Analyzing the Grade Point Credit System of Vocational Colleges Based on the Theory of Multiple Intelligences

Jing Lu[a],*, Yi Mao[b]

College of Electronics and Internet of Thing, Chongqing College of Electronic Engineering, Chongqing, China
[a] lujing0808@163.com, [b] YMAO@163.com
*Corresponding author

Abstract: The credit system based on the theory of multiple intelligences embodies the concept of student-centered education. This system places importance on the development of students' personality and focuses on the cultivation of students' innovative and comprehensive capabilities, which leads to a positive social development outcome. This paper applies the theory of multiple intelligences to illustrate the grade point credit system by analyzing the specific strategies that target the grade point credit system.

Keywords: Theory of multiple intelligences, Grade point credit system, Strategies, Practice

1. Introduction

The "National Higher vocational education Reform and Implementation Plan" issued by the State Council of China in January 2019 fully acknowledges the important role of vocational education in social and economic development. This plan also indicates that imperfect systems and mechanisms still exist ubiquitously in current vocational education and that there also exists instability in the quality of talent training, among other issues. In 2015, a document entitled "Opinions of the Ministry of Education on Deepening Career Development Education and Teaching Mode Reform and Comprehensively Improving the Quality of Enterprise Talent Training" clearly stated that vocational schools needed to immediately plan and consolidate the credit bank system. This was to achieve mutual recognition of credits between different schools and increase the timeliness of the credit system, so that the continuous advancement of technical personnel can be guaranteed.

The credit system is regarded as a perfect educational management method in institutions of higher learning. Thus demonstrates the advanced teaching idea of "focusing on students, encouraging heterogeneity among students, and valuing the development of healthy personality". [1].The credit system has been introduced in China in the 1980s in China. Though its implementation has varied, this system has produced significant impacts. It has achieved excellent results in terms of fostering students' enthusiasm for learning, cultivating their moral character, urging teachers to reform their teaching methods and enhance their teaching skills, improving the efficiency of educational resource combinations, and training students with comprehensive skills. However, the credit system of vocational colleges still faces many problems. These include the simplification of the judging criteria, the lack of incentive factors, and the inability to objectively reflect students' learning process or their comprehensive ability level. With the progress resulting from China' state asset composition reform and the increase in students receiving higher vocational education, how to promote the credit system reform and improve the quality of talent training has become a new problem that needs answers.

The theory of multiple intelligences can provide a new perspective for reforming talent training models in higher vocational education. Therefore, it is necessary to explore the implementation of classification teaching, merit teaching, and differentiated models based on the theory of multiple intelligences. This will help improve the grade point credit system and provide vocational colleges with possible talent modeling and credit innovation methods. Such improvements are important given the increasing demand for the professionalization and knowledge enrichment of vocational talents brought about by modern economic development.

2. The Credit System in China's Institutions for Higher Learning

The credit system of a school is a governance mechanism that differs from the academic year system. The academic year system is a governance mechanism for judging students' academic achievement according to the statistical year. The school divides the course content to be completed in the curriculum into each academic year. Students only need to meet the learning requirements of the academic year in order to graduate. Conversely, credit measures students' levels of learning. The credit system is a type of education governance mechanism that is based on students' own course selection. This system takes credits as statistical units. Cumulative credits are the judging criteria for assessing students' academic status. This method was created by Harvard University in the United States. the credit system, together with class system and mentoring system, are collectively referred to as the three major teaching methods. All courses in schools have definite credits. After completing the course requirements, students obtain the corresponding credits. In the required school time, after enough credits have been obtained to meet the level of certain professional demands, students are able to graduate successfully. If they take the required courses and credits early, students can graduate early. Compared with the academic year system, the credit system is a more flexible educational method. It allows students to have many learning options on campus. This system can enable students to request course absence or entrepreneurship opportunities over certain periods. It also encourages energetic students to graduate early, enabling them to study for other majors and degrees. Moreover, this credit system provides schools with more teaching methods and more flexible learning governance mechanisms.

The credit system was adopted by major universities in China and can be divided into four categories: the weighted credit system, the additional credit system, the grade point credit system, and the full credit system. The credit system is a type of flexible educational governance mechanism that preserves the individual differences of students. It has the following characteristics:

(1) Replacing the academic year examination with credit examination. This system enables former rigid educational planning and methods to be replaced with alternative educational methods and school hour mechanisms. Educational planning is required to provide students with more freedom in choosing their own time and making their own choices[2]. The school curriculum can evolve from being required to one that encourages students to make independent choices. Students can select their own courses according to their individual conditions and hobbies. They can even change their study majors according to their personal ability positioning. Thus, this system can accurately demonstrate the spirit of "choose what I love and love what I learn." It can help students develop their self-awareness and self-reliance through their school learning activities, thus enabling them to develop qualities and reach their full potential.[3,4]

Promoting students' personal growth. The credit system stipulates that students can have the freedom to choose courses before their student status expires. They only need to complete the courses required by the training program and the necessary practical training internships before they can choose certain elective courses. Students can graduate after they have taken the total graduation credits required by the program, and after demonstrating professional ability and character behavior that met the required conditions. In fact, teaching criteria that are dependent on the heterogeneity of students and are student-centered can promote the physical and mental growth of students. They can also help create talents with a unique personality and an innovative and exploring ability.

Strengthening the combination of teaching resources. Some schools have the same courses offered in different majors. As a result, the same knowledge is repeated in different courses, which takes up the students' learning time and consumes teaching resources. After the credit system is implemented, students can abandon similar courses, and teachers have more time to improve the quality of the courses.

3. A Credit System Based on the Theory of Multiple Intelligences

(1)Theory of Multiple Intelligences

Classical intelligence theory argues that individual intelligence is independent and quantitative. Intelligence is the combination of linguistic ability and logical/mathematical thinking ability. However, Howard Gardner, an educator and psychologist at Harvard University in the United States, made a different observation in 1983. He noted that intelligence was based on the values of certain social or cultural environments and that it represented the individual ability to invent and create useful objects or

to deal with actual difficulties encountered. He believed that the previous description of intelligence was too one-sided and insufficient to judge a person's specific abilities. He proposed that, in addition to linguistic intelligence and logical/mathematical intelligence, every individual also has musical intelligence, intrapersonal intelligence, spatial intelligence, bodily-kinetic intelligence, and interpersonal intelligence. Later, Gardner added the naturalist intelligence. This theory is called theory of multiple intelligences. This view argues against an independent intelligence. Rather, each person has a unique way of accomplishing tasks and everyone will use their own methods to develop personal brain resources. Such diverse and ingenious ways for completing development are types of intelligence, thus characterizing individual differences between people.

According to the theory of multiple intelligences, there are no differences between people in terms of their degree of intelligence. However, different individuals are more prominent in certain aspects. For example, composers, singers, and tuners have relatively stronger musical intelligence, while lawyers, salesmen, and politicians have relatively stronger interpersonal intelligence. Mathematicians, scientists, and engineers have stronger logical/mathematical intelligence.

(2) A Grade Point Credit System Based on the Theory of Multiple Intelligences

Colleges that provide vocational courses need to include the development of key career skills and professional skills as their educational objectives. The construction of the grade point credit system must be based on vocational training and on respect for the diversified development of individual differences. This would ensure the improvement of students' vocational skills and professional abilities on the ground through the training mechanism.

The grade point credit system based on the theory of multiple intelligences takes the credit system as the basis and uses the grade point credit as the fundamental calculation unit to count students' learning status. The grade point credits obtained by students serve as a new type of examination to assess their graduation requirements. Among them, the grade point credits show the weight of students' final grades obtained in each course in the context of their training program. They also show the capacity of a training method for achieving the purpose of the training program. The grade point credit system alleviates process manipulation, pays more attention to purpose manipulation, and greatly improves the quantitative governance method for students learning.

Course assessment results and course performance grade points are linked as follows:

Credit grade points = course grades (percentage system) × standard course credits/100; the results are kept to one decimal place (rounding off). The grade points of a single subject lower than 40 points are not calculated - that is, they amount to zero credit grade points. The grade point of qualified course credits is 60% of the standard credits of the course.

Grade   point   average credit   for   one   semester

The average credit   point   at   the   end   of   study

When implementing the grade point credit system, the credits specified in each course have different weights within the grade point credit system according, to different emphases of this course. That is, the credit grade points can highlight the real learning situation of the students. For example, in a semester, Course A with 32 hours (2 specified credits) and Course B with 64 hours (4 specified credits) are set up. Student A has 60 grade points for Course A, and 90 grade points for Course B. Student B has 90 grade points for Course A and 60 grade points for Course B. If these two students are evaluated according to traditional average grade points, the average grade points of the two students are the same. However, this does not reflect the students' efforts in their learning process. Conversely, according to the grade point credit measurement system, Student A's grade point credit is 6.8 (average score is 85), which is higher than Student B's grade point credit 6.0 (average score is 75). The average score calculated in this way is a weighted score. It is more intuitive, can show the learning status of each student in a certain area, and can greatly stimulate students' enthusiasm for learning.

Moreover, the "credit bank" program is implemented in the credits of the grade point credit system because the credits can be accumulated. The graduation requirements are not measured by the total average grade points, but by the total grade point credits. In this way, students with special skills can make use of their outstanding course grade points to make up for some courses' grade point credits. This also shapes the personal differences between students, ensuring the implementation of the diversification shaping mechanism. According to diversified teaching concepts, intelligence structures and intelligence types are different, meaning that our development direction and methods will be completely different. In terms of the classic teaching plan, talent shaping programs and assessment

methods focus on overall development, so the results are similar. The previous instruction practice has demonstrated that schools can easily pay attention to the students with abstract thinking abilities, while ignoring students with imagery thinking abilities. Students with strong imagery thinking intelligence absorb knowledge slowly and have poor performance in theoretical subjects. However, this does not mean that they will not become elite talents in society. Schools have an obligation to find and develop the abilities of their students. They should encourage them to demonstrate their own strengths and advantages, and help them contribute to the progress of society. Therefore, the grade point credit system will not regard individual course results as the only way to assess students. For example, the way of awarding students with credits is to add outstanding grade points related to students' overall vocational skills to the grade point credits by means of rewards. This will stimulate students with low abstract thinking ability but high imagery thinking ability to engage in various aspects. These include invention activities, professional skill competitions, product creation, professional skill evaluation and other activities that can help them receive professional skill reward credits and tap into their special abilities. This is a good way to show respect for individual development. The guidelines for using professional skills as a way to add credits in the school where the author works is shown in Table 1.

Table 1: The criteria for using professional skills as a way to add credits

Items	Criteria for adding credits				
	3 credits	2 credits	1.5 credits	1.0	0.5
National professional qualification certificate (or other equivalent certificates)	Technical personnel	High-level		Middle-level	
Special skills training		≥60 credits	40 ~ 59 credits	20 ~ 40 credits	
Professional skills competitions organized at the school level			First prize	Second prize	Third prize
Professional skills competitions at the municipality level		First prize	Second prize	Third prize	
Professional skills competition at the national level	First prize	Second prize	Third prize		

At the same time, students with other types of intelligence (such as linguistic intelligence, musical intelligence, etc.) under the traditional education system must spend all their time and energy to deal with exams. This is similar to judging the ability of an elephant by assessing its ability to climb trees. Great regret will be felt as a result of covering up the abilities of talents if students' merits in marketing, hosting, language, management and other areas are curbed simply for 60 points[5]. This is not what higher education practitioners desire to achieve. Many of the students studying in vocational colleges do have some subtle differences from those studying at universities. Usually, students who enter

vocational colleges deviate in logical intelligence but often have high abilities in other areas. Therefore, this credit adding system will enable students to exchange grade point credits as rewards for outstanding achievements after they have joined various activities. These include science and technology competitions, social practice, literary and artistic sports events, and professional and technical training. In this way, schools can encourage students to spend their learning time on the development of their special skills, which broadens the channels for students' professional growth. The criteria for adding vocational skills credit points as rewards implemented in the author's school are shown as in Table 2.

Table 2: criteria for adding vocational skills credit points as rewards

Items	Criteria for adding credits				
	2 credits	1.5 credits	1.0 credit	0.5 credit	0.3 credit
Applied English proficiency test for vocational college students	Band Four		PRETC O—A	PRETC O—B	
Mandarin Proficiency Certificate	First degree A	First degree B	Second degree A	Second degree B	
School-level special competitions in arts and sports			1-2 winners for the first prize	2-4 winners for the second prize	3-6 winners for the third prize
City-level special competitions in arts and Sports (Organized by the government agencies at the municipality level) National-level special competitions in arts and sports(Organized by the government agencies at the state level)	1-5winners for the first prize	1-3 winners for the first prize 2-8 winners for the second prize	2-6 winners for the second prize 3-10 winners for the third prize	3-8 winners for the third prize	

4. Social Significance

With the meticulous division of labor in society and the diversification of social needs, the cultivation of qualified professionals with "special skills" and "good job abilities" is necessary. The implementation of the grade point credit system based on the theory of multiple intelligences is not only the essential need of higher vocational education, but it is also an inevitable choice for social development[6].

(1) Essential Needs of Higher Vocational Education

It is the social responsibility of higher vocational education practitioners to train application-oriented talents with "special skills" and "good job abilities"[6]. In recent years, due to the gradual increase and enrichment of vocational education management concepts, higher education has become increasingly popular. The degree of "industrialization" of higher education has gradually increased, and the differences in the training of students have become greater. The "National Vocational Education Reform Implementation Plan" also clearly states that "vocational teaching and ordinary teaching are two different teaching concepts but have the same key components". In terms of the targeted students, vocational education is more extensive. As of 2019, the expansion of the enrollment of one million students in higher vocational education means that "the enrolled students in higher vocational education are the current-year graduates from secondary schools (including secondary vocational school graduates, and secondary school graduates from previous years), migrant workers, veterans, laid-off and unemployed job seekers, new-type professional farmers, etc." As a result, the differentiation of the targeted education receivers is more obvious. Therefore, higher vocational colleges should use differentiated training mechanisms to meet the demands of diversified training. The application of the grade point credit system based on the theory of multiple intelligences can enhance students' sense of accomplishment in the kinds of intelligence that are dominant. It can also strengthen students' abilities at in which they excel, giving them the skills to adapt to society and serve regional economic development.

(2) Inevitable Choice for Social Development The grade point credit system based on multiple intelligences theory has been successfully adapted to train talents who have learned to adapt to the subtle division of technical fields. The rapid development of technology has led to the increasingly detailed division of labor in society. No matter whether it is an enterprise or an individual, they can't be too greedy for all. As long as we continue to study in one area and achieve excellence, we can make achievements. Due to industrial progress and changes in the rapidly developing economic system, there is an increasing demand for technical talents, especially for professional technical talents. According to a survey, until 2020, there have been more than 200 million technical professionals in China's technology industry. However, this number only accounts for 30% of the total employment force, among which professional and technical personnel have not reached 7%. Therefore, there is a shortage of approximately 22 million professional and technical personnel. The talents trained by the traditional credit assessment system are seriously homogenized and cannot meet the diversified and sophisticated demands of society. The grade point credit system based on the theory of multiple intelligences no longer implements a one-size-fits-all assessment of students. Rather, it respects the diversified development of students and helps cultivate students' personality and their diversified development. This will enhance the targetability and diversity of the cultivation of technical talents.

(3) The Need for Cultivating Innovative Talents The credit system based on multiple intelligences theory is conducive to the cultivation of innovative talents. General Secretary Xi Jinping proposed that, in order to cope with the gradual and intense international disputes, it is necessary to place creativity in the key position of China's development planning. Premier Li Keqiang pointed out that the Chinese government encourages "mass entrepreneurship and innovation" [5].According to Gardner's theory of multiple intelligences, intelligence focuses on one's abilities in two areas: first, the ability to overcome practical difficulties and second, the ability to invent and manufacture useful items for society. The teaching methods and academic examination methods all focus on linguistic competencies and logical/mathematical thinking abilities, which do not promote the development and progress of students' creativity. The grade point credit system based on the theory of multiple intelligences encourages students to develop their strengths in the assessment system. It affirms students' innovative spirit, stimulates their potential interest for learning in their favorite fields, and cultivates their habit of independent inquiry and independent thinking. This way, students can put forward new insights and create new things.

5. Analysis of the Strategies of the Grade Point Credit System

(1) Constructing a Diversified Talent Training Program

A diversified talent training program is the basic guarantee for the grade point credit system. The diversified talent training program breaks away from the traditional education model that aims at the cultivation of compound technical skills. It emphasizes students' comprehensive development, fully consider the needs of vocational teaching, and takes into account the individual development of students. This creates an organic and reasonable knowledge structure and competency system for each field of study.

Higher vocational colleges should scientifically build a complete knowledge system by conducting a comprehensive career position analysis, a supporting knowledge needs analysis required by the competence system, and a self-development knowledge needs analysis through career-related industries. At the same time, it is necessary to fully analyze the learning characteristics and individual differences of students in higher vocational colleges. We must design and establish talent training programs that encourage diversified development. In practice, the training plan of most higher vocational colleges should be designed as a three-tier framework structure: general basic education, professional basic education, and professional core education. Each layer should be composed of required and elective courses, and even required courses should have different specifications from which students can choose. Through this three-layer framework structure the professional knowledge system be realized. Students are also provided with a variety of alternative development options to meet the needs of basic education and encourage the development of special skills. As a result, not only is the integrity of the students' knowledge structure guaranteed, but their diversified development is also achieved.

(2) Enriching the Credit System Curriculum Resources of Higher Vocational Colleges

A rich curriculum directly determines the effect of the implementation of the grade point credit system. Rich curriculums guarantee that grade point credit systems play a relevant role in schools.

Without rich curriculum categories, it is impossible to achieve diversified training, let alone the grade point credit system based on the development of multiple intelligences, which acts as the assessment part.

At present, there are three main ways to develop curriculum resources in higher vocational colleges. The first way is to encourage teachers to increase school-based curriculum development according to their own development positioning. The second way, based on the characteristics of individual schools, is to deepen the integration of industry and education, perfect the school-enterprise cooperation model, and introduce enterprise-involved teaching and develop courses jointly by schools and enterprises. The third way is to make full use of the national teaching resource library course resources and widely introduce excellent online open courses.

6. Operation effect

Since the implementation of the grade point credit system in the autumn of 2006 the school where the author works has implemented some changes. Through the practice of the grade point credit system, students' learning enthusiasm, their autonomy and innovation have been fully activated, their professional skills and key technical skills for career development have been tremendously developed, and the quality of talents has been significantly enhanced. In addition, good code of conduct in terms of school environment and vocational studies has been promoted. Not only have students achieved excellent results in various professional, cultural and sporting events at all levels across the country, but the overall literacy and vocational skills of the students has also increased. Moreover, the employment situation for students has improved. Although negatively affected by the international financial crisis, the employment rate for students in this school has remained stable at over 96%. The vocational skills and overall standards of the students have been widely recognized by their employers.

Acknowledgements

References

[1] Heather Freya Abenti. How do I teach you? An examination of multiple intelligences and the impact on communication in the classroom [J]. Language and Communication, 2020, 73.
[2] Goitia Belén, Bruno Diana, Abrevaya Sofía, Sedeño Lucas, Ibáñez Agustín, Manes Facundo, Sigman Mariano, Sinay Vladimiro, Torralva Teresa, Duncan John, Roca Marí The relationship between executive functions and fluid intelligence in multiple sclerosis [J]. PloS one, 2020, 15(4):
[3] Junliang Dong, Zhuomin Huang. Design of art interactive teaching system based on multiple intelligence theory. 2020, 16(3)
[4] Gardner H (1983) Frames of mind: The theory of multiple intelligences, vol 23. Basic Books, New York, pp 87–89
[5] Wang, G.: Review and reflection on the theoretical research of multiple intelligences in China in the past 20 years. Comp. Res. Cult. Innov. 2(31), 163–165 (2018)
[6] Trail, C., Reiter, H.I., Bridge, M. et al. Impact of Field of Study, College and Year on Calculation of Cumulative Grade Point Average. Adv in Health Sci Educ 13, 253–261 (2008). https://doi.org/10.1007/s10459-006-9037-z