



Design of An Internationalized Intelligent Micro-credential Cloud Platform and Analysis of Operating Effectiveness

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Abstract

With the recurring global COVID-19 pandemic, colleges and universities in China are facing huge obstacles in engaging in international education. The original international students are also unable to enter and study normally due to the COVID-19 pandemic, and the enrollment of international students has been greatly affected as a result. Based on the above, this paper tries to build a platform applicable to international online teaching - Tiangong International Micro-credential Cloud Platform and two supplementary modules have been created to meet the needs of the offline smart classroom and the online international course resources, and explained the construction method and functions of the platform and auxiliary modules. An internationalized teaching management system, classroom teaching format, resource sharing and evaluation mechanism have been further developed for Tiangong International Micro-credential Cloud Platform. The platform has been applied in teaching, and this paper and the data analysis and summary of the effect produced by the platform in the process of teaching application.

Keywords: *Cloud Platform, Internationalization, Micro-credential, Intelligence*

1 INTRODUCTION

In recent years, online education is developing rapidly, such as catechism, SPOC and other kinds of online teaching mode are constantly changing and progressing. Online education has become a mainstream component of higher education [1]. Its evolution and configuration has gone hand in hand with changes that societies themselves have experienced with pervasive effects of the digital and networked society [5]. The closure of educational institutes has prompted a transition from the traditional face-to-face learning methods to online or distance learning modes to ensure the continued delivery of learning [4].

At present, the COVID-19 pandemic in China is basically under control, but COVID-19 pandemic still appear in individual regions from time to time, and the COVID-19 pandemic outside China is still in a serious state. The international education and international exchange have been greatly affected. The emergence of the teaching mode of Internationalized Intelligent Micro-credential Cloud Platform combines international education, micro-credential and Intelligent Technology to solve this problem.

2 INTELLIGENT TEACHING PLATFORM COVERING THE WHOLE PROCESS OF ONLINE AND OFFLINE HYBRID TEACHING

This study builds the Tiangong International Micro-credential Cloud Platform with three auxiliary modules, ChuangWen Information Teaching Resource Sharing Platform, the iFlytek A.I. Classroom Platform, and the Intelligent Simultaneous Interpretation Terminal, as shown in Figure 1. An intelligent platform to realize the whole process coverage of online and offline hybrid teaching.

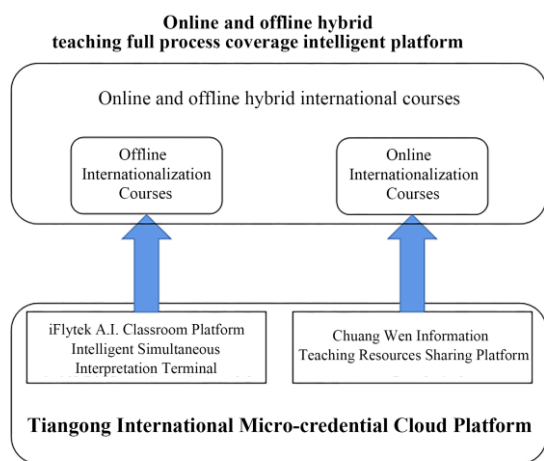


Figure 1: Online and offline hybrid teaching composition mode.

2.1 *Tiangong International Micro-credential Cloud Platform*

In order to meet the international demand for online education, this study has jointly created the Tiangong International Micro-credential Cloud Platform with the leading technology companies in the industry.

Tiangong International Micro-credential Cloud Platform is a special application software for online teaching, which applies artificial intelligence, big data, virtual reality technology and many other modern information technology means to build a new teaching mode, is a fusion of modern education concept, teaching content and modern information technology, and has a variety of functions of open teaching interactive system.

A new intelligent platform course teaching environment is built, which integrates modern education concept, teaching content and modern information technology with multiple functions of open teaching and learning interactive system. By building highly easy-to-use and targeted classroom teaching aids that run before, during and after class, building a classroom big data asset center, integrating and applying new software and hardware systems and devices, and realizing efficient integration of teaching resources. It provides new teaching tools and aids to promote the change and upgrade of traditional classroom teaching.

2.2 *The Construction Method and Function of Platform*

The platform supports the whole teaching process, including course creation, content sharing, learning process tracking and control, online test and assignment release, communication and interaction, performance evaluation and feedback of learning results, and realizes the deep integration of information technology and teaching process. The system is designed to meet the performance requirements of large-scale users,

distributed deployment and online learning for 10,000 people. The platform adopts B/S structure, based on J2EE architecture, and the pages are developed by Web2.0 AJAX, which can support IE9 and above, safari, Firefox, chrome and other mainstream browsers without installing plug-ins separately.

The platform fully supports students' independent learning and cooperative learning, reflecting the main position of students and the dominant position of teachers in teaching activities, building an environment for students to learn independently and explore actively, and teachers guiding and helping students to learn by organizing learning materials and real-time and non-real-time teaching means.

The platform supports a variety of online teaching modes such as assisted teaching, flipped classroom, pure online teaching and live classroom. It has the functions of automatic conversion of video and document formats and automatic conversion of code streams to adapt to different access terminals (Windows, Android, iOS); all document resources are automatically transcoded into flash format for playback, and video resources are automatically transcoded into mp4, flv and other formats by the system.

2.3 *Auxiliary Modules for The Platform*

In the actual process of internationalized micro-credential teaching, in order to further improve the wisdom of offline classroom, this study adopts the iFlytek A.I. Classroom Platform as a supplementary module.

iFlytek A.I. Classroom provides teachers with offline classroom teaching services including before, during and after class. It aims to provide convenient and regular teaching data collection means and processing services, including classroom teaching aids, classroom teaching recording tools, classroom teaching behavior analysis tools and classroom teaching data analysis platform and other software and hardware products and auxiliary services. It provides teachers with easy-to-use, convenient, practical and interesting classroom interaction tools, provides data basis for teachers' teaching design and teaching improvement, provides data support for school teaching evaluation and diagnostic improvement, and enhances students' classroom participation and activeness. Through all-round intelligent teaching, it helps teachers improve students' classroom learning participation and learning achievement, helps teachers improve classroom teaching efficiency and teaching quality, helps further study and analyze the operation of internationalized micro-credential offline classrooms, visualizes and digitalize the teaching situation, and also provides data support for school classroom teaching evaluation. The auxiliary module also supports the offline recording of the entire

online production of internationalized AI smart micro-credential resources, which can realize the production of quality internationalized curriculum resources with a mix of online and offline.

In order to allow teachers to efficiently and conveniently produce online course resources for internationalized microspecialties, this study has built its own teaching resource sharing platform as an auxiliary module to realize the whole process of producing online course video resources in the cloud. The platform can translate subtitles into the videos uploaded by teachers with multilingual artificial intelligence and place them in the videos, and support the function of real-time correction of subtitles and separate output of subtitles. At the same time, the platform is further developing the terminology database function, which makes the translation of some terms more accurate and truly serves the development and application of internationalization micro-professions, solving many pain points of the current international education teaching team in the construction of course resources.

3 MANAGEMENT SYSTEM AND SYSTEM OPERATION MODEL OF THE PLATFORM

The realities of the COVID-19 pandemic make institutionally implemented quality assurance systems

for online education even more crucial [6]. In this study, the management system and system operation model of the platform were optimized for the internationalization micro-credential.

3.1 Intelligent Teaching Management System

In terms of the construction of the teaching management system of the Internationalized Micro-credential Cloud Platform, there are a number of high-quality "Micro-credential" through the cloud platform courses jointly created with iFlytek, serving four groups of Chinese teachers and students and foreign teachers and students, offering online credit microspecialties to foreign students and preparatory course microspecialties to Chinese students, and obtaining corresponding credits and professional certifications through studying international cooperative courses. International students are offered online credit micro majors, and Chinese students are offered preparatory course micro majors to obtain credits and professional certifications by studying international cooperative courses. To solve the language barrier, the platform provides intelligent translation technology to provide greater convenience in communication, as shown in Figure 2.

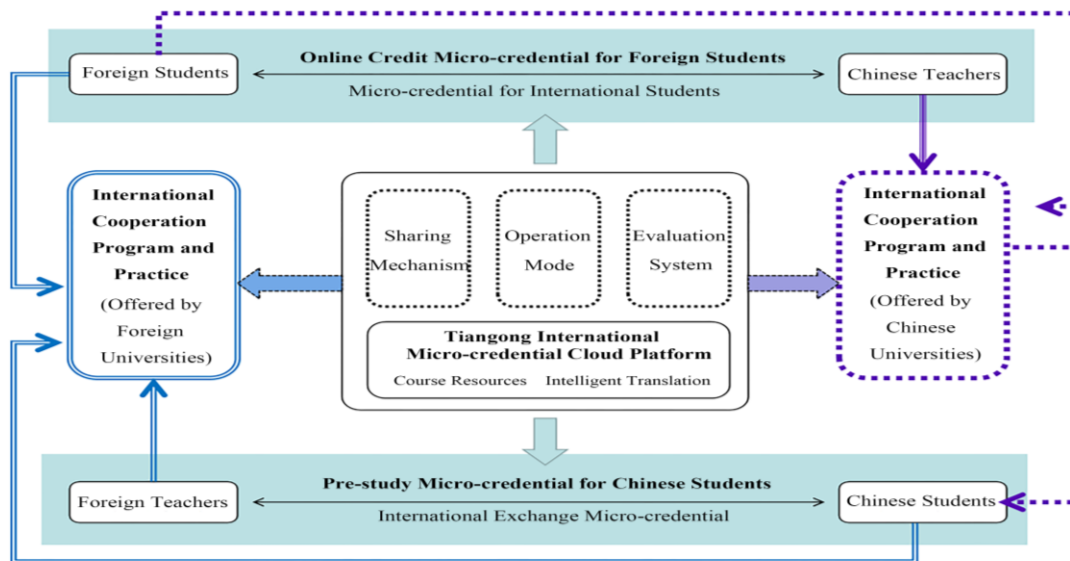


Figure 2: Internationalized Micro-credential teaching management system.

3.2 Independent Learning-based System Operation Mode

Applying the system operation mode based on independent learning to the actual teaching process of internationalization microspecialties can further improve students' initiative in learning, as well as improve students' teamwork ability and stimulate their creative

thinking. Self-directed learning is a learning mode in which learners freely choose learning objectives, learning contents and learning methods according to their own conditions and needs, and accomplish specific learning goals through self-regulated learning activities under the macro-control of overall teaching objectives and teachers' guidance. Self-directed learning is not the same as individualized learning, and students'

independent learning ability is weak [2]. Therefore, teacher guidance and collaborative learning among students are still needed as an aid to improve the classroom teaching model.

4 RESOURCE SHARING SYSTEM AND TEACHING EVALUATION MECHANISM OF THE PLATFORM

In terms of improving the teaching resource sharing system and teaching evaluation mechanism of Internationalized Micro-credential Cloud Platform, this study investigates two aspects: building a multi-level hierarchical internationalization course resource sharing system and establishing a flexible and diverse teaching effect evaluation mechanism that focuses on qualitative evaluation.

4.1 Multi-level International Course Resource Sharing System

Based on the Internationalization Micro-credential Cloud Platform, the internationalization curriculum resource sharing mechanism is further developed. According to the content and construction goals of the platform, the sharing mechanism will be developed, and the sharing level will be divided into national sharing service, provincial sharing service and university sharing service; the service groups will be divided into four groups: domestic students sharing, foreign students sharing, domestic teachers sharing and foreign teachers sharing; on the basis of establishing the platform, the system of resource collection, selection and integration, standard management, performance evaluation and charging mechanism will be studied in depth. In addition, we will conduct an in-depth study on the collection of resources, selection and integration, standardized management, performance evaluation, and fee mechanism of the platform.

4.2 Flexible and Diverse Teaching Assessment Mechanisms

The traditional evaluation of classroom teaching is mostly quantitative, closed and generalized, which does not meet the objective needs of internationalized online teaching.

The evaluation for internationalized online teaching is to emphasize diversity and flexibility in the form of evaluation, so the evaluation of classroom teaching in the reform of professional teaching mode should be the same. International online teaching emphasizes the establishment of an evaluation system that promotes the overall development of students, the continuous improvement of teachers and the continuous improvement of the curriculum, so on the basis of comprehensive evaluation, more attention is paid to the

progress of individuals and the development of multifaceted potential. This evaluation idea of "based on process and promoting development" requires that the focus of evaluation on classroom teaching quality must shift from results to process, from achievement to attitude, and from explicit to implicit indicators.

5 EVALUATION OF THE EFFECTIVENESS OF THE OPERATION

Since the end of 2020, the Tiangong International Micro-credential Cloud Platform, which was initially constructed, has been running on a trial basis and has achieved good teaching results so far. Up to March 2022, the total number of learners of this micro-credential cloud platform has reached 2,646, and the source of students covers 76 countries and 5 continents.

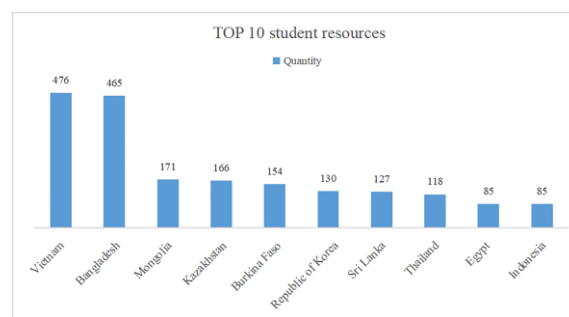


Figure 3: Tiangong International Micro-credential Cloud Platform Top 10 Student Resources Countries.

At present, the students studying through Tiangong International Micro-credential Cloud Platform are mainly concentrated in Asia, most of which are developing countries as shown in Figure 3. Due to the poor network condition in such developing countries, the network gap is also large in different areas of the same country. In view of this situation, Tiangong International Micro-credential Cloud Platform has been optimized to ensure that students can study smoothly under the condition of low or fluctuating internet speed.

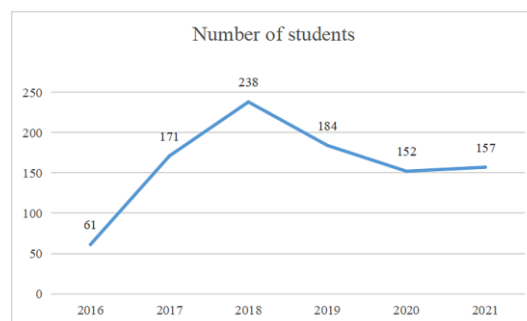


Figure 4: Tiangong University's international student enrollment in the past 6 years

The enrollment numbers of international students in Tiangong University are counted according to academic

years, as shown in Figure 4. From academic year 2016 to 2018, the number of foreign students enrolled in Tiangong University increased steadily, but at the end of academic year 2019, due to the COVID-19 pandemic, all international students were unable to come to China

for study, and the enrollment numbers began to decline significantly. After the official application of Tiangong International Micro-credencial Cloud Platform at the end of 2020, the number of enrollment stabilized and began to gradually rebound.

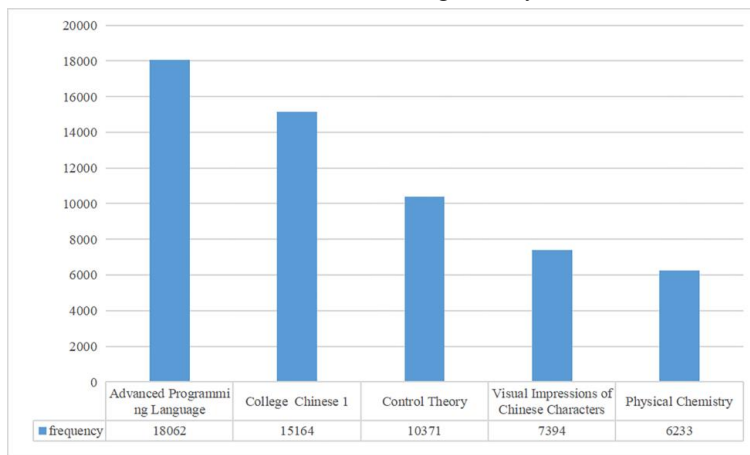


Figure 5: The top 5 courses with the highest learning frequency on Tiangong International Micro-credencial Cloud Platform

During the nearly 3 years of operation of Tiangong International Micro-credencial Cloud Platform, a total of 122 teachers have adopted this platform for online international teaching. As shown in Figure 5, the five courses with the highest learning frequency all exceeded 5000 per semester.

In order to further explore the actual teaching effect of Tiangong International Micro-credencial Cloud Platform, comparative analysis of teaching operation data was conducted with the course final grade as the index.

Table 1: Final grades for different grades taking the same course online and offline.

College Chinese 1	Mean score	100-90	80-89	70-79	69-0
Online course (class 2020)	92.63/100	87.50%	12.50%		
Offline course (class 2019)	88.19/100	42.86%	33.33%	23.81%	

After the same teacher was selected to teach the course, there were some differences in the final scores of international students in different grades who studied online and offline on Tiangong International Micro-credencial Cloud Platform. The average score of students who used Tiangong International Micro-credencial Cloud Platform for online learning was significantly

higher than that of students who used offline learning, reaching 92.63. Meanwhile, the percentage of high final score of students who used Tiangong International Micro-credencial Cloud Platform for online learning was much higher than that of students who used offline classroom learning, reaching 87.50%, as shown in Table 1.

Table 2: Final results after separate online and offline studies in the same class.

Class 2019	Mean score	100-90	80-89	70-79	69-0
College Chinese 3 (Online course)	90.28/100	50.00%	44.44%	5.56%	
College Chinese 1 (Offline course)	88.19/100	42.86%	33.33%	23.81%	

The final scores of the same class were compared between online learning and offline classroom learning

using Tiangong International Micro-credencial Cloud Platform. It can be seen that after adopting Tiangong

International Micro-credential Cloud Platform for online learning, the average final score of the class increased from 88.19 to 90.28, and the percentage of high final score increased from 42.86% to 50%, as shown in Table 2.

6 CONCLUSION

According to current research data, the Intelligent Micro-credential Cloud Platform is targeted to solve many of the current challenges in online international education. During the whole research process, we also found some problems that need to be solved. For example, how to further simplify the operation difficulty of the teacher side of the platform so that some teachers who are experienced in offline teaching but lack computer operation ability can join the online teaching; how to solve the problem of online learning of experimental courses; how to maintain the utilization rate of course resources and cloud platform after the COVID-19 pandemic is effectively suppressed, etc. It is believed that along with the continuous progress of information technology and Internet technology, the international online education mode will be more perfect.

The application of Tiangong International Micro-credential Cloud Platform is of great help to international students in the midst of the COVID-19 pandemic. Online education can augment more traditional instruction, and serve as an effective means to scale education to students when other (in-person) forms of instruction are unavailable [3]. The application of this international teaching mode can also further promote the international development of universities.

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