

Research on Civics Teaching in Surveying Program

Qingda Duan¹, Dan Su², Na Duan^{3*}

¹College of Forestry, Xinyang College of Agriculture and Forestry, Xinyang 464000, Henan Province, China

²Department of Medical Chemistry, Xinyang Vocational and Technical College, Xinyang 464000, Henan Province, China

³Party Committee Office, Xinyang Normal University, Xinyang 464000, Henan Province, China

*Corresponding author: Na Duan, 13353769677@163.com

Copyright: © 2023 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: The integration of the civics course and surveying professional course is an important part of the teaching reform of surveying, which is an important way to implement the principle of cultivating educated talents with moral characters for the country. Based on the surveying course, this paper deeply analyses the spirit of hard work and endurance, craftsmanship, innovation, and national sentiment contained in surveying, carries the civics education with professional knowledge, and makes the civics element subliminally enter the brain and heart, so as to improve the patriotic sentiment and professional quality of students.

Keywords: Civics course; Surveying; Literacy; Patriotism

Online publication: September 26, 2023

1. Introduction

With the continuous progress of the times, the requirements for higher education are also increasing. Colleges and universities should not only focus on the cultivation of students' professional skills, but should also meet the requirements of the times in terms of ideology and politics, social adaptability, and other aspects. Ideology and politics education is an important grasp of moral education. In the context of the construction of ideology and politics curriculum, teachers in colleges and universities should actively explore new ideas and paths to integrate the elements of ideology and politics into teaching, and endeavor to achieve the organic fusion of professional knowledge and ideological and political elements, so that while mastering the knowledge, the students can also elevate their own ideological level, so as to become the applied, complex, all-round high-quality talents that the national needs ^[1].

2. Introduction to surveying courses

Surveying is the study of the shape and size of the earth and the determination of points on the ground (including the air, the subsurface, and the seabed). The course focuses on cultivating students' ability in measurement,

calculation, and drawing, and the contents mainly include level, angle, and distance measurements, linear orientation, measurement error, basic knowledge of data processing, small area control measurement, global positioning system (GPS) technology and application, basic knowledge and application of topographic maps, and large-scale topographic map surveying and mapping. The course aims to enable students to understand the use of basic surveying and mapping instruments (level, latitude and longitude, total station, etc.), and to be able to use these instruments to carry out elevation surveying, angle surveying, and distance surveying, etc.^[2].

3. Importance of civics in surveying courses

Politics course is essentially a kind of education to achieve moral education. The first step in educating people is to educate morality, focusing on the organic unity of preaching, teaching, and educating, educating people and talents, and always adhering to the principle of standing up for oneself with morality, learning and teaching with morality. It focuses on strengthening students' education in the worldview, outlook on life and values, passing on and innovating the excellent traditional Chinese culture, and actively guiding contemporary students to establish a correct outlook on the country, the nation, history, and culture, so as to cultivate more talents with all-round development in morality, intelligence, physical fitness, and hard work for the society, and to cultivate qualified builders and reliable successors for the cause of socialism with Chinese characteristics.

Measurement is a compulsory course for forestry majors in the author's institution, and its course ideology plays an important role in firming students' ideals and beliefs, thickly planting patriotism, setting up a correct outlook on life, values, and worldview. It is also essential in improving students' ability to understand, analyze, and solve problems, fostering students' patriotic sentiment, sense of social responsibility, spirit of innovation, practical skills, improving scientific thinking methods, enhancing the consciousness of following scientific ethical norms, promoting the formation of a scientific research style that is rigorous and factualistic, facilitating the cultivation of students' courageousness to explore the unknown and pursue the truth, as well as stimulating the students' ambitions to reach scientific peaks, etc.^[3].

4. Teaching tools for civics in surveying courses

In the daily teaching process, it is necessary to use appropriate teaching methods to integrate the elements of politics course into professional knowledge, to not only make students feel a sense of fulfillment in learning, but also to improve students' quality of thought and self-cultivation.

4.1. Implementing the flipped classroom to evoke students' learning initiative

Flipped teaching refers to transferring the content originally explained in the classroom to outside the classroom, allowing students to learn independently at home or at school through videos, PowerPoint presentations (PPTs) or other forms, and then carrying out interactive teaching modes in the class. Compared with the traditional classroom teaching mode, flipped teaching focuses more on students' initiative and participation, and improves students' independent learning.

Teachers can release course guides through Learning Channel and Rain Classroom before class, which contain the relevant content of the Civics of Surveying course, so that students can study independently before class. In class, students are asked to express their opinions on a hot topic of politics, so that students can change from passive learning to active thinking, thus stimulating students' initiative and effectively improving the effect of politics course.

4.2. Applying information technology in civics classroom

In the teaching process of surveying courses, the use of virtual reality (VR), artificial reality (AR), and other new technologies can effectively improve students' interest in learning, which is conducive to students' deeper perception of the professional scene. For example, when teaching the process of surveying and mapping Mount Everest, the students are allowed to put on the equipment and instrument, and put themselves in the VR virtual scene to experience the process of climbing, so as to cultivate the professional spirit and refine their personal character.

4.3. Bringing ideological and political content to life

The content of ideology and politics is indeed relatively boring, and the content of the measurement course should be brought to life in teaching by linking it to students' real lives. Firstly, teachers should respect each student, treat the students with a developmental perspective, and establish a relaxed and pleasant learning atmosphere. Secondly, teachers should start from the real-life examples around students and guide them to establish correct values. For example, in the explanation of distance measurement and linear orientation, real-life cases can be introduced, such as the simplest brick length and width, methods to measure the school runway, the consequences if a building alignment is not done, and so on, in order to train the students' spirit of dedication and thinking habit.

5. Pathways to implementing civics in surveying courses

The surveying program consists of four main civic elements: the spirit of hard work and endurance, the spirit of craftsmanship, the sense of innovation, and the sense of family and country.

5.1. Hardworking and enduring hardships

In the learning process of surveying, a combination of theory and practice is adopted, with the theoretical part mainly about teaching of construction and use of some instruments (level, latitude and longitude, total station, etc.), and the practical part being the on-site explanation of how to use these instruments. Although remote sensing satellites can be used to obtain topographic maps of small areas, the resolution of the images is low, and the author's major has not been exposed to similar courses, so surveying belongs to the blind spot of students' knowledge, which is not only reflected in the construction of the instruments and the understanding of a large number of formulas in the textbooks, but also in the specific use of the instruments. Therefore, it is highly necessary to carry out classroom practical experiments on campus, and the classroom practical aspects of surveying mainly include eight in-class experiments such as level measuring elevation, latitude and longitude measuring angle, total station measuring coordinates, and a one-week internship part. In this process, higher demands are made on students' physical and mental qualities, forcing them to cultivate the spirit of hard work and endurance.

In the classroom teaching process to explain the level measuring elevation, the principle of level measurement is first explained, then the spirit of climbing can be further introduced into the teaching, the spirit of climbing involves unremitting exploration, tenacity to move forward, unafraid of difficulties and dangers, courage to accept challenges, self-transcendence, and the spirit to make the dream come true. Hardworking is the most basic quality in the spirit of climbing. Mount Everest as the world's highest peak, in front of which human beings seem very small, but this does not stop human beings from exploring it. The 8848.86m height of Mount Everest are inseparable from the surveyor's job, facing the bad weather of Mount Everest, the surveyor wore simple equipment and measured its 8848.86m height, even if there were team members sacrificed in the

middle of the journey, they are still moving forward until climbing to the highest point, these are inseparable from the surveyor's spirit of hard work and endurance that defy the difficulties and dangers.

5.2. Craftsmanship spirit

Craftsmanship is a state of professionalism based on the practitioner's reverence and love for the profession and a state of dedication, seriousness, and diligence. It is the professional quality of concentrating on each product and process, striving for perfection and pursuing excellence. It is also the spirit of patience, persistence, and perseverance with an inner certainty and an eye for details.

Surveying requires a very high degree of accuracy, as the saying goes, "a tiny lapse can lead to a huge difference," which is also applicable to surveying, whether it is measuring elevation, distance, or angle, we are required to follow the principle of "step by step checking" to ensure that the measured data can meet the specification requirements and the error of each step can be within the error tolerance. While in the measurement process to record the most authentic data, the data should never be falsified for the sake of high precision, the archiving steps should also be performed well to prevent data loss, and should do the best to ensure that the measured data is reliable with the highest precision, and to achieve these, it cannot be separated from the spirit of craftsmanship in practice ^[4].

To explain the difference between systematic error, chance error, and roughness, roughness is "gross error," this kind of error is the most obvious error in measurement data, which must not exist, systematic error and chance error exist objectively, which cannot be completely eliminated, but can be reduced to a certain extent. As a surveyor, we need to cultivate students with meticulous, rigorous, and realistic style of work, because what we measured is the first-hand data, if the gatekeeper is not strict, negligence will directly affect the quality of the project, and in serious cases will even cause casualties and major hazards to the national infrastructure. In the process, a number of real-life cases combined with current events can be discussed, so that the students do not dare to slack off, and to cultivate students to strive for excellence, careful and prudent spirit of great national craftsmen, and pragmatic style of scientific research.

5.3. Innovation

Innovation refers to the intention, desire, and conception that arouse the motivation to create unprecedented things or concepts according to the needs of the development of society and individual life, and show in the creative activities, which is divided into two categories: active and passive. At the same time, innovation is also the first power to lead the development, it is an indispensable part of scientific research. Innovation can be either questioning old problems or giving solutions to new ones. Measurement is also inseparable from the sense of innovation, which cannot be rigid and unchanging in the teaching process, we must teach students cutting-edge knowledge, encourage students to participate in academic lectures, understand the latest science and technology, so as to cultivate students' sense of innovation, to solve the problem from a different perspective, and encourage students to keep an open mind, and constantly absorb the new knowledge, science and technology, and concepts ^[5].

In teaching the shape of the earth, the question "why is the earth ellipsoidal" can be asked, so that students develop the habit of independent thinking, and then the development of the earth is taught to prove that the earth is ellipsoidal, from the circumnavigation of the globe under the leadership of Magellan to prove that the earth is indeed spherical. Newton studied the effect of the earth's rotation on the earth's shape, and considered that the earth should be an equator slightly elevated, with the poles slightly flattened and ellipsoid. Paris Observatory sent two expeditions, respectively, to 2° south latitude of Peru and 66° north latitude of Laplin geodesy, the results proved Newton's speculation. Modern man-made satellites in the sky for geodesy to add a new means of

measuring the earth have accurately measured the radius and circumference of the earth^[6]. This can be used as an opportunity to convey to students that the journey of proving the shape of the earth cannot be separated from the sense of innovation, and that only by keeping a skeptical attitude towards the problem and putting in their own efforts to prove, practice, and innovate, can they find the essence of the problem, lead the development of the times, and reach the peak of science.

5.4. Feelings of belonging to the country

China's vast territory and all walks of life are inseparable from the silhouette of the surveyors, whether it is a skyscraper, highway, underground, high-speed rail, or space shuttles, deep-sea submarines, ships, and freight are all related to the survey. As a newcomer of the times, the best way to practice the national sentiment is to put in the actual struggle and take the initiative to contribute to the social development and national construction. In surveying and mapping, people should maintain the spirit of practical work, pragmatic attitude, love and dedication, self-discipline, and self-improvement, and actively participate in the national infrastructure, externalizing the family and national sentiments in action, and leading the behavioral habits with the correct thinking^[7].

In teaching small area control measurement, control measurement and the importance of the control point are explained, only by following the order of "from the control to the broken part" can the most accurate data be measured, the order cannot be skipped, and put an end to behaviors that do not comply with the operating norms, such as the selection of fewer or no control points, or arbitrarily selecting the control point. The phenomenon of not double-checking on the next step of the operation needs to be eradicated, step by step checking must be done to prevent the accumulation of errors and problem of excessive errors. In the small area control measurement internship, the bridge collapse, tofu dregs project, etc. can be taken as cases, and the students are warned to be conscientious and careful, and see the world from the perspective of the responsibility of the family and the country, so that the students can correctly carry out the responsibility as "new man of the times," and to contribute to the country and society to the best of their ability.

6. Retrospect and prospect

This paper studies the teaching of surveying course by integrating the elements of ideology and politics from four aspects, namely, hardworking spirit, craftsmanship, innovation, and national sentiment. The fundamental task of cultivating talents is to cultivate people with moral integrity, with the professional course as the carrier and the element of ideology and politics as the medium, integrate the teaching of knowledge, value creation, and skills cultivation, break through the perception that it is difficult to integrate the professional education with the element of ideology and politics, and better reflect the function of the professional course as an important carrier for the cultivation of skills and ideology and politics. Thus, the students can absorb the knowledge while getting the physical and mental, value, and comprehensive quality of the whole aspect.

Acknowledgments

Thank you.

Funding

Project of Young Teachers' Research Fund of Xinyang College of Agriculture and Forestry (Project number: QN2021014)

Disclosure statement

The author declares no conflict of interest.

Author contributions

Q.D. wrote this article, D.S. collected information, and N.D. provided ideas.

References

- [1] Hudnut KW, 1995, Earthquake Geodesy and Hazard Monitoring. *Reviews of Geophysics*, 33(S1): 249–255.
- [2] Peng C, Li X, Zhang C, et al., 2022, Discussion on Some Problems in Informatization Teaching of Surveying Course. *Surveying and Mapping Bulletin*, 2022(06): 158–161.
- [3] Zhang Q, Gao J, 2023, Exploration on the Cultivation Mode of Foreign Language Talents in Foreign-Related Rule of Law by Integrating Curriculum Civics and Politics. *Shandong Foreign Language Teaching*, 44(03): 48–56.
- [4] Wang X, Zhang Y, 2023, Exploration on the Integration of Craftsmanship into the Cultivation of Newcomers of the Times in Higher Vocational Colleges and Universities. *School Party Building and Ideological Education*, 2023(14): 50–52.
- [5] Xue S, Liu Z, 2021, Exploration on Education and Training of Innovative Awareness of Employment and Entrepreneurship of College Students: A Review of Career Planning and Guidance on Employment and Entrepreneurship. *Journal of Tropical Crops*, 42(12): 3764.
- [6] Hu X, Wang Y, 2022, From “Elemental Earth” to “Presuppositional Earth”: A Test of Copernicus’s Renewal of Aristotle’s Earth Theory. *Nature Dialectics Research*, 38(03): 89–94.
- [7] Zhou L, 2023, Education of Young People’s Family and National Sentiments: Connotation of the Times, Educational Mechanisms and Direction of Action. *Journal of Southwest University (Social Science Edition)*, 49(04): 195–205.

Publisher’s note

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