# Application of basic medical micro-courses on the Learning Pass platform in the era of "Internet plus"

Jia Liu[a], and Chunxia Huang[b,*]

Application Characteristic Discipline of Hunan Province, Changsha Medical University, Changsha, 410219, China

[a]forwork99@sina.com, [b]joyandwork@sina.com

*Corresponding author

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**Abstract.** Taking the basic medical course of medical cell biology as an example, using the teaching assistant of mobile teaching software "Learning Pass", this paper discussed the application of micro-course from the micro-course design, micro-course construction, micro-course application practice, micro-course effect evaluation and so on. Based on the comprehensive analysis of students' scores and questionnaires, it is found that proper application of Learning Pass in the teaching process can effectively stimulate students' enthusiasm for learning and improve the teaching effect.

## 1.Introduction

In the information age, with the popularization of smart phones and other mobile electronic products and the improvement of educational technology, online teaching based on mobile terminals has become an important auxiliary teaching method [1]. The mobility and portability of mobile teaching terminals, enable learners to study and communicate at any time and anywhere. It can highlight students' dominant position, which is a brand new autonomous learning mode [2]. Teachers can adopt appropriate teaching software to teach, so as to make up for the shortcomings of traditional classrooms. For example, many medical colleges in the UK use digital interactive ibook to teach anatomy [3]. For medical students, basic courses of medicine are the foundation for learning clinical courses, such as biochemistry and pathology, which are extremely important. However, basic courses are generally characterized by "difficult courses, hard teaching by teachers and little gains by students", and the teaching effect needs to be improved.

Learning Pass APP is a professional free mobile teaching platform developed by Century Superstar Company. Educators download the software to the mobile phone terminal, and create a class after registering as a teacher. The teaching class can join the class through the invitation code published by the teacher. Teachers edit course chapters, upload learning resources and organize teaching activities through the web-based learning platform. Students can download and view teaching resources through the Learning Pass APP to participate in teaching activities. The university has started to promote the software and build open online courses. The author tried to apply Learning Pass in the teaching of a few classes in 2018, and popularized this teaching method in 2019. By the interesting and rich content of mobile phone terminals to attract students' attention, the enthusiasm and initiative of students in learning were improved, and the teaching effect was significantly improved.

## 2.Design and Construction of micro-course

Based on the basic situation of our university and teaching experience, the author linked the seemingly independent knowledge points of each task through the projectized content to ensure that students could easily master project knowledge.

### 2.1 Micro-course Design

Learning situation analysis is the basic work of micro-course design [4]. The teaching object is freshman medical students. Each student has a smart phone, and more than half of the students have

computers or other information equipment. In the teaching process, appropriate use of smart devices such as mobile phones can well urge students to study independently and explore cooperatively. In the traditional classroom, basic medical courses are generally in a state of "tired teachers and absent-minded students". In order to solve this problem, the author introduced the idea of online and offline teaching into the basic course Medical Cell Biology.

In this course, there are two key contents: cell structure and cell life activity. The author reconstructed these two contents, and to master cell structure as the first part. The task list included five tasks: cell membrane, endomembrane system, mitochondria, cytoskeleton and nucleus. The second part included cell proliferation, cell differentiation, cell senescence and cell death.

## 2.2 Micro-course Construction

The main task of constructing micro-course is to establish the teaching resource database. The micro-course teaching resource database includes teaching micro-video, teaching PowerPoint, work task list, electronic question bank, scene animation and so on. The core work of micro-course construction is micro-video editing. Our university has a special course recording room, and the author recorded the course micro-video with the help of digital screen software. For the two projects, 27 micro-video were produced, ranging from 1 to 5 minutes in length. The contents of video were key and difficult points or expanding knowledge, which were easy for students to learn. The electronic question bank of Medical Cell Biology was edited again, which was used for self-study examination before class, consolidation in class and review of knowledge after class. The purpose of self-study test before class was to check the effect of students' self-study and urge students to study by themselves. The number of questions in the consolidation link of knowledge in class was 5-10, which aimed to fully digest the knowledge points of the task and verify the teaching effect. The purpose of review after class was to strengthen the error-prone knowledge in the task. Electronic question Banks and typical tasks could assist students to complete the internalization and consolidation of knowledge points [5]. Task sheet could guide students to complete tasks and record relevant knowledge points. Work task list was designed before class according to students' self-study situation to make clear teaching task. In class, the teacher guided students to complete teaching tasks independently or in groups, and students record knowledge points on the work task list with the help of mobile terminals. At last students handed in their work sheets and teacher graded students according to the completion of the task.

## 3.Application practice of micro-course teaching

In the following part, mitochondria, a task in the course of Medical Cell Biology, is taken as the main line to discuss the practice of micro-course. This task includes the structure and chemical composition, the function and the semi-autonomy of mitochondria. The structure and semi-autonomy of mitochondria are the focus, and the difficult point is the mitochondrial function (energy conversion).

### 3.1 Preview before class

In combination with the cognitive law of medical undergraduates, one week before class, the teacher uploaded a micro-video of basic knowledge, supporting PowerPoint and a simple online learning task list to the learning platform, and released online preview notice. Two days before class, the teacher started the topic discussion with the help of the "topic discussion" function of the platform, and gave thumb up, the excellent topic that students discussed, to improve the enthusiasm of students to participate in the discussion. With the help of the "test" function on the platform, the teacher launched an online test about the preview of video content, and the test scores were included into the task scores, so as to urge students to preview carefully.

### 3.2 Implementation in class

In class, the teacher led the students to briefly review the knowledge learned in the last class, and with the help of the platform "test" function, the teacher initiated 3 single choice questions, and the test scores were counted into the total score of the task. Then, with the help of the function of "selecting

candidates", a random student was found to share the online preview experience. Students could check the learning task list and watch the animation "What makes mitochondria different", While watching, the students finished the task on the mobile phone. After the animation video was played, the teacher looks for a student to answer the questions combined with the animation content through the Learning Pass function of "selecting candidates". The teacher summarized the animation content, introduced this classroom teaching task, and students read the knowledge. Through the "topic discussion" function, the discussion of "Why are mitochondria semi-autonomous" was initiated, and thumb up was given according to the quality of students' discussion. Subsequently the teacher summarized the knowledge point, so far, teaching key was solved.

### 3.3 After-class development

Teacher assigned extension tasks and upload the materials to the learning platform. Students should complete and submit the extended tasks within the prescribed time and preview the next task.

## 4.Application effect of Learning Pass platform

### 4.1 Comparative analysis of course scores

In the first semester of 2018-2019 academic year, the author organized teaching in the mixed teaching mode (class A, 119 students) and the traditional teaching mode (class B, 116 students), respectively. The final examination was conducted with the same papers. The comparison of the examination results of the two classes is shown in figure 1. The test scores of class A were significantly higher than those of class B.
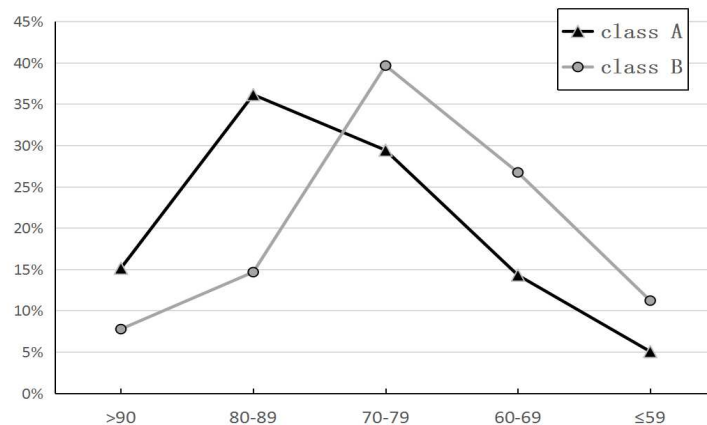


Fig 1 Comparison of course scores percentages of class A and class B

### 4.2 Questionnaire Results

In terms of "learning interest and participation in learning", 235 questionnaires were issued, 217 were collected and 212 were valid. The results of the questionnaire are shown in table 1, indicating that this teaching method has fully stimulated students' interest in learning and improved their participation in class.

Table 1 Questionnaire survey based on the teaching of learning communication platform

| Topic | class A, 110 students | | | class B, 102 students | | |
|---|---|---|---|---|---|---|
| | agreement | neutrality | disagreement | agreement | neutrality | disagreement |
| Effectively stimulate students' enthusiasm for learning | 74（67.3%） | 33（30.0%） | 3（2.7%） | 52（51.0%） | 45（44.1%） | 5（4.9%） |
| Enhance students' awareness of independent learning | 50（45.5%） | 48（43.6%） | 12（10.9%） | 25（24.5%） | 59（57.8%） | 18（17.6%） |
| Enhance students' sense of teamwork | 64（58.2%） | 39（35.5%） | 7（6.4%） | 30（29.4%） | 61（59.8%） | 11（10.8%） |
| More opportunities to communicate | 81（73.6%） | 29（26.4%） | 0（0%） | 22（21.6%） | 51（50.0%） | 29（28.4%） |
| Good teaching effect | 69（62.7%） | 39（35.5%） | 2（1.8%） | 45（44.1%） | 55（53.9%） | 2（2.0%） |

## 5.Summary

As the cornerstone of clinical courses, a series of basic medical courses focus on improving the basic knowledge and skills of medical students. Although many research teams at home and abroad have found that smart phones are associated with the addiction and anxiety of young people [6-7], proper use of smart phones in teaching can still play a positive role [8-9]. The teaching method based on "Learning Pass" APP has changed the classroom atmosphere. Because students are more and more obsessed with smart phones at present, mobile teaching terminal is used to turn students' attention curve back to the classroom, so as to stimulate students' interest in learning. Based on the learning mode of "Learning Pass", which is different from the traditional teaching mode, teachers design a variety of activities for students, and the curriculum is carried out with students, which is a student-centered teaching mode. Students can learn platform resources independently according to tasks before class and record questions. In class, teachers can answer students' doubts about independent learning and come to class with questions to make students more involved in class. Rational use of information platform "Learning Pass" can effectively improve the enthusiasm of students to participate in the classroom, as well as the enthusiasm of independent learning. The design and construction of micro-course can effectively promote the development of mixed teaching mode. Teachers use this way to guide students to learn effectively, so that students really learn something. From the results of examination and questionnaire survey, the teaching quality has been improved and the teaching effect has been significantly improved.

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