Journal of Contemporary Educational Research, 2025, Volume 9, Issue 9
http://ojs.bbwpublisher.com/index.php/JCER
ISSN Online: 2208-8474
ISSN Print: 2208-8466

Thoughts on the Implementation Path of General Technology Curriculum in Senior High Schools from the Perspective of New Productive Forces

Xiaoyan Su*

Changji Prefecture No.4 Middle School, Changji 831800, Xinjiang, China

Author to whom correspondence should be addressed.

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: From the perspective of new productive forces, the general technology curriculum in senior high schools should not only cultivate students' technical knowledge and practical abilities but also focus on the development of innovative thinking to meet the demand for interdisciplinary talents in the future society. Based on the chapter "Common Conception Methods" in the Jiangsu Education Edition of Technology and Design 1, this paper explores the implementation path of the general technology curriculum, focusing on the optimization strategies in four aspects: Project-based learning (PBL), strengthening technical practice, STEAM interdisciplinary integration, and a diversified evaluation system. It also analyzes the application of divergent thinking (brainstorming) and reverse thinking in the curriculum through cases. The research shows that optimizing teaching methods and enhancing practical links can effectively stimulate students' creativity and teamwork ability, improve the effectiveness of curriculum implementation, and provide strong support for the cultivation of future technical innovation talents.

Keywords: New productive forces; General technology curriculum; Project-based learning (PBL)

Online publication: Oct 22, 2025

1. Introduction

Against the background of the rapid development of global scientific and technological innovation, education must adapt to the needs of the times and cultivate high-quality talents with innovative thinking, technical literacy, and practical ability. The general technology curriculum in senior high schools is an important part of China's basic education system, aiming to enable students to master the basic principles of technical knowledge and form scientific ways of thinking and problem-solving abilities. However, there are still many problems in the traditional curriculum implementation mode, such as a single teaching method, insufficient practical opportunities, low degree of subject integration, and backward evaluation system, which make it difficult to meet the demand of new productive forces for talent cultivation [1].

2. Connotation and significance of general technology courses in senior high schools from the perspective of new productivity

Driven by factors such as information technology, artificial intelligence, and sustainable innovation, society is developing at a high speed, and technology is playing an increasingly prominent role in production and daily life. The general technology courses in senior high schools aim to guide students to initially understand, perceive, and apply technology, thereby cultivating their innovative thinking and practical abilities. In the stage of transformation and development of new productivity, society's demand for talents' abilities is complex, diverse, and comprehensive [2]. Relying on real scenarios and project-based practices, general technology courses provide students with opportunities to practice hands-on control and innovative design.

Essentially, new productivity requires education to integrate multidisciplinary knowledge and cultivate the ability of cross-field thinking [3]. General technology courses emphasize both practice and innovation, advocating that students incorporate knowledge from subjects such as mathematics, physics, fine arts, and information technology into the design and production process. In this way, students' subject cognition will transition from narrowness to expansion, which can better stimulate their learning enthusiasm and creative potential, laying the foundation for in-depth learning of subsequent subjects. Traditional education focuses more on the imparting and memorization of knowledge, but new productivity focuses on creative thinking, problem awareness, and practical problem-solving. With the help of general technology courses, students can, under the guidance of teachers, analyze practical problems and design solutions through observation, research, discussion, and personal experience. This can not only cultivate students' innovative abilities but also enable them to understand the social responsibility and practical significance of technology in on-site experience [4].

3. Analysis of the implementation paths for general technology courses in regular senior high schools

3.1. Developing a project-based learning (PBL) teaching model

Project-based learning (PBL) is a teaching approach centered on practical projects. It emphasizes students' acquisition of knowledge, mastery of skills, and enhancement of problem-solving abilities in specific contexts. Compared with traditional knowledge-transmission models, PBL is more effective in stimulating students' desire for knowledge, enhancing their enthusiasm for active learning, and boosting their teamwork vitality [5]. In advanced general technology courses, PBL guides students in independent learning through comprehensive project tasks (such as "Design of Intelligent Environmental Protection Trash Bins," "Construction of Solar-Powered Models," and "Analysis of Sustainable Energy Systems") [6]. The teaching process of the PBL model typically includes multiple stages: introduction of problem scenarios, task decomposition, data collection, scheme design, production of works, result presentation, and evaluation. During the completion of projects, students not only apply technical knowledge but also engage in problem analysis, group communication, and scheme optimization, thereby fostering their innovative thinking abilities.

3.2. Promoting technical practice links to enhance hands-on skills

One of the core goals of general technology courses is to cultivate students' practical hands-on abilities, enabling them to use the knowledge they have learned to solve existing problems [7]. However, in daily teaching operations, due to constraints such as curriculum design, school resources, or teacher strength, the implementation effect of practical teaching links in some schools is unsatisfactory, resulting in students lacking sufficient hands-on experience [8]. To address such issues, it is necessary to strengthen technical hands-on links and adopt various approaches to improve students' practical experience [9]. Virtual simulation technology can be used to make up for the shortage of equipment resources. For example, relying on virtual simulation software like TinkerCAD and Proteus, learners can carry out online activities related to circuit design and 3D modeling, master the technical principles in the field of tools in advance, and lay the groundwork for subsequent practical operations.

3.3. Adopting the STEAM education concept to promote interdisciplinary complementarity

STEAM education is a teaching model focused on interdisciplinary integration, aiming to cultivate students' comprehensive innovation capabilities. General technology courses in regular senior high schools cover various fields such as engineering design, manufacturing technology, and material application. Therefore, adopting the STEAM education concept can effectively enhance the multi-dimensional teaching value of these courses, helping students form interdisciplinary connections and develop a gradient-based understanding of technology. Based on the STEAM education framework, the teaching of general technology courses can be realized through approaches such as "technology + science," "technology + art," and "technology + mathematics" to achieve effective integration between disciplines [10]. For instance, during the implementation of the "Bridge Design" unit, teachers can combine the principle of force analysis from physics, require students to estimate the load-bearing capacity of the bridge, and use mathematical modeling software (such as GeoGebra or Matlab) for simulation calculations. At the same time, aesthetic design elements are integrated, allowing students to find a balance between functionality and aesthetics.

STEAM education encourages students to adopt inquiry-based learning methods. For example, in the implementation of the "Intelligent Robot Design" course, students need to apply interdisciplinary knowledge such as physics, computer programming, and electronic circuits to independently construct robot structures and then carry out programming control. To facilitate the effective implementation of STEAM education, schools can plan to build STEAM laboratories or maker spaces, equipped with 3D printers, laser cutters, electronic components, and other tools, encouraging students to carry out technological innovation in open spaces. Meanwhile, teachers can collaborate with colleagues from subjects such as mathematics, physics, and art to develop comprehensive projects through interdisciplinary cooperation, forming a teaching system where multiple disciplines mutually benefit [11].

3.4. Developing a diversified evaluation system to stimulate students' innovative potential

In the traditional teaching evaluation system, the assessment of general technology courses mostly adopts written tests or theoretical knowledge assessments, which are unable to comprehensively evaluate students' innovative thinking, practical abilities, and teamwork skills [12]. Therefore, against the background of emerging new productive forces, general technology courses in regular senior high schools need to establish a scientific and reasonable diversified evaluation system to promote students' creative thinking and technical practical abilities [13]. The diversified evaluation system should include multiple dimensions such as process evaluation, work display evaluation, teamwork evaluation, and self-reflection evaluation. For example, in the "Solar Lighting Design" course, students can formulate plans at the beginning of the project, with teachers providing phased guidance; during the project implementation, teachers can record the process of students' operations and team interactions; finally, students' works should not only be evaluated through physical assessment but also through overall consideration in forms such as result displays and peer reviews [14].

4. Case analysis: taking "common conception methods" in Jiangsu education press's technology and design 1 as an example

As a textbook playing an important role in the general technology curriculum of ordinary senior high schools, Jiangsu Education Press's Technology and Design 1 features the combination of universality and design, providing a strong foundation for students' innovative design. Among them, the training of students' design conception is extremely crucial. The textbook describes various thinking training methods in the chapter "Common Conception Methods".

4.1. Analysis from the perspective of innovative thinking - divergent thinking method

Divergent thinking method emphasizes putting forward as many ideas as possible in a short period of time without examining their feasibility and rationality. This method can expand the boundaries of thinking, help students break through traditional constraints, and inspire creative inspiration in a "non-judgmental state". Brainstorming activities usually set a core topic or problem [12], allowing students to communicate and express independently, while teachers play the role of organizing, guiding and encouraging throughout the brainstorming process [15]. The following teaching application strategies can be adopted:

First, real cases should be used in the design of teaching scenarios. For example, when starting an environmental protection packaging design, teachers can share real environmental protection issues or cases with students, and guide them to conduct preliminary research first, so as to provide sufficient material support for subsequent brainstorming.

Second, try to create a free and relaxed discussion atmosphere during brainstorming, and adopt diversified encouragement. For instance, those who "put forward the most novel ideas" can receive praise, which can greatly boost students' enthusiasm.

Third, after the ideas are fully developed, teachers should make reasonable induction and screening, guide students to summarize and integrate their insightful ideas, and form modular design ideas. This not only maintains creativity but also avoids chaotic and illogical imagination.

Teachers assign students to improve the design of "school garbage classification". In the idea collection stage, students can come up with various schemes: automatic classification trash cans, design of classification publicity activities, multi-functional garbage sorting robots, and even trash can appearances with artistic styles. Then teachers summarize and classify these schemes, guide students to further explore the feasibility and innovation of these schemes, and finally select one or two design ideas from many to conduct in-depth research and practice.

4.2. Analysis from the dimension of solving difficult problems - reverse thinking method

Reverse thinking method emphasizes reversing the existing cognitive system, thinking about problems from opposite or uncommon perspectives, thereby driving new design ideas and solutions. This method has important value in innovation activities of design teaching: when students encounter technical difficulties or bottlenecks in the design stage, relying on "reverse thinking" can often help them discover possibilities overlooked by conventional approaches. During teaching, it is necessary to clarify the key points and scope of "reverse thinking". Teachers should demonstrate to students how to raise questions from opposite sides, promote the combination of divergent and convergent thinking. Reverse thinking can be understood as a highly targeted divergent activity. After students put forward ideas opposite to conventional designs, they need to use convergent thinking to screen and integrate them, and finally form practical and operable plans. It is necessary to guide students to review and record the stages. Reverse thinking is often interfered by inertial thinking in the initial stage. Teachers should require students to constantly examine their own thinking patterns in the design process, and break through thinking set through peer evaluation, collective evaluation and other methods.

When designing an innovative portable storage device, students usually first consider how to make the device lighter and easier to carry. Teachers may give students a hint of reverse thinking: through this reverse way, students may propose to install wheels or slide rails on the device for movement. After screening and optimizing these ideas, a new design plan that takes both portability and versatility into account can be hatched.

4.3. Comprehensive application of conception methods and teaching design

In actual teaching activities, divergent thinking method and reverse thinking method are generally not used alone, but need to be properly combined to form a systematic design idea from scattered mode to focused mode, and from traditional representation to non-traditional representation. Teachers can combine the two methods in the following links.

(a) Project introduction: Arouse students' desire for exploration by presenting focus issues or topics in reality.
(b) Brainstorming: Put forward a large number of unique ideas for the subject without any evaluation.
(c) Reverse thinking: Start from the perspective of abandoning the conventional to find potential breakthroughs.
(d) Scheme screening: Evaluate the value of each idea and then integrate them, focusing on the design direction with implementability and sufficient innovation drive.
(e) Finished product production and evaluation: Students personally implement the design scheme, and improve the design by means of peer mutual learning, user experience feedback and other means.

This comprehensive teaching design can not only allow students to experience the entire construction process of innovative thinking at multiple levels, but also guide them to realize the sense of achievement brought by thinking collision and creation in practice.

5. Conclusion

The arrival of the new productive force's era puts forward higher requirements for the general technology curriculum in ordinary senior high schools. This paper discusses the curriculum optimization path from four aspects: project-based learning (PBL), strengthening of practice links, STEAM interdisciplinary integration and diversified evaluation system, aiming to improve students' innovative consciousness and technical application ability through real project tasks, hands-on operation, interdisciplinary learning and multi-dimensional evaluation. In the future, curriculum reform should further strengthen resource integration, introduce enterprise cooperation, social practice projects and other ways to provide students with richer learning experience, so as to better cultivate high-quality innovative talents meeting the needs of the new era.

Disclosure statement

The author declares no conflict of interest.

References

[1] Wang X, 2024, Legal Regulation Path of Data Elements Empowering New Productivity. Journal of Guangdong

University of Finance & Economics, 39(6): 112–128.

[2] Yang H, Fang M, 2024, Qualitative Change of Productivity: Representation, Motivation and Process. Research on Financial and Economic Issues, 2024(8): 3–21.

[3] General Technology International, 2024, Strategic Planning, Transformation Empowerment, Empowering New Productivity with Financial Digital Intelligence. New Finance & Economics, 2024(7): 37–40.

[4] Liu W, 2024, Theoretical Innovation and Practical Requirements of New Productivity. Theoretical Guide, 2024(6): 11–14.

[5] Zhou B, Yang L, 2024, Financial Empowerment to Accelerate the Development of New Productivity: Focus Points, Implementation Paths and Basic Principles. Journal of Hebei University (Philosophy and Social Science Edition), 49(4): 11–21.

[6] Liu Y, 2025, A Case Study on Project-Based Implementation of Senior High School General Technology Curriculum. Guangxi Normal University.

[7] Zhou W, 2021, Exploration on Teaching Strategies of Senior High School General Technology from the Perspective of Core Literacy. Today, 2021(15): 70.

[8] Zhou Y, 2018, Discussion on Several Issues in the Implementation of General Technology Teaching in Regular Senior High Schools. New Curriculum (Middle School Edition), 2018(3): 138.

[9] Zhao Y, 2021, Research on the Application of Experiential Learning in General Technology Teaching in Ordinary High Schools. Secondary School Curriculum Coaching: Teacher Communication, 2021(6): 111–112.

[10] Chen H, 2019, Practical Exploration on Improving the Efficiency of Senior High School General Technology Classroom Teaching. New Curriculum, 2019(27): 2.

[11] Zhao J, 2023, Exploration on the Teaching Path of Senior High School General Technology under the New Curriculum Reform. Middle School Curriculum Guidance, 2023(24): 75–77.

[12] Wu T, 2022, Problems and Countermeasures Faced by Senior High School General Technology Courses under the New Curriculum Standard. Legendary Stories, 2022(11): 75–76.

[13] Yan C, 2019, Paths for Cultivating the Quality of Senior High School General Technology Teachers in the New Era. Basic Education Research, 2019(15): 2.

[14] Chen S, 2021, Research on Strategies for Improving Students' Comprehensive Practical Ability in General Technology Teaching in Senior High Schools. Shanhaijing: Education Frontier, 2021(2): 222.

[15] Wei C, 2019, Constructing a New Teaching Model for Senior High School General Technology Discipline under Core Literacy. Exam and Research, 2019(36): 1.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.