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## The development and practice of flipped classroom expansion pattern

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### ABSTRACT

With the rapid development of information sciences, education Informationization has become one of the important contents to facilitate education modernization in today's education reform process. Taking the course of integration of information science and curriculum offered by Southwest University as an example, the thesis analyzed the course feature, made use of Sakai platform to have secondary development and designed expansion instruction pattern of flipped courses, to verify with real instruction and obtained better results, and put forward new ideas for the reform of education informationization.

### KEYWORDS

Sakai; Integration of information technology and curriculum; Network course.



## INSTRUCTION

With the in-depth development of education informationization, network platform has been used more and more widely. In 2004, the five universities, in the USA, including The University of Michigan, Indiana University, MIT, Stanford University and University of Berkeley had cooperated to development course management system called Sakai. Sakai is a free, course-opened online cooperative learning environment, which is very fit for instruction and management of college curriculum, it can be used in classroom and research and collaboration. At present, the domestic colleges have gradually begun to use this platform, the information center of Southwest University also used Sakai<sup>[1]</sup> to build network-instruction based platform for the convenience of teachers and students to make use of this platform to have conduct development and instruction of network curriculum.

After in-depth thoughts of network learning, the international education technology community put forward blended learning of organic combination of face-to-face learning and network learning. many famous experts including Huang Ronghai<sup>[2]</sup> pointed out that blended learning has more advantages than simple face-to-face and network learning. Flipped classroom is an innovative instruction pattern of blended learning. In spring of 2007, a chemistry teacher of Woodland Park senior middle school in the state of Colorado has undertaken an attempt to overturn traditional classroom, they uploaded videos of real-time explanation and PPT to the web, and let the students to watch them outside the classroom, and then have face-to-face discussion and homework supplementary lectures in class, to let the students to arrange their own study process according to their own habits, thus to improve the learning efficiency a lot.

The three strategic goals made in national plan for medium and long-term education reform and development (from the year 2010 to 2020) is to realize basic education modernization, to form learning-oriented society on the whole. Curriculum integration based on information science is a new channel of teaching reform of basic education in 21<sup>st</sup> century of our country. Southwest University, one of the six universities which recruited tuition-free normal students authorized by the Ministry of education, attaches great importance to cultivating the tuition-free normal students' information literacy. The subject of integration of information science and curriculum, as a compulsory major course of Normal University students, integrate education informationization into all the subjects, not only in the subject types of information science. But also have deep influence on many subjects, such as Chinese, Math, Music, Arts etc. Thus, it can achieve the goal of optimizing teaching resource and teaching effect.

## CURRICULUM DESIGN

### Early analysis

In the early period of offering the course *The Integration of Information Science and Curriculum*, many teachers in the curriculum group has undertaken a survey on the offering status of this course in many other Normal universities, only to find that many universities adopted the pattern of blended instruction, but still use traditional blended instruction pattern, namely: the combination of explanation in classroom together with network platform practice after class, this pattern can't give full play to the initiative of the students.

At the same time, against the actual situation of the normal students of this university, for example, the course was offered to junior students, the students at this stage have learnt many courses related to pedagogy, and have possessed related basic knowledge in terms of the development, goal, and reform direction of informationization instruction. The course *The Integration of Information Science and Curriculum* have in-depth integration of information science with other subjects like Chinese, math, foreign language, the basic theories, teaching design, evaluation design etc. They will also be used in the integrated course, and this knowledge is not strange to students. Thus, it is conducive for the students to undertake in-depth discussion and research.

Southwest University brought in Sakai platform, encouraging teachers of the whole school to conduct network course teaching, deepen the education informationization reform. from the interview to some normal students before class, It was learnt that normal students are familiar with the use of network platform, and are also used to cooperative learning on the platform of network.

Based on the above, The course group of the course *The Integration of Information Science and Curriculum* decide to carry on flipped classroom instruction<sup>[3]</sup> based on Sakai platform, to let each student to have independent learning and have active discussion by changing instruction pattern, on one hand, to facilitate the normal students to master the teaching contents of the subject, on the other, to let the normal students to form the concept of education informationization reform, so that they can lay a solid foundation to explore reform after they work as teachers in primary and secondary school.

### The design of the activity

Based on the structure pattern of flipped classroom designed by Zhang Jinlei<sup>[4]</sup> and others<sup>[5]</sup>, the teaching design of the course *The Integration of Information Science and Curriculum* is designed as below. As shown in Figure 1, the flowchart is an expansion of flipped classroom on the basis of usual flipped classroom pattern: an expansion of 'before class + in class' to 'before class + in class+ after class', to meet the basic demand of students by offering.

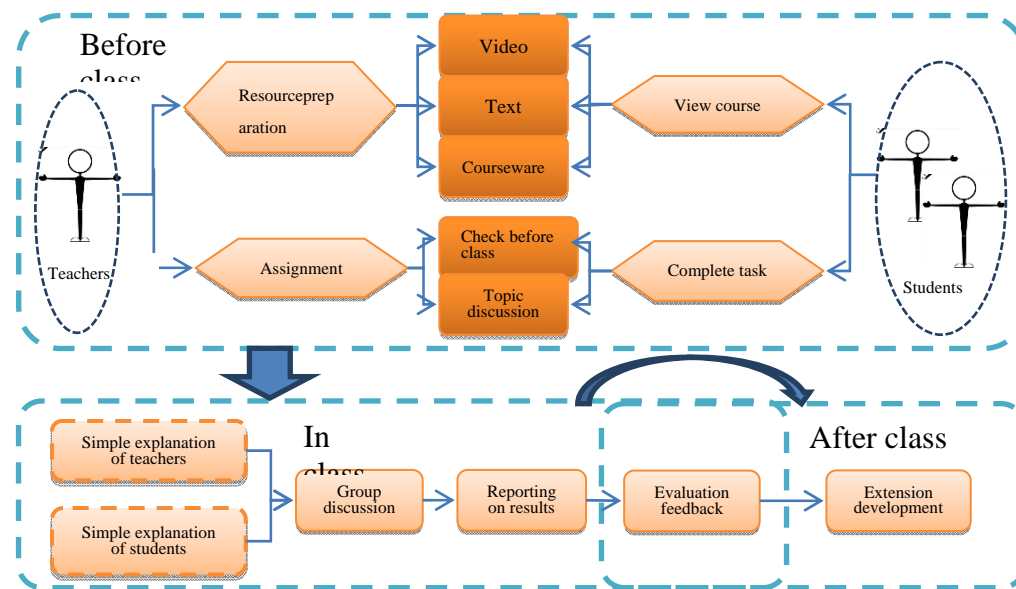


Figure 1 : Teaching design flowchart

### Activity before class

Activity before class means the preparation activity before formal class, this part of activity is undertaken based on network teaching, it has two bodies, namely, teacher and students.

At the beginning, the teachers get ready the resources related to knowledge contents two weeks ahead of the classroom teaching, record or collect from the internet and edit a video of about 10 minutes on the knowledge point basis, and upload PPT courseware, prepare many case text information.

The students log on to the network platform to check the related information before classroom teaching according to his own habits to complete the assignments, which includes two parts: the first part is to complete pre-class quiz after learning the information, this part of knowledge is mostly for the mastering of basic knowledge, to make students be familiar with each knowledge point, have a basic learning of the framework of the whole unit. The second part are cases or open questions offered by the teacher, the students think them over get ready for discussion, they can also upload the questions produced in the process of their own learning, those questions can be kept to be discussed in classroom teaching.

### Classroom activity

Classroom activity also means in class, it is communication activity between the teacher and the students. This part can be divided to four parts.

Link 1: Simple explanation. The teacher or students make an explanation to the basic knowledge, to introduce the basic concepts, definition or development trend of the contents of this unit, and give topic discussion on pre-class network platform.

Link 2: Group discussion. This is a part of cooperative learning, 6-8 students freely from a group, each group must at least select one question case to analyze, and give opinions to improve it or choose teachers or classmates to raise other questions on network platform, one student is responsible to record the discuss process, this student or another one report the result, collecting the discussion and opinions of this group. The teacher will go around in the classroom, get involved in each group.

Link 3 : Fruit reporting. Each group assigns one member to report on the discussion results, and the others can supplement.

Link 4: Assessment feedback. This link mainly has three parts: to let each student to present a result of his or her own performance in the group according to some evaluation questionnaire. To let each student to evaluate other groups' fruit in peer assessment, in teacher's assessment, the teacher give assessment result for each group.

### Activity after class

Activity after class is expansion, supplementary and deepening of flipped classroom, which is the biggest difference from usual flipped classroom. Feedback of two assessment links and knowledge expansion are brought in here for activity after class, assessment needs in-time feedback, as classroom activity design is only confined to multimedia classroom, it is not insured that each student has a computer. After completing assessment questionnaire in class, the students need to input to network platform to collect data after class, each student can check the evaluation result of feedback.

In order to consolidate and deepen the understanding of the knowledge, the teacher will assign some compulsory homework after class to all the students. At the same time, in order to meet the demand of some capable students to conduct more in-depth study and research, some related expanded, diverged knowledge and expanded tasks will be provided in

network platform, the students can freely study and complete the expanded contents, and realize individual learning for students of different levels.

### PLATFORM BUILDING

According to the teaching design of earlier period, teaching network platform selected Sakai, module shown in Figure 2 can be chosen in Sakai to realize the expanded teaching pattern of flipped classroom ‘before class+ in class+ after class’.

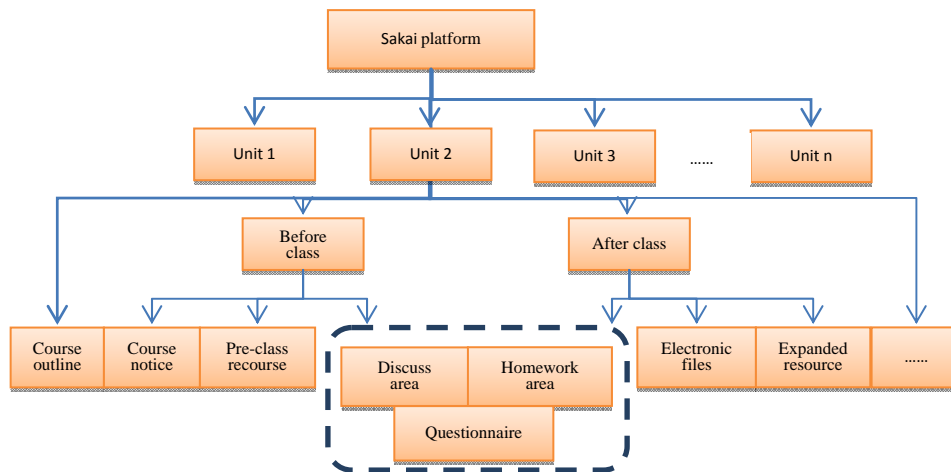


Figure 2 : Sakai platform module chart

Take curriculum instruction diversification into consideration when setting up platform, choosing other modules such as course outline, podcast etc., course outline as general introduction, including the basic information of the course, the feature of the course, status and task, the basic requirements of the course, the way of assessments, etc. podcast is a way of electronic podcast technology, which is convenient for the students to upload some videos which are made, downloaded or synthesis by themselves. But the focus is still on the teaching pattern of flipped classroom, so the thesis mainly introduces related modules; the course is divided into many units by knowledge points. For example, the course *The Integration of Information Science and Curriculumis* divided into 9 units; the contents of each unit can be completed within three hours' class time. The two parts, before class, and after class can be designed according to the earlier flipped class expansion, three parts belong to two parts, and the details are as follows.

#### Pre-class module

The teacher upload the notice two weeks ahead of the class, the notice should contain all the task instruction that the students must complete ahead of class, the tasks should contain learning the videos resource that the teacher uploaded, PPT courseware, excellent case analysis etc. the preliminary discussion of the discussion area, pre-class test of homework area preliminary and question and case analysis, the downloading of assessment questionnaire, the filling of the survey before class.

#### Post-class module

Post-class module is the follow-up tasks that must be completed three days after classroom teaching. The tasks include compulsory and optional tasks, which are for students of different levels to finish independently. Discussion area has been discussed before class, after class, the students can have further discussion with the teacher after class, to make up the limitation of class time. In the area of homework, the teacher will assign follow-up homework of the knowledge point, generally it can be the writing of a case, which requires each student to hand up, and the teacher will supply feedback after checking. The questionnaire is for the convenience of the teacher to add up the teaching effects after class. The electronic files are other works of the students, such as the collected materials which are helpful to them, the post-class reflection after writing. The habits of using electronic filesto record the learning process is conducive to present knowledge in an organized way, and learn the process of self-structure knowledge. Expansion resource is expansion of contents related to the knowledge point, including video, text, pictures, page links, etc.

### TEACHING PRACTICE

In order to verify the teaching effect of flipped class with expansion pattern based on Sakai platform, it is applied in *The Integration of Information Science and Curriculum*, offered to the students majoring in computer science and technology (normal major) of Southwest University from September 2013 to January 2014, its 9 knowledge points are all applied in the

teaching pattern design. The thesis selected the contents of the fifth unit 'the teaching of information technology supported teaching' to introduce the detailed teaching process.

### Teaching activity

#### Pre-class activity

Two weeks ahead of offering the course, the teacher uploaded the resource in the Sakai platform; including videos, PPT courseware, excellent case The Summer Palace, and look from different directions. The pre-class quiz in homework area offered some basic conceptions of one-answer questions, such as what are the theoretic foundations of lecture-style teaching? What are the basic features? The question case *The Structure of Flowers* and *Cells division* were offered in homework area. Some questions were raised in discussion area, such as the function of information technology in teaching, its difficulties and errors. The questionnaire used structured questionnaire to survey the opinions of the students to lecture-style teaching. For example, suppose you were a teacher of information technology, will you use lecture-style teaching?

#### In-class activity

Divide all the students into groups, with 6- 8 people in a group, 9 groups in total. Each unit has 120 minutes to spend. 1-2 students to make a simple explanation for the basic concepts of the knowledge points (20 min), the groups discuss the solutions of question cases and other related questions (40min). One student of each group report the discussion result (each one has 6 min, about 50 min in total), the teacher then makes a simple conclusion and comments (10min)

#### Post-class activity

The students should hand in the homework 'the teaching plan that is centered by lecture-style teaching', fill up the assessment questionnaire, submit the questionnaire. They should expand knowledge independently in the future; complete the electronic files, etc.

## RESULT AND DISCUSS

After the whole course is completed, the students were found to have better effects in terms of mastering the knowledge after final exams, the further analysis of the survey of the student's learning interests, adapting degree of teaching pattern change, the acceptance degree of Sakai platform were made. It was found that 95% of the students support the teaching pattern of flipped class, 90% of them thought flipped class can better realize individual learning, 88% of them get used to Sakai platform. Those results reflects the fact that the students can well adapt to flipped classroom, prefer more time to have classroom discussion as well as free learning outside the classroom to complete learning tasks.

## CONCLUSION

The teachers applied information sciences to set up network learning platform to upload learning resource and tasks before class, to leave more time for the students to have discussion, and have face-to-face interaction among students and teachers, to conduct cooperative learning. in view of the confinement of classroom discussion, the thesis is based on the basic pattern of flipped classroom 'before class+ in class', expand it into 'before class+ in class+ after class'. to let the students to make use of the network platform to check assessment feedback result, to further consolidate knowledge, and broaden horizon, and better construct knowledge and to develop new ideas to realize individual teaching.

As the teachers in the future, how can normal students follow the new trend of the informationization education reform to try new teaching pattern while learning the curriculum about education? Which raised high requirements for the normal students' teaching? Research of the recent 10 years shows that the application of blended teaching fit for the needs of the present informationization education reform. When using flipped classroom in normal students' teaching, on one hand, to get the normal students familiarize the pattern of newly blended teaching, on the other hand, to promote the develop the teaching skills. the lectures of the normal students' major courses, cant not rest on the theoretic surface, using the technological methods to teach, or using the network platform to collect the homework after class, though the blended teaching pattern is adopted, the students are still on the phase of passive learning, the teacher should put the advanced teaching pattern into practice, to make the normal students form the conscious of education informationization reform, and can change passive learning to active learning, to meet the need of individual learning, to promote deepening reform of informationization education.

## ACKNOWLEDGMENT

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