

Research on the Ideological and Political Theories teaching in All Courses Innovation of "New Engineering" in Universities from the Perspective of Big Data

—— “Writing and Communication class” at Taiyuan University of Technology as an example

Bo Cui^{1,a}

¹Taiyuan University of Technology, Taiyuan, China

^a cuibo@tyut.edu.cn

Abstract. In recent years, with the rapid development of big data analysis, machine learning and cloud computing, artificial intelligence has gained breakthroughs in many fields such as image processing, speech recognition, medical diagnosis, deep learning and autonomous driving, etc. Especially with the deep development of deep learning technology, big data technology has also brought profound changes to university education. As the front line of shaping college students' worldview, outlook on life and values, the ideological and political courses of universities must also follow the trend of the times, integrate big data technology into the teaching of ideological and political education in universities, and create a "Ideological and Political Theories teaching in All Courses" that adapts to the goals of education reform in the new era. On the basis of the gap between the ideological and political education model and modern technology, we reflect on the opportunity of integrating artificial intelligence into the reform of curriculum thinking and politics teaching, and take Writing and Communication class of Taiyuan University of Technology as an example to introduce the practical process of designing a general writing class based on the constructivist teaching model and analyze the effect of this course in promoting the construction of curriculum thinking and politics in the context of "big data".

Keywords: big data; new engineering major; ideological and political theories teaching in all courses; writing and communication; innovative research

1. Introduction

As the frontier of contemporary information technology development, big data's wide range of information resources, advanced information processing technology and a new mode of thinking, it empowers the innovative development and promotes the intelligence of daily ideological and political education of college students. Under the perspective of "New Engineering", the general curriculum and the specialized curriculum are the two major elements of the curriculum system of higher education in science and technology. At the same time, in the context of promoting the construction of Ideological and Political Theories Teaching in all Courses (hereinafter referred to as "IPTTC"), Writing Courses, as an important part of the general education curriculum, assume a variety of functions such as improving students' writing ability and cognitive level, nurturing students' humanistic literacy and family sentiment, improving students' ethical and moral level and shaping students' scientific spirit.

General Secretary Xi Jinping has pointed out that "to do ideological and political work in universities, we must follow the law of ideological and political work, the law of teaching and education, and the law of student growth, and constantly improve our working ability and level"[1]. The three laws are the key to guide the good work of ideological and political theories teaching in all courses among undergraduate students in science and technology. In the fall of 2021, Taiyuan University of Technology (TYUT) added a course on "Writing and Communication" (hereinafter referred to as "Writing Course") to the overall framework of general education courses, with a clear goal of "full coverage" for freshmen. TYUT's writing course draws on Tsinghua

University's "trinity of value shaping, ability cultivation and knowledge transfer" education and teaching concept, aiming to teach students the knowledge related to writing and communication on multiple subjects, to exercise students' writing and communication skills, and finally to bridge the basic logic between multiple disciplines and cultivate students' critical thinking and logical thinking. Many innovations have been made in writing classes to achieve this goal. In the design of the course content, a "theme-based" design is adopted, and students are organized to carry out in-depth reading, writing and seminar activities around the theme in a way that provides vivid scenes for value building and ability development. Therefore, in the context of big data, it is necessary to carry out IPTTC in science and technology majors to build on their strengths and avoid their weaknesses. With the overall goal of IPTTC, give full play to the advantages of general education focusing on value shaping and value leading, and clarify the direction, scenario and mechanism of nurturing people in general education courses, and eventually go in the same direction with the ideological and political education courses, together with other educational links to form a synergistic effect to achieve the goal of education. Big data occupies a very important position in promoting IPTTC innovation in universities.

2. The Real Impact of Big Data on IPTTC

The fourth technological revolution with big data as the core is transforming people's life, work, learning and other aspects with unprecedented momentum, opening the curtain of the deep impact on human social life. As in the fight against COVID-19, data information plays an important role in understanding people's movements and helping to pinpoint close contacts. As a social subsystem, the universities ideological and political education shouldn't ignore the importance of big data as well. Because for IPTTC, big data is not only an information technology, but also an information resource and thinking concept, which brings good opportunities to promote the innovation of ideological and political education in colleges and universities. First of all, big data as information technology provides advanced technical means for IPTTC in colleges and universities, optimizes the traditional ideological and political education methods, greatly improves the presentation of ideological and political education in colleges and universities, and makes it more vivid and more penetrating and infectious. Secondly, big data as a resource provides richer, more vivid and diversified information resources for IPTTC, breaking through the limitations of traditional information resources in terms of "quantity" and "quality". In addition, big data as a thinking concept has injected a new concept and working idea for IPTTC in colleges and universities, breaking through the traditional simplistic, uniform and linear thinking mode, and providing an effective guide for the development of precise and personalized thinking and administration. Big data is another double-edged sword, which also raises questions from some people about the innovative integration of IPTTC and big data in universities, so how to give full play to the value of big data in the ideological and political education of colleges and universities, it is necessary to continue to deepen the theoretical cognition of big data and the research on the necessity, feasibility and innovation strategy of IPTTC innovation in colleges and universities under the background of big data.

3. The Internalizing Effect of Writing and Communication Class on "IPTTC" of "New Engineering" Students

"To carry out ideological and political work throughout the whole process of education and teaching, to realize the whole process of education and all-round education" [1] is the new requirement of IPTTC work for all universities, all teachers and all courses. "To comprehensively promote the construction of IPTTC is to integrate the guidance of values into the teaching of knowledge and the cultivation of abilities, and to help students shape a correct world view, outlook on life and values, which is the proper and necessary content of talent cultivation" [2]. The essence

of IPTTC "is a kind of curriculum view, not an additional course or an additional activity, but the integration of ideological and political education in colleges and universities into all aspects of curriculum teaching and reform, so as to realize the establishment of moral education without any sound" [3]. General education is an important part of university education system, and has been the focus of university education reform in recent years. Compared with professional courses, general education courses are more value-oriented and leading, and more directly answer the question of "what kind of people to train". How to effectively and purposefully carry out IPTTC in university general courses is one of the important nodal issues in the comprehensive promotion of IPTTC.

Both the curriculum construction of "New Engineering" and the Outline advocate the teaching concept of "student-centered, output-oriented, and continuous improvement" and require attention to students' learning effectiveness [4]. Analyzed at the top-level design and implementation level of the curriculum, the instructional design that focuses on student learning outcomes and teacher teaching outcomes is also key to ensuring the effectiveness and quality of teaching and learning [5]. To promote the construction of "IPTTC" in writing classes from the perspective of science and technology, it is reasonable to clarify the learning effect of students and the teaching effect of teachers in writing classes before discussing the choice of teaching methods. The effect of the writing course is more complex from the perspective of the IPTTC, which has the characteristics of "theme" + "general knowledge" + "writing", it is required to assume the multiple roles of professional education and public basic education. From a thematic, professional perspective, this category should focus on the professional, industrial, national, international, cultural and historical perspectives involved in the subject matter, encouraging students to discover and explore the width, depth of different fields. And from the perspective of public basic education of general education, this kind of courses should focus on the improvement of college students' ideological and moral cultivation, humanistic quality, scientific spirit, constitutional and legal awareness, national security awareness and cognitive ability. The general writing course for science and technology students also needs to echo the construction of the science and technology major curriculum system of the Outline, taking into full consideration the characteristics of science and technology majors in order to meet its teaching effect, including: training students' scientific thinking methods, educating them on science and engineering ethics, encouraging them to explore the unknown and pursue the truth, cultivating their great craftsmanship spirit, inspiring their sense of family feeling and responsibility and mission of serving the country with science and technology, etc [4]. The current consensus on "teaching writing" is that writing is not only "writing" itself, but also the externalization of thinking; developing students' writing skills means focusing on their ability to think critically in the discipline [6.7]. To promote the construction of IPTTC in writing courses in the context of "new engineering", the course design of writing courses can be appropriately borrowed from the constructivist teaching model, focusing on the construction of "context" and guiding students to collaborate and dialogue with the help of big data and other tools in the design of course sessions, so as to finally construct the teaching effect of the courses.

4. The Organic Integration of Big Data and General Education Courses Promotes the Rapid Development of IPTTC for Students with "New Engineering" Background

For the goal of IPTTC, curriculum construction is the "main battlefield" and classroom teaching is the "main channel". As a public foundation course, the first task of IPTTC is to strictly and scientifically control the content of the course, following the law of ideological and political work.

4.1 Clustering and Selecting of Ipttc Educational Content in Higher Education

In the process of clustering and selecting, traditional university network ideological and political education often lacks systematization and flexibility, and the attempts and efforts in inter-school cooperation are not deep enough, more sporadic, scattered and internal school network ideological

and political education is the main body, lacking the overall concept and overall awareness. Under the threshold of big data, the clustering selecting of college network IPTTC grasps the systematicity and the degree of attention to social focus, which is different from the content of college network ideological and political education in the past. Under the threshold of big data, the systemic nature of the clustering and selecting grasp of college network IPTTC, as well as contemporary students' attention to social focus issues, is different from the content of college network ideological and political education in the past. From the perspective of big data, the first thing to do in the screening of educational resources for IPTTC is to classify the elements of ideological and political education frequently. For example, "theme-based" instruction is the most important feature of writing classes in terms of curriculum design. Each teacher can create individual course topics to teach writing classes based on their research interests. From the survey, most of teachers can analyze the topics of interest to students based on big data, covering a wide range of fields such as human history, natural space, life and health, social life, and future technology. The key to a good IPTTC is to choose the right topic among many options to "strengthen students' ideals and beliefs, cultivate patriotism, enhance moral cultivation, increase knowledge and insight, cultivate the spirit of struggle, and improve students' overall quality" [2].

With the creation and development of big data, students thinking and learning way and living environment have been greatly changed, and thus have an impact on the internal structure of the ideological and political education environment in universities [8]. Under the threshold of big data, when exploring the path innovation of IPTTC is conducive to enhancing the effectiveness of ideological and political education and promoting its innovative development. Big data is not only about collecting complicated and huge data information, but also about handling and processing the data. For example, A pile of raw materials can only add value if they are processed and packaged. In the theme selection ideas, writing classes follow the laws of ideological and political work, and deal with the relationship between unity and plurality in the selection of content themes. On the one hand, we strictly grasp the politics of the course content to ensure "the same direction", on the other hand, on the basis of strict requirements for the depth of theoretical content of the course, we scientifically and systematically set IPTTC objectives to achieve "the same level".

4.2 Make Use of the Intangible Influence of Big Data, Give Full Play to the Leading Role of the Teacher in the Class

Teachers are the "main force" of IPTTC, and they are the key to fully promote the construction of IPTTC. Teachers should strengthen the awareness of nurturing people, find the right angle of nurturing people, improve the ability of nurturing people, and ensure the implementation of IPTTC on the ground and its effectiveness. IPTTC teachers should make good use of the website's information base to find focus and form educational breakthroughs through big data mining and analysis. "Total immersion" is the hallmark of writing classes and the greatest strength of writing teachers' IPTTC work. Teachers not only conduct classroom lectures and in-depth workshops, but also interact with students in an immersive manner through office open time, "one-on-one" assignment critiques, and out-of-class book clubs. This teaching organization model of high-frequency interaction between teachers and students in order to help teachers' work on IPTTC through explicit and implicit education of context creation and high-frequency feedback. Therefore, college students, as the main group of Chinese Internet users, also rely more and more on the Internet in their academic life and in and out of class [9]. In order to further integrate IPTTC elements, teachers should add more elements of the information age and use the Internet as a new tool, method and position for ideological and political education. In the course, in the face of different types of events, to do specific analysis of specific problems, and at different stages, different time points, different response strategies.

4.3 "New Engineering" Background Students are Good at Taking Advantage of the Characteristics of Big Data and Giving Full Play to Students' Initiative

Writing classes are designed to take into account the characteristics of science and technology majors, and as a student-centered teaching model, the constructivist model is a model that is close to the cognitive processes of students [10 11]. By emphasizing the active, social, and contextual nature of learning, the curriculum is more effective than traditional teaching models in facilitating the transfer of knowledge and learning skills [12].

At the same time, students are encouraged to become "active constructors of knowledge and meaning", and the instructor is merely the "organizer, guide, helper and facilitator". Currently, writing classes do not assign specific textbooks, but give recommended books and references, so students may find material that fits their topics, and therefore big data should be a tool to help students learn actively and assist them in collaborative communication [13]. For example, when students choose writing or reading topics, they can effectively select "situations" that are close to the professional and industrial development characteristics of science and technology students in the context of "new engineering" through big data, so as to meet the requirements of IPTTC implicit teaching and motivate students to learn actively to the greatest extent.

References

- [1] Xi Jinping stressed at the national conference on ideological and political work in colleges and universities: to carry out ideological and political work throughout the whole process of education and teaching to create a new situation in the development of China's higher education [N]. People's Daily, 2016-12-09 (1).
- [2] Notice of the Ministry of Education on Issuing the Guidance Outline of IPTTC Construction in Higher Education [EB/OL]. http://www.moe.gov.cn/srcsite/A08/s7056/202006/t20200603_462437.html, 2020-06-01/2021-01-02. I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.
- [3] Gao Deyi, Zong Aidong. IPTTC: an inevitable choice to effectively play the role of the main channel of classroom education [J]. Journal of Ideological Theory Education, 2017, (1)
- [4] Ministry of Education. Guideline for the construction of IPTTC in higher education schools (Teaching High [2020] No. 3) [R]
- [5] Ministry of Education, Ministry of Industry and Information Technology, Chinese Academy of Engineering. Opinions on accelerating the construction and development of new engineering disciplines to implement the Excellence in Engineer Education and Training Program 2.0 [J]. Bulletin of the Ministry of Education of the People's Republic of China, 2018(10):13-15
- [6] Richardson M. Writing is not just a basic skill [J]. The chronicle of Higher Education, 2018(11).
- [7] Bean J. Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom [M]. San Francisco: Jossey-Bass, 2011.
- [8] Wang HJ. The effectiveness of ideological and political education in colleges and universities in the era of big data [J]. Journal of College Counselors, 2014, 6(04):37-40.
- [9] Guan Yinshang. Exploring the content and methods of online ideological and political education in higher education [J/OL]. Electronic test, 2013, (16):165-166+47.
- [10] Eetmer P A, Newby T J. Behaviorism, cognitivism, constructivism: comparing critical features from an instructional design perspective [J]. Performance Improvement Quarterly, 1993, 6(4):50-72.
- [11] Ho, K.-K. The constructivist model of teaching, teaching methods and instructional design [J]. Journal of Beijing Normal University (Social Science Edition), 1997(5):74-81.
- [12] Zhang JW, Chen Q. From cognitivism to constructivism [J]. Journal of Beijing Normal University (Social Science Edition), 1996(4):75-82+108.
- [13] Zhao Mengcheng. A review of constructivist approach to teaching and learning [J]. North Foreign Educational Research, 2002(9):15-19