



Research on Flexible Blended Learning of Traditional Chinese Medicine History Based on Modular Design in Post COVID-19

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Abstract. A flexible blended learning method is proposed based on modular design. The blended learning framework is implemented in the following three steps. First, analyze the challenges and implications of blended learning in post COVID-19. Second, different courses are designed as a combination of small modules and large modules based on modular design. Third, build a logical connection between different course. Some suggestions have been put forward to convert offline courses into online courses, including course content, learning initiative, participation, concentration, and technical means.

Keywords: Traditional Chinese Medicine History (TCMH) · Flexible Blended Learning · Modular Design · post COVID-19

1 Introduction

IN 2002, the American Society for Training & Development (ASTD) proposed the blended learning model [1]. With the continuous development of the COVID-19, the advantages of blended learning have needed to be more prominent and its priority has become higher. In recent years, there have been main research directions on blended learning in terms of its definition [2], teaching effectiveness [3–7], research direction [8], technical route [9, 10] and challenges [11, 12].

In the blended learning course of TCMH, online courses account for 30%-50% of the class hours, and offline courses account for 50%-70%. The teaching objectives are historical facts related to the formation and development of Traditional Chinese Medicine (TCM), to reveal the cause, nature and historical law of the development of the particularity of TCM, Cultivate students' thinking of TCM and the ability to propose, analyze and solve problems. To lay the foundation for the professional course of TCM.

Blended learning faces many new challenges in post COVID-19. In our research, we designed a novel flexible blended learning method built on modular design. According to the design principle of teaching method, a detailed course design was carried out for the TCMH.

Our scheme has the following three advantages:

- (1) It can effectively cope with the great uncertainty of the post COVID-19;
- (2) It can effectively solve the difficult predicament of adjusting the course sequence;
- (3) put forward the conversion path of offline courses and online courses.

2 The Challenges of Blended Learning in Post COVID-19

2.1 The Teaching Rhythm of Blended Learning is Facing Great Uncertainty

In mainland China, colleges and universities are highly populated areas with strict epidemic prevention and control measures. In the case of frequent outbreaks, it is difficult to keep the teaching method and teaching time stable. It is very likely that offline teaching activities can be conducted on the first day, and online teaching must be changed on the second day. It is difficult to ensure the normal implementation of the designed teaching schedule and teaching programs, which lead to the failure to complete the teaching activities as planned and the adverse impact on the learning effect.

2.2 High Coupling [13] of Knowledge Acquisition, Thinking Expansion and Ability Improvement Course, the Course Sequence and Teaching Methods Are Difficult to Adjust in the Blended Course Framework

For more than ten years, the knowledge acquisition, thinking expansion and ability improvement course of TCMH are close, and they are interlaced with each other. The knowledge system composed of them has been properly designed. Take the TCMH at Heilongjiang University of Chinese Medicine, for example, which has been a national quality course for more than a decade. Since the reform of real-time blended learning, the teaching effect has been praised by experts, teachers and students because of the gradual course and complete teaching structure. It has been assigned the provincial first-class undergraduate course. However, the closely connected and complete design brings some difficulties to the flexible change of course order and teaching form. Changing course orders and teaching form will affect students' pre-knowledge reserve, and it is difficult to carry out deep thinking training. Thus reducing the teaching effect. During the post COVID-19, in order to ensure that students have pre-knowledge reserve, they will try not to change the course sequence. However, adjustment of the teaching form is inevitable, and the temporary change may lead to the incomplete realization of the TCMH teaching objectives, which will eventually affect the overall teaching effect.

2.3 Lack of Conversion Methods Between Online and Offline Course

In post COVID-19, blended learning courses may often face situations where offline courses have to be converted to online courses, and when online courses turn, there are opportunities for offline teaching. Because such cases are mostly sudden and the form transformation is relatively hasty, if the existing technical means are only used to move the offline course to the online, and the online course to the offline, the teaching

effect is difficult to guarantee, and the students' learning concentration and initiative will decline. Due to the difference of network status and teachers' technical ability, different students may receive different teaching display effects in the same course, which should be avoided.

3 Modular Design Principles of the Flexible Blended Learning

The blended learning course program has a relatively close overall connection and faces a great impact under the extremely uncertain situation of the epidemic. In order to ensure the teaching effect, solve the problems of the uncertainty of teaching forms, the flexibility of course order within the knowledge system and the adjustment of teaching methods. This scheme proposes the following four modular design principles to construct a new hybrid teaching model of TCMH:

3.1 Divide the Whole Course into Large Modules, Which Are Further Divided into Medium Modules and Small Modules

Combined with the modular design [14], the teaching content and teaching objectives of the course, the whole course is divided into several modules: knowledge acquisition course, thinking expansion course and ability improvement course.

The knowledge acquisition course (KAC) includes the teaching of basic historical facts (emphasizing the learning of basic knowledge). The thinking expansion course (TEC) includes dialectical analysis of historical facts, in-depth interpretation of behavior, etc. (with emphasis on the cultivation of logical thinking ability). The ability improvement course (AIC) focuses on discussion, debate, speech, research report, etc. (focusing on the cultivation of professional quality and autonomous learning ability).

The KAC can be displayed in the form of micro class. The historical facts related to the formation and development of TCM are divided into small modules based on specific knowledge points. Each small knowledge module can be made into a 5–15 min video course. These basic small modules can be flexibly combined into medium-sized modules and large modules as required.

For example, small modules such as the “Wei Ji Bao Shu”, “Renzhai Zhizhi Fanglun”, “Ji Yan Bei Ju Fang”, “Wai Ke Jing Yao”, and “Wai Ke Jing Yi” can be combined into a medium-sized module of “The Development of Surgery in the Song and Yuan Dynasties”. This medium module can be related to “The Development of Internal Medicine in Song and Yuan Dynasties”, “The Development of Gynecology in Song and Yuan Dynasties”, “The Development of Pediatrics in Song and Yuan Dynasties”... The equal-sized module horizontally forms the large module “Achievements of clinical departments in Song and Yuan Dynasties”(shown in Fig. 1). It can also be related to “The Development of Surgery in the Jin and Tang dynasties”, “The Development of Surgery in the Ming and Qing Dynasties” “... Medium-size modules form the large module “Development of Ancient Chinese Surgery” vertically (shown in Fig. 2).

The TEC combines specific knowledge content with the intended training of thinking skills. By using modular design, the knowledge content with the goal of thinking expansion is taken as a small module, and the thinking skills are divided into basic thinking

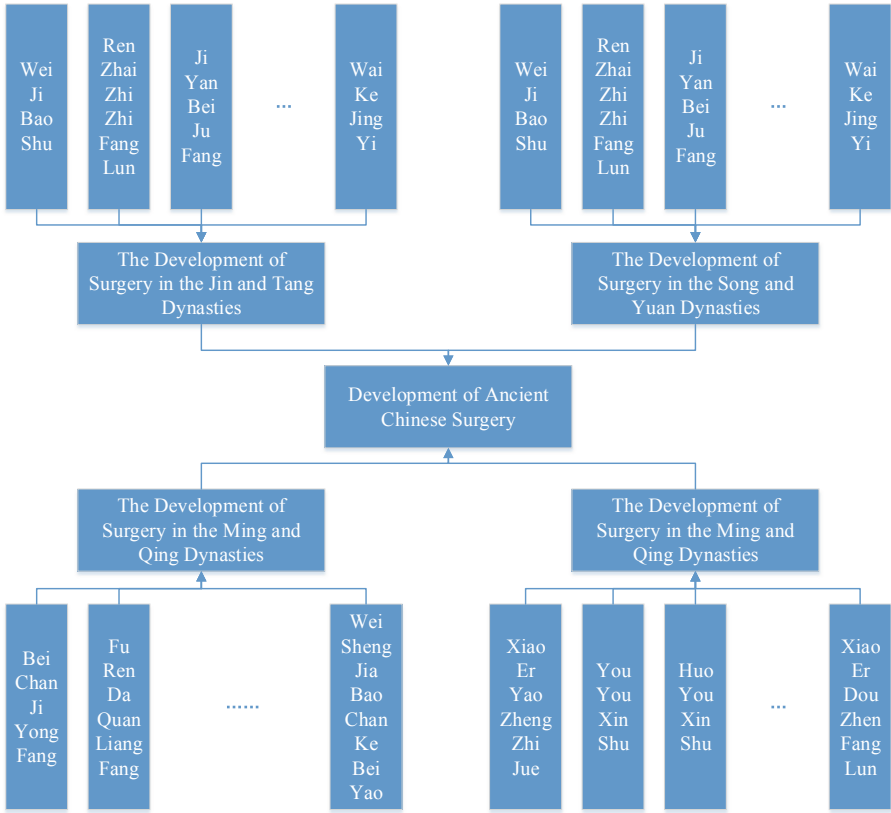


Fig. 1. Achievements of clinical departments in Song and Yuan dynasties composed of small modules (drawn by the author)

modules, such as inductive thinking module, deductive thinking module, critical thinking module, reverse thinking module, dialectical thinking module, etc. These basic modules of thinking skills can be used as the master of small modules with the same goal of thinking expansion, and can also be used as basis modules of thinking formality large modules (rational concrete thinking, abstract logical thinking...) and thinking purpose large modules (solver thinking, decisive thinking).

At the same time, small modules of knowledge content with the goal of thinking expansion can be independently combined into large modules according to the course content (the origin of medicine, the establishment of the academic system of TCM...). And the way of thinking always works together and there is a cross between different thinking skills, so the small modules can be flexibly adjusted as needed.

For example, the critical thinking module [15] can relate to “The Basis and Defects of the Theory of the Origin of Various Medicines”, “The Contribution and Harm of Alchemy”, “The Advantages and Disadvantages of Efficacy Classification and Compendium of Materia Medica”, etc. This basic thinking module, together with inductive thinking module [16] (Evolution of Etiology of TCM, Transformation of Surgery of

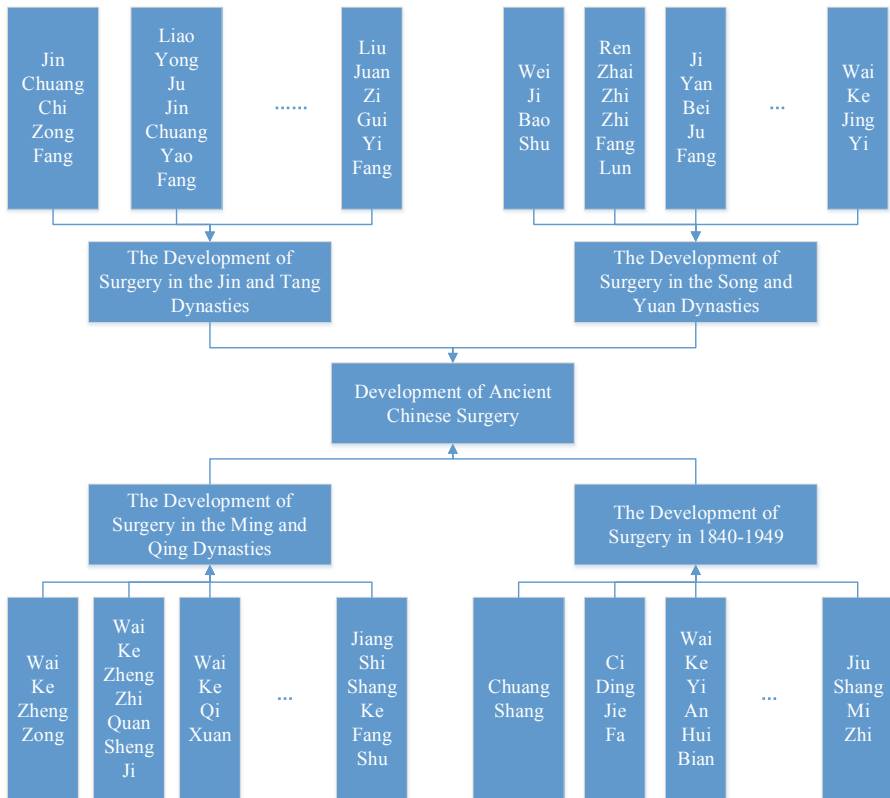


Fig. 2. The historical process module of TCM surgery is composed of small modules (drawn by the author)

TCM, Withdrawal and Revival of Anatomy of TCM...) and dialectical thinking module (“The Regional and Humanistic Factors of the Origin of TCM”, “The Historical Direction of TCM academic”...), can form a large module of “Abstract Logical Thinking of TCMH” to help students understand and form TCM thinking (shown in Fig. 3). The critical thinking module of “The Basis and Defects of the Origin Theory of Various Medicines”, the inductive thinking module of “The Evolution of Etiology of TCM”, the dialectical thinking module of “The Historical Direction of TCM”, and the comparative thinking module of “The Conceptual System of TCM and Its Characteristics” can also constitute the large module of “The Particularity of the Academic System of TCM”(shown in Fig. 4).

TCMH is mostly the first course for students after admission. It is not only necessary to complete the teaching of relevant academic content of this course, but also to lay the foundation for students’ subsequent learning of various courses. Therefore, the course should take into account the necessary ability to cultivate college students, including data retrieval, comparative analysis, logical thinking, language expression, unity and cooperation, autonomous learning, etc. The AIC are generally comprehensive courses

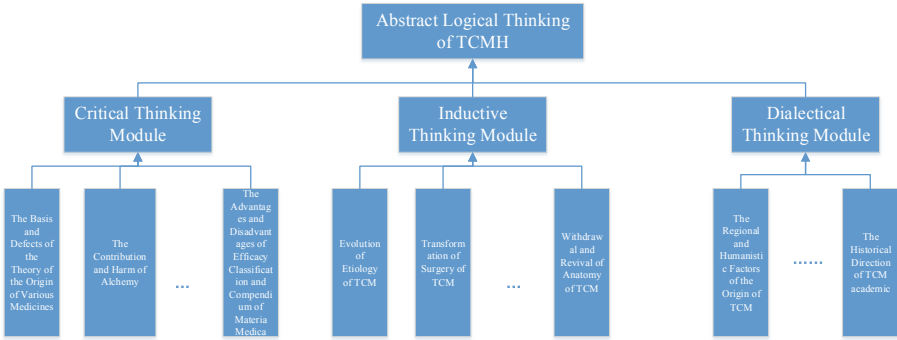


Fig. 3. Abstract logical thinking large module composed of small modules (drawn by the author)

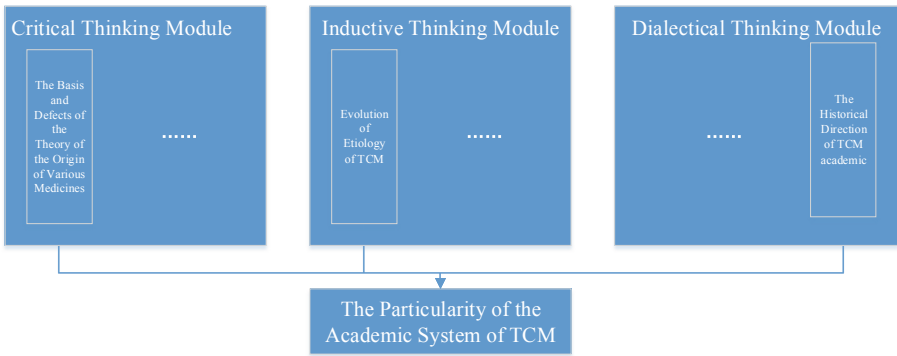


Fig. 4. Systematic thinking large module composed of small modules (drawn by the author)

with multiple objectives, such as knowledge acquisition, thinking expansion and ability improvement. Those courses can accomplish classroom practice in various forms, such as intra-group discussion, inter-group communication, independent learning, teaching and reporting, expanding topics, research sharing, knowledge competition, viewpoint debate, field trip, diverse presentation, etc.

There are three ways to make up the AIC module. Activities as a large module, flexible organization of knowledge content, thinking skills and ability direction. Combined with the relevant course content as a large module, call the relevant thinking expansion module and different activity module to cooperate with it. Taking the main ability training direction as a large module, the appropriate knowledge module and activity module can be selected flexibly for training.

3.2 Low Coupling with Various Course Modules

After the modular design is used in the course of TCMH, small modules have certain independence and will not affect each other. When it is used to combine medium and large modules, it can not only ensure the inevitable connection between knowledge, but

Table 1. The beginning and end of the multi-directional connection(drawn by the author)

Connection Type	Beginning	End
KAC-KAC	KAC	KAC
KAC-TEC	KAC	TEC
KAC-AIC	KAC	AIC
TEC-KAC	TEC	KAC
TEC-TEC	TEC	TEC
TEC-AIC	TEC	AIC
AIC-KAC	AIC	KAC
AIC-TEC	AIC	TEC
AIC-AIC	AIC	AIC

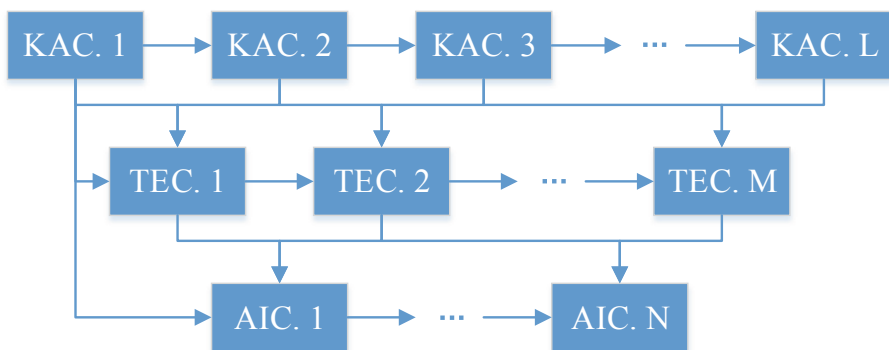


Fig. 5. Multi-directional connection between course modules (drawn by the author)

also have considerable flexibility and freedom. It can take care of the change of course duration, rhythm and form, and minimize the impact of the abrupt change of course forms on students' learning effects.

3.3 Building Multi-directional Connection Between All Kinds of Course Modules

In order to adapt to the demand of changing course form at any time, the relationship between various modules must not be unidirectional, but need to construct multi-directional connections, which can not only realize the continuous succession of the same course modules, but also meet the requirements of mutual jump or even cycle between different classes. The multi-directional connection relationship between various course modules is shown in Fig. 5, and the relationship between the starting point and ending point of each module is shown in Table 1.

4 Course Conversion Suggestions for Online and Offline

After the blended learning course of TCMH was divided into three modules: KAC, TEC and AIC, there were some differences in the adaptability between each module and different teaching forms.

KAC is more suitable for online courses, which focus on self-directed learning. Students can repeatedly watch video teaching resources to consolidate basic knowledge. TEC has strong flexibility. This kind of course mainly trains students' thinking and guides them to learn dialectical analysis and in-depth thinking. It is relatively less restricted by time and space conditions, which can achieve good interactive teaching effect on offline courses and adapt to online courses. As a comprehensive course module, the AIC is mostly completed in the form of various practical activities. Offline teaching can achieve the teaching objectives more ideally.

In post COVID-19, teaching forms may change at any time, and different course modules also need to be coordinated and adjusted. When the TEC module and AIC module need to be temporarily converted into online courses, the biggest challenge is to ensure students' initiative and concentration. The following suggestions are put forward in terms of technical conditions, implementation methods and students' enthusiasm for course conversion:

4.1 Improve the Focus and Integration of Course Content

When the TEC and AIC is conducted in the form of offline teaching, teachers have strong control over the classroom, and can adjust the course pace and gradient design timely by integrating the states of students in various aspects, so as to ensure the complete realization of teaching objectives. After the transition to online teaching, it is significantly more difficult for teachers to collect students' classroom status in a comprehensive and real-time manner, and it is difficult to flexibly adjust the classroom effect at any time. Therefore, it is necessary to further improve the focus and integration of the course content of the organic combination of different modules.

4.2 Strengthen the Classroom Teaching Rhythm Grasp

With online courses, it's harder for students to maintain their focus and be affected by other factors of their environment. Intersperse with interesting points and timely interaction can help students maintain their curiosity and focus on the course content. We can shorten the single interaction time and increase the interaction frequency to strengthen the control of the classroom rhythm, so as to reduce the interference in other factors of students' focuses.

4.3 Enhance the Perception, Immersion and Freshness of the Course

The TCMH is a comprehensive course integrating medical professional knowledge and historical evolution process, coupled with the particularity of TCM. It also has higher requirements on students' traditional culture and philosophy of the foundation. Therefore, it is difficult to achieve a comprehensive and in-depth understanding of the course

content, and the perception of ease of use is insufficient. Online courses add to this problem. A variety of technology means can be used to make students more deeply immersed in perceptual courses, such as “movies”, “themed games” and other forms popular with contemporary students to assist in the development of course. In future, Augmented Reality (AR) and 3D projection technology can also be used to lead students to “travel through” time-space and “revisit” history, so as to improve students’ perception and understanding of the course.

4.4 Improve the Course Evaluation and Incentive Mechanism

In the blended learning course of TCMH, the teaching design is student-centered, and students are the center of the class. In particular, the TEC and AIC are mostly carried out in the form of student activities. In offline courses, teachers can use language, expression and behavior to evaluate, feedback, guide and encourage students in real-time, so as to mobilize the enthusiasm and participation in students. When such activities are carried out online, it is difficult for teachers and students to interact through non-verbal communication. Therefore, teachers need to design and adjust appropriate incentive methods and strategies according to the form and content of activities in advance to arouse students’ enthusiasm for learning.

4.5 Simplified Online Teaching Support Platform and Tools

The blended learning course of TCMH should not use too many online teaching auxiliary platforms and tools at the same time. The frequent switching between platforms and tools increases the instability of the classroom, which brings a heavy burden on students’ study and life. The software should have the characteristics of stable connection, rich function and simple operation. In terms of technology, online courses are ensured to be carried out stably, and in terms of functions, various teaching forms can be carried out to avoid students’ resistance to courses due to tedious tool operation.

5 The Flexible Blended Learning Course Can Choose the Course Sequence Diagram

The timing diagram of blended learning course is shown in Fig. 6. The timing diagram of the flexible blended learning course is shown in Fig. 7. The timing diagram of the new flexible blended learning course when the COVID-19 lasts for a short time is shown in Fig. 8. The timing diagram of the flexible blended learning course when the COVID-19 lasts for a long time is shown in Fig. 9. In addition, the teaching form can be flexibly adopted according to the principle of online and offline course conversion.

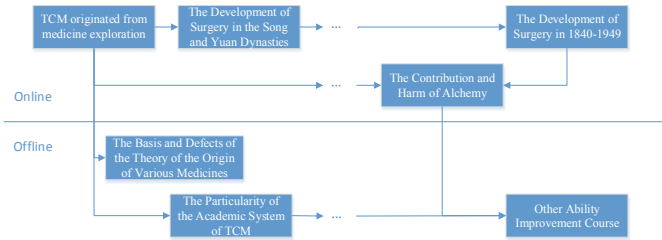


Fig. 6. The timing diagram of the blended learning course of TCMH (drawn by the author)

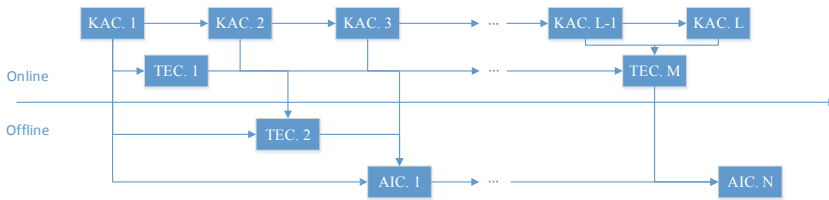


Fig. 7. The timing diagram of the flexible blended learning course of TCMH (drawn by the author)

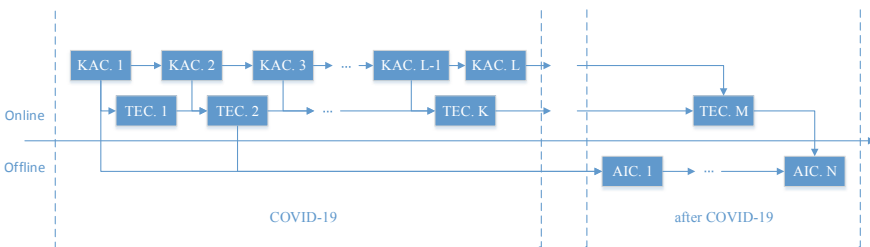


Fig. 8. The timing diagram of the flexible blended learning course when the COVID-19 lasts for a short time (drawn by the author)

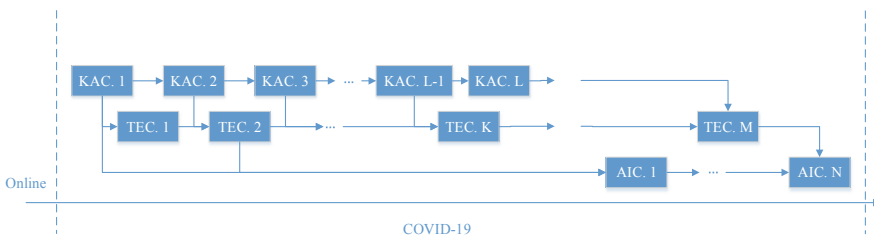


Fig. 9. The timing diagram of the flexible blended learning course when the COVID-19 lasts for a long time (drawn by the author)

6 Conclusions

In this study, through analyzing the challenges and difficulties of blended learning in post COVID-19, and putting forward some targeted three modular design principles and five offline courses into online courses Suggestions, effective response to the outbreak of great uncertainty, sequential adjustment difficulties and offline course is difficult to convert the challenges of the online course. Compared with the existing blended learning course, the novel flexibility blended teaching has higher flexibility, stronger ability to cope with emergencies and simpler knowledge structure, but it is difficult to modularize the course content and more complex knowledge system design.

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Conflicts of Interest. The authors declare no conflicts of interest.

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