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Exploration of Large-Unit Teaching in Junior High School Comprehensive Practical Activity Courses Under Digital Empowerment

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Abstract: Against the background of educational digital transformation, the teaching of junior high school comprehensive practical activity courses is in urgent need of innovation. Large-unit teaching, with its thematic and systematic design, fits the educational characteristics of comprehensive practical activities, while the integration of digital technology and AI tools provides new innovative channels for curriculum implementation. Based on the actual situation of junior high school teaching, this paper clarifies the core connotation of integrating digital empowerment with large-unit teaching of comprehensive practical activities, and explores the application methods and empowering paths of different digital tools, such as intelligent sensing, AI design, online platforms, and digital communication, combined with specific teaching units. It is expected to provide useful references for relevant educators, make comprehensive practical activity teaching more practical, interesting and effective, and effectively improve students' comprehensive literacy.

Keywords: Digital empowerment; Junior high school comprehensive practical activities; Large-unit teaching; Digital technology; AI tools

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1. Introduction

As a compulsory course, the junior high school comprehensive practical activity course undertakes the important task of cultivating students' practical ability, innovative spirit and sense of social responsibility. Teachers should break disciplinary barriers, break away from traditional fragmented activity forms, and design systematic teaching content based on real life. The "Guidelines for Comprehensive Practical Activity Courses in Primary and Secondary Schools" (hereinafter referred to as the "Guidelines") put forward four activity directions: investigation and exploration, design and creation, professional experience, and social service, which define the core framework for curriculum design. Large-unit teaching has become an effective teaching form to implement these four directions, enabling students to complete knowledge construction and ability improvement in continuous and systematic practice. Therefore, this paper explores the application of

digital technology and AI tools in large-unit teaching of comprehensive practical activities, which is of great significance for optimizing the teaching process and giving play to the educational value of practical teaching[1].

2. Core connotation of digital-enabled large-unit teaching in junior high school comprehensive practical activities

2.1. Design principles of large-unit teaching

The design of large-unit teaching for junior high school comprehensive practical activities shall take the "Guidelines" as the fundamental basis, closely follow the four activity directions of investigation and exploration, design and creation, professional experience, and social service, and follow three core principles.

(1) The principle of life orientation, teaching themes should originate from students' campus life or community life, so that students have a sense of familiarity and participation.

(2) The principle of systematicness, one large unit is developed around one core theme, with continuous teaching links and practical tasks set to make the students' practice process progressive layer by layer.

(3) The principle of practicality, the whole large-unit teaching takes students' independent practice as the core, and teachers only act as guides, allowing students to improve their abilities through personal participation.

2.2. Core orientation of digital empowerment

Digital empowerment does not mean simply integrating digital tools into teaching, but reasonably designing and using digital technology and AI tools to optimize practical activities and improve educational effects.

Digital empowerment in junior high school comprehensive practical activity courses is mainly reflected in three aspects: First, it empowers the students' practical process. That is, teachers can reduce the difficulty of the practice through digital tools, allowing students to focus more on problem thinking and exploration. Second, it enriches the students' practical experience. Teachers can utilize virtual simulation, online platforms, etc., to enrich the practical scenarios and resources, thereby optimizing the practical experience of the students [2]. Third, it expands the students' practical dimensions. Through digital communication tools, the practical achievements of students can generate greater value and enhance their sense of practical accomplishment. In large-unit teaching, the selection of digital tools should be in line with the teaching theme and practical tasks, so that technology can truly serve the comprehensive quality cultivation of students.

3. Implementation paths of digital-enabled large-unit teaching in junior high school comprehensive practical activities

3.1. Relying on intelligent sensing and AI analysis tools to deepen investigation and exploration practice

Investigation and exploration are one of the core activity directions in the "Guidelines." This practice requires students to draw exploration conclusions through field observation, data collection, analysis and summary. Intelligent sensing equipment and AI data analysis tools collect and analyze data more accurately and efficiently. Their application in practice can help students complete tasks more efficiently and make the exploration process deeper [3]. Taking the large unit "Campus Plant Ecology and Growth Environment Investigation" as an example, teachers can design a two-week investigation and exploration practice, guiding students to use the Xingse APP, intelligent temperature/humidity/light sensors, Qiankunban Smart Agriculture

Platform, Excel AI data analysis tools, etc.

Teachers first determine the exploration objectives of this unit, asking students to conduct field investigations, master the growth habits of common plants on campus [4], and analyze the relationship between plant growth environment and growth status. Students are organized to practice in groups of four. First, scan various plants in campus plant corners and green belts with the Xingse APP. With the help of the APP's AI image recognition function, obtain information such as plant family, genus, growth habits and suitable growth environment. Each group sorts out this information in an electronic document to complete the preliminary knowledge reserve for exploration. Then guide each group to carry intelligent temperature and humidity sensors and light sensors to the field, place the sensors in the growth areas of different plants to read environmental data in real time, and synchronize the data to the cloud through the Qiankunban Smart Agriculture Platform [5].

After the investigation, students export the cloud data to Excel, use the software's AI data analysis function to screen, compare and analyze temperature, humidity and light data. Combined with data analysis results and plant growth status, students summarize the problems existing in campus plant growth and initially put forward suggestions for environmental optimization. In the exploration process, intelligent sensing tools make data collection more efficient, and AI analysis tools free students from cumbersome data calculation, allowing them to focus more on the essence of exploration problems and deepen the practical effect of investigation and exploration [6].

3.2. Using AI design and virtual simulation tools to promote the implementation of design and creation practice

Design and creation practice focuses on cultivating students' innovative thinking and creative materialization ability, which is an important link for comprehensive practical activities to cultivate students' core literacy. AI design software and virtual simulation tools can make students' creative design more intuitive and practical, and reduce the trial-and-error cost of physical production [7]. Teachers can design the unit teaching of "Campus Plant Intelligent Maintenance Device Design," carrying out a three-week design and creation practice. The digital tools used include 3D One design software, the virtual simulation module of Qiankunban Smart Agriculture Platform, and the Caoliao QR Code applet. The core task of this unit is to let students design a simple intelligent maintenance device combined with the problems existing in campus plant growth, and make exclusive "ID cards" for campus plants to realize intelligent plant maintenance and visualize plant information display.

In the intelligent maintenance device design link, teachers can organize students to determine the design direction according to the environmental problems obtained from previous exploration in groups, and guide students to draw 3D models of the device with 3D One design software [8]. After completing the model design, students can import the design plan into the virtual simulation module of Qiankunban Smart Agriculture Platform, test the operation effect of the device with the help of the platform's simulation function, and optimize the design plan according to the simulation results. AI design and virtual simulation tools turn students' creative ideas from minds into intuitive models, and make the design more scientific through simulation testing, effectively promoting the implementation of design and creation practice [9].

3.3. Applying online platforms and AI auxiliary tools to enrich the forms of professional experience practice

The core of professional experience practice is to let students understand the work content and professional requirements of different occupations and establish initial professional cognition [10]. However, due to

the limitations of time and space, many occupations cannot be experienced by students in person. Online professional experience platforms and AI auxiliary tools enable students to complete real professional practice in virtual scenarios. Taking the large unit "Community Nutritionist Professional Experience" as an example, teachers can use the professional experience section of the smart education platform, the AI nutrition analysis function of the Boohee Health APP, and the Tencent Docs shared collaboration platform to carry out teaching [11].

Teachers first guide students to enter the professional experience section of the smart education platform to preliminarily understand the work content of nutritionists. Then let students practice as "intern nutritionists". First, learn basic nutrition matching knowledge with the help of the AI nutrition analysis function of the Boohee Health APP. The APP will push scientific nutrition matching principles according to the age, gender and physical condition of different groups, and students can design recipes on the platform [12]. Then, combined with the actual situation of the community, the experience objects are locked into the elderly and the teenagers in the community. Each group collects the dietary characteristics and nutritional needs of the two groups through the Tencent Docs shared collaboration platform. After completing the demand collection, each group designs a week's nutrition recipes for the two groups, enters the recipes into the Boohee Health APP, and optimizes the recipes with the help of the APP's AI nutrition analysis function. Throughout the entire career experience process, the online platform enables students to access professional career resources, while AI-assisted tools enhance the professionalism of students' career practices, allowing them to complete real-life practical training in virtual career scenarios [13].

3.4. Expanding the dimensions of social service practice through digital communication and interactive tools

Social service practice focuses on cultivating students' sense of social responsibility, enabling students to apply their knowledge to social life and provide services for others and the community. Digital communication and interactive tools can make students' service content more in line with community needs, expand the coverage of service achievements, and improve the effectiveness of social services [14]. Taking "Community Elderly Smartphone Use Guidance" as the large-unit theme, teachers organize social service practice, guiding students to first design a "Questionnaire on Community Elderly Smartphone Use" with Wenjuanxing, conduct offline visits in the community, distribute and collect questionnaires to understand the common scenarios and problems of the elderly using smartphones, such as being unable to scan codes for payment, make video calls, use navigation software, etc., and determine the guidance content according to the questionnaire results. Then each group can use the Jianying AI production tool to make short teaching videos of basic smartphone operations, and go to the community to teach the elderly offline. For the elderly with limited mobility, students can provide online live guidance via Tencent Meeting, demonstrate operation steps in real time and answer the elderly's questions during the live broadcast.

Digital interactive and live streaming tools allow social services to cover more elderly people in the community, make the service form more flexible to meet the actual needs of the elderly, effectively expand the practical dimensions of social services, and enable students to improve comprehensive abilities and enhance social responsibility in service [15].

4. Conclusion

The application of digital technology and AI tools makes students' practical exploration deeper, design

and creation more scientific, professional experience more realistic, and social services more effective. Of course, digital empowerment does not pursue the stacking of technology, but selects appropriate digital tools according to teaching themes, practical tasks and students' cognitive characteristics, so that technology can truly serve the cultivation of students' practical ability and comprehensive literacy. As the guide of teaching, teachers need to constantly learn digital technology knowledge, explore effective paths for integrating digital tools with comprehensive practical activities, design large-unit teaching content more suitable for students' lives, make digital technology a "booster" for students' practice, make comprehensive practical activity courses truly an important position for cultivating students' core literacy, so that students can gain growth in systematic practice and improve abilities in independent exploration.

Disclosure statement

The author declares no conflict of interest.

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