CS HISTORY AND EDUCATION HOLD CULTURAL AND SPIRITUAL VALUE

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Abstract

The author examines how computer science history can serve a cultural and spiritual purpose in higher education, emphasizing the importance of developing a broad and interdisciplinary knowledge base to foster comprehensive talent in computer science. The author also explores the integration of humanistic education and science education in computer education, ultimately proposing a curriculum system that aims to cultivate students' innovation abilities and overall quality, with specific methods for incorporating humanistic education into computer science education.

Introduction –

Computer science has a significant impact not only on the development of productive forces as a form of material progress, but also on the development of people's ideology as a form of intellectual progress. Those who are passionate about the study and pursuit of science should recognize the cultural and spiritual value of computer science history, not just in terms of its impact on productive forces but also on ideology. The birth, evolution, and development of computer science theories reflect scientists' methods of thinking and research, which is more valuable than specific knowledge.

In modern higher education, a comprehensive science education should encompass two aspects: the imparting of specific scientific knowledge and methods, as well as the cultivation of abstract scientific thoughts and

spirits. While the former represents the body of science education, the latter represents its soul. In other words, higher education should not only teach students what to think, but how to think. Computer science history serves as an effective means of instilling scientific thoughts and spirits in education. Hence, the history of science in higher education plays an indispensable role in terms of its cultural function and spiritual value.

University education aims to promote integrated scientific thinking and cultivate well-

rounded talents, with an emphasis on nurturing talents with humanistic spirits. However, in modern university education, utilitarian andtest-oriented education often prevail, while scientific thought, spirits, and humanistic education are often neglected and weakened. This has resulted in students who are only concerned with results and utility, neglecting the development of science and lacking in exploratory and innovative spirits for science. It is unwise to focus higher education solely on pragmatism. Thus, developing a broader, humanistic, and comprehensive knowledge system is crucial for cultivating well- rounded talents in the field of computer science.

History –

The history of computer science is marked by numerous challenges and setbacks, including technical limitations, resource constraints, and societal pressures. However, scientists have persevered through these difficulties by drawing upon their passion for knowledge, creativity, and dedication to problem-solving. Their persistence and unwavering commitmentto scientific inquiry have led to breakthroughs and innovations that have advanced computer science and transformed the world. The history of computer science is a testament to the power of scientific inquiry and the boundless potential of human curiosity and imagination, as well as to the dedication and ingenuity of scientists who have pursued their dreams and aspirations with unwavering determination.

The greatness of science fosters scientists' dreams and pursuits, while their spirits, thoughts, and methods give birth to science and propel it to greater heights.

One example of this is John Cocke, the winner of the Turing Award in 1987 and designer of the IBM360 computer system. He discovered that only 20% of instructions in a common computer system were frequently used, while the remaining 80% were seldom used. Based on this finding, he defined the concept of RISC computers and developed a new computer architecture.

Another example is R.W. Hamming, winner of the Turing Award in 1968, who demonstrated remarkable insight when working on communication error codes. He realized that the problem could not be solved by ensuring the sending of correct codes but rather by finding and correcting errors once they occurred.

Charles Babbage devoted his life and fortune to researching mechanical computers and

overcame incredible difficulties to create a complete series of computer structural drawings, which laid the foundation for the study of modern computers. Although he was not able to realize his assumptions due to technological limitations at the time, his research life embodies the spirit of devotion to science and shows that scientific research is inevitably intertwined with economic foundations, scientific research systems, cultural environments, and other factors.

These scientists' attitudes of diligence and hard work, as well as their aspirations, have inspired us all. The readers of this text will share in their joy of success, experience the fun of learning, and absorb the nourishment for growth, increasing their confidence and strength for overcoming difficulties.

HUMANISTIC SPIRITS AND COMPUTER SCIENCE EDUCATION–

1. The scientific thoughts, methods, and spirits that are inherent in the history of computer science hold immense importance in nurturing talented individuals.

The history of computer science is not merely a record of achievements in technology, but rather a history that depicts the hardships, challenges, and even crises faced by scientists during its development. For over three hundred years, previous generations of scientists have devoted their lives to research and development. The history of computer science and technology illustrates the journey of raising questions, experiencing ups and downs, until the theories reach maturity, and some questions remain unresolved.

The history of computer science not only documents the advancements and breakthroughs in technology but also the scientists' perseverance in overcoming obstacles and crises. By studying the history of computer science, people can gain a deeper understanding of the scientists' dedication, thoughts, methods, and spirits. The spirit of "science for science" has inspired generations of scientists to continue exploring the truth of the universe. The greatness of science fuels scientists' dreams and aspirations, and their spirits, thoughts, and methods give rise to science and lead it to greatness.

2. **The study of computer science history can help students develop a better understanding of the theoretical background of computer science, which is crucial for forming a comprehensive knowledge structure in this field.**

The primary goal of college education is not only to impart knowledge but also to teach students how to think, analyze, and research. Unfortunately, in today's classrooms, teachers often focus solely on imparting knowledge and

reaching final conclusions when teaching theories, neglecting the evolution of theories, thinking methods, and historical context. As a result, students tend to view the theories, formulas, and laws in their textbooks as the only correct answers, without understanding the background of these theories, alternative solutions to problems, and the development of theories. This approach is detrimental to the cultivation of innovative thinking in students.

3. **Studying the history of computer science enables students to gain a deeper comprehension of how innovation plays a vital role in scientific discoveries.**

The history of computer science is a saga of

continuous innovation. Every improvement, from the earliest mechanical computers to today's digital electronic computers, and from Fortran and ALGOL to C++ and Java, is the result of innovative ideas. By studying this history, students can comprehend that innovation is the driving force behind the development of science, and that it is the essence of scientific work.

Develop a curriculum content system that focuses on cultivating students' comprehensive qualities and innovative abilities –

One suggestion for constructing a curriculum content system aimed at cultivating students' overall qualities and innovative ability is to focus on the following aspects in a logical and organized way:

(a) The cultural background and basic information of the researcher(s) who developed the theory or invention, their motives, thoughts and methods, and the rudiments related to their work.

(b) The revision and improvement of the theory after its initial proposal, as well as any new theories or problems that were derived from the proposed theory.

(c) The value and application areas of the theories, and how they can be utilized in various fields.

(d) Any unsettled problems or weaknesses of the theory, as well as any solutions that have been proposed or are currently being studied, along with the theory's current state of development

and future prospects.

(e) The impact of the theory on the economy and society, as well as any social problems that have arisen as a result, such as legal, ethical, moral, intellectual property, and career- related issues.

By emphasizing these key aspects and exploring them in a comprehensive manner, students can gain a deeper understanding of the historical and cultural context surrounding computer science and technology, as well as the importance of innovation and problem-solving in the field. This can help them to develop their critical thinking, analytical skills, and creativity, while also preparing them to become more well-rounded individuals and professionals.

By familiarizing students with the definition of computer science, the context surrounding the emergence of scientific theories, the evolution of these theories over time, their areas of application, current challenges, and prospects, educators can help students comprehend the challenges and uncertainties inherent in scientific discovery. This understanding can motivate them to explore and innovate.

Devote substantial research efforts to explore an effective teaching practice model that combines science education and cultural education –

Integrating science and culture education Incorporate humanistic knowledge and spirit into the teaching of professional knowledge to foster students' interest and develop their scientific and humanistic spirits. To achieve this, introduce the background and development of a certain knowledge point to

cultivate students' awareness of innovation. During the teaching process, prioritize students, respect their personality and interests, and teachers should set a good example with their academic learning and dignity, creating a fair, harmonious, democratic, and inspiring atmosphere. The goal of combining science and cultural education is to help students understand the cultural spirit of science and develop a scientist's ideal personality, which represents the highest level of scientific life.

Enhancing the cultural quality of teachers is crucial for improving the quality of teaching and implementing successful teaching reforms. To achieve this, various methods can be used, including providing training classes, study reports, teaching demonstrations, and group lesson preparations to improve teachers' teaching abilities and skills. Additionally, it is important to incentivize teachers to incorporate cultural education into their teaching of professional courses.

Conclusion –

Computer science education is not only about learning technical skills, but it also involves understanding the historical context, development process, and cultural impact of scientific inventions. It is crucial to cultivate students' innovative abilities and overall qualities, including humanistic knowledge and spirit, to raise their interest and develop their scientific and humanistic spirits. The effective teaching practice mode of combining science education and cultural education involves introducing the cultural background of a certain knowledge point, respecting students' personalities, and interests, and creating a fair, harmonious, democratic, and inspiring atmosphere.

To achieve successful teaching reform, it is necessary to improve teachers' cultural quality, which plays a significant role in improving teaching quality. Teachers should also be encouraged and incentivized to conduct cultural education in the teaching of professional courses. Overall, the goal of computer science education is not only to produce technically skilled professionals but also to foster innovative, well-rounded individuals who understand the cultural and societal implications of their work.

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