



International Journal of Global Perspective in Academic Research

Journal homepage: <https://ijgpar.org/index.php/journal/index>

Curriculum teaching of mechatronics in the information age

Haoran Li

Guangzhou Xinhua University, China

Abstract: In the wave of digital education, the teaching design and practice of mechatronics integration courses in the information age become the key to innovative education. The course combines online teaching, virtual experiments and remote control techniques to break the limitations of a traditional classroom. Through multimedia courseware, real-time interactive platform and virtual simulation laboratory, students can not only master theoretical knowledge flexibly, but also conduct practical training online. Remote control technology enables students to operate practical equipment in real time and enhance their practical skills. The preliminary practice shows that this mixed teaching mode effectively improves students' interest in learning and practical ability, and provides a new direction and opportunity for mechatronics education.

Keywords: Information age, Innovative education, Teaching development

1 Introduction

With the rapid development of the information age, the coverage of information technology has brought revolutionary changes to the mechatronics course teaching. The combination of information technology and practical training teaching, using simulation technology and virtual experiment to provide students with more extensive learning resources and practical training opportunities, and greatly reduce the risk and cost in practical training operation. This paper will discuss the application and development prospect of information technology in electromechanical integration teaching.

2 Research background

With the deepening and rapid development of modernization and industrialization, new technologies such as information technology have been widely used in modern industrial production. A series of information teaching means and technologies, such as digitization of teaching content, informatization of teaching means, sharing of teaching resources and virtualization of teaching process, have been applied. Digital experiment teaching has become the norm, through computer simulation experiment, virtual simulation experiment and other ways, to help students to better understand and master the experiment content. The

application of network distance teaching in some colleges and universities is continuously expanded, and the Internet and distance technology are used to make learning resources more popular and convenient, and meet the learning needs of different regions and different student groups. The development of intelligent teaching resource management system has also attracted much attention, these systems can effectively integrate, share and manage teaching resources, improve teaching efficiency and quality.

Researcher Pang Xiaolan proposed that in the exploration of innovative teaching models for the "Mechatronics Integration" course in the context of digitalization, As the core course of manufacturing major, the course of "Mechatronics" can use the application of information technology, use innovative teaching methods such as online learning platform and simulation software, and we provide students with opportunities to learn and explore flexibly in and out of class. This will not only help them improve their knowledge structure, but also significantly improve their job adaptability and professional skills, so as to cultivate high-quality technical personnel for the country. Therefore, in the background of the information age, the innovation of the course teaching mode of "mechatronics" has extremely important practical significance.

3. Characteristics of mechatronics course teaching in the information age

3.1 Frontier nature of teaching content

The frontier of the teaching content is particularly important in the teaching of the electromechanical integration course in the information age. The rapid progress of science and technology has led to the continuous emergence of new technologies and new processes in the field of mechatronics. In order to maintain the leading and timeliness of the teaching content, teachers must continuously pay attention to and absorb the latest scientific and technological development and research results. Specifically, the teaching content should cover the current popular robotics technology, automatic control system, high-precision manufacturing technology, etc., and integrate the application of cutting-edge technologies such as artificial intelligence and the Internet of Things. By introducing the latest research results and engineering cases, students can understand the latest development trend of mechatronics and master the future technical direction. Teachers should also encourage students to study independently and explore new technical areas to meet the changing market needs. By maintaining the forefront of the teaching content, teachers can ensure that students master the latest knowledge and skills, while stimulating their innovative thinking and practical abilities, so that they are able to better adapt to the changing areas of mechatronics.

3.2 Diversity of teaching means

The teaching methods of mechatronics curriculum show unprecedented diversity. Traditional teaching methods, such as blackboard writing and oral teaching have been combined with modern multimedia, network technology and virtual simulation technology, forming a diversified teaching mode. The teacher uses the multimedia courseware to show the complex mechanical structure and electrical system, and lets the students intuitively understand the working principle through animation and simulation. Online classroom and online learning platforms break the limitation of time and space, enabling students to access learning materials and courses anytime and anywhere. Virtual simulation technology provides the possibility of simulating the real engineering environment, allowing students to conduct practical operations in a safe environment, and deepen the understanding and application of theoretical knowledge. These diversified teaching methods not only improve the teaching effect, but also stimulate students' interest and

enthusiasm in learning.

3.3 Sharing of teaching resources

The sharing of network resources makes the teaching resources of mechatronics courses be fully utilized. Teachers can obtain the latest teaching resources through the network platform, and students can also learn and interact independently through the network platform. Through the network platform, teaching resources can be easily shared across regions and across schools. This sharing greatly enriches the teaching content and enables teachers and students to have access to more high-quality educational resources. The shared teaching resource database avoids the repeated construction of resources and saves manpower and material resources, financial resources and time costs. For example, multiple schools can use an elaborate teaching courseware or simulation software together to improve the efficiency of using resources. The sharing of resources also helps to narrow the educational gap between regions and schools, let more students enjoy high-quality educational resources, and promote the balanced development of education.

4 Teaching method of mechatronics course in the information age

4.1 Teaching method of combining theory and practice

According to the research and analysis of relevant scholar Zhao Bing, Mechatronics course is a very practical course, so we must pay attention to the combination of theory and practice in the teaching process. Teachers can master the knowledge and skills of mechatronics technology in practice through experiment, practical training, course design and other ways. Practice link is a key part of the curriculum system. Through the setting of practice link, students can better understand and apply what they have learned.(1) Build some practice bases, such as mechanical manufacturing laboratory, electronic technology laboratory, etc., to provide practice site and equipment for students to carry out practical operation.(2) Set up some experimental courses, such as circuit experiment, control experiment, etc., let students build circuit and debug control system.(3) Organize some engineering practice projects, where students can participate in real engineering projects and exercise their practical operation ability and engineering practice experience.[][]

4.2 Case teaching method

The information platform provides a wealth of digital

case resources, and teachers and students can obtain various types of case materials through the Internet, including text, video, audio and multimedia. These rich resources make the case teaching more vivid and practical. Through the online platform, students can conduct real-time discussions and collaborative learning, breaking the limits of time and space. Teachers can use discussion boards, video conferencing, and online collaboration tools to promote interaction and communication between students, allowing for more in-depth analysis and understanding of cases. Teachers are able to provide immediate feedback and evaluation on students' case analysis and discussions. This immediate interaction not only helps students quickly identify and correct mistakes, but also effectively consolidate their knowledge base, which can continuously improve their learning effectiveness. Information technology provides powerful data analysis and simulation tools that students can use to conduct in-depth analysis of data in cases, simulate decisions and outcomes in different scenarios. This approach not only enhances students' analytical ability, but also improves their ability to solve complex problems, further enabling personalized learning. Students can choose different case learning according to their own interests and professional needs, while teachers can flexibly adjust the teaching content and strategies according to students' learning progress and feedback, so as to more effectively achieve personalized educational goals.

4.3 Interactive teaching methods

Interactive teaching method is a student-centered teaching method information platform, which provides a convenient communication channel between teachers, students and students. Through online discussion areas, instant messaging tools and collaboration software, students can easily share views and materials, conduct group discussions and project collaboration. Teachers can use the information platform to timely evaluate and feedback students' homework and classroom performance, so as to help students timely understand their learning situation, correct mistakes and consolidate knowledge. As an important tool of modern education, the information platform not only has strong technical support, but also can greatly promote the development of personalized learning. On this platform, every student can enjoy a tailored learning experience, because the platform will carefully recommend the most appropriate learning materials and practice questions based on their interests, abilities and learning progress. This

customized learning path planning can not only effectively stimulate students' enthusiasm for learning and improve their learning motivation, but also help students to master knowledge and skills more solidly. Students can choose learning topics according to their personal interests and preferences, so as to study their favorite areas more deeply and realize personalized learning. At the same time, the platform will also adjust the learning content and difficulty in time according to the students' learning progress and feedback, so as to ensure that every student can get the most suitable teaching for themselves.

5. The future development trend of mechatronics course teaching in the information age

5.1 Use information technology to stimulate your interest in learning

Using the virtual laboratory or simulation software, students can conduct experimental operations in a safe virtual environment. This interactive learning method can not only stimulate students' interest in learning, but also improve their practical ability. Students are encouraged to participate in online learning communities or forums to share learning experiences and experiences with other students. Through communication and discussion, students can inspire each other and make progress together. Use information technology to build an adaptive learning system, and recommend appropriate learning resources and paths for students according to their learning situation and progress. This personalized learning method can help students to find suitable learning methods for themselves, so as to improve their learning interest and efficiency. Design the project tasks with practical significance, and let the students learn the knowledge in the process of completing the task. For example, in a programming course, students can develop a simple application or game to stimulate their interest in learning and creativity.

5.2 Information-based assisted teaching

With the continuous development of information technology, the teaching content of mechatronics has been greatly enriched and diversified. By introducing multimedia resources such as animation and simulation experiments, students can visually perceive the operating state and principle of the electromechanical system visually and auditory, and have a deep understanding of its complex structure. Through the data information analysis, the

operating data of the system can be deeply mined and analyzed, so as to find out the potential problems and bottlenecks. Optimize the control logic and parameter setting to improve the operation efficiency and performance of the system. Mechatronics equipment can be remotely monitored and managed via the Internet. Students can watch the running status of the device online, conduct remote operation and maintenance, and improve their practical ability and problem-solving ability, so as to cultivate their innovative thinking and practical ability.

5.3 Enrich the content of the information resource database

In the actual teaching process, we need to continuously expand and enrich the relevant information teaching resource library. For the teaching of mechatronics courses, in order to ensure that students majoring in mechatronics can conduct personalized learning according to their own learning needs and interests, the setting of course resources must be comprehensive and complete. In the process of building the information learning resource database, we can set up a diversified media database, which includes text, image, audio and other forms of mechatronics core teaching materials. This intuitive teaching method helps the students to understand and master the relevant knowledge more deeply. In order to provide students with more learning reference, we can also use a special educational information website to show students' latest academic achievements, and provide a variety of learning reference materials. We can also create a resource library of excellent courses, which includes not only the syllabus, content, teaching plan, question bank of basic courses, but also the relevant literature, textbook catalogue and detailed answers to various questions. We can also set up a digital library, including e-books, electronic journals and other electronic materials, as an important part of the library, to provide students with rich learning resources. In addition, after the completion of the resource database construction, we also need to continuously update and optimize the teaching resources according to the latest development trends of the industry, so as to ensure that it can meet the changing learning needs of students.

5.4 Virtual simulation teaching

The application of virtual reality (VR) and augmented reality (AR) technology makes the experimental teaching of mechatronics more vivid and realistic. Students can conduct equipment operation and system debugging through the

virtual simulation experiment platform, reducing the risks and costs in the actual operation, and choose suitable virtual simulation technology platforms and development tools, such as Unity, UnrealEngine, etc. Ensure that the platform supports the required functions, such as 3D modeling, real-time interaction, data recording, etc. The virtual simulation content is designed according to the teaching objectives, including scenes, roles, tasks, and interaction modes. Ensure that the content is educational and interactive, and can be presented through case analysis, experimental simulation and other ways. The virtual simulation system was developed according to the design content, including 3D modeling, programming, and system integration. After the development, multiple tests were conducted to ensure the stability and interactivity of the system. The teacher demonstrates the operation process through the virtual simulation system, and the students can have interactive experience and operation exercises. Ensure adequate guidance and feedback in the teaching process. Feedback from teachers and students was collected through questionnaires and learning results evaluation. Analyze the effect of virtual simulation teaching, find out the existing problems and improvement measures, and constantly optimize the teaching content and technical realization. Regularly maintain the virtual simulation system, update the teaching content and technical functions, to ensure the long-term and stable operation of the system and the continuous improvement of the teaching effect.

6 Conclusion

Under the background of the information age, the teaching of the electromechanical integration course presents a brand-new development trend. With the continuous progress of technology, the Mechatronics course pays more attention to the combination of theory and practice, and emphasizes the students' comprehensive application ability of modern mechanical, electronic and computer technology. The information teaching methods have been widely used in the curriculum. Through multimedia, online courses and virtual simulation experiments, students can more intuitively understand the operation principle of mechanical and electronic systems, and improve the learning effect. This teaching method not only increases the interest of the course, but also provides students with more opportunities to study and explore independently. The mechatronics course focuses

on cultivating students' practical ability. Through experimental operation, project design and other ways, students can apply theoretical knowledge to practical problems and exercise their ability to solve practical problems. This practice-oriented teaching method helps to cultivate students' innovative thinking and teamwork ability. The course also strengthens ties with industry. Through close cooperation with enterprises and industries, the course content is more close to the actual needs, and students can better understand the industry development trends and technology dynamics. At the same time, enterprises also provide students with internship and employment opportunities, which can contribute to their career development.

The future development of information mechatronics course teaching will pay more attention to technology application, data analysis, online education, interdisciplinary integration and industry-education integration. More attention should be paid to technology-driven teaching innovation, popularization of online learning and distance education, data-driven teaching decision-making, development of interdisciplinary and comprehensive courses, integration of industry and education and school-enterprise cooperation. Through online teaching platforms, virtual simulation and experimental systems, interactive teaching tools, and the application of data analysis and personalized teaching, teachers can provide a more flexible, rich and personalized educational experience, and improve the teaching effects and learning effects. At the same time, teachers also need to constantly update their teaching ideas and educational technology to adapt to the needs and challenges of information teaching. It is helpful to improve the teaching effect and quality, and to cultivate more talents with innovative spirit and practical ability.

References

- [1] Pang Xiaolan, Tang Zengliang, Liang Jianjing. On the innovation of teaching mode of Electromechanical Integration under the background of digitalization. *Equipment Engineering of China*, 2024, (08): 23-25.
- [2] Zhao Bing. Teaching design and practice of Internet-based mechatronics courses. *Integrated circuit applications*, and 2024, 41(01): 224-225. DOI:10.19339/j.issn.1674-2583.2024.01.101.
- [3] "On the Application of Information Platform in

Classroom Teaching of Secondary Vocational Schools"
-Li Tingting, -*National Common Language Teaching and Research* (journal)

- [4] Zhao Dayu, Song Huabin, Chen Shihai and so on. Application and development trend of mechatronics technology in petrochemical machinery. *Modern Industrial economy and Information Technology*, 2022,12 (7): 2-14.
- [5] Li Jiahao. Exploration of information teaching Methods of university teachers under the background of "Internet +" . *Technology wind*, 2024, (09): 114-116.DOI:10.19392/j.cnki.1671-7341.202409038.