U for short) has formulated 16 evaluation indexes of effective learning for undergraduates, including critical thinking and information literacy, namely the VALUE standard [9], which has had a far-reaching impact on the evaluation of learning outcomes of higher education students all over the world [10]. The research on the learning outcomes of normal students at home and abroad is mainly reflected in the professional identity of Normal students [11, 12], the cultivation of teaching practical skills and information technology ability [13, 14], the investigation of learning input [15], the influence of academic achievement [16] and so on. Study or pay attention to the special target groups of Normal students, such as free Normal students [17], special education Normal students [18, 19], minority democratic Normal students [20] and Normal students in a certain discipline [21, 22], and investigate and evaluate their learning situation; Or focus on the professional characteristics of Normal students, and explore the acquisition and influence of Normal students' learning outcomes in subject curriculum design [23, 24], information technology application and data literacy improvement [25, 26], internship [27] and social support [28, 29]. The existing research content is rich, but there is little discussion on the value-added of Normal students' learning outcomes from the overall perspective of educational practice that highlights the characteristics of normal education, especially the high-impact educational practice that is indispensable and replaceable in the training process of normal students.

The concept of High-impact educational practices [30] originated from developed countries. (It was first put forward by American scholar George Ku, a representative of the «ecological school» of college students' development in 2008, including ten kinds of educational practices that can obviously and effectively improve students' learning quality, such as freshman seminars, internships and international exchanges, and then it was gradually introduced to China by scholars in research universities. Many research results show that high-

impact education practice is of great significance to promote the development of students' ability [31]. Some scholars have found that high-impact educational practice has a significant positive impact on students' GPA scores [32], has a positive effect on students' comprehensive development ability [33], and can promote students' success and sustainable development [34, 35]. A follow-up survey on the learning and development of college students in China (CCSS) found that high-impact educational practice has a significant promotion effect on the educational gains of college students in China [36, 37]. Some scholars further put forward the characteristics of High-impact education activities for undergraduates in research universities in China, including promoting students' in-depth exchanges, creating opportunities for cooperation and challenging tasks, realizing the integration of knowledge and practice, improving learning freedom and autonomous learning, feeling the teacher's demeanor, inspiring in-depth thinking, providing reading or writing opportunities, and experiencing multiculturalism [38]. Compared with research universities, there are obvious gaps in activity design, content form and task challenge of educational practice in non-research universities, and even there is a serious lack of cognition and attention to educational practice. Related research is less involved in the field of normal education. Therefore, this study will learn from the existing research results and try to explore the special influence of high-impact education practice on the learning outcomes of Normal students.

Model Construction

Through the relevant research and combing of the learning outcomes of Normal students, the study holds that the learning outcomes of Normal students refer to the development of educational and teaching knowledge and ability and academic appreciation of Normal students after receiving higher education. Therefore, the evaluation index of Normal students' learning outcomes is further constructed. First of all, refer to the special requirements for the training of Normal students in five documents issued by the Ministry of Education in April, 2021, namely, the professional competence standard of Normal students majoring in secondary education (Trial), the professional competence standard of Normal students majoring in primary education (Trial), the professional competence standard of Normal students majoring in pre-school education (Trial), the professional competence standard of Normal students majoring in secondary vocational education (Trial) and the professional competence standard of Normal students majoring in special education (Trial). Secondly, considering the particularity of Normal students in the whole education cycle, the scope of consulting experts will be expanded to college normal education experts and teachers in internship or study units for Normal students. After absorbing the interview opinions, the first-level indicators of Normal students' learning outcomes evaluation are determined as four aspects: teachers' morality, teaching practice, comprehensive education and independent development (as illustrated in table 1). At the same time, it further divides the two-level evaluation index,

refers to the VALUE standard of American undergraduate learning outcomes evaluation, concretizes the evaluation index of Normal students' learning outcomes into ability evaluation, selects students from related majors to conduct indepth interviews, and adds the content of self-evaluation in the evaluation to complete the formulation of the evaluation index of Normal students' learning outcomes.

Table 1

First-level Evaluation Indicators of Normal students' Learning Outcomes

No	First-level evaluation indicators	Interpretation of evaluation criteria
1	Ability to practice teacher ethics	Love the profession of teachers, always follow the professional ethics of teachers, have ideals and beliefs, and are willing to devote themselves to education
2	Teaching practice ability	Have professional teachers' theories and skill, The comprehensive ability to accurately carry out educational design, practice, feedback and other activities
3	Comprehensive educational ability	Follow the basic concept of moral education, pay attention to students' physical, mental and emotional problems, master the connotation and methods of education, properly handle the relationship between home and school, and do a good job in the overall management of students
4	Self-development ability	Paying attention to teachers' development needs can make teachers' career development plans reasonably, pay attention to the improvement of their comprehensive quality and ability, adhere to the concept of lifelong learning and constantly reflect and improve

The study summarizes high-impact educational activities as practical activities that are non-curricular, require a lot of learning input, promote the deep learning of Normal students and bring remarkable educational achievements. A statistical analysis of the classification of high-impact educational practice activities by scholars at home and abroad shows that, compared with the research and practice of western universities, although there is a certain degree of «coincidence» in the classification of high-impact educational practice, foreign countries pay more attention to learning expansion and social services in specific categories, in contrast, domestic countries pay more attention to academic research (as illustrated in Table 2). Among them, the localization classification of high-impact educational practice in the follow-up survey conducted by CCSS research group in Tsinghua University for college students in China is one of the theoretical basis for studying the classification of high-impact educational practice activities of Normal students; Secondly, the Delphi method is mainly used to determine the types of high-impact education practice of Normal students, and the consultation of experts in related fields and the interview data of the research objects are analyzed and summarized. Finally, the types of high-impact education practice of Normal students are divided into three categories and nine contents, including teaching and research projects and activities, educational scientific research and writing, teaching skills and class teacher's ability training,

Normal students' skill clubs/learning communities, teaching and training exchanges in primary and secondary schools/minor in the second degree of normal majors, Normal students' skill competitions, social practices such as internship/study/probation, teaching activities/educational research, and educational community services/voluntary services (as illustrated in figure 1).

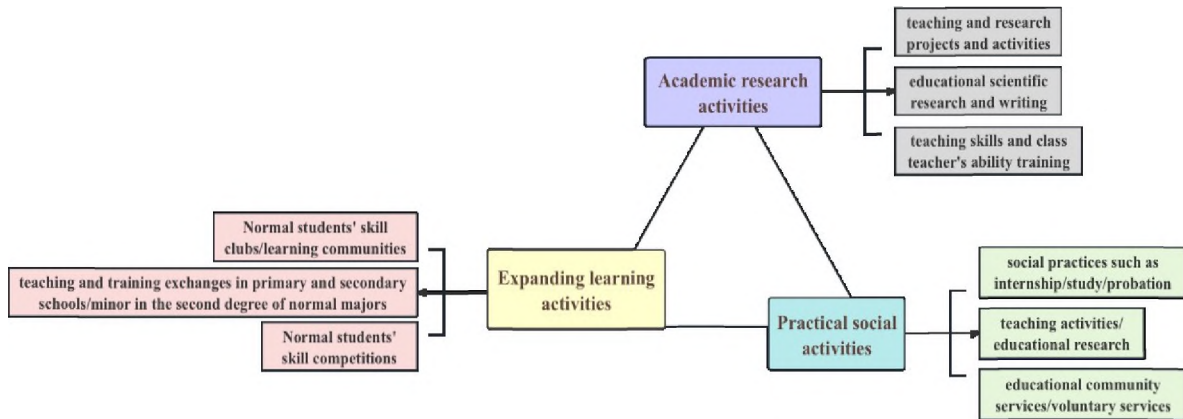


Figure 1. Classification of practice types of high-impact education for Normal students
Table 2

Understanding and classification of high-impact educational practice by scholars at home and abroad

	High-impact practice HIPS	Kuh (2008)	Brownell, Swaner (2010)	Finley, McNair (2013)	McMahan (2015)	Wen Wen, Shi Jinghuan, etc. (2014)	Zhang Huafeng, Guo Fei, etc. (2017)	Guo Jiao (2019)	Xu Dandong (2020)
Academic Research	Participate in teacher research					√	√	√	
	Participate in academic competitions					√	√	√	√
	Contribute to academic journals or conferences					√	√	√	√
	Undergraduate scientific research	√	√						√
Learning Development	Freshman seminar	√	√	√	√				√
	Vertex course	√	√	√					√
	Minor/double degree						√	√	
	Overseas study	√		√	√	√	√	√	√
	second foreign language						√		
	Learning community	√	√	√	√	√			
	Intensive writing training	√							
	General knowledge and experience	√							√
Social Work	Collaborative learning project	√			√				
	Community/voluntary service	√	√	√		√	√		
	Student union/club activities							√	√
	Internship/part-time job/ entrepreneurship	√		√	√	√	√	√	√

	Social practice/investigation						√		√
	total	10	5	6	5	7	9	7	10

The research is based on the I-E-O model put forward by Astin as the model basis to explore the influence of high-impact educational practice on the learning outcomes of normal student and classifies the high-impact educational practice of Normal students into three categories: academic research activities, extended learning activities and practical social activities. Explore their interactive influence paths on Normal students' professional ethics practice ability, teaching practice ability, comprehensive and human ability and independent development ability, and form a conditional configuration of multi-factors. We will use Qualitative Comparative Analysis (QCA) to explore the causal mechanism between high-impact educational practice and the appreciation of Normal students' learning outcomes and construct a specific influence relationship model (as illustrated in Figure 2).

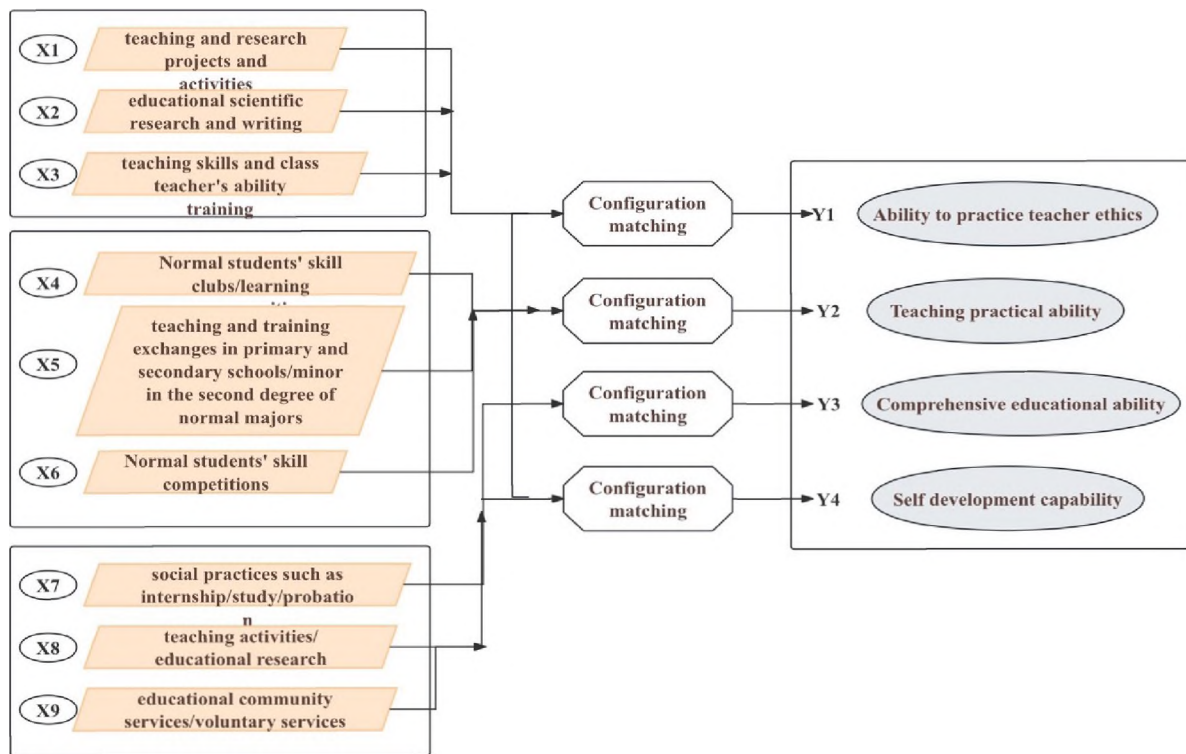


Figure 2. The influence model of high-impact education practice on the learning outcomes of Normal students

Data analysis

In this study, S University is selected as the representative normal college. This school is a well-known provincial first-class normal college with a history of more than 70 years. It has a complete range of disciplines, including philosophy, economics, law, education, literature, science, engineering, management and art. It has opened 18 normal majors (as illustrated in Table 3), and the research has achieved full discipline coverage in sample selection and questionnaire survey. In order to fully and systematically understand the characteristics of the influence of high-impact education practice in S University on Normal students' learning

outcomes, the research builds a model of the influence of high-impact education practice on Normal students' learning outcomes and adapts the questionnaire items of the existing research-related scales. After several rounds of integration and revision, referring to the evaluation feedback from many experts in the field, the number of expert consultants is generally 10-50. Based on the standard of meeting the number of experts and the actual demand, 24 experts inside and outside the school were selected for questionnaire consultation, including 10 tutors in S University and 14 tutors outside the school. By summarizing and recoding the interview contents, the effective reference for constructing the evaluation index of Normal students' learning outcomes is extracted. Finally, the questionnaire on the influence of high-impact education practice on the learning outcomes of Normal students was formed. The content of the questionnaire is divided into three parts, with a total of 12 items, in which high-impact educational practice is taken as the independent variable and Normal students' learning outcomes as the dependent variable. The change and appreciation of Normal students' morality practice ability, teaching practice ability, comprehensive education ability and independent development ability are explored respectively.

There were two rounds of questionnaire distribution. At first, a small-scale pilot questionnaire was distributed to 18 normal college students, and the questionnaire was further revised and improved according to the actual situation of questionnaire recovery. In the second time, more than 200 questionnaires were distributed and 183 valid questionnaires were recovered. In terms of gender distribution, boys and girls account for 31.69% and 68.31% respectively; In terms of grade distribution, freshmen to seniors account for 10.38%, 12.57%, 22.4% and 54.64%, respectively, and junior and senior Normal students account for a higher proportion, which is more favorable for sample data analysis, because the higher the grade, the more experiences, the higher the frequency and the richer the selectivity of students participating in high-impact education practice, so it is easier to test the influence of high-impact education practice on the learning outcomes of Normal students.

Table 3

Distribution of 18 normal majors offered by S University

Number	College	Major
1-2	College of Educational Sciences	Professional Education
		Applied psychology major
3	School of chemistry and chemical engineering	Chemistry Specialty
4	School of Tourism Management	History major
5	Marxist college	Ideological and political education major
6	College of Art and Design	Fine arts major
7	Software college	Computer science and technology
8	School of Life Science	Biological Science
9	School of Mathematics and System Science	Mathematics and applied mathematics

10	Institute of physical education	Physical education major
11	College of Foreign Languages	English major
12-13	School of literature	Chinese language and literature major
		International education in Chinese
14	College of Physical Science and Technology	Physics
15	School of Journalism and communication	Educational Technology Major
16-17	College of Preschool and Elementary Education	Preschool education/early childhood education major
		Primary education major
18	Conservatory of music	Musicology major

The collected questionnaire data mainly used SPSS21.0 software to make descriptive statistics and significant analysis of the influence mechanism of high-impact education practice. Firstly, the reliability and validity of the questionnaire data collected twice are tested. The reliability analysis of the questionnaire shows that the Cronbach coefficient of the whole questionnaire is 0.827, and the significance value of Friedman chi-square test given by the analysis of variance table is 0.000($p < 0.05$), which shows that the reliability is good. The validity of the questionnaire was tested by KMO and Bartlett sphericity test in factor analysis. The results showed that the measured value of KMO sample of the whole questionnaire was 0.912, the approximate chi-square of bartlett sphericity test was 273.6, and the significance level was 0.000($p < 0.05$), which passed the validity test. This laid a good data foundation for the next application of qualitative comparative analysis (QCA). QCA qualitative comparative analysis is to explore the multiple concurrent causal mechanisms of the appreciation of Normal students' learning outcomes from the overall perspective of causal analysis. By analyzing the different configurations of influencing factors, it explores the causal conclusions and equivalent configuration schemes that lead to specific results, and provides feasible paths for colleges and universities to expand Normal students' learning outcomes and improve the quality of training.

Results

The most intuitive performance of Normal students' ability to practice teachers' morality during their study period is their willingness to teach. Previous studies have shown that Normal students with strong willingness to teach are more likely to be teachers and cultivate people. Therefore, this study takes Normal students' willingness to teach as the main evaluation standard of their ability to practice teachers' morality. From the results of data analysis, there is a significant positive correlation between high-impact education practice and Normal students' willingness to teach. As Normal students participate more in the practice of high-impact education, their willingness to teach will become stronger (see Figure 3). On the one hand, Normal students have a deeper and clearer understanding of teachers' professional roles, social responsibilities, professional beliefs and moral norms during their participation in high-impact education practice, which greatly

enhances their professional identity; On the other hand, in the practice of high-impact education, the academic career planning of Normal students has been carefully guided, which has enhanced the willingness of Normal students to teach, and thus improved their ability to practice teachers' morality.

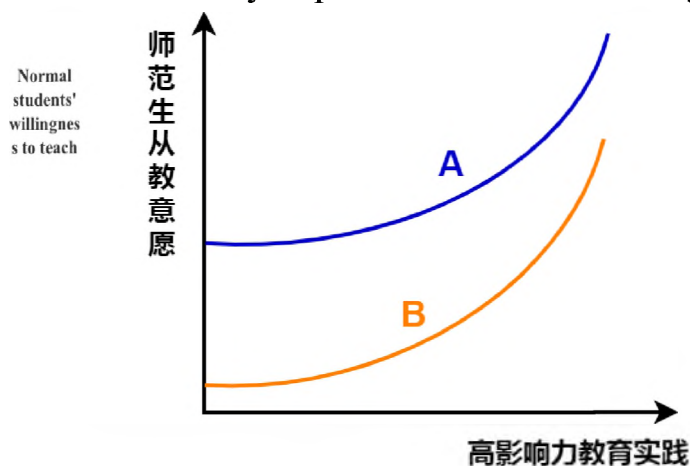


Figure 3. The relationship between high-impact educational practice and Normal students' willingness to teach.

Normal students' teaching practice ability is an important part of their learning outcomes. This study divides Normal students' teaching practice ability into ten dimensions: teaching design and preparation, teaching implementation and professional knowledge, and explores the influence of high-impact educational practice on Normal students' teaching practice ability. The survey results show that high-impact educational practice has a significant impact on improving the teaching practice ability of Normal students (as illustrated in Table 3). More than 80% students believe that high-impact educational practice can effectively improve their teaching practice ability, especially in the aspects of teaching content teaching, teaching method use, educational technology application, student learning evaluation and so on. High-impact education practice can effectively improve the professional level and professional ability of Normal students, and promote the improvement of key teacher skills of Normal students.

Table 3
The influence of high-impact educational practice on the teaching practice ability of Normal students

Content	Dimension interpretation	Influence degree	frequency	Effective percentage
Teaching design and preparation	Curriculum design	effective	138	75.41%
		high-efficiency	88	48.08%
	Teaching plan design	effective	158	86.34%
		high-efficiency	68	37.16%
	Analysis of the characteristics of academic situation	effective	144	78.69%
		high-efficiency	60	32.79%

	Familiarity with courses and teaching materials	effective	155	84.70%
		high-efficiency	59	32.24%
	Understanding and grasping of educational policy and reform	effective	127	69.40%
		high-efficiency	51	27.87%
Teaching implementation	Teaching skills of course content	effective	173	94.54%
		high-efficiency	100	54.64%
	The use of various teaching methods	effective	176	96.17%
		high-efficiency	132	72.13%
	Application of educational technology means	effective	175	95.63%
		high-efficiency	165	90.16%
Evaluate students' learning.	effective	164	89.62%	
	high-efficiency	94	51.36%	
professional knowledge	Renewal and application of professional frontier knowledge	effective	149	81.42%
		high-efficiency	57	31.15%
	Ability to apply professional knowledge	effective	124	67.76%
		high-efficiency	45	24.59%

Comprehensive education ability and independent development ability are the most difficult contents to obtain and evaluate in the training of normal talents. The reason is that it is difficult to cultivate these two abilities independently, and it is difficult to present stable and remarkable results, and these abilities are more focused on the reflection of teaching experience and the perception of educational ideas in the process of individual learning practice. In view of this, this study combines the characteristics of Normal students' comprehensive educational ability and independent development ability, and selects seven learning outcomes that best reflect these two abilities, including effective communication, oral expression, teamwork, class management, teaching reflection, humanistic care and growth planning, to explore the influence of high-impact educational practice on them. The results show that the practice of high-impact education is the most obvious to improve the class management, teamwork and teaching reflection of Normal students (see Table 4). This shows that the practice of high-impact education can not only cultivate the basic teaching skills of Normal students, but also effectively improve the management ability of class teachers of Normal students, enhance the team integration and cooperation of Normal students, and promote teaching reflection and improvement.

Table 4

The influence of high-impact education practice on Normal students' comprehensive educational ability and independent development ability

	Influence	Frequency	Effective
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	degree		percentage
Effective communication	effective	136	74.32%
	High-efficiency	92	50.27%
Express orally	effective	132	72.13%
	High-efficiency	90	49.18%
Teamwork	effective	173	94.53%
	High-efficiency	117	63.93%
Class management	effective	174	95.08%
	High-efficiency	132	72.13%
Teaching reflection	effective	165	90.16%
	High-efficiency	131	71.58%
Humanistic care	effective	129	70.49%
	High-efficiency	88	48.09%
Growth planning	effective	147	80.33%
	high-efficiency	101	55.19%

From the results of investigation and analysis, the value-added of Normal students' learning outcomes is influenced by different types of High-impact educational practices to different degrees. The types that students choose to participate in high-impact educational practice are different, among which the Normal students who participate in academic research activities have the best value-added effect (see Figure 4), followed by practical social activities. More than 70% students agree with the efficient role of academic research activities in the process of learning outcomes appreciation. This is because, among the three types of educational practice, academic research activities are the most relevant to Normal students' professional learning and preparing for graduate students. By participating in teaching and research projects and activities, conducting educational scientific research and writing, participating in teaching skills and class teacher's ability training and other important practical activities, Normal students have gained pedagogical knowledge growth and academic training, and their learning results have been significantly improved.

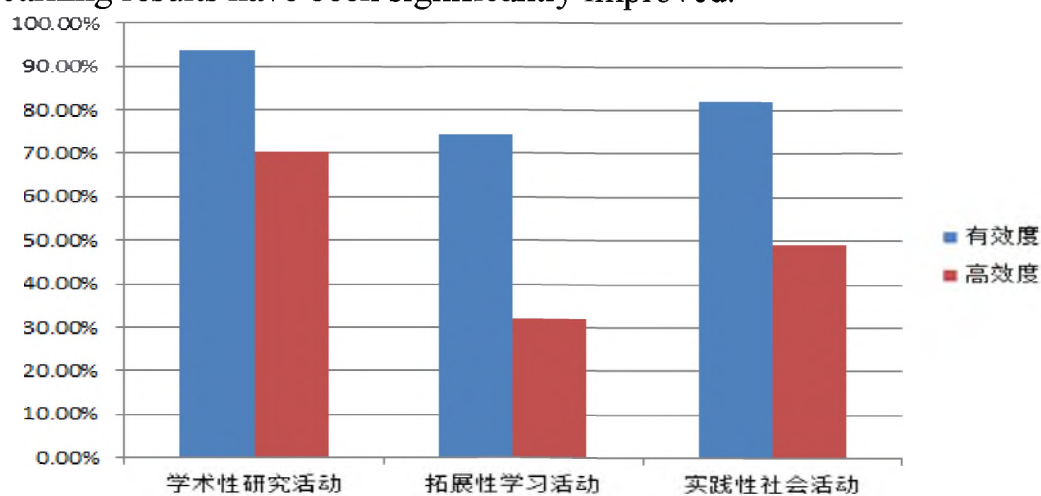


Fig. 4. The influence of different types of High-impact educational practices on the learning outcomes of Normal students.

Compared with the other two types of educational practice, the overall participation of extended learning activities is relatively low, and the data results of different disciplines are quite different. This study re-codes and classifies the surveyed Normal students according to the subject categories, and further explores the influence of extended learning activities on the learning outcomes of Normal students, which are divided into seven categories: pedagogy, science, engineering, literature, history, philosophy and art. The survey results show that the extended learning activities have the greatest difference on the learning outcomes of Normal students (see Table 5), among which the Normal students of literature and art are most affected by the extended learning activities. In the interview survey, it is found that the skill clubs and competitions of Normal students are diversified in the extended learning activities, and they are irreplaceable in the path of improving their learning outcomes. Students usually participate selectively according to their professional relevance.

Table 5

Different types of High-impact educational practices have different effects on the learning outcomes of Normal students

	Pedagogy	Neo-Confucianism	Engineering	Literature	History	Philosophy	Art Theory
Academic research activities	3.35	3.10	3.06	3.34	3.13	3.02	3.19
Extended learning activities	2.69	2.57	2.39	3.21	2.63	2.61	3.24
Practical social activities	3.17	2.98	3.06	3.19	3.13	2.82	3.08

Participating in social practice, especially internship, study and probation activities, is an indispensable and important link in the training process of Normal students. The survey results show that practical social activities are a kind of high-impact educational practice with the highest participation of Normal students. Among all Normal students surveyed, more than 92% participate in practical social activities (see Table 6). In addition to the internship activities provided by training institutions, Normal students are more willing to participate in educational community volunteer services, including compulsory tutoring, interest training for primary school students in the community, part-time teaching in senior universities, teaching assistants for adult lifelong education courses, etc. More Normal students also show higher enthusiasm for participating in teaching activities and educational research projects. In view of the fact that practical social activities have the highest coverage rate on the learning outcomes of Normal students, colleges and universities should make full use of this effective high coverage rate as a starting point to guide students to participate in high-impact educational practice and improve the overall efficiency of its influence on the learning outcomes of Normal students.

Table 6

Coverage rate of different types of high-impact education practices on learning outcomes of Normal students

	Coverage frequency	Coverage rate	Effective coverage rate
Academic research activities	142	77.59%	77.59%
Extended learning activities	166	90.71%	90.71%
Practical social activities	174	92.84%	92.84%

According to the influence model of high-impact educational practice on Normal students' learning outcomes, this study takes nine specific practical activities of three types as conditional variables, the value-added of Normal students' learning outcomes as result variables, assigns values according to the data of respondents' participation in practical activities, and uses qualitative comparative analysis method QCA for configuration analysis. In the analysis of the sufficiency and necessity of conditional variables, it is found that all consistency scores are less than 0.8 (see Table 7), reflecting that each condition is not enough as a necessary condition to independently contribute to the effective appreciation of the learning outcomes of Normal students. This shows that the value-added of Normal students' learning outcomes is the result of many educational practices, not a single factor, so it is necessary to further analyze the condition combination and configuration.

Table 7

Sufficient necessity of different types of high-impact educational practice

Influencing factor	consistency	coverage rate
X1 Teaching and research projects and activities	0.74	0.73
X2 Educational Science Research and Writing	0.63	0.54
X3 Teaching Skills and Ability Training of Class Teachers	0.69	0.77
X4 Skills Association/Learning Community for Normal students	0.70	0.68
X5 Second Degree of Teaching and Training Exchange/Minor in Normal Major in Primary and Secondary Schools	0.45	0.69
X6 Skills Competition for Normal students	0.55	0.65
X7 Internship/Study/Internship	0.71	0.63
X8 Social practice such as teaching activities/educational research	0.76	0.86
X9 Educational Community Service/Volunteer Service	0.60	0.82

According to the five configuration solutions derived from fsQCA software, the High-impact educational practices that affect the value-added of Normal students' learning outcomes mainly include: teaching and research projects and activities (X1), teaching skills and class teacher's ability training (X3), internship/study/probation (X7) and educational community service/voluntary service (X9) (see Table 8). Among them, the consistency of configuration 1, configuration 3, configuration 4 and configuration 5 is 1, and the

coverage rate is above 0.6, which is highly explanatory to the result variables. The coincidence rate among the four configurations is relatively high. Teaching and research projects and activities (X1), internship/study/probation (X7) and educational community service/volunteer service (X9) are the core conditions for Normal students to add value to their learning outcomes. This shows that from the type of high-impact educational practice, the interaction between academic research activities and practical social activities is the best.

Table 8

Configuration of Value-added Learning outcomes of Normal students

Influencing factor	Configuration solution				
	1	2	3	4	5
X1 Teaching and research projects and activities	●	○	●	●	●
X2 Educational Science Research and Writing			○		
X3 Teaching Skills and Class Teacher's Ability Training	●			○	
X4 Skills Association/Learning Community for Normal students	△		○		△
X5 Second Degree of Teaching and Training Exchange/Minor in Normal Major in Primary and Secondary Schools					
X6 Skills Competition for Normal students		△	△	△	
X7 Internship/Study/Internship	●	○	●	●	●
X8 Social practice such as teaching activities/educational research	○			○	
X9 Educational Community Service/Volunteer Service		●			●
consistency	1	0.923	1	1	1
Original coverage rate	0.7	0.48	0.7	0.6	0.73
Overall agreement rate	0.98				
Total coverage rate	0.642				

In view of the fact that the coverage rate of practical social activities is the highest in the process of adding value to Normal students' learning outcomes, this study further analyzes the influence mechanism of this type of educational practical activities, and groups the respondents according to liberal arts, science and engineering and art, and makes configuration analysis respectively. It is found that practical social activities have a more significant impact on the learning outcomes of Normal students of liberal arts. From the four configurations, the social practices (X8) such as teaching and research projects and activities (X1), skill clubs/learning communities for Normal students (X4), skill competitions for Normal students (X6), internship/study/internship (X7) and teaching activities/educational research all appear as core conditions (as illustrated in Table 9), among which internship/study/internship (X7) is the core condition. This shows that practical social activities, especially internship activities, are the core influencing factors to promote the appreciation of the learning outcomes of liberal arts Normal students, and interact with other influencing factors most frequently, and different factors combine to form different configurations, thus providing an

effective multi-choice path to enhance the appreciation of the learning outcomes of liberal arts Normal students.

Table 9

Configuration Configuration of Learning outcomes Value-added of Liberal Arts
Normal students

Influencing factor	Configuration solution			
	1	2	3	4
X1 Teaching and research projects and activities		●	●	●
X2 Educational Science Research and Writing		○		
X3 Teaching Skills and Class Teacher's Ability Training			○	○
X4 Skills Association/Learning Community for Normal students	●	●	○	○
X5 Second Degree of Teaching and Training Exchange/Minor in Normal Major in Primary and Secondary Schools				
X6 Skills Competition for Normal students	●	○		●
X7 Internship/Study/Internship	●	●	●	●
X8 social practice such as teaching activities/educational research.	●	○	●	○
X9 Educational Community Service/Volunteer Service	○			○
Consistency	1	1	1	1
Original coverage rate	0.4	0.4	0.4	0.2
Unique coverage	0.2	0.2	0.2	0.2
Overall agreement rate	1			
Total coverage rate	0.35			

Note: ● indicates that the core condition exists, ▲ indicates that the core condition does not exist, ○ indicates that the edge condition exists, △ indicates that the edge condition does not exist, and spaces indicate that the condition may or may not exist.

V. Strategies and Enlightenment

(A) give play to the positive role of high-impact educational practice in promoting the pedagogical knowledge learning of Normal students.

The results show that the practice of high-impact education has a positive and significant impact on the value-added of Normal students' learning outcomes. The distinguishing feature of normal education from non-normal education is that in addition to mastering professional knowledge, it pays more attention to the learning of teaching knowledge, not only to understand it by itself, but also to learn to teach it. Colleges and universities should pay full attention to and give full play to the positive role of high-impact educational practice in promoting Normal students' pedagogical knowledge learning, and make use of its diverse teaching and training forms and special practical educational functions to enhance Normal students' sense of skill acquisition and teaching ability. For example, teaching and research projects should be incorporated into the professional curriculum training of Normal students, and the teaching skills of Normal students should be improved through practical task design, so as to help Normal students find a correct position, internalize theory and improve their professional ability in the process of "practice-reflection-practice-reflection"; Secondly, strengthen the frequency and efficiency of teaching and training exchanges between primary and secondary schools, and hire primary and secondary school teachers as

professional tutors to help Normal students acquire practical knowledge in line with the real teaching situation; At the same time, we should carry out activities such as study, teaching, educational research, educational voluntary service/community service in a planned and regular way, introduce more learning classes of Normal students into real situations, and arrange internships in all stages of the whole training process. On the one hand, it can improve the restriction that most colleges and universities only regard educational practice as a single content of Normal students' educational practice, on the other hand, it can make up for the time constraint that most Normal students' internships are arranged in the senior year, and ensure the «double professionalism» of the whole training process.

This study found that different types of High-impact educational practices have different influences on the learning outcomes of Normal students, among which academic research activities have the greatest contribution value, extended learning activities have the greatest difference and practical social activities have the widest coverage. First of all, colleges and universities should pay more attention to students' needs and preferences in the process of Normal students' participation in educational practice, actively investigate students' willingness to choose activities, process gains and experiences, deeply understand and fit the characteristics of students' practical interests, and reasonably match the types of high-impact educational practice. Secondly, colleges and universities should guide students to participate in different types of educational practice in a targeted and planned way according to the learning characteristics and professional knowledge characteristics of Normal students in different disciplines, and implement classified guidance according to the different contributions and functions of academic research activities, extended learning activities and practical social activities to the learning outcomes of Normal students. Finally, colleges and universities should do a good job in evaluating the effectiveness and process of the quality of Normal students' educational practice, and regularly monitor the learning improvement and problem dilemma of Normal students in educational practice. On the one hand, we can learn from the existing evaluation system, for example, we can refer to the «micro-certification system for Normal students' classroom teaching ability» developed by East China Normal University to evaluate the development of Normal students' classroom teaching ability; On the other hand, we can make full use of big data and blockchain to record and analyze the whole training process information of Normal students, and build a profile portrait of each normal student's own ability, so as to facilitate the targeted adjustment and improvement of educational practice training programs and promote the acquisition of high-quality learning outcomes of Normal students.

The research shows the causal mechanism of multi-factor concurrent that high-impact educational practice promotes the learning outcomes of Normal students. Different configuration characteristics can provide effective reference for colleges and universities to optimize the differentiated professional design and implementation path of Normal students' educational practice. Only by

emphasizing differentiated design can we meet the needs and preferences of different groups of Normal students. From the overall perspective, the organizational design and implementation of high-impact educational practice should promote the "coordinated development" of various educational practices and realize the «1+1>2» synergistic effect. Among them, the interaction between academic research activities and practical social activities is the best. Colleges and universities should formulate the general framework of Normal students' educational practice in combination with their professional characteristics and academic advantages, and carefully design a series of diversified practical activities, which should not only maintain the difference in disciplines, but also increase the relevance and cohesion between academic research activities and practical social activities, so as to make the two types of educational practices more compatible and integrated. The research results show that practical social activities are the core influencing factors of the appreciation of the learning outcomes of Normal students of liberal arts, and colleges and universities should focus on developing high-quality practical social activities suitable for Normal students of liberal arts to participate in and exert their special educational effects. In addition, colleges and universities should also play an important role in the organization and implementation of educational practice and do a good job in the organic combination of discipline knowledge and professional knowledge. On the one hand, they should strengthen the close relationship between discipline colleges and teacher education colleges to ensure the integrity of the professional growth process of Normal students. On the other hand, we should break the disciplinary barriers between the training of Normal students in various professional colleges, encourage the training of interdisciplinary and interdisciplinary Normal students, encourage the combination of specific characteristics and unique resources at the professional and curriculum levels, improve the quality level and influence of educational practice, and then optimize the implementation process of Normal students' educational practice.

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Дата поступления рукописи в редакцию: 12.03.2024.

Дата принятия рукописи в печать: 31.03.2024.