ISSN: 2664-9640

STEAM-based creative programming lesson design for kindergartens

Jingting Fan and Yu Sun*

School of Information, Yunnan Normal University, Kunming, China.

*Corresponding Author: sunyu_km@hotmail.com

Abstract

At the moment when the country advocates quality education and cultivates innovative talents, STEAM education as a problem-driven and student-oriented education model has attracted more and more attention and attention from the society. The children in the big kindergarten class can already understand and complete the design and construction of simple robots in terms of language, hands-on ability, and receptive ability. STEAM education can greatly promote the development of children in the five major areas, and enhance children's innovative consciousness, practical ability, and cooperation ability. This article builds a kindergarten creative programming lesson examples based on STEAM education by studying the core concepts of STEAM education, and develops interesting, enlightening, inheritance, and interdisciplinary integration peacock robot lesson examples, from the content of the lesson examples, design ideas and ability training Explain the lesson examples in three aspects.

Keywords

STEAM education; STEAM course; kindergarten course.

1. STEAM education

STEAM is the abbreviation for Science, Technology, Engineering, Mathematics, and Art. The predecessor of STEAM education was the STEM education proposed by the Americans in the 1980s. The scholar Yakman of Virginia Tech in the United States proposed for the first time when studying comprehensive education to add the Art (Art) discipline to the original four disciplines. STEAM education. STEAM education is a comprehensive course that emphasizes the organic cross integration of knowledge of various subjects. It promotes the integration of design ability and knowledge and the improvement of comprehensive application ability through independent design, exploration and problem solving and practice, and cultivates knowledge transfer to apply to solutions. The ability of practical problems, cultivate students' hands-on practice, innovation and creativity, and communication and collaboration skills.

The core idea of STEAM education: The core idea of STEAM education is to break the boundaries of disciplines and realize the integration of interdisciplinary knowledge. Through the contextualization of knowledge, students comprehensively use subject knowledge to creatively solve practical problems.

2. The goal of the Kindergarten class STEAM course

Early childhood development is all-round development. This is our original intention to look at the problems of early childhood and its development, and it is also the logical starting point for education. In the field of pre-school education, more frequent vocabulary is considered to be the "five areas" than the comprehensive development. The "3-6 Years Old Children's Learning and Development Guide" points out: "The core is the development of moral, intellectual,

physical, and beautiful. , Describing children's learning and development from five areas: health, language, society, science, and art.

The overall goal of the kindergarten large class STEAM course is to cultivate children's comprehensive practical ability, scientific inquiry spirit, critical thinking, aesthetic and creative ability, and focus on the development of children's learning and thinking qualities and problem-solving skills.

Children's STEAM education should be based on project-based learning, problem-solving learning, and more personal exploration of complex and real problems in life. Task-driven inquiry learning allows children to understand problems at different levels. And eventually learn to solve problems or understand scientific knowledge in your own way.

3. STEAM-based creative programming lesson design for kindergarten

The STEAM-based kindergarten creative programming lesson design is mainly a multi-disciplinary and multi-field integrated curriculum system with the theme of biodiversity. The STEAM education model can fit well with the learning and development of the five major areas of children.

In accordance with the development requirements of the five major areas of young children, combined with the theme of biodiversity, this paper designs and develops a series of interdisciplinary "Peacock Robot" courses.

3.1. Interdisciplinary integration of language and science

In the field of language, let the big class children experience other creatures besides the common animals in life, and let them see more animals through videos and pictures and understand the characteristics of peacocks.

Instruct young children to observe the peacock and describe the characteristics of the peacock in words. "The peacock has white and green. Its head is round and small, and it has beautiful feathers on its head. It folds up like a small fan; its pointed mouth is very similar to the familiar rooster. Bright feathers reflect beautiful colors; some peacocks have long tails. When they are happy, their tail opens up like a big colorful fan, very dazzling, very beautiful, but some Peacocks don't have long tails, they won't turn on the screen..."

3.2. Interdisciplinary integration of art and science

The physical and mental development of children determines that most of the knowledge acceptance of children in this period comes from their own perception of life. After the language class, parents can be suggested to lead their children into the zoo to observe and understand the appearance characteristics and living habits of peacocks on the spot. As a small breeder, listen to the breeder's explanation of the peacock's living habits, food characteristics, reproductive habits, etc., and learn to get along with animals under the explanation of professional breeders to protect wild animals. Combining the knowledge learned in the language course, combined with field observations, let children record their cognition of the peacock through the brush.

3.3. Interdisciplinary integration of science and engineering

From language courses, field experience, peacock painting and other courses, young children have a preliminary understanding of peacocks and have developed a strong interest. Then use the geometric robot kit to know that children build a "peacock robot".

ISSN: 2664-9640

3.3.1. Understanding structural parts

Octagonal apex: The center hole is used to insert the rotating shaft, and the eight slots evenly distributed around it are used to insert connecting rods and connecting blocks.

Connecting rod: The center hole is used to insert the rotating shaft, and there are two bumps on the left and right sides to connect with the groove at the octagonal apex.

Connecting block: The central hole is used to insert the rotating shaft, and the raised block of 90° layout is used to connect the two octagonal vertices, realizing the transformation from the planar structure to the spatial structure.

Connecting shaft: It is used for the mutual articulation between the octagonal apex, connecting rod and connecting block to realize the function of deformation and rotation.

3.3.2. Construction of "Peacock Robot"

Through the understanding of the structural parts, let the big class children build a parallelogram, and then add a shaft to each link point of the quadrilateral, and the quadrilateral will move. In the process of building, children can understand that parallelograms are unstable structures. Through the expansion of the parallelogram, there is a mesh structure that can be stretched and changed, which can imitate the change of the peacock's tail when the screen is opened. Through the rotation of the motor, the expansion and contraction of the parallelogram is changed.

Figure 1: Peacock when the screen is not on

ISSN: 2664-9640

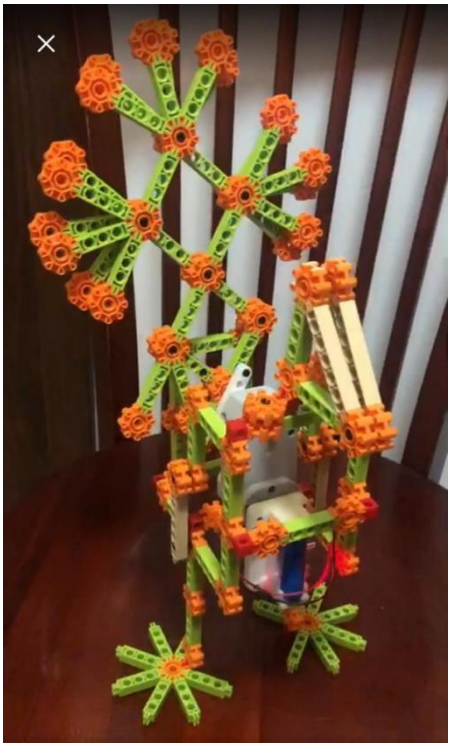

Figure 2: Peacock when opening the screen

In the process of building the robot, children can integrate the knowledge learned in the previous lessons.

4. Summary

The STEAM curriculum and the development of the five major areas of children have a high degree of compatibility. Through the design of the curriculum, it can be felt that children's ability to innovate and solve problems has been greatly improved, but the construction of the STEAM curriculum has a greater impact on preschool teachers. The author hopes that the design of this course can give kindergarten teachers some inspiration.

References

[1]Yu Shengquan,Hu Xiang.STEM education concept and interdisciplinary integration model[J]. Open Education Research,2015(4):13-22.

[2]Chen Ying. STEAM education is to play "cross-border" subject[N]. Science and Technology Daily, 2015-11-17(7).

[3]Ministry of Education. "Guide to Learning and Development of Children from 3 to 6 Years Old" (2012-10-09).

[4]Hu Yinghui. STEAM education curriculum design and case study for preschool children[D]. Changchun: Northeast Normal University, 2018: 17.