

Research Article

Study and Design of Promoting Fine Traditional Chinese Culture into the Course of Software Engineering Moderately

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Abstract

Since 1994, we Chinese login the Internet, more than 30 years have passed. And now the Internet is the foundation of the web and the technical infrastructure in China. And among the Internet Era, so many fields have been influenced, such as the education and so on. The impact on education of the Internet Era has brought so many changes, such as the teaching methods etc. With the influences of Internet, the world has entered into globalization. Among the context of globalization, Cultural Globalization has become an uncontrollable trend. Culture is the soul of a nation. While China has a long history of about 5000 years and has accumulated so much Fine Traditional Chinese Culture. Then how to broadcast the Fine Traditional Chinese Culture in Internet Era with the background of Cultural Globalization based on the first-line teaching of Computer Science in college? In this paper we elaborate the significance to integrate Fine Traditional Chinese Culture moderately into the course of Software Engineering in college in the Internet Era. And we also propose some specific cases for integrating Fine Traditional Chinese Culture moderately into the course of Software Engineering from both macro dimensions and micro dimensions. With the updates of the teaching content of integrating Fine Traditional Chinese Culture moderately into the course of Software Engineering, we have got good teaching effects. We present the teaching effects through the evaluations of the students. By summarizing the study and design of promoting Fine Traditional Chinese Culture into the course of Software Engineering moderately, we want to communicate and exchange with experts and peers better.

Keywords

Fine Traditional Chinese Culture, Software Engineering, Internet Era, Cultural Globalization

1. Introduction

In this part, we will emphasize the significance of integrating Fine Traditional Chinese Culture moderately into the course of Software Engineering.

China has been connected to Internet for more than 30 years since 1994 [1]. With the continuous influence of Internet, the world has entered into the era of globalization. In the context of globalization, the development of Cultural Globalization has become an uncontrollable trend.

Culture is the soul of a country and a nation. Cultural Confidence is the most fundamental, profound, and enduring force in the development of a country or a nation. In the context of Cultural Globalization, how to better strengthen Cultural Confidence and inherit and develop Fine Traditional Chinese Culture?

Universities are important places for the construction of soft power of national culture. According to the National

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Statistical Bulletin on the Development of Education in 2024 issued by the Ministry of Education, the total number of students of various forms of higher education was 48.46 million [2]. How to speak up for the times, open up the eyes for the times, and write for the times? It is of great significance to integrate Fine Traditional Chinese Culture moderately based on the first-line teaching in college. And as teachers engaged in Software Engineering, we integrate Fine Traditional Chinese Culture moderately into the course of Software Engineering in the face of opportunities and challenges brought by Cultural Globalization in Internet Era.

Software Engineering was first proposed in 1968 [3], emphasizing to understand the entire Software Development Process from the perspective of the Software Life Cycle. The theoretical and practical aspects of the course are strong. By learning of the course, students will master the general process of software development and maintenance, grasp software development methods, understand new technologies and trends in professional development, and apply software engineering to solve specific practical problems.

Firstly, the core idea of Software Engineering is to draw concepts, principles, techniques and methods from the long-standing engineering systems such as construction, water conservancy and military engineering to instruct the development of software. The accumulation of Fine Traditional Chinese Culture in engineering since ancient times is also dazzling and beautiful. While promoting the professional course, to integrate Fine Traditional Chinese Culture moderately into Software Engineering can, on the one hand, further enhance the cultural consciousness and confidence of teachers and students; On the other hand, it can effectively achieve moderate cross disciplinary integration between science and humanities. Cultivating cultural talents and educating students through humanities is an important method of implementing core competencies in the curriculum. This method can also accomplish the aim of providing more comprehensive cultural education for students. And it can enhance the cultural literacy, comprehensive qualities, sense of social responsibility of the students, helping them better shoulder the mission of national development.

Secondly, the content of Software Engineering covers a wide range and spans a large distance. The ideological and political elements of Fine Traditional Chinese Culture courses behind the knowledge of Software Engineering are particularly rich. On the basis of teaching professional knowledge, to update the teaching objectives, to enrich the teaching methods, to optimize the teaching content, and to integrate the ideological and political elements of Fine Traditional Chinese Culture behind the relevant professional knowledge are the cores of doing a good job. And it is necessary to cultivate high-quality talents by doing so in the new era.

Thirdly, Software Engineering is generally set up when students are approaching the graduation. Before the students formally step into the construction of modernization, it is of great significance to help the students to better improve their

cultural consciousness while studying the courses. This can further strengthen the inheritance spirits of the students. And it can better stimulate their ideals, beliefs and ambitions.

The authors intend to study the topic of integrating Fine Traditional Chinese Culture moderately into the teaching of Software Engineering in college. The following text will focus on the specific plans and cases of integrating Fine Traditional Chinese Culture moderately into Software Engineering. The specific plans and cases cover two dimensions: curriculum design from macro perspective and specific knowledge design from micro perspective.

2. The Overall Design (Macro Perspective)

From a macro perspective, the whole design of integrating Fine Traditional Chinese Culture moderately into Software Engineering is to optimize the teaching goals, enrich the teaching methods, and update the teaching content in the curriculum.

Optimization of the teaching goals: Based on the original teaching goals (mastering the basic concepts and principles of Software Engineering; mastering the engineering methods and techniques for developing software projects, processes, guidelines, standards; mastering professional theories, analytical tools, methods at different stages of the Software Life Cycle; possessing the ability to apply theory to practice, etc.), continuously deepen the optimization of the curriculum, cultivate students' all-round development in "morality, intelligence, physique, aesthetics, and work skills". Special emphasis is placed on integrating Fine Traditional Chinese Culture moderately into Software Engineering.

Enriching the teaching methods: On the basis of traditional teaching methods, enrich diverse teaching methods that are in line with the characteristics of the learning situation. Emphasis is placed on Case-based Learning Method, Project-driven Teaching Method, and Discussion Teaching Method, etc. In the Project-driven Teaching Method, Software Design is mainly carried out around the relevant themes of Fine Traditional Chinese Culture.

Updating the teaching content: Integrate Fine Traditional Chinese Culture moderately into the teaching of professional knowledge, cases, projects, etc. The updated teaching content enables the handover of Fine Traditional Chinese Culture among members of the national community, which is an organic combination of culture and subject, the production and reproduction of culture, and the education and reeducation of people [4]. To inherit the Fine Traditional Chinese Culture further deeply through education and other means. Inheriting Excellent Traditional Chinese Culture and promoting its creative transformation and innovative development is an inherent requirement for universities to effectively carry out the practice of cultivating morality and talents, and it is also a strategic mission for universities to promote the construction

of cultural power. To develop the Fine Traditional Chinese Culture in the process of inheritance. To integrate the Fine Traditional Chinese Culture appropriately into Software Engineering in the Internet Era.

3. The Specific Design (Micro Perspective)

From a micro perspective, the specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering is reflected in the excavation and application of Fine Traditional Chinese Culture behind the relevant professional knowledge. The paper shares some selected specific designs in the following:

(1) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

Assign the project topics at the beginning of the semester, with the main theme revolving around Fine Traditional Chinese Culture.

For example, to design an online quiz system on the theme of Fine Traditional Chinese Cultural. The basic requirement of the system is that administrators can create questions, publish questions, publish answers, while users can choose to join the system, submit answers, view grades, view answers, etc. The system can perform necessary user management, such as registration, login, personal information maintenance, etc.

Through the course learning, students can not only apply the theories, tools, methods and so on of Software Engineering to guide the development of practical projects, but also achieve the collection, organization, classification, and summarization of Fine Traditional Chinese Culture.

(2) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

When discuss the concept of "Software Engineering", we emphasize the characteristics of "Engineering". We share the principles and technical methods involved in "Engineering", and the impact of good "Engineering". We choose some typical cases of the famous engineering projects in Chinese history to carry out the teaching activities.

For example, the engineer of the Forbidden City (as shown in Figure 1). The Forbidden City in Beijing is the paragon in the history of ancient Chinese palace development, and it is the largest and the best-preserved ancient palace in the world. It inherits and condenses the traditions of ancient Chinese urban planning and construction of palace city, such as Axis Layout, Central Symmetry, Front Court and Rear Living Quarters and so on [5].



Figure 1. The Forbidden City.

For example, the engineer of the Great Wall (as shown in Figure 2). The Great Wall of China is the longest and largest military defense engineer in the world at the age of Cold Weapons War. It is the greatest engineer in the history of human civilization. It was first built more than 2000 years ago during the Spring and Autumn Period and the Warring States Period. After the unification of China by the Qin Dynasty, it became the Great Wall of China. The Great Wall is located in northern China, starting from Shanhaiguan in the east and ending at Jiayuguan in the west, with a total length of about 6700 kilometers, commonly known as the Great Wall of China. From the construction of the "Fangcheng" by the Chu state in the 7th century BC (Before Christ) to the Ming dynasty (1368-1644), more than 20 feudal states and dynasties formed the Great Wall. In December 1987, the Great Wall was listed in the World Heritage List [6].

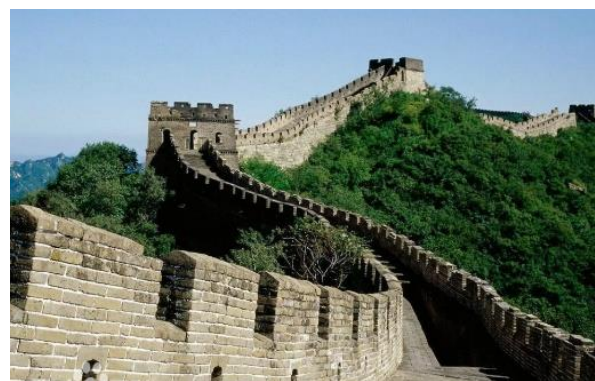


Figure 2. The Great Wall.

For example, the engineer of Beijing Hangzhou Grand Canal (as shown in Figure 3). The Beijing Hangzhou Grand Canal, also known as the South North Canal, starts from Tongzhou in the north of Beijing and ends in Hangzhou, connecting Beijing, Tianjin, and the four provinces of Hebei, Shandong, Jiangsu and Zhejiang. With a total length of more than 3400 miles, it is a major transportation artery connecting the north and south [7].



Figure 3. The Graph of Beijing Hangzhou Grand Canal.

(3) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

When it comes to the "Software Life Cycle", we will indicate the various different stages of the Software Life Cycle, which include Problem Definition, Feasibility Study, Requirement Analysis, Architecture Design, Detailed Design, Coding and Unit Testing, Comprehensive Testing, and Maintenance. We emphasize the different goals and tasks in different stages of the Software Life Cycle. And we can analogize between some classic literature on the human life cycle in Chinese history to help the students to learn.

For example, in the Book of Rites (as shown in Figure 4), it states: Ten years of human life is called You, learning. Twenty years is called Ru, crown. Thirty years is called Zhuang, having a room. Forty years is called Qiang, serving in government. Fifty years is called Ai, occupying an important position. Sixty years is called Qi, instructing. Seventy years is called Lao, passing down. Octogenarian is called Mao..... Centenarian is called Qiyi [8]. In ancient classic Chinese literature, people's lives were divided into different stages according to their chronological order, which can analogize the "Software Life Cycle".



Figure 4. The Book of Rites.

For example, in the Analects of Confucius, it is expressed as "I had determined to learn at the age of fifteen. I stood firm at thirty. At forty, I had no doubts. To know my destiny at fifty. I could accommodate various viewpoints at sixty. And to follow my heart's will without violating the rules at seventy." According to this passage, later generations used "the year of learning" to refer to the age of fifteen, "the year of establishing oneself" to refer to the age of thirty, "the year of not being confused" to refer to the age of forty, "the year of knowing one's destiny" to refer to the age of fifty, "the year of accommodating various viewpoints" to refer to the age of sixty, and "the year of desire" to refer to the age of seventy [9]. This can also analogize the "Software Life Cycle".

(4) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

When it comes to the "Software Process", in order to emphasize the characteristics of the "Software Process" (i.e. the framework of a series of tasks that need to be completed to obtain high-quality software, and the steps for completing each task are specified), the typical elements and representative processing of certain Fine Traditional Chinese Culture are shared.

For example, the processing of Chinese Porcelain. The processing of porcelain in China is divided into the following main steps: taking clay, refining clay, plating the box, trimming the mold, washing the material, forming, impressing, spinning, painting, glazing, filling the kiln, opening the kiln, coloring, and firing in the furnace [10]. This can analogize the "Software Process".

(5) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

When it comes to the "Waterfall Model", in order to highlight the sequential and dependent characteristics of different stages in the "Waterfall Model", relevant poems and verses are shared to depict it vividly.



Figure 5. The Waterfall of Lu Mountain.

For example, the poem emerged in the Tang Dynasty with the name of "To See the Waterfall of Lu Mountain (Li Bai)" (as shown in Figure 5) describes the characteristics of the waterfall. In the sunshine, the censers release purple smoke, while the waterfall faraway hangs in front of the mountain. And the waterfall is flying straight down from the top of the mountain which is about three thousand feet high. It is just like the silver river is falling from the sky [11]. This can analogize the "Waterfall Model".

When it comes to the "Fountain Model", in order to highlight the iterative and seamless features of object-oriented software development in the "Fountain Model", relevant poems and quotes are shared to depict it.

For example, the poem emerged in Yuan Dynasty with the name of "Baotu Spring" (as shown in Figure 6) Zhao Mengfu describes the characteristics of the fountain. The source of the Luo River is unique in the world, and white jade pots gush out from the flat ground [12]. This can analogize the "Fountain Model".



Figure 6. The Baotu Spring.

(6) The specific design of integrating Fine Traditional Chinese Culture moderately into Software Engineering.

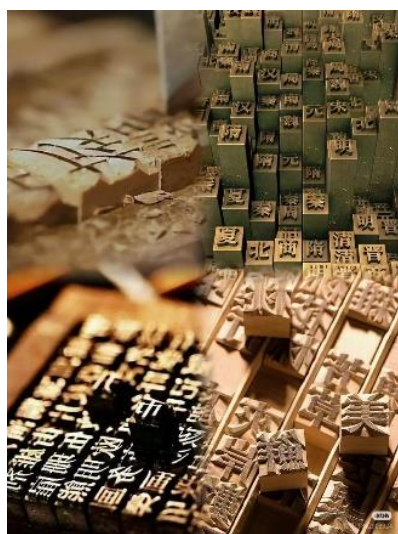


Figure 7. The Movable Type Printing.

When it comes to the stage of "Architecture Design" in the "Software Life Cycle", in order to emphasize the design principles and heuristic rules of "Modularization + Module Independence + High Cohesion and Low Coupling", we share the Movable Type Printing, which is one of the Four Great Inventions of Ancient China, to help students understand the expertise better.

The invention of Movable Type Printing (as shown in Figure 7) effectively improved the printing efficiency at that time. Each movable individual letterpress reflects the rules of "High Cohesion" and "Modularization". And different movable letterpresses reflect the rule of "Low Coupling". Movable Type Printing highlights the wisdom among Fine Traditional Chinese Culture, which can analogize the design principles in "Architecture Design".

In the specific teaching process of Software Engineering, the excavated knowledge of Fine Traditional Chinese Culture will be presented to students in various forms such as graphics, videos, etc. On the one hand, it showcases the richness and diversity of Fine Traditional Chinese Culture moderately, meeting students' needs for diverse cultures through the subtle influence of "sneaking into the night with the wind, moistening things silently"; On the other hand, it has achieved the goal of integration and intersection of science and arts, reflecting the diversity of teaching content and enhancing students' interest in learning.

On the premise of ensuring that the teaching of Software Engineering is the main focus, the moderate integration of Fine Traditional Chinese Culture into the curriculum from two dimensions (macro perspective and micro perspective) has achieved the teaching goals of Software Engineering better.

4. Teaching Effects

The results section should provide an accurate and concise description of the experimental findings, and the resulting conclusions that can be inferred from the experiments. Meanwhile, the results should be presented in a transparent and truthful manner, avoiding any fabrication or improper manipulation of data. Where applicable results of statistical analysis should be included in the text or as tables and figures.

(1) By integrating Fine Traditional Chinese Culture moderately into Software Engineering, the Goal Achievement Rate of the curriculum has been improved to a certain extent.

The Goal Achievement Rate of Software Engineering for the second semester of the 2022-2023 academic year is 0.76, meeting the qualification standard. While in the second semester of the 2023-2024 academic year, the Teaching Content has been optimized, which means that Fine Traditional Chinese Culture has been integrated into the course teaching moderately, with a Goal Achievement Rate of 0.79.

(2) By integrating Fine Traditional Chinese Culture moderately into Software Engineering, the students' Evaluation Scores have improved to a certain extent.

In the second semester of the 2023-2024 academic year, the

Fine Traditional Chinese Culture has been integrated moderately into Software Engineering, and the students' Evaluation Score is 97.22 (as shown in Figure 8). And in the first semester of the 2024-2025 academic year, the Fine Traditional

Chinese Culture has been integrated moderately into Software Engineering continuously, and the students' average Evaluation Score is 97.50 (as shown in Figure 9).

评价我的问卷

教师个人报告

期末评价

课程 (1)	教学班 (0)					
课程名称	课程代码	开课院系	问卷名称	任务类型	参评率	平均得分
软件工程	12331013	信息科学与工...	2023-2024学...	期末评价	100%	97.22

Figure 8. 2023-2024 (2) Evaluation Score of Software Engineer.

评价我的问卷

教师个人报告

期末评价

课程 (3)

教学班 (0)

课程名称	课程代码	开课院系	问卷名称	任务类型	参评率	平均得分
软件工程	00941023	信息科学与工...	2024-2025学...	期末评价	100%	97.05
软件工程	02832112	信息科学与工...	2024-2025学...	期末评价	100%	97.95

Figure 9. 2024-2025 (1) Evaluation Scores of Software Engineer.

(3) To establish one project related to integrating Fine Traditional Chinese Culture moderately into Software Engineering, providing feedback for teaching.

5. Conclusions

Cultural Globalization has become an uncontrollable trend in the Internet Era. Cultural exchanges are becoming increasingly frequent. In this article we propose some specific contents for integrating Fine Traditional Chinese Culture moderately into the course of Software Engineering in order to help the students to grasp the professional knowledge and skills better, and at the same time to inherit and broadcast the Fine Traditional Chinese Culture better. With the adjustment of the teaching content of Software Engineering, we have achieved some good teaching effects.

Well, it is a long and arduous task to integrate the Fine Traditional Chinese Culture moderately into the related computer courses in universities. In the following teaching, it is necessary to explore relevant resources continuously and optimize the teaching mode further. For example, we might try to collaborate with cultural organizations and institutions

on Software Engineering projects development, etc.

As the saying goes, "If there are so many virtuous people in the country, the governance of the country will be strong. " With the study and design of promoting Fine Traditional Chinese Culture into the course of Software Engineering moderately, we are willing to communicate and exchange with experts and peers better in the future to cultivate more talents for humankind.

Abbreviations

BC Before Christ

Author Contributions

Jiang Haiyan is the sole author. The author read and approved the final manuscript.

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Conflicts of Interest

The author declares no conflicts of interest.

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