# Study on course design and practice of "Internet + Education" under STEAM concept

## -- Take "Let the" see "world unhindered -- Design Braille" as an example

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**Abstract:** STEAM education has become the important way and grasp to promote innovative personnel training and accelerate the construction of innovation-type country, at the same time, the "Internet +" era provides a new way to think for education's construction and reorganization, the integration of the two has produced a huge impact for our country curriculum reform in the field of basic education. However, the realization of STEAM ecological education supported by the Internet is not yet perfect. It is of great significance for front-line teachers to construct and design and practice the "Internet + education" model under the STEAM education concept.

**Key words:** STEAM education; Internet + Education; Mode

## I. Introduction

Contemporary education emphasizes the cultivation of innovative talents who can adapt to the future society. Gretel Yakemen, a well-known American scholar, believes that steam, "as a mode of education beyond the traditional, can narrow the gap between students' existing knowledge and skills and enhance students' employment competitiveness", plays an important role in cultivating students' innovative spirit, and elevates the importance of steam education in cultivating innovative talents to a new height.

Injecting the Internet into the gene of STEAM education through information network technology can effectively support the changes in the mechanism of talent training, meet the needs of talents needed in the era of Internet economy and social development, and effectively promote the overall development and strategic transformation of education.

Our school under the guidance of "high-tech whole-person education concept", on the basis of steam education for all students in the school, developed the "steam Education Science and Innovation Experiment" textbook, and carried out the practice. On the basis of summarizing practical experience, this paper focuses on combing the integration method, and puts forward the "Internet + education" curriculum design model under the STEAM concept. And combined with specific cases to explain, in order to promote the vigorous development of STEAM.

## 2. Course development and implementation process

1. Development path

Under the guidance of the school's high and new whole-person educational philosophy, curriculum objectives are formed according to the core qualities, curriculum standard requirements and curriculum theoretical knowledge. Then, according to the "four" curriculum system of our school, a curriculum framework with school-level characteristics is formed. On this basis, we will strengthen curriculum development, teacher team construction and space construction, and constantly improve the curriculum under the guidance and supervision of experts.
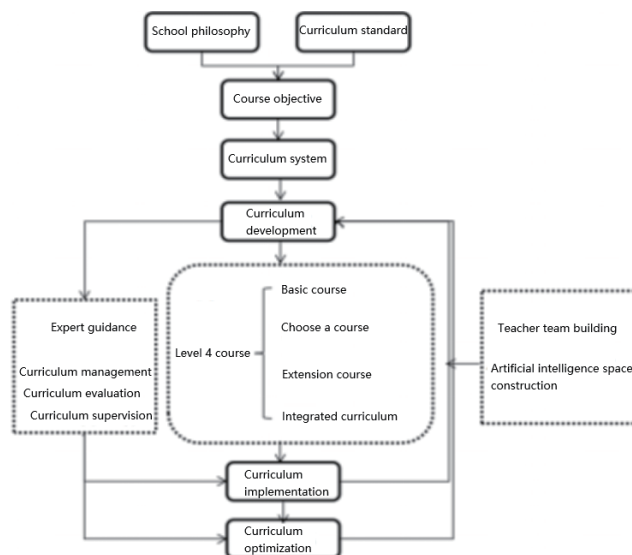


**Figure 1 Curriculum development path diagram**

2. Curriculum Implementation Guarantee System

Focusing on the key points such as teaching system construction, curriculum resource development and teaching evaluation, our university has formed a five-in-one teaching guarantee system of "teaching, learning, research, general communication and evaluation".

(1) Teaching: According to the needs of learning advancement, the four-dimensional integrated curriculum structure of "Foundation -- expansion -- selection -- synthesis", which integrates horizontal multi-disciplines and vertical whole learning segments, is established;

(2) Learning: grasp the main battlefield of "classroom", take "cooperation-inquiry" teaching reform as a breakthrough, and run "teacher-student interaction and hands-on brain" through the learning process of "observation - design - practice - sharing - extension" to form a "double-action five-step cooperative" learning strategy;

(3) Research: "whole-school integration", "group-based micro-teaching and research", "cross-professional training", "expert guidance" and other measures are carried out simultaneously to create a deep and rich research atmosphere;

(4) General: Artificial intelligence laboratory, the new learning place of the juvenile Academy of Sciences, break through the space barrier, the combination of hardware and software, and fully support students' personalized learning;

(5) Evaluation: condense the core literacy of various disciplines, develop evaluation gauges, break the "only score theory", and carry out online multiple comprehensive quality evaluation.

## 3. "Internet + Education" model under the STEAM concept

Some scholars at home and abroad have explored the teaching model of steam, but have not concluded the general model suitable for steam "Internet + education" in primary schools. "Internet + education" not only provides a platform, but also focuses on improving students' ability and awareness of using Internet technology to solve problems in real life. "Internet + Education" has the characteristics of openness and integration, emphasizing that students use scientific thinking methods and information technology means to solve practical problems. On this basis, combined with the steam education thought proposed above, the steam 5D teaching model is proposed.
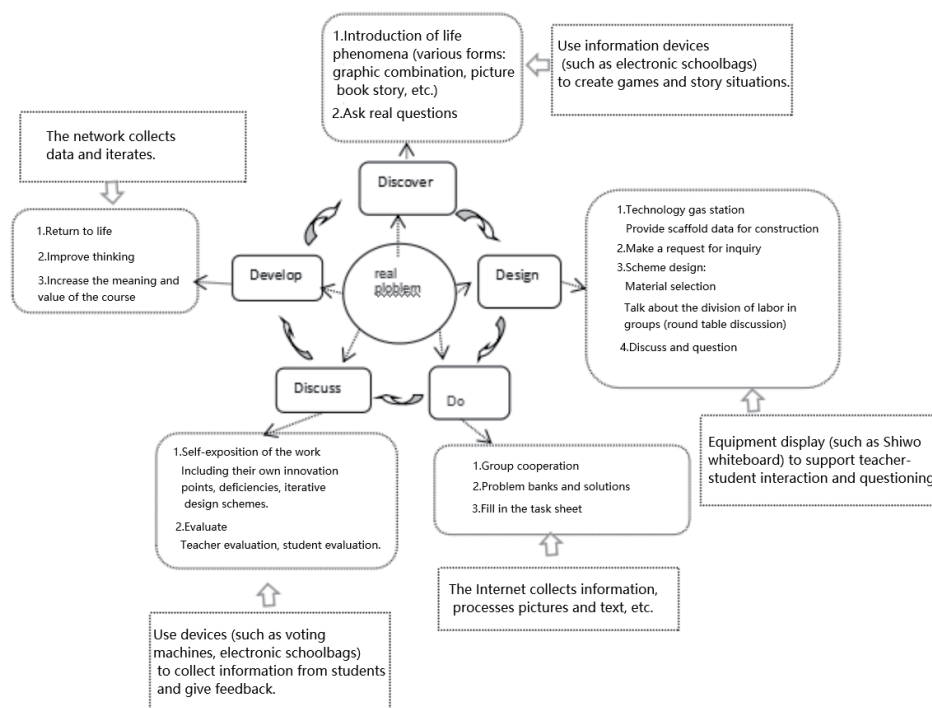


**Figure 2 steam 5D teaching model**

1. Discover

One of the main characteristics of steam is the authenticity of problem design and the solution of real world problems.

For example, start with game Lead-in, where one student puts on a blindfold and another student supports them across an obstacle (prepare the obstacle). The other students observe the whole process as observers. After removing the blindfold, ask the students how they feel? Transition: What you have just felt is a period of darkness. In fact, there are a group of people in our lives whose world is dark all year round. They are blind. Lead to the topic "Let the vision be unimpeded -- Design Braille".

2. Design

Design thinking is a kind of thinking ability that contemporary students should have to meet the need of social development. How to cultivate the students' design thinking and improve the students' design ability has become an important educational problem that our country needs to solve. Science and technology gas station can also provide students with the brackets they need, such as situational

brackets, etc., to improve students' learning ability. How to use the Internet to solve problems in the design process is the core key.

For example, in conjunction with open web search, brainstorm solutions to the following questions: (1) What is Braille (concept) and (2) What are the rules for reading and writing Braille? (3) What is the smallest unit of Braille? (4) How to distinguish numeric Braille?

3. Do (Practice)

Inquiry is the core way to complete STEAM learning. The inquiry experiment of Internet + education courses focuses on allowing students to solve practical educational problems by means of information.

For example, the group works together to find the corresponding braille by using the Chinese Braille converter on the tablet, make braille works with obvious tactile feeling and easy for the blind to recognize, and turn their own designs into reality, emphasizing the exploratory practice based on science.

4. Discuss (Exchange)

In this link, the support of Internet means is particularly important for students to give full play to the exchange and evaluation between students and students.

For example, students are organized to vote on the works they admire most by using a voting device. In addition, in the student sharing process, electronic schoolbags are integrated, students' works are photographed on a tablet and projected on the screen, so as to effectively organize students to evaluate each other, and then students can share how to improve their own designs.

5. Develop (Expansion)

In this part, you should go back to life and ask students what other practical problems in life they can solve with the knowledge they have learned. Improve thinking and ask students what other innovative solutions they have. In addition, the curriculum needs to be refined to increase the meaning and value of the curriculum.

For example, this lesson, as a little designer, experiences the work of Braille designers and designs Braille products. The use of Internet multimedia resources to let students know what other loving technology inventions have improved the quality of life of the blind.

This lesson successfully integrated information technology into classroom teaching, using electronic school bags, whiteboard, Chinese Braille converter, browser search, screen projection and other information technology means. In the discovery process, multimedia video is introduced, the design process uses the photo function of the electronic schoolbag as the screen projection, and the painting function as the way for students to display and question. In the design and practice process, students use the Internet to form a preliminary perception of Braille. In the whole class, because of the use of Internet, teachers do not need to participate in the class too much, and more give the class back to the students.

## 4. Summary

STEAM education is a very popular research content at present, and teachers gradually realize that STEAM education, which breaks the disciplinary boundaries, can effectively promote students to grasp concepts more firmly and transfer knowledge more flexibly. However, "the domestic STEAM theory is not perfect", "the practice does not reflect the real whole-person education thought", the understanding of "Internet + education" is not deep, and there is an educational deviation. This paper, combined with the exploration and practice of steam school-based textbooks for many years, proposes the "Internet + education" model under the STEAM concept, hoping to introduce a new example. It can provide reference for the development of steam education.

## References:

[1] Zhao Huichen, Lu Xiaoting. Carrying out STEAM Education and Improving Students' Innovation Ability -- Interview with Professor Gretel Yakemen, a well-known scholar of STEAM Education in the United States [J]. Open Education Research,2016,22(05):4-10.

[2] Xia Xiaogang, Zheng Gang. STEAM Project Design and Implementation Based on Engineering Practice -- taking "3D Printing -- Bridge design and Production as an example [J]. Digital teaching in primary and secondary schools,2018(01):56-58.

[3] Zhou Ziming, Zhang Zhi, Yuan Lei. STEAM Education Integrating design thinking: Model Construction and Case Analysis [J]. Modern Distance Education, 202:1-12.

[4] Yan Hanbing. Research on Learning support of information-based teaching [J]. China Audio-Visual Education,2003(11):18-21.