Design and Application of Innovative Practice Course for Nursery Education Specialty with STEAM Concept

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Abstract: The purpose of this article is to explore innovative practical courses for nursery education majors that integrate the idea of STEAM, so as to solve the shortcomings of traditional courses for nursery education majors. Based on the theoretical research method, this article expounds the concept of STEAM and the related theories of nursery professional courses, and carefully designs the integrated courses from the aspects of goal setting, content construction, structural planning and implementation method selection. Goal setting focuses on cultivating students' interdisciplinary knowledge application, innovative thinking and practical ability; Content construction breaks down discipline barriers with thematic learning units; The structure is promoted in three stages; Implement diversified methods such as project-based and situational teaching. At the same time, the paper puts forward application strategies covering teacher construction, resource allocation and evaluation system construction. It is expected that this course can improve students' comprehensive quality, promote the development of nursery education, provide reference for the curriculum reform of related majors, and is of great significance for cultivating nursery talents to meet the needs of the times.

1. Introduction

In today's society, the demand for nursery services continues to grow, and the development of nursery specialty is very important to improve the quality of nursery services [1]. There are some problems in the traditional curriculum of nursery education, such as clear discipline boundaries and insufficient training of practical application ability, which are difficult to meet the demand for nursery talents in the new era [2]. In this context, it is an important direction of reform and development to integrate the idea of STEAM into the innovative practice course of nursery education specialty [3]. The concept of STEAM emphasizes the interdisciplinary integration of Science, Technology, Engineering, Arts and Mathematics, aiming at cultivating talents with innovative thinking, problem-solving ability and comprehensive literacy [4]. Since this concept was put forward, it has aroused widespread concern in the field of global education and has been applied in many disciplines and educational stages [5]. For nursery majors, the introduction of STEAM concept can break down the discipline barriers and make the course content closer to the complexity and comprehensiveness of nursery practice.

Nursery major aims to cultivate professionals with solid professional knowledge and practical skills, who can provide quality care and education for infants [6]. Its curriculum should not only cover the basic knowledge of infant's physical and mental development, nutrition and health care, but also focus on cultivating students' practical operation ability and innovative thinking [7]. However, at present, there are some limitations in teaching methods and course content integration of nursery professional courses, which can not fully stimulate students' learning interest and potential.

It is of great practical significance to integrate the concept of STEAM into the innovative practice course of nursery education specialty. It helps to improve students' comprehensive quality, so that they can use interdisciplinary knowledge and skills to solve problems in the face of complex

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and changeable nursery practice scenarios [8]. It can also promote the optimization and innovation of the curriculum system of nursery education and promote the development of nursery education in a more scientific and comprehensive direction. Through interdisciplinary integration, the course can better meet the needs of the all-round development of infants and lay the foundation for cultivating nursery professionals who adapt to the development of the times. This study will deeply discuss the design and application of innovative practical courses for nursery education with the idea of STEAM, so as to provide useful reference for the educational reform of nursery education.

2. STEAM concept and theoretical cornerstone of nursery practice course

STEAM concept is based on constructivism learning theory. According to this theory, learners actively construct a knowledge system through interaction with the surrounding environment. In STEAM education, students integrate knowledge from different disciplines by participating in practical projects, thus deepening their understanding and mastery of knowledge. The theory of multiple intelligences also supports the idea of STEAM, which emphasizes that individuals have multiple types of intelligence and can stimulate and develop different intelligences through interdisciplinary learning.

The practical course of nursery education is based on the theory of children's development. Children's development has stages and continuity, and they have different cognitive, emotional and social development needs at different stages. The curriculum design of nursery school should provide suitable educational activities according to these characteristics. In addition, Montessori education law also provides guidance for the practical curriculum of nursery education, emphasizing respect for children's autonomy and creating a rich learning environment for them.

The concept of STEAM is interrelated with the theory of nursery practice course. The interdisciplinary integration of STEAM can better meet the needs of children's all-round development, and the theory of children's development based on the practice course of nursery provides pertinence and scientificity for the application of STEAM concept in the field of nursery.

3. Curriculum design of nursery education specialty with STEAM concept

In the process of integrating the concept of STEAM into the curriculum of nursery education, it is necessary to comprehensively consider the key elements such as curriculum objectives, content, structure and implementation methods, so as to build a scientific and innovative curriculum system. The setting of curriculum objectives is very important, which guides the direction of the whole curriculum. The professional course of nursery education, which integrates the concept of STEAM, aims to cultivate students' interdisciplinary knowledge application ability, so that they can use knowledge in many fields such as science, technology, engineering, art and mathematics to provide quality care and education services for infants. It focuses on cultivating students' innovative thinking and practical operation ability, so that they can creatively propose solutions when facing various problems in nursery practice. For example, based on the scientific knowledge of children's development, students should be able to use engineering thinking to design activity facilities suitable for infants and children, and use artistic means to enhance the interest of activities to meet the cognitive, emotional and physical development needs of infants and children.

The construction of curriculum content is the core link to realize the curriculum goal. Based on the concept of STEAM, the course content needs to break the boundaries of traditional disciplines and be organically integrated. The infant science exploration course, for instance, no longer teaches physics, chemistry, biology, and other subjects in isolation. By designing a series of interesting exploration activities, such as the theme activity of "The Mystery of Water", teachers guide infants to observe the morphological changes of water and the movement law of water flow, and skillfully integrate physical knowledge in this process; At the same time, guide infants to explore the relationship between water and plant growth, which involves biological knowledge. In the organization of the course content, a detailed thematic learning unit is designed, as shown in Table 1:

Table 1 Thematic Learning Units for Childcare Professional Courses Integrating the STEAM Concept

Theme	Scientific Knowledge	Technological Application	Engineering Design	Artistic Expression	Mathematical Application
The Wondrous World of Light and Shadow	Principles of Light Propagation	Operation of Light and Shadow Equipment	Construction of Light and Shadow Display Devices	Creative Light and Shadow Painting	Measuring the Length and Angle of Light and Shadow
Little Architects	Knowledge of Material Properties	Tool Usage Techniques	Construction of Small Architectural Models	Creative Design of Building Exteriors	Calculating Architectural Dimensions and Ratios

These thematic learning units focus on the common things in infants' daily life, and skillfully integrate the knowledge of various disciplines so that students can understand and master interdisciplinary knowledge and skills in practice.

The optimization of curriculum structure is the key to ensure the smooth implementation of the curriculum. The course should be divided into three stages: basic theory learning, practical operation training and comprehensive project practice. In the learning stage of basic theory, students systematically learn the basic knowledge of nursery specialty and the basic concepts and principles of various disciplines of STEAM. In the practical operation training stage, students can exercise their hands-on ability and knowledge application ability through practical operation activities, such as designing and making toys for infants. In the practical stage of comprehensive projects, students complete complex nursery projects in the form of teams, such as planning and implementing a large-scale infant theme activity, comprehensively applying the knowledge and skills they have learned, and improving their ability to solve practical problems.

The course implementation methods should be diversified to meet the teaching needs under the concept of STEAM. Project-based teaching method is adopted to enable students to explore independently and study cooperatively in the process of completing specific projects. For example, to arrange the project of "designing an environment-friendly playground for infants and young children", students need to use multidisciplinary knowledge to complete the project from site planning, material selection to activity design. At the same time, the situational teaching method is used to create a real nursery scene, so that students can use what they have learned to solve practical problems in simulated situations and improve their practical ability and adaptability. In addition, online and offline mixed teaching mode can be introduced to expand students' learning channels and strengthen their flexibility and autonomy.

4. Curriculum application strategy and expected effect

When putting the professional curriculum of nursery education with the idea of STEAM into practice, a series of effective application strategies are needed to ensure the achievement of the curriculum objectives, and at the same time, many positive effects can be expected. Curriculum application strategy is the key guarantee for the smooth implementation of the curriculum. As the direct implementer of the curriculum, teachers need to have interdisciplinary knowledge and teaching ability. Schools should regularly organize teachers to participate in training related to the concept of STEAM, and invite industry experts to give lectures, so as to enhance teachers' ability of integrating interdisciplinary knowledge and teaching application. For example, teachers are arranged to participate in the training course on "STEAM Teaching Skills in Nursery Practice", so that teachers can skillfully use diversified teaching methods such as project-based teaching method and situational teaching method.

The rational allocation and utilization of teaching resources is indispensable. Schools need to increase investment in teaching facilities, equipped with tools and materials needed to carry out STEAM teaching, such as building blocks for engineering design, electronic components, and various painting materials for artistic creation. At the same time, a digital teaching resource

platform is built and enriched with online teaching resources—including high-quality instructional videos and virtual experiment software—to enable students to learn anytime. Curriculum evaluation should not be limited to traditional test scores, but should adopt diversified evaluation methods. In addition to assessing students' knowledge, we should pay more attention to the evaluation of students' practical operation ability, teamwork ability and innovative thinking. See Table 2 for the diversified evaluation system of nursery courses integrating the idea of STEAM. Through such a comprehensive and diversified evaluation system, students' comprehensive performance in course learning can be more accurately reflected, which provides a basis for teaching improvement.

Table 2 Diversified Evaluation System for Childcare Professional Courses Integrating the STEAM Concept

Evaluation Dimension	Evaluation Indicators	Evaluation Methods
Knowledge Mastery	Understanding and memorization of childcare professional knowledge and knowledge from various STEAM disciplines	Written tests, assignments, classroom questioning
Practical Operation	Quality of project completion, proficiency in experimental operations	Practical assessments, project presentations, and evaluations
Team Collaboration	Communication skills and performance in division of labor and collaboration during team projects	Peer evaluations among team members, teacher observation evaluations
Innovative Thinking	Ability to propose novel solutions, improvements to traditional methods	Evaluation of innovative projects, presentations of creative solutions

The course is expected to have a positive impact on many levels. At the student level, students' comprehensive quality will be significantly improved. Through the study and practical application of interdisciplinary knowledge, students can fully understand the complexity of nursery work and improve their ability to solve practical problems. For example, when designing creative activities for infants, students can comprehensively use scientific knowledge to ensure the safety and education of the activities, and use artistic knowledge to enhance the interest of the activities, thus providing infants with a better activity experience. From the perspective of professional development, courses that integrate the concept of STEAM will promote the modernization of nursery education. The innovation of course content and the improvement of teaching methods will attract more outstanding students to apply for nursery education specialty and enhance the competitiveness and influence of the specialty. The trained professionals with interdisciplinary ability can better meet the social demand for high-quality nursery services and promote the overall development of the nursery industry. On the educational level, the application of this course will provide reference for the curriculum reform of other related majors. Its successful experience can be extended to preschool education and other similar majors, which will promote the exploration and practice of interdisciplinary education in the whole education field and contribute to the cultivation of innovative talents to meet the needs of the times.

5. Conclusions

In this article, the innovative practice course of nursery education specialty, which integrates the concept of STEAM, is studied in depth and has achieved rich results. In the course design, the goal is to cultivate nursery talents with interdisciplinary knowledge application, innovative thinking and practical operation ability, break the boundaries of traditional disciplines, build thematic learning units, optimize the course structure, and adopt diversified implementation methods to inject new vitality into nursery professional courses. In the aspect of curriculum application strategy, teachers' interdisciplinary teaching ability can be improved by strengthening the construction of teaching staff; Reasonable allocation of teaching resources to meet the needs of curriculum practice; Establish a diversified curriculum evaluation system, comprehensively and accurately evaluate students' learning effect, and provide a strong guarantee for the effective implementation of the curriculum. For students, this can effectively improve their comprehensive quality, make them

better deal with all kinds of complex problems in the practice of nursery, and provide quality services for infants. From the perspective of professional development, it will strongly push the kindergarten specialty towards modernization, enhance the professional competitiveness, and meet the urgent needs of society for high-quality kindergarten talents. In the field of education, this course can provide valuable experience and reference model for curriculum reform of other related majors and lead the exploration and practice of interdisciplinary education.

To sum up, the innovative practice course of nursery education with the idea of STEAM is a useful attempt to adapt to the development of the times, which has important theoretical and practical significance for nursery education and related fields. In the future, relevant personnel should further deepen the research and practice of this course, and constantly improve the curriculum system and application strategies, so as to better serve the training of nursery professionals and the development of the industry.

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