Applying Grounded Theory Method in Building a Hybrid Learning Activities Model

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Abstract. In order to promote the practical application of hybrid learning in colleges and universities in Guangdong, a study named "Hybrid learning application patterns in colleges and universities in Guangdong province" was carried out. This study, supported by education technology centers from colleges and universities in Guangdong province, adopts grounded theory analysis method of qualitative study in summing up several patterns of hybrid learning activities of teachers and students. The result of this study has a guiding significance and referential value to promote the teaching design and application of hybrid learning practice.

Keywords: Hybrid learning · Qualitative study · Grounded theory

1 Introduction

Hybrid learning is a popular term in the field of educational technology in recent years, which is a theory or teaching mode formed after reflecting on the shortcomings of e-learning. Different scholars have different definitions of hybrid Learning. Bonk defined that hybrid learning is a combination of face-to-face instruction with online learning [1]. In this research, we think that hybrid learning appears in many forms, which is not only a mixture of face-to-face (F2F) and online learning (OL), but also a mixture of receiving knowledge and discovery learning, a mixture of autonomous learning and collaborative learning, a mixture of knowledge learning and practice, a mixture of process study and evaluation, and a mixture of applying media and learning tools.

In China, the research on hybrid learning can be mainly divided into two aspects including theory analysis and practice exploration. The theoretical analysis is mainly concentrated in the connotation, elements and design strategies of hybrid learning. Li proposed the design steps of hybrid learning and introduced four kinds of application modes of hybrid learning [3]. Huang proposed a hybrid learning course activities model and divided the process of the hybrid learning course design into three stages: analysis, activities and resources design, and teaching evaluation design [4]. The practice exploration mainly focused on applying hybrid learning in a subject or a field and carrying out the specific practice, thus developing some typical cases or typical hybrid learning patterns. According to the actual situation of the curriculum and the discipline characteristics, Zhou designed many hybrid learning modes, such as collaborative learning, inquiry based learning, case teaching, skills training, role-play etc. [5]. Huang

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constructed a hybrid learning mode for "Modern Educational Technology" curriculum based on a networked teaching platform. After the teaching practice, he pointed out that the design of curriculum content and learning activities have great influence on the application effect of hybrid learning [6].

The instructional design is the key of hybrid learning. The important part of hybrid learning is the design of teaching environment and learning resources, and the design of teachers' teaching and students' learning activities. However, there is little research on the instructional design or activity model of hybrid learning. Furthermore, many researches are just theoretical deduction, so the effectiveness remains to be tested in practice. In this paper, we apply the grounded theory to analyze some successful experience of the colleges and universities in Guangdong province and sum up several patterns of teachers and students activities in hybrid learning, so as to provide some useful reference for instructional design of hybrid learning.

There are 37 common colleges and universities in Guangdong province (not including vocational and technical colleges) and most of them have acquired networked teaching management platforms. The construction of online course resources on these platforms strongly promotes the higher education curriculum and teaching reform in Guangdong and stimulates changes in personnel training. We found that there is a batch of curriculum resources available on the network, which has embedded stories of successful experience in the construction and application of these courses. We hope that learning from this successful experience will promote the application of hybrid learning in colleges and universities in Guangdong. Therefore, under the auspices of the education technology centers in Guangdong province, a consortium was formed by Sun Yat-Sen University, Jinan University and South China Normal University to carry out the research study named "Hybrid learning application patterns in colleges and universities in Guangdong province". Through field investigation and teacher interviews, this research aims to understand the current situation of the application of hybrid learning in colleges and universities in Guangdong, and to discover a batch of good models courses and teachers in hybrid learning. Through the use of grounded theory analysis on successful experience of hybrid learning of some teachers, we summed up several patterns of hybrid learning activities of teachers and students, which has guiding significance and referential value in promoting the teaching design and application of hybrid learning practice.

2 Research Methods

This research adopts grounded theory method of qualitative research method. Grounded theory, established by Glaser & Strauss in 1967 [1, 2], is an important method of qualitative data analysis, using bottom-up procedures systematically with actual data collected in the system, looking for reflection on the social phenomenon of the core concepts on the basis of inductive methods, finding links between these concepts, thus forming a theory viewpoint. The description of the teacher's teaching experience is a piece of qualitative data. To this end, this research is divided into three parts, namely

(1) Qualitative data collected rooted in the actual environment,
(2) Qualitative data analysis, and
(3) Summary of the characteristics of teaching and learning activities of teachers and students.

3 Qualitative Data Collected

In order to obtain the rich qualitative research data of hybrid learning applications in Guangdong, we use a variety of ways:

Step 1: the questionnaire survey. We designed the "Questionnaire on basic situation of networked course construction and application in colleges and universities in Guangdong province" and requested that colleges and universities in Guangdong to fill in. Items in the questionnaire include the basic situation of platform and network resource construction, the number of online courses and usage, and recommendations of a number of the successful experience of hybrid learning courses and teachers.

Step 2: field investigation and interviews. Based on the data collected from the basic situation and recommendations of excellent cases from the questionnaire, we arranged a team of teachers and graduate students to further investigate the 24 universities.

Investigation activities include:

(1) Understanding the general situation of hybrid learning in each college and university;
(2) Listening to actual hybrid learning experience from teachers;
(3) Watching the actual scene of the classroom teaching;
(4) Collecting teaching cases, which include teaching design, presentation files (ppt), relevant network course websites and related teaching narrative;
(5) Interviewing teachers; and
(6) Holding a colloquium, which includes all interviews with digital recording, all teachers experience introduction with presentation files, and part of the lecture videos.

Step 3: the data sorted. Through investigation, we obtain the type and amount of qualitative data as shown in Table 1.

Table 1. The type and amount of qualitative data

	Data collection in projects	Number
01	Recycling questionnaires situation	24 set
02	Overall introduction (PPT) and text summary material	24 set
03	Listening to the teacher's report	71
04	Collection of teacher's teaching design and PPT	70 set
05	Face to face interviews	74 teachers
06	Watch lectures at the scene	19
07	Panel (focus group interview)	7 games
08	Materials of recording	650,000 words

After obtaining a large number of qualitative data, based on grounded theory analysis method, the point of view was formed through the induction analysis of data.

4 Grounded Theory Analysis of Qualitative Data

We use grounded theory analysis on the collected qualitative data. Before analysis, we highly focus on blended learning theory and make preliminary theoretical assumptions in the process of collecting and analyzing data; and unceasingly to test our own preliminary theoretical assumptions. We systematically collect data, reflect on the core concept of hybrid learning phenomenon, sum up the relationship between these concepts using the three-level coding method, and then form our theory viewpoint.

The three-level data coding process includes (1) open coding, (2) axial coding, and (3) select coding. Figure 1 shows the three-level data coding process.

(1) **Open coding.**

Open coding is for the purpose of analysis of the original data collected, including to point out the phenomenon preliminarily, to define the concept, and to look for the categories. Category is the concept of a higher level abstraction, which is to be used to reflect the data content and meaning. The operation process is as follows:

① "Break up" is the original recorded data and for each set of data the phenomenon reflected by a local concept is defined. A local concept is based on the theory derived from the concept of blended learning. Table 2 is part of the open coding examples; it shows the process from "break up" the original recorded data to every data definition phenomenon and gives the concept.

Through opening the qualitative data to coding, according to the basic theory of hybrid learning, more than 430 native concepts were introduced and part of them was shown in Table 3.

Table 2. Open coding examples

Examples analysis unit (interview) (part)		Conceptualization
Example 1	I will ask students and teachers together, through various channels to collect many video cases in criminal cases, and then uploaded to the network platform for students to browse it.	Resource sharing
Example 2	I will choose a batch of excellent student learning works of the students, and then put it on the network platform, I'd like to have these good students learning works for use in other grade undergraduates.	Resource sharing

② Mining category is to integrate the concepts of similar meaning to the a concept at a higher level, named category. Through the analysis, we further found that the concepts were summarized to the higher category through continuous "downsizing". This study discovered more than 50 categories and part of them was shown in Table 4.

Table 3. After open coding to introduction of native concept (part)

After open coding to introduction of native concept (part)
Course open time, training before class, study plan, BBS exchange, answering questions, the network learning resources, corrects students' papers, online platform using time, BBS exchange, job management, resources, evaluation methods, stability of the platform, platform maintain, learning behavior, application effect, project learning website, multimedia resources, resources abroad, online learning time, learning and research learning, multimedia resources, inquiry learning, evaluation methods, and student feedback, job submission time, login time, intellectual property rights ...

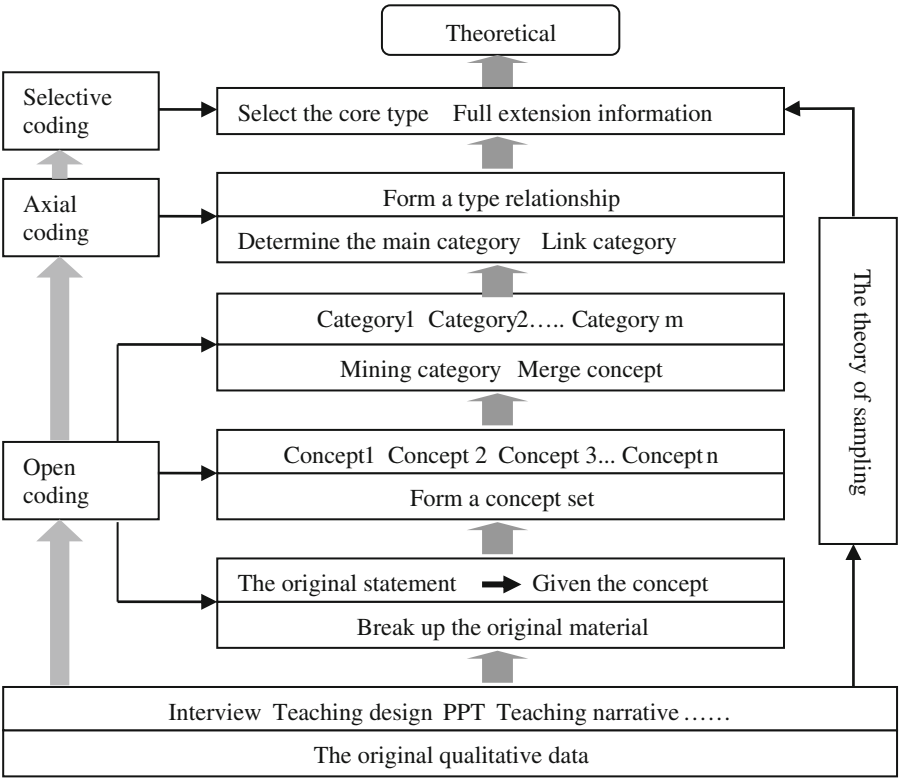

Fig. 1. Three-Level data coding process

(2) **Axial coding.**

Its main task is to find and establish the relationship between different categories, through the analysis, select one or several strong relationships, and recapitulate the association with the strong ability of the core concepts as the main category, the other as a condition and the context of a concept. The connection between the different categories gradually becomes the formation of our theory viewpoints.

Table 4. Categories and concepts that are included in part of the cases

Category	The concept of category contains
Teaching resources	Provide video case, curriculum document, project learning website, multimedia resources, Micro course resources, the introduction of foreign resources, resource update,…
Teaching activities	Organization of classroom discussion, decorate learning tasks, select important issues Guiding thinking, to guide the learning methods, online answer this question,…
Learning activities	Login web site, the group collaborative learning, understanding of learning tasks, online BBS communication, learning plan, online discussions, form opinions, online learning time, role playing, the application of social software…

(3) **Selective coding.**

Its task is to select a core attribute, and then to connect all the other attributes, make the type of data, form a clear clue, and make preliminary theoretical perspectives more completely. In accordance with the above principle, we establish a blended learning activity analysis model of teachers and students, as shown in Fig. 2, namely the teachers' classroom teaching activities, students' classroom learning activities, teacher's online teaching activities - online learning activities of students.

Use of hybrid learning in the four corners of the teaching and learning activities analysis model, we put the various associations with hybrid learning which is acquired by grounded theory of "category", formed the different types of teaching and learning activities in the hybrid learning.

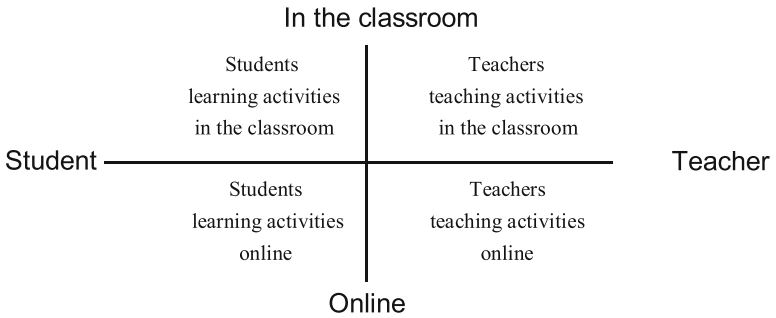

Fig. 2. Blended learning activity analysis model

5 Hybrid Learning Activity Type

Root through the above theoretical analysis, we discovered different contents and process structure in face-to-face and online teaching and learning activities from teachers and students. The formation of a case study, task driven learning, inquiry

learning, and virtual simulation study and so on appear in various hybrid learning modes. All of these patterns are rooted in the actual teaching practice.

Type 1: Online Case Teaching + in Classroom Teaching

Case: Courses "Jurisprudence II" in Guangdong Business School.

First of all, the teacher provided a group of cases of related laws in video on the networked platform. Students were required to watch the web video cases with in-depth analysis and then asked some questions. In view of the questions identified, students collected and studied relevant information and discussing the cases via the network, guided by the network curriculum formation methods of the system.

Teachers organized students in a way to simulate a real court in the class, in which students played the roles as the judge, the plaintiff and the defendant, and gained experience in a simulated court, thus finished the class with a better understanding of the knowledge and migration to a higher level. We concluded that both teachers and students completed the process of knowledge construction as shown in Table 5.

Table 5. Activity process and content in type of online case teaching

	F2F		OL	
Process	Teachers' teaching activities	Students' learning activities	Teachers' teaching activities	Students' learning activities
01	◆Determine the learning task ◆Guiding learning method	◆Understanding learning task and Learning methods	◆Provide video case	/
02	/	/	◆Guiding learning method	◆Online autonomous learning
03	/	/	◆ Choose to think questions	◆Analysis of cases, ◆Ask questions
04	/	/	◆Organize group learning ◆ To guide the online discussion	◆Online discussion question
05	◆Design of moot court ◆Determine activity rules	◆Role play	/	/
06	◆ Teachers and students together evaluation and summary	◆ Teachers and students together evaluation and summary	/	/

Type 2: Online Inquiry Learning + in Classroom Teaching

Case: Courses "Oral pathology" in Jinan University Medical School.

At the beginning of the project, teachers put a variety of learning resources on to the network teaching platform, including the literatures related to oral pathology locally and abroad, foreign library websites, multimedia resources and so on.

Then the teacher released information about research questions on the platform, such as the reasons for the formation of various kinds of disease in the course. Students were required to use literatures provided online to explore, and to conduct interactive discussion with each other between classmates online. According to the results of the discussion, students sorted out the academic points of view.

After a period of time, the teachers organized data of class discussion, students' opinion, and learning outcomes. Teachers were in the process of monitoring network platform continuously and tried to understand students' learning states. Table 6 shows such a process.

Table 6. Activity process and content in type of online inquiry learning

F2F			OL	
Process	Teachers' teaching activities	Students' learning activities	Teachers' teaching activities	Students' learning activities
01	◆Introduce general content and inquiry learning method and requirements	◆Understanding learning content ◆Understanding learning requirements	/	/
02	/	/	◆Integration of teaching resources including oral pathology project site, index of related literature at home and abroad, the library website, etc.	◆ Browse the resources
03	/	/	◆Put forward the research question	◆Students use online resources to explore problems
04	/	/	◆ Guide students online discussion	◆Online discussion
05	◆Organize class discussion ◆To explore the learning outcomes were summarized	◆Show Learning outcomes, ◆Teachers students discuss with each other	/	/

Type 3: Online Collaborative Learning + in Classroom Teaching

Case: Course "Modern learning technology" in Sun Yat-Sen University.

The teacher formed a series of collaborative learning subjects according to the course content and built collaborative learning groups on the platform. Each group of students chose a theme, in which students in a collaborative learning group adopted division of labor according to the topic, sought for resources on the Internet, applied these resources to complete tasks to be borne by each group, again through consultation and discussion on the online platform, formed the comprehensive opinion, and completed the work together.

Lastly each team showed the learning outcomes in the classroom in various ways; the teacher conducted evaluation and summary so that both teachers and students shared the harvest of the learning outcomes. Table 7 summaries such a process.

Table 7. Activity process and content in type of online collaborative learning

	F2F		OL	
Process	Teachers' teaching activities	Students' learning activities	Teachers' teaching activities	Students' learning activities
01	◆Introduction to course content ◆Introduction to method of group cooperative learning	◆Establish collaborative learning team	/	/
02	/	/	◆Display multiple learning theme	◆Collaborative team choose learning theme
03	/	/	◆Provide learning resources and learning materials relevant to the theme	◆Browse the learning resources
04	/	/	◆ To guide the discussion	◆Discussion tasks of Group collaboration online
05	/	/	◆Guide the Methods of each other comments	◆ Show group learning work, watching each other comments
06	/	/	◆Published teacher evaluation opinion	◆Published personal learning experience

Type 4: Online Learning Task Drive + in Classroom Teaching

Case: Course "Secretary professional English" in Shenzhen Institute of Information Technology.

First of all, the teacher with the aid of network platform established a learning situation in flash with other multimedia content, and used the network platform to present learning tasks, to explain to students learning task requirements, and to provide the corresponding learning resources for students.

After obtaining the task, students in order to complete the task used network autonomous learning at the first place; then the study group for collaborative learning discussed and completed the learning task.

Finally, the formation of learning outcomes was uploaded to the Internet platform so that they could display and learn from each other. Teachers and students made evaluation to students' learning outcomes and study effects of each group. The learning task was completed. Table 8 shows such a process.

Table 8. Activity process and content in type of online learning task drive

F2F			OL	
Process	Teachers' teaching activities	Students' learning activities	Teachers' teaching activities	Students' learning activities
01	/	/	◆ Release phase learning tasks and requirements	◆Read and Understanding phase learning tasks and requirements
02	/	/	◆Provide flash multimedia learning resources	◆ Browse the resources Autonomous learning
03	/	/	◆Clear group learning tasks	◆ To carry out group cooperative learning
04	/	/	◆Organize students to watching each other communication	◆Upload the cooperative learning results
05	◆ Organize class discussion	◆Published phase learning outcomes	/	/

Type 5: Online Simulation Practice + in Classroom Teaching

Case: Course "Simulation practice of enterprise operation" in Guangdong Finance and Economics University.

The course is in the form of simulation practice in training students. It realized integrated management of operations using the network platform to effectively improve

the students' comprehensive quality, to shorten the cycle of personnel training, and to improve the efficiency of the personnel training. The particular way of training is to ask students following the practice links after completing the course. An online comprehensive practice content system with practice schedules was well-designed by the teacher. Then, students began simulation practice activities according to the plan.

Students studied on the network platform which provides a dynamic simulation environment to simulate practice, and the teacher used the network platform for business monitoring and educational administration. The teacher also used the platform to discuss the design scheme of the virtual enterprise, to communicate with students, to provide business consulting and online training and other activities.

Finally, according to the recorded data on the internship process on the BB platform, teachers evaluated and assessed the performance on students' self-assessment, performance of the teams and individually combining multiple evaluation criteria. Table 9 summaries such a practice.

Table 9. Activity process and content in type of online simulation practice

F2F			OL	
Process	Teachers' teaching activities	Students' learning activities	Teachers' teaching activities	Students' learning activities
01	/	/	◆Internship announcement, including Practice content and schedule	◆ read
02	/	/	◆ Provide online resources, including: Government regulations on enterprise operation, specification of the declaration form	◆The simulation to fill out The simulation to declare
03	/	/	◆Business monitoring ◆Educational administration	◆The simulation enterprise operation
04	/	/	◆Answer the questions Communication with students ◆ To guide the simulation operation	◆Ask questions Communicate with the teacher
05	/	/	◆Organize students to watching each other communication	◆The simulation enterprise information release
06	◆ Organization simulation market	◆ The simulation transaction in the simulation market	/	/
07	/	/	◆Organize students to summarize reflection	◆Release summary and experience

6 Summary

Through the analysis of the successful cases using grounded theory analysis, we discovered many categories related to hybrid learning activities, from numerous and relevant categories shown in hybrid learning activity modes. The following experience is worth to be highlighted: (1) need to attach great importance to the instructional design; (2) pay attention to introduce and integrate curriculum resources on network platform; (3) positive use of a variety of computer software as a learning tool; (4) pay attention to build the real-time interactive platform between teachers and students; (5) diversify the design of learning evaluation; and (6) emphasis on the presentation and evaluation of students' learning outcomes. By using grounded theory analysis, this study summarized hybrid learning activities of different types for teachers and students. This study has a referential value for instructional design of blended learning and may provide a positive guiding significance to the teaching reform of colleges and universities.

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