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Path of General Skills Cultivation in Art Courses for Preschool Education Majors in Colleges and Universities-Based on NCA and FSQCA Methods

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Abstract

This research delves into the enhancement of generic skills among preschool education majors through art courses, with the ultimate goal of informing and guiding future curriculum improvements. Utilizing the Comprehensive Evaluation Questionnaire (CEQ) model, it integrates Narrative Configurational Analysis (NCA) and fuzzy-set Qualitative Comparative Analysis (fsQCA) to pinpoint essential conditions and optimal combinations for skill development. Key aspects like teaching quality, course objectives, workload balance, and grading standards were scrutinized. A survey of early childhood education students in China garnered 235 valid responses, which were analyzed to uncover pivotal influences and causal links in skill cultivation, highlighting the paramount importance of teaching quality in nurturing generic skills.

Keywords: Generic Skills Fine Arts Curriculum Necessary Conditions Analysis (NCA) Fuzzy Set Qualitative Comparative Analysis (Fsqca)

Introduction

With the development of society and the change in professional needs, higher education faces more and more challenges in cultivating students' comprehensive quality (Long, 2019). As a part of art education, art courses for preschool education majors need to pay attention not only to the cultivation of students' art skills but also to the overall development of general skills, such as expression and communication skills, thinking and analytical skills, hands-on practical skills and teamwork skills (Spyropoulou et al., 2020). The art program of preschool education not only provides students with the space to develop their imagination and creativity but also cultivates their independent thinking and innovation through the learning and practice of various art forms (Cohn, 2018). As a unique language, artworks help to improve students' communication skills and express opinions and emotions through their works (Luo, 2024). In addition, in the process of art practice, students often face various problems and challenges, which prompts them to solve. They use their hands, thus developing problem-solving skills and logical thinking. Developing these generic skills plays a crucial role in students' careers and is an essential factor in shaping their overall quality (U et al. 2020).

However, some art courses in preschool education majors are taught in a single format, and the research on skill development in art courses in preschool education majors still needs to be improved (Gan, 2023). Most existing research focuses on analyzing art skill development and needs an in-depth understanding of the synergy between multiple elements.

This study aims to reveal the synergies and interactions between different elements of general technology through NCA and fsQCA methods to understand the complexity of general skill development more comprehensively and deeply. I was exploring a comprehensive pathway for generic skills development in preschool art courses. This study adopted the CEQ (Course Experience Questionnaire) assessment model and analyzed it using NCA and fsQCA methods. By examining the group effects and interrelationships of critical elements such as teaching level, objectives and standards, workload, and assessment scales, this study reveals the complex mechanisms of these elements in enhancing students' generic skills. The study sample was drawn from students majoring in preschool education at a university in Guangxi to ensure the representativeness and reliability of the sample. Through the use of NCA and fsQCA methods, this study digs deeper into the causality and complexity of generic skills development in the art course of preschool education majors. The results indicated that generic skills development showed multiple concurrency under the synergistic effect of teaching level, workload, and assessment scale. This provides important insights for future reforms in acceptable arts courses.

While adopting the NCA and fsQCA methods, this study thoroughly considered the impact of sample size and chose to analyze a large sample to ensure the reliability and generalisability of the findings. This also enables this study to summarise the generic skills development strategies with differentiated characteristics more comprehensively, providing solid theoretical support for the future development of generic skills development in art courses.

Literature Review and Model Construction

Literature Review

Another critical dimension in assessing a program's quality is the extent to which it develops students' generic skills. An excellent program should help students develop generic skills, including communication, critical thinking, problem-solving, etc. (Thornhill-Miller et al., 2023). These skills are essential for student's future career development and social engagement, so the program should be able to provide students with adequate opportunities and support to develop these skills (Shanta & Wells, 2022). In addition, the curriculum should integrate these skills with subject content so that students can better understand and apply what they have learned. The following four dimensions provide important indicators for assessing generic skills in the curriculum. By considering these indicators together, the quality of the curriculum can be assessed more comprehensively, and teachers and educational institutions can be provided with the necessary guidance for improving teaching and learning practices.

Level of Teaching

The teaching level is an essential dimension in assessing a program's quality and plays a crucial role in developing students' generic skills (Praetorius et al., 2018). The Level of teaching is not only directly related to students' learning outcomes but is also a critical factor in improving students' generic skills. A good teacher needs to be able to express him/herself clearly and

communicate complex concepts to students simply and understandably (Stenberg & Maaranen, 2022). This is crucial for students to improve their generic skills. Through clear and vivid explanations, teachers can help students build their knowledge system and stimulate their interest and creativity in learning (Manasia et al., 2019).

Secondly, teachers' knowledge is vital to improving students' generic skills. Teachers need to deeply understand the subject areas they teach and the relevant theoretical knowledge and practical skills to provide accurate and comprehensive guidance to students (Virtanen, 2018b). Teachers' teaching skills are also vital in developing students' generic skills. Good teachers should be able to use different teaching methods and strategies flexibly to meet the learning needs of different students (Kim et al., 2019). Through well-designed teaching activities and practical opportunities, teachers can help students master the generic skills of art education better and develop their independent learning and problem-solving skills (S. et al., 2019).

Objectives and Standards

Clear learning objectives and standards play a vital role in developing students' generic skills and are another essential dimension in assessing a program's quality (Virtanen, 2018a). An excellent program needs to set clear objectives that provide direction for students' learning and provide teachers with a basis for assessing students' learning outcomes (Reed, 2012). Clear learning objectives can guide student learning (Biggs, 2012). For preschool children, improving generic skills is a long-term and systematic process (Delijeva & Ozola, 2021). In this process, clear learning objectives act as a compass, helping students to clearly understand the levels of competence they need to achieve at different stages so that they can learn and practice in a planned and gradual way.

Alignment between objectives and standards helps students better understand and grasp the curriculum's focus (Sewagegn, 2020). When learning objectives and course content are closely linked and consistent, students can understand the course's internal logic and knowledge system in greater depth and thus develop their generic skills more effectively through the specialized courses (Kim et al., 2021). At the same time, this coherence can also reduce students' learning confusion and anxiety and increase their motivation and self-confidence. The ability of teachers to communicate the learning objectives and standards in the curriculum and to provide students with the support and resources they need to achieve these objectives is essential for improving students' generic skills. This requires teachers not only to have rich teaching experience and professional knowledge but also to have flexible and versatile teaching methods and strategies to meet the learning needs of different students (Ertmer & Ottenbreit-Leftwich, 2010). Of course, when teachers can effectively guide and support students' learning, students' generic skills can be effectively developed.

Learning Workload

A clear learning workload is a factor in the process of improving generic skills in preschool art courses. The effectiveness of the learning workload can only be demonstrated by a combination of several factors, such as clear learning objectives, a high level of teaching, and appropriate assessment scales (Caena & Redecker, 2019). A clear learning workload helps students maintain a moderate learning pace and Level of engagement with the program (Hew et al., 2020).

If the learning workload is set appropriately, students will have sufficient time and resources to complete tasks inside and outside the classroom. They will neither feel too relaxed and lack in challenge nor be overburdened by an overload of tasks (Ruiz-Gallardo et al., 2016). This balanced pace of learning helps students to maintain sustained motivation and interest in learning and, therefore, to focus more on improving their skills (Seli, 2019). The effectiveness of the learning workload is also very much related to the Level of teaching. When teachers have a high level of teaching competence, they can better design and set learning tasks, ensuring that they are closely related to the program objectives and that they help students master the required skills (Hakim, 2015). Such a teaching environment makes the learning workload meaningful and efficient, ensuring that students make the most of their limited time.

Grading Scales

Appropriate assessment scales play a crucial role in developing students' generic skills and are key to ensuring fairness, validity, and transparency in program assessment (Uerz et al., 2018). A sound assessment scale accurately measures students' academic performance and provides valuable feedback and suggestions to help students improve their generic skills (York et al., 2019).

Clear assessment criteria can give students clear learning directions and goals (Ferreira et al., 2020). When students clearly understand the standards and requirements of the assessments, they can be more focused on their learning and practice and strive to meet the requirements of the assessment scales. Such clarity helps to reduce students' learning confusion and anxiety and increases their motivation and confidence to learn.

Well-designed assessment scales reflect the aims and requirements of the program, thus ensuring that student learning outcomes are aligned with program requirements (Juuti et al., 2021). When assessment scales are closely linked to program objectives, students will have a clearer understanding of whether their academic performance has met the program's requirements so that they can make timely adjustments to their learning strategies and approaches to improve their generic skills (Theobald, 2021). Properly constructed assessment scales can also provide helpful feedback and suggestions. Through assessment, teachers can understand how students are learning and what problems they are having in order to provide them with targeted guidance and support (Ferreira, 2020). Such feedback helps students correct their mistakes and improve their learning methods in time and motivates them to work harder at learning and improving their generic skills.

In conclusion, the Level of teaching, clear objectives and standards, appropriate learning workload, and reasonable assessment scales together provide a key framework for developing students' generic skills in preschool arts programs. These elements work together to ensure students acquire practical skills through high-quality teaching guided by clear objectives. They continue developing their generic skills efficiently, supported by appropriate workload and practical assessment.

Model Construction

According to the above literature review, this study explores how art teaching can improve general skills. In the art class course of preschool education majors, facing the training of

kindergarten teachers, the traditional unidirectional skill training of art class teaching can no longer meet the needs of the times. In order to deeply explore the ways to improve the generic skills in the art class course of preschool education majors in higher education, this study adopts the validated CEQ (Course Experience Questionnaire) assessment model and, based on its sequential position (i.e., antecedent and consequent) in the relational network, divides the CEQ into five well-defined dimensions: teaching level, objectives and standards, learning workload, evaluation scales, and generic skills (Cano et al., 2021), as shown in Fig. 1.

The CEQ was developed by Ramsden in 1991 to measure students' perceptions of the quality of teaching and learning in their programs (Saputra et al., 2021). Rather than attempting to capture all aspects of teaching effectiveness, the assessment model focuses on collecting data on the reliability and validity of the elements of teaching and learning that students experience directly (Ramsden, 1991). Quality is a relative concept; therefore, the CEQ is suitable for measuring and comparing the assessment of learning outcomes and the quality of teaching and learning in a particular program. Therefore, the CEQ, as a valid measurement model of course quality, fits well with the topic of this study.

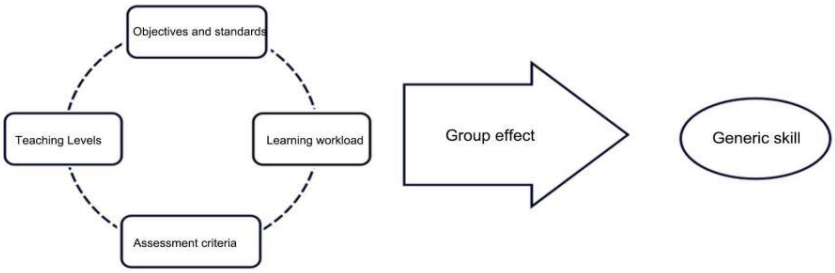


Fig. 1. Theoretical Model for Enhancing Generic Skills

Research Methodology

Choice of Method

This paper adopts an integrated research method to explore the causal complex mechanism of cultivating students' generic skills in art courses for preschool education majors. fsQCA method achieves complete comparison and analysis of cases through Boolean operations and set relationships, focuses on mining the relationship between antecedent complexity and causal asymmetry, and can effectively explore the synergistic effects and interactions between multiple elements, which is suitable for solving the research problem of this paper (Mendel & Korjani, 2018). fsQCA can discover the combinatorial relationship between four or more elements, thus effectively dealing with the grouping relationship of multiple variables in cultivating generic skills (Zhang & Long, 2021). fsQCA is different from cluster analysis, factor analysis, and other methods of examining the grouping relationship, which can effectively identify the interactive relationship between conditions and help to explore the possible substitutive and complementary relationship between multiple elements of the cultivation path, which can help to more comprehensively. fsQCA can also be used to explore the relationship between multiple elements of the path of cultivating generic skills and an in-depth understanding of the complexity of developing generic skills.

However, while fsQCA can provide a qualitative interpretation in analyzing the necessary conditions and showing whether or not the conditions are necessary for the outcome, it cannot provide a precise quantitative dimension to answer to what extent the conditions are necessary for the outcome. For this academic challenge, the NCA approach compensates for the limitations of the fsQCA by quantifying the effect sizes of necessary conditions and assessing the bottleneck effects of necessary conditions (Sukhov et al., 2023). The NCA approach complements the fsQCA approach in that it In contrast, the fsQCA determines whether a condition is necessary or not in terms of category, and the NCA determines necessary conditions in terms of degree (Dul, 2016). This analysis method allows this study to understand more precisely the extent to which necessary conditions affect outcomes. Therefore, this study adopts the NCA method as an analytical tool to study the necessary conditions for developing generic skills, combined with the fsQCA analysis of necessary conditions as a robustness test.

Sample and Data

This study took the preschool education majors of the Teacher Training College of a university in Guangxi as the object of study and conducted a questionnaire survey among the current students of the university who had participated in art classes. A total of 269 questionnaires were distributed, and after repeated screening, 235 valid questionnaires were finally identified, with an effective rate of 87%. In order to ensure the comparability of the results of the study, the survey included students who had taken art classes from their first to fourth year of university. The data collected showed a high degree of heterogeneity, which meets the case selection requirements of ensuring sufficient overall homogeneity of the cases and maximum heterogeneity within the cases in order to ensure adequate comparability and validity of the conclusions.

Measurement and Calibration

Measurement

To ensure the accuracy and validity of the study, the validated measurement scales, which have shown excellent reliability and validity in previous studies, were used. At the same time, some of the measurement items were moderately adapted to better fit the curriculum development pathway, taking into account this study's specific contextual and disciplinary characteristics. In terms of measurement, this study adopted the internationally recognized 5-point Likert scale, which allows respondents to rate the questions in the questionnaire from 1 to 5 based on their personal learning experience, where one stands for “Strongly Disagree” and 5 for “Strongly Agree." This rating scheme helped to provide insights into the respondents' views and attitudes towards the research variables. Throughout the data collection process, the researcher emphasized the content's objectivity to ensure the data's authenticity and reliability. (1) Level of teaching (HQTAL). It refers to the research scale of Byrne M et al. It contains six questions: Teachers will motivate, critique homework, and solve difficulties. (2) Goals and Standards (COAS). The research scale of Grace D et al. was used, which includes four items of questions such as homework standards, indicating requirements, and informing content. (3) Academic Workload (AWL). The research scale of Wilson K L was used, including four items: workload, study time, and stress. (4) Assessment Scale (ASC). Based on the research scale of Lyon P M et al. It includes three items: aesthetic skills and factual issues. (5) General Skills (GS). Based on the research scale of Crespí P et al. It includes six items: problem-solving skills, teamwork skills, and practical skills (as shown in Table 1).

Table 1
Study Variables and Reference Sources

variant	Defining	reference source
Teaching Levels	The ability of educators to stimulate learning and promote the holistic development of students through in-depth subject knowledge and diverse teaching methods	Byrne M , etc(Byrne & Flood, 2003)
Objectives and standards	Setting clear learning objectives, as well as defining specific criteria for measuring the Level of student performance required to meet those objectives	Grace D , etc(Grace et al., 2012)
Learning workload	The amount of tasks that can be completed and effectively assimilated within a given time frame to promote depth of learning and understanding	Wilson K L(Wilson et al., 1997)
Assessment criteria	Assessment criteria and tools that can comprehensively, objectively, and accurately measure student learning outcomes and are aligned with set learning objectives	Lyon P M,etc(Lyon & Hendry, 2002)
Generic skill	Essential competencies outside the discipline, including teamwork, communication skills, hands-on skills, problem-solving skills, etc	Crespí P, etc(Crespí & Ramos, 2021)

Calibration

Before applying the NCA and fsQCA methods for in-depth analyses, to ensure that the consistency and accuracy of all variables are crucial, this study conducted a comprehensive calibration of the variables to ensure that each sample case accurately reflects its affiliation index in the set. In order to complete the calibration, this paper analyzed the initial data, drawing on the theoretical perspectives of scholars such as Du Yunzhou, and adopted the direct calibration method, using the three key points of 95%, 50%, and 5% as the reference standards for the complete non-affiliation point (Pappas & Woodside, 2021), the crossover point and the complete affiliation point. Setting three anchor points for four condition variables and one outcome variable ensured the accuracy and consistency of the data. In addition, the researcher conducted a comprehensive fuzzy set calibration of the five generic skills development variables (as shown in

Table 2) to further improve the quality and reliability of the data. Due to cases where the values of the sample intersections were calibrated to be precisely 0.5, to maintain the

completeness and multiplicity of the data, this paper adjusted 0.5 to 0.501 based on the bias associated with the values of the intersections.

Table 2
Pooling, Calibration, and Descriptive Statistics

	Fuzzy set calibration			Descriptive statistics			
	Total affiliation	intersection point	Unaffiliated	average value	standard deviation	Maximum values	minimum values
Teaching Levels	5.00	4.00	3.00	4.20	0.691	5	1
Objectives and standards	5.00	3.75	3.00	3.83	0.683	5	2
Learning workload	5.00	3.50	2.75	3.60	0.687	5	2
assessment criteria	5.00	3.67	2.67	3.75	0.675	5	2
generic skill	5.00	4.00	3.00	4.04	0.639	5	3

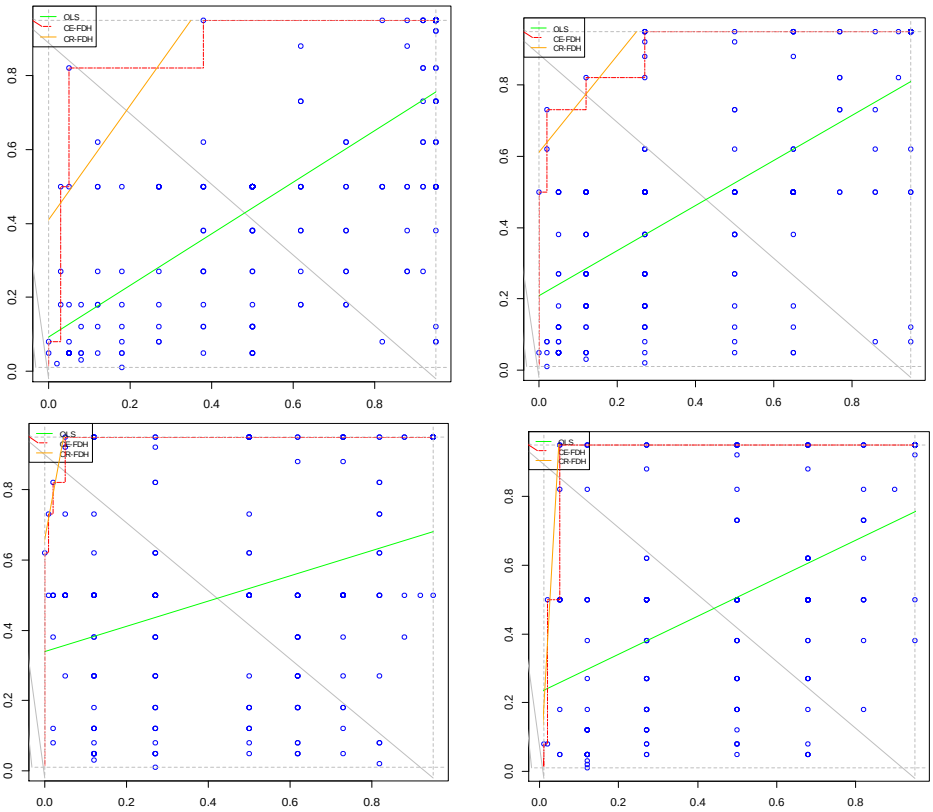
Data Analysis and Empirical Results

Analysis of Necessary Conditions

NCA Method

This study adopts the NCA research method to analyze the necessity of individual conditions for developing generic skills in art courses. Using RGui (64-bit) software to analyze the data in R language, the scatter plot shown in
Fig. 2 and the analysis results in

Table 3 were obtained. These results provide a basis for determining whether a particular condition is necessary for the occurrence of an outcome variable and to quantify the importance of that necessary condition further. To achieve this, the researcher used two estimation tools, ceiling regression (CR) and ceiling envelope (CE), to calculate the effect size Fig. 2 accurately. Fig. 2 shows that the influence of learning workload and evaluation scale variables on improving general skills is more significant in the NCA method. Determining the necessary conditions must meet two conditions simultaneously: the degree of effect (d) is not less than 0.1, and the Monte Carlo simulation replacement test results show that the effect size is significant. The degree of effect (d) indicates the minimum Level of attainment of the necessary conditions required to produce a particular result, and its value ranges from 0 to 1. According to Dul J et al, if $0 \le d \le 0.1$, it means that the condition variable has a negligible effect on the outcome; if $0.1 < d \le 0.3$, it means that the condition variable has a medium effect on the outcome; if $0.3 < d \le 0.5$, it means that the condition variable has a significant effect on the outcome; and if $0.5 < d \le 1.0$, it means that the condition variable has a significant effect on the outcome (Dul, 2016). To determine that a variable is necessary for the outcome, a p-value of less than 0.05 must also be met, and the precision must be greater than 90% (Su et al., 2023).



(1) Teaching Levels (2) Objectives and Standards
(3)Learning Workload (4)Assessment Criteria

Fig. 2. Scatterplot of NCA method requisites analysis

Based on the above necessary condition determination criteria, the effect sizes of the four condition variables were analyzed using two different estimation methods: upper-bound

regression analysis (CR) and upper-bound envelopment analysis (CE). The results showed that the effect sizes of teaching level, objectives and standards, and assessment scale were more significant than or equal to 0 and less than 0.1, which had a negligible effect on the General Skills Enhancement Index (GSEI). The learning workload was less than 0.3 and more significant than 0.1, which had a medium effect on the GSEI. The p-value of the teaching level variable was less than 0.05, and the precision was 98.3%, which was more than 90% of the standard and met the necessary condition criterion. Hence, the teaching level was a necessary condition for the improvement of general skills. The objectives and standards, learning workload, and assessment scale d-values are all less than 0.1, so they are not necessary conditions for the outcome variable.

Table 3
Results of NCA Method Requisites Analysis

conditional variable	method	c-accuracy	ceiling zone	scope	effect size	p-value
Teaching Levels	CR	98.3%	0.094	0.89	0.106	0.000
	CE	100%	0.078	0.89	0.102	0.000
Objectives and standards	CR	99.1%	0.042	0.89	0.047	0.000
	CE	100%	0.050	0.89	0.057	0.000
Learning workload	CR	99.1%	0.007	0.89	0.008	0.204
	CE	100%	0.009	0.89	0.011	0.235
assessment criteria	CR	99.6%	0.015	0.88	0.017	0.079
	CE	100%	0.022	0.88	0.025	0.090

Notes: a. Fuzzy set membership values after calibration. b. 0.0≤d<0.1: "low level"; 0.1≤d<0.3: "medium level"; 0.3≤d<0.5: "medium-high level"; 0.5 ≤ d: "high level". c. NCA analysis of the permutation test (permutation test, the number of resampling = 10,000).

The study further explored the bottleneck level of each condition variable, and according to the data in Table 4 , teaching level, objectives and standards, learning workload, and assessment scale affect generic skills. When the generic skills improvement index level reaches 60%, 11.2% of the Level of teaching and 2.1% of the Level of assessment scales are required. In contrast, objectives sta, standards, and learning workload did not limit the Level of significant impact on the outcome variable. Considering the results of the analysis of the necessary conditions test with the QCA method, the Level of consistency of the variables on the improvement of generic skills is below 0.9, except for the variable Level of teaching, which is 0.901919, which indicates that the Level of high-quality teaching is a necessary condition for the improvement of generic skills and that the other variables are not necessary conditions for the improvement of generic skills. This is consistent with the results of the NCA necessary condition analysis.

Table 4
Analysis of NCA Requisite Bottleneck Levels

Enhancement index	Teaching Levels	Objectives and standards	Learning workload	assessment criteria
0	NN	NN	NN	NN
10	NN	NN	NN	NN
20	NN	NN	NN	0.1
30	NN	NN	NN	0.6
40	NN	NN	NN	1.1
50	4.8	NN	NN	1.6
60	11.2	NN	NN	2.1
70	17.6	4.4	0.2	2.6
80	24.0	11.7	1.8	3.1
90	30.4	19.0	3.4	3.6
100	36.8	26.3	5.0	4.1

Note: CR method, NN = not necessary.

The fsQCA Approach
The results of the analyses carried out using the fsQCA method are shown in

Table 5 ; for both generic skills improvement and non-generic skills, the necessary conditions require that the consistency threshold of the individual antecedent conditions should be greater than the criterion of 0.9, as proposed by scholars such as Du Yunzhou et al. Consistent with the results of the analyses carried out using the NCA method, among the necessary conditions required for generic skills improvement and non-generic skills, only the Level of instruction meets the criterion of the necessary conditions. In the context of the study, it is impossible to explain or predict the pathway of generic skills improvement by a single factor. The combination or interaction of several factors should lead to the improvement pathway. This multifactorial situation is more common in some complex systems studies, and therefore, a combination of factors must be considered to gain insight into the mechanisms inherent in generic skills improvement.

Table 5
Analysis of fsQCA Requisites

variable symbol	Corresponding Meaning	Consistency	Coverage
HQTAL	Teaching Levels	0.901919	0.857398
COAS	Objectives and standards	0.888920	0.855385
SWL	Learning workload	0.811553	0.776160
ASC	assessment criteria	0.836508	0.849080
~HQTAL	~Teaching Levels	0.368066	0.632842
~COAS	~Objectives and standards	0.394272	0.663391

~SWL	~Learning workload	0.455374	0.774533
~ASC	~assessment criteria	0.447379	0.690039

Highly generic skill set			Low generic skill set	
preceding variable	H1	H2	L1	L2
Teaching Levels	●	●	⊗	⊗
Objectives and standards		●		⊗
Learning workload				●
assessment criteria	●		⊗	
Raw Coverage	0.771445	0.833867	0.638577	0.556067
Unique Coverage	0.0420548	0.104477	0.136603	0.0540926
coverage	0.875922		0.692669	
consistency	0.889148		0.896223	

Sufficiency Analysis of Conditional Groupings

Sufficiency analysis of conditional grouping investigates whether the set represented by a grouping composed of multiple conditions is a subset of the result set. First, in the parameter setting, in order to distinguish whether the grouping passes the consistency of fuzzy set theory or not, the consistency threshold is set to 0.8, the case frequency threshold is set to 1, and in order to reduce the potentially inconsistent grouping, the consistency value of PRI (proportional reduction in inconsistency) is set to 0.75. The analysis of the grouping patterns is shown in

Table 6

Configuration *of High/Low Generic Skills* It is generally assumed that when the consistency value reaches 0.8, the data obtained have good explanatory

Table 6

Configuration of High/Low Generic Skills

Note: " ● " and " ⊗ " indicate the presence or absence of the core causal condition, respectively;" ● " and " ⊗ " indicate the presence or absence of the auxiliary causal condition, respectively, and a blank indicates that the presence or absence of the condition does not affect the outcome.

Power. As can be seen in Table 5, the consistency level of the two groupings of general skills improvement is more significant than 0.8, the overall consistency is 0.889148, and the overall coverage is 0.875922, which indicates that the results have high explanatory power and meet the standards of academic research. In order to verify the reliability of these results, this study conducted an in-depth robustness test of the antecedent grouping pattern of generic skills improvement using three different methods, including adjusting the consistency thresholds, the case frequency thresholds, and calibrating the anchor points. After these tests, the results all showed high stability, further confirming the reliability and validity of this study. The parsimonious and intermediate solutions analyses for generic skills show that learning workload is the boundary condition and teaching level is the core condition. Objectives, standards, and assessment scales are auxiliary conditions.

Pathways for Improving Generic Skills

Based on the in-depth path analysis, the study finally identified the two core pathways for improving generic skills - H1 and H2. Both pathways are significantly influenced by the variable of teaching level, which plays a crucial role in improving generic skills.

In the H1 pathway, targets sta, standards, and learning workload did not affect the improvement of generic skills in the H1 pathway. This means that high-quality teaching plays a crucial role in improving generic skills. It is worth noting that scientific assessment scales also played an essential role in the H1 pathway. Although its impact is not as significant as the Level of teaching, it provides a clear direction for generic skills and ensures the relevance and effectiveness of the teaching process. From the pathway with low generic skills development in L1, a reverse validation can be obtained: the absence or inadequacy of teaching level and assessment scales is the main reason why the improvement of generic skills is hindered. This observation provides valuable insight into the study and emphasizes the importance of ensuring a high level of teaching and scientific assessment scales in the teaching and learning process.

High-quality teaching and scientific assessment scales are indispensable critical factors in both pathways. In future educational practice, we need to focus on optimizing and developing these two aspects to lay a solid foundation for enhancing generic skills in the art curriculum for early childhood education majors. In the H2 pathway, the Level of teaching still plays an irreplaceable role. Unlike the H1 pathway, in the H2 pathway, objectives and standards become supporting factors that provide clear directions and guidelines for improving generic skills. It is worth noting, however, that learning workload and assessment scales had no impact on the H2 pathway.

From the H2 pathway, it can be deeply recognized that to improve the Level of generic skills in the art course of preschool education, teachers must have excellent teaching ability, so improving the Level of teaching is necessary. At the same time, teachers should set clear learning objectives in each course to ensure that the cultivation of professional competence and the improvement of generic skills can be closely integrated. This combination will significantly enhance students' overall skills and prepare them for future career development. In the L2 pathway, the study observed that the lack of teaching level and objectives became the key factors leading to the blockage of generic skills. In contrast to the positive pathway, in the case of the low Level of teaching and lack of clear objectives, the increase in learning workload not only failed to promote the development of generic skills but became an obstacle. This finding highlights the importance of ensuring a high level of teaching and clear objectives in teaching practice for the development of generic skills. It emphasizes that the critical role of teaching level and objectives should be considered in pursuing learning outcomes.

Conclusions and Implications

Conclusion of the Research

This study analyzed an in-depth sample of questionnaires on art courses taken by Preschool Education students at a university in Guangxi, China. To ensure the study's accuracy and reliability, 235 valid questionnaires were collected, and a comprehensive multidimensional evaluation of these data was conducted. In order to explore the relationship between the

improvement of generic skills and other aspects of education in a more comprehensive and systematic way, the study applied fsQCA and NCA methods from a group perspective. It analyzed the four key conditional variables in detail. This research method helps the study reveal the complex relationship between the variables more accurately and provides valuable references and guidance for developing preschool children's generic skills in the arts. Through multi-level analyses, the final study found that None of the individual factors of teaching level, goals and standards, learning workload, and assessment scales are the only conditions that produce high/low generic skills, and teaching level plays a prominent role in the influencing process. In the process of improving generic skills in art programs in preschool education, the Level of teaching is necessary to influence the improvement of generic skills.

Two sets of patterns produce pathways for the development of generic skills. The first grouping is the combined pathway of teaching level and assessment scale. In this process, the teacher's Level of teaching plays a crucial role. A good teacher can impart professional knowledge and skills to students and help students better understand and master this knowledge through his/her own teaching methods and experience (Du Plessis, 2020). On the contrary, if a teacher's Level of teaching is not high, it will be difficult for students to master general skills other than professional knowledge through art courses, and they may even lose their interest and confidence in early childhood education courses. Therefore, teachers' teaching level plays a vital role in the mastery of students' generic skills (U. et al., 2020). Only with high-level teachers can we provide students with a better learning environment and better educational resources, which helps students improve their generic skills in the arts. At the same time, this also creates the necessary conditions for improving students' overall ability. Teachers' teaching level is an indispensable and essential factor in improving the general ability of art courses for preschool education majors. Only with a high level of teachers can we provide students with better educational resources and a better learning environment (Alam, 2023), which in turn will help students to master general skills better, improve their comprehensive ability, and lay a solid foundation for future work in early childhood education.

Assessment scale variables also play an indispensable supporting role in improving the generic skills of art courses in preschool education. Assessment scale variables usually refer to standards and indicators used to assess the degree of improvement of students' skills (Gao et al., 2020). These variables help teachers accurately measure students' skill mastery and provide students with a clear learning goal and direction (Alehegn, 2020). The assessment scale variables help teachers to get a clearer picture of students' progress and Level of learning. By comparing students' performance with the assessment scales, teachers can identify students' deficiencies in time and adjust their teaching strategies and methods to improve students' generic skills more effectively. At the same time, the scale variable also provides teachers with an objective evaluation standard, which helps to avoid subjective assumptions and prejudices. It ensures the fairness and accuracy of the evaluation. Secondly, grading scale variables also play a positive role in motivating students. Students can clearly understand the gap between their performance in generic skills and the assessment scale, thus clarifying their learning goals. This clear goal orientation can stimulate students' interest and motivation in learning, encouraging them to study and practice harder to improve their generic skills. Assessment scale variables also help to create a positive learning atmosphere and environment. When teachers and students know the assessment scale, they can focus

more on learning and improving their skills with fewer unnecessary interruptions and distractions (Salendab, 2021). This focus and engagement help to create a positive, energetic, and creative learning climate that further develops students' generic skills.

In the second grouping path, for improving the general skills of art courses in preschool education, teachers' teaching level is still an essential condition. This is because teachers' professionalism and teaching methods directly affect students' learning effects (Choi & Faucher, 2024). A teacher with rich experience and professional knowledge can accurately grasp the key points and difficulties of teaching, give targeted guidance, and then help the students master general art skills (Chew & Cerbin, 2021). In addition to the necessary conditions for the Level of teaching, the target and standard variables also play an essential supporting role in the second grouping pathway. Clear learning objectives and standards are essential for student learning and progress guidelines (Boysen & Sawhney, 2020). By setting clear and specific learning objectives, students can be more aware of their learning direction and focus their learning and practice (Walkington & Bernacki, 2020). At the same time, these objectives and standards provide teachers with a basis for assessment and feedback, helping them to understand student learning better and to make timely adjustments to their teaching strategies and methods.

In this pathway, the variables of objectives and standards and the Level of teaching of teachers complement each other and promote the improvement of students' general skills in art education. Teachers need to set learning objectives and standards that meet students' actual Level and development needs according to their learning needs and the actual situation (Sudargini & Purwanto, 2020). These objectives and standards should be both challenging and achievable, which can stimulate students' interest and motivation in learning and, at the same time, help them gradually improve their general art skills.

In conclusion, the core of improving generic skills lies in the organic combination of high-quality teaching and scientific assessment scales or clear teaching objectives and standards. The two complement each other and form a solid cornerstone for improving generic skills. In future educational practice, it is essential to optimize and develop these two aspects to ensure that they provide solid support for developing generic skills. Especially for the arts program in preschool education, teachers should be committed to improving their teaching skills and set clear learning objectives in the program to ensure that the cultivation of professional skills and the enhancement of generic skills can go hand in hand. This holistic approach to education enables students to develop more comprehensively in the art program and lays a solid foundation for their future careers.

Research Findings and Recommendations

This study aims to explore the pathways for cultivating generic skills in art courses within the early childhood education program at higher education institutions, with the goal of providing valuable references and theoretical support for the future development of such courses. In the research, we utilized the validated CEQ (Course Experience Questionnaire) assessment model and applied a combination of NCA (Necessary Condition Analysis) and fsQCA (Fuzzy Set Qualitative Comparative Analysis) methods to conduct an in-depth questionnaire sample analysis of students from the early childhood education program at a university in Guangxi.

The main findings are as follows: First, teaching quality plays a crucial role in the process of enhancing generic skills and is a necessary condition for their improvement. Second, assessment scales and clear learning goals and standards play important supportive roles in the pathway to enhancing generic skills. We identified two primary pathways for improving generic skills: one is the combination of high-quality teaching and scientific assessment scales; the other is the synergistic effect of high-quality teaching and clear learning goals and standards. Both pathways emphasize the importance of teaching quality and reveal how other factors interact with teaching quality to jointly promote the enhancement of generic skills.

The following recommendations are made: In future educational practices, greater emphasis should be placed on improving teachers' teaching quality, ensuring that they not only impart professional knowledge and skills but also effectively help students enhance their generic skills. Additionally, scientific assessment scales and clear learning goals and standards should be developed to provide students with clear learning directions and effective feedback. Furthermore, educational institutions and teachers should continuously explore and optimize teaching methods to meet the diverse learning needs of students, thereby enhancing students' overall competence more comprehensively. The results of this study have significant guiding implications for the reform and development of art courses within early childhood education programs at higher education institutions, and also offer valuable references for future related research.

Research Limitations and Future Directions

The sample of this study mainly focuses on students majoring in early childhood education at a university in Guangxi. Although such a sample selection has a certain degree of relevance, it also limits the generalisability and replicability of the findings to some extent. As a result, the generalisability of the findings is limited. In future studies, the sample will be expanded to include universities in different regions and levels to collect more comprehensive and representative data.

Considering that different regions or schools may have different pathways and influencing factors for cultivating arts programs for early childhood education majors, future studies need to broaden their horizons and explore the pathways for cultivating generic skills in different contexts. In addition, this study mainly relied on questionnaires for data collection, and although this method has certain advantages of quantitative analysis, it is challenging to avoid subjectivity and bias. In order to obtain more prosperous and more in-depth data, future research could consider using a combination of different material collection methods, such as interviews, observations, and case studies, to reveal the internal mechanisms and influencing factors of generic skills cultivation more comprehensively.

There are still many areas worth exploring in the pathway of generic skills cultivation in art courses for early childhood education majors. Future research can further focus on the generic skills development needs of students from different professional backgrounds and at different stages of learning, as well as the different influences of teaching methods and assessment mechanisms on the development of generic skills. Cross-regional and cross-school comparative studies can provide a more comprehensive understanding of the best way to develop generic skills in pre-primary art programs. Meanwhile, with the rapid development

of educational technology, using modern technological means to enhance the effect of generic skills development more effectively will also become an essential topic for future research. Through continuous and in-depth research and practice, the study can provide more scientific and practical guidance for developing art courses in preschool education.

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