

# Design and Application of Mobile Clinical Education

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## Research article

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# Abstract

Background: To design and evaluate a mobile app to provide Mobile Clinical Education (MCE). Students: 181 students from the Nursing Department of Nanjing Medical University. Methods: The students were divided into an MCE group and a control group based on their class organization. "Nutrition" was chosen as the experimental course. The MCE app was developed and applied during a whole semester for the MCE group, while the control group was taught using the traditional method of passive transfer of information from lecturer to group of students. Results: The MCE group performed better on the final examination ( $69.1 \pm 7.5$  vs  $67.9 \pm 6.7$ ,  $t = 1.127$ ,  $P = 0.26$ ); and in terms of general evaluation ( $74.9 \pm 6.0$  vs  $67.9 \pm 6.7$ ,  $t = 7.419$ ,  $P < 0.001$ ). There was a significant increase in the MCE group after introduction of MCE in terms of course appeal ( $t = -4.75$ ,  $P < 0.001$ ), classroom communication and the opportunity to discuss and debate what they had learnt ( $t = -4.5$ ,  $P < 0.001$ ) and course content ( $t = -4.44$ ,  $P < 0.001$ ). Conclusion: MCE has been found to improve learning and the overall experience. The application and promotion of this teaching method should improve medical education in terms of flexibility, practicability and extensiveness.

## Background

Medical education is characterized by aspects such as complicated context, rapid updates and requires a high degree of clinical experience. Therefore, some modern methods of education, like Problem-Based Learning (PBL) and Clinical-Based Learning (CBL), emphasize the participation of students [1-2]. These methods tend to enrich the context of classes and increase communication between professors and students. However, these methods cannot help in the organization and achievement of overall knowledge [2]. In addition, methods of teaching in small groups such as PBL and CBL are not often suitable for adaptation to larger groups without large investments in lecturers with relevant clinical experience [2]. Several experiments have shown that the adoption of electronic devices is beneficial to widen knowledge, improve final grades and emphasize clinical problem solving [3-9]. The appropriate application of mobile electronic devices tends to facilitate communication and enthusiasm during education [3,10-14]. This experiment aims to design and evaluate the application of "Mobile Clinical Education" (MCE).

## Methods

### 1. Subjects

Nursing students at Nanjing Medical University in the 2016 year were selected to complete the same course taught by the same professor on the same day. A total of 97 students from classes 1-3 were designated as the MCE group; 84 students from classes 7-9 acted as the control group. "Nutrition" was selected as the academic topic for this experiment. Their Ethic Approval and Consent to Participate have been submitted as an oral consent provided by one of our lecturers and confirmed by a teaching assistance. There was no statistically significant difference between groups in terms of gender or age ( $P > 0.05$ ).

## 2. Teaching method

An app on the current social media tool “WeChat” was designed and applied during this semester. The education method and related content provided on the MCE app was decided ahead of time, and is detailed below.

The control group received traditional in-class teaching, delivered by the same group of professors as the MCE group. The whole course included eight lectures and two clinical labs. All of the in-class lectures were progressed by professors, without declaration of any form of preparation or review by students themselves for the lectures.

In addition to the lectures outlined above, the MCE group also received the app. This included a preview of each lecture, a take-home exercise, a group chat center and evaluation center so that students could practice leadership during education and extend the coverage of the lecture. The app consisted of a client side (used by the professors and managers of this experiment) and the server side (used by the students), as shown in Fig 1. The QR code, login page and main menu of the app are shows in Figs. 2, 3 and 4. The detail of the content is as follows:

2.1. Preview: the latest relevant results from nutrition research were examined and provided to students through the app. Therefore, students were able to familiarize themselves with this content before the lecture, increasing participation during class. The main menu is shown in Fig. 3.

2.2. Take-home exercise: to test the effectiveness of the lecture and review the in-class knowledge, an exercise was provided on the app 10 minutes before the end of the lecture and collected 5 minutes after the end. The system allows students to evaluate and reflect on the results afterwards. All the results were able to review by students with related contents. All of the material was arranged by chapter, and prepared and examined by professors and managers before the start of the semester. (Figs. 5 and 6).

2.3. Group-chat center: the group chat facility was divided into two parts: an in-class debate and a clinical lecture. The overall introduction to Nutrition took two lectures using the traditional education method. The other content was divided into eight chapters and delivered using the app. At the beginning of the semester, the supervisor randomly divided all MCE students into eight education activities (eight in-class lectures and two clinical labs). During each in-class lecture, ten students would be set up as a debating group; the proposition and the opposition were assigned randomly. The topic was related to the in-class material was provided on the app a week before the lecture. The whole debate took about 40 minutes and included a total of 80 students in the whole semester.

The debates followed the “Singapore competition system” [15], which includes a thesis, submission, position, rebuttal, free debate, questions and a summary submission. Considering the number of students, the method was adjusted so that the proposition and opposition provided their submission at the first debate, argued their position at the second debate, joined the rebuttal during the third and fourth debates and summarized their submissions at the fifth debate. Debaters were allowed to communicate

with professors through WeChat during their preparation; professors were responsible for leading the topic to ensure the quality of education and the efficiency of the debate. The supervisor managed the organization of the debate and was also responsible for the timing (Fig. 7 shows the menu of the in-class debate center).

Clinical labs were carried out twice per group in three small groups. The 17 participating students were those who did not take part in the in-class debates: 2-3 students were selected to form a teaching group to lead the whole clinical lab progress. Students were able to prepare the teaching material on the preview part of the app, and the professors and managers formed a chat group to answer questions and guarantee the quality of education.

**2.4. Evaluation:** the evaluation center was used to collect suggestions from users (students and professors) in the form of online questionnaires. The questionnaire was designed as the Chinese form of SEEQ (Students' Evaluations of Educational Quality) on the student side and was found to have high stability and reliability [16]. There were eight parts to the questionnaire with a total of 34 questions: teaching quality, enthusiasm of teaching, organization, cooperation, communication, extension of knowledge, level of take-home exercise and overall evaluation.

### **3. Grading:**

The grades given to the two groups were assigned as follows. In the control group, the final examination represented 100% of the mark; in the MCE group the final grade was made up of completion of the take-home exercise (10%), in-class debate/clinical lab presentation (20%) and final examination (70%).

### **4. Evaluation of the education method:**

This evaluation had two parts: subjective and objective evaluation. The objective evaluation also included two parts: final examination and evaluation. Students in both the control group and the MCE group took the final examination at the same time. All tests were graded by professors in the same teaching group and referred to a uniform standard. After verification by the managing group, all grades from the different groups were collected and analyzed.

The subjective evaluation was in the form of a questionnaire: the MCE group was required to fill out two SEEQs (before and after this experiment). The control group was only required to complete the SEEQ once, which was required after completion of the whole course.

### **5. Statistical method:**

SPSS Statistics 22.0 (IBM Inc., Chicago, IL) was used to perform t-tests to compare the grades and questionnaires of students in the control and MCE groups.

### **6. Ethics and Consent to Participate:**

This research presents no risks to the participants. All of our participants will not be identifiable from the data collected. The research does not involve any therapeutic intervention. For this consideration, the Exception to Written Evidence of Consent was approved by the IRB of First Affiliated Hospital with Nanjing Medical University / Jiangsu Province Hospital. The participants` Ethic Approval and Consent to Participate have been submitted as an oral consent provided by one of our lecturers and confirmed by a teaching assistance.

## Results

### 1. Final examination:

Compared with the final examination results from the control group ( $67.9 \pm 6.7$ ), the MCE group obtained a higher score although this was not significant ( $69.1 \pm 7.5$ ,  $t = 1.127$ ,  $P = 0.26$ ).

### 2. Final evaluation:

Compared with the result from the control group ( $67.9 \pm 6.7$ ), the result from the MCE group was significantly higher ( $74.9 \pm 6.0$ ;  $t = 7.419$ ,  $P < 0.001$ ).

### 3. Questionnaire:

The MCE group undertook 96 questionnaires at the beginning of the semester and 77 questionnaires at the end (Table 1: analysis of SEEQ from the MCE group). The evaluation of the app showed a substantial difference between the start and end of the semester in terms of appeal of the lecture, increasing student interest, detailed education content, interesting teaching method, encouragement of students to communicate with each other and the development of educational quality. There was also a significant increase in student satisfaction in the lecture content ( $t = -3.27$ ,  $P < 0.001$ ), professors ( $t = -2.81$ ,  $P = 0.01$ ) and the overall course ( $t = -3.69$ ,  $P < 0.001$ ). This increase was particularly seen in aspects such as extension of lecture content ( $t = -4.44$ ,  $P < 0.001$ ), the appeal of the teaching method ( $t = -4.75$ ,  $P < 0.001$ ) and the personalization of education ( $t = -4.50$ ,  $P < 0.001$ ).

The results of SEEQ were collected from both groups after the end of the semester. The MCE group returned 77 validated questionnaires and the control group returned 65 validated questionnaires (Table 2). Students in the MCE group had significantly higher scores for encouraging communication and personal expression ( $t = 2.22$ ,  $P = 0.03$ ;  $t = 2.16$ ,  $P = 0.03$ ). There was also a significantly higher satisfaction with educational content, preparation and quality of professors in the MCE group compared to the control group ( $t = -2.54$ ,  $P = 0.01$ ;  $t = -2.89$ ,  $P < 0.001$ ).

## Discussion

The ultimate goal pursued by medical higher education is to provide high-quality medical and healthcare personnel for society. As a lifelong, social, flexible and practical education, undergraduate clinical teaching is the basic stage in the process of medical talent growth. Its theoretical teaching is characterized by abundant content, high update speed, lack of lectures, etc. Traditional models and methods often do not meet the needs of students' theoretical knowledge and practical skills after graduation [17]. Previously, professors could employ a "forced" teaching style and ignore the important role of students in their own education: this not only hinders potential progress by the students to become self-sufficient in the learning process, but also hinders the cultivation of enthusiasm and clinical thinking. Considering the large scale of medical talents in China, the strong demand for clinical education and the need to optimize education styles, our department of education and research independently developed "Mobile Clinical Education" (MCE), which relies on the widely-used free social media tool WeChat as the intelligent terminal. The department selected its own teaching task "Nutrition" as the experimental course to complete the initial promotion of MCE.

Analysis of the results of the two groups at the end of the general assessment showed that MCE not only improves the quality of teaching but also helps students to deepen their understanding of theoretical content and cultivate practical ability. At the same time, the introduction of MCE is vital to improve students' comprehensive ability to communicate as well as to learn and analyze independently.

Analysis of the students' evaluation of teaching effectiveness showed that MCE improved students' participation in teaching, embodying personalized teaching, advocating active learning and formative evaluation. At this stage, students are more accustomed to the traditional "teacher teaching, student listening" teaching style: this study indicates that the new teaching style has several advantages. The acceptance of the control group for the teacher preparation process is better than that of the MCE group (Table 2, Question No. 10,  $t = -2.68$ ,  $P = 0.01$ ), which may be related to the reduced teaching time from classroom teaching and the refined content.

Therefore, it can be seen that MCE has the following advantages:

- 1) Interactive and timely teaching: through the different teaching methods, such as daily WeChat group interaction and free debate, MCE can effectively improve the participation in and experience of teaching. MCE also increases interactivity, helping students to realize their important role in the teaching process. In addition, timely communication between students and teachers helps to avoid the problems of students not actively asking or answering questions, as can happen in the traditional teaching method.

- 2) Extensible thinking space: the pre-class preparation debate and independent teaching methods break the time and space restrictions inherent in classroom teaching. This method helps students to make full use of the school's convenient educational resources and high-quality teaching environment, as well as promoting lifelong active learning behavior and the development of good learning habits.
- 3) Cutting-edge and high-quality content: the teachers not only have rich clinical experience and profound theoretical foundations, but also follow the development of the discipline – allowing them to incorporate this into practical techniques. All content of the mobile teaching platform is approved by the instructors after screening and review, which avoids many problems caused by insufficient knowledge or experience when students select their own resources. MCE ensures that students are only exposed to forward-looking quality education resources.
- 4) Formative evaluation system: the problem-solving test, active learning score and traditional test scores help to promote multi-dimensional evaluation of the whole process, vertical compatibility theory and practical ability. Formative evaluation is the core concept and knowledge mastery and practical operation are the basic points, along with active learning, analyzing speculation and communication. These provide reliable and reasonable evaluation of learning ability and evaluation of teaching effect.
- 5) Evidence-based teaching management: the platform is managed so that each step of the teaching process can be traced, standardized and evaluated: this is vital to the continuous improvement of teaching methods, and guarantees quality teaching.

However, the current experimental model still has the following challenges: 1) high teaching ability requirements: the student-centered teaching process seems to reduce the teacher's theoretical teaching time, but in reality, this method requires teachers to refine the theory and maintain an active classroom atmosphere to increase knowledge, with an emphasis on logical focus and the cultivation of thinking methods. Therefore, in the teaching process, the instructor must pay attention not only to the learning hotspots to ensure the quality of teaching, but also to help students understand and develop their clinical thinking logic. MCE can thus help students grow as well as promote the progress of teaching. 2) Teaching management is more rigorous: although WeChat provides learners with more learning options and richer communication methods, it still needs teaching managers to perform auxiliary teaching functions and avoid unintentional counteraction. The application of MCE must achieve the full integration of high-quality resources, strict review of teaching content and timely management of

teaching users. Appropriate guidance must be produced for user-related teaching content, to avoid excessive bias or ineffective communication and to encourage inactive students to pay attention.

## Conclusions

The 2015 Horizon Report (Higher Education Edition) highlighted that flipping classrooms and bringing in equipment and adaptive learning technologies in the next five years will have an important impact on higher education [18]. The rational application of mobile intelligent platforms not only highlights the flexibility, efficiency and directness of education in the era of "Internet +", but also promotes the development of lifelong and active learning behaviors and improves the student-centered educational process. MCE is based on an existing free mobile platform, which reduces the cost of exploration while ensuring the quality and efficiency of teaching, enhances the mastery of theoretical knowledge and practical ability, stimulates interest in learning, fosters communication and collaboration and improves teaching efficiency. The goal of improving the teaching experience and optimizing teaching management has good application value and promotion prospects.

## Abbreviations

1. MCE: Mobile Clinical Education
2. PBL: Problem Based Learning
3. CBL: Clinical Based Learning
4. QR code: Quick Response code
5. SEEQ: Student's Evaluations of Educational Quality

SPSS: Statistical Product and Service Solutions

## Declarations

Competing Interests:

The authors declare no conflicts of interests.

Funding:

This research was supported by Nanjing Medical University in 2017 (QN2017151). The role demands of the founder throughout this research was to cover the expenses on design and maintenance of the MCE app.

## Availability of Data and Materials:

All the data included in this research are available in a public, open access repository.

## Author's Contribution:

XM was the leader of all the researchers included, who was responsible for decision making and research design. As the corresponding writer and the teaching secretary of Nutrition department, JW planned the research, submitted the study, responsible for organization of teaching activity and was a major contributor in writing the manuscript. JC and TZ were responsible for literature review beforehand. SG, FW and CP analyzed the results. All authors read and approved the final manuscript.

## Consent to Publish:

Not Applicable.

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## Tables

Table 1 The SEEQ evaluation of the MCE group throughout the semester

Question	MCE group (before)	MCE group (after)	t	P
I found this course to be intellectually challenging and motivating	$3.24 \pm 1.02$	$3.84 \pm 0.69$	-4.44	$\leq 0.001$
I have learned something that I think is valuable	$3.57 \pm 0.82$	$3.83 \pm 0.73$	-2.16	0.03
Due to this course, my interest in this subject has been increased	$3.31 \pm 0.90$	$3.86 \pm 0.77$	-4.21	$< 0.001$
I have learned and understood the subject of this course	$3.36 \pm 0.80$	$3.68 \pm 0.75$	-2.62	0.01
Instructors of this course was very enthusiastic about this course	$4.07 \pm 0.65$	$4.16 \pm 0.59$	-0.87	0.39
Instructors were quite energetic about this course	$4.03 \pm 0.72$	$4.10 \pm 0.58$	-0.72	0.47
The personality of instructors increased the attraction of lectures	$3.52 \pm 0.92$	$4.03 \pm 0.58$	-4.20	$< 0.001$
<u>The teaching method of instructors were quite attractive to me</u>	<u><math>3.33 \pm 0.87</math></u>	<u><math>3.90 \pm 0.64</math></u>	-4.75	$\leq 0.001$
The explanation of instructors was clear	$3.95 \pm 0.59$	$4.00 \pm 0.46$	-0.64	0.52
Instructors prepared and explained this course carefully	$4.13 \pm 0.65$	$4.06 \pm 0.50$	0.67	0.51
I can catch up the progress of this course because the academic goal was consistent with the actual lecture.	$3.74 \pm 0.65$	$3.90 \pm 0.70$	-1.52	0.13
The way of this teaching method was easy to take notes	$3.53 \pm 0.85$	$3.73 \pm 0.75$	-1.59	0.11
Encourage students to participate into class discussions	$3.67 \pm 0.71$	$4.06 \pm 0.61$	-3.90	$< 0.001$
<u>Invite students to share their thoughts and knowledge</u>	<u><math>3.51 \pm 0.81</math></u>	<u><math>4.03 \pm 0.67</math></u>	-4.50	$\leq 0.001$
Encourage students to ask questions and give meaningful answers	$3.56 \pm 0.82$	$4.04 \pm 0.59$	-4.28	$< 0.001$
Encourage students to express their thoughts	$3.65 \pm 0.85$	$4.03 \pm 0.61$	-3.32	$< 0.001$
Instructors were very nice to each student	$4.08 \pm 0.66$	$4.16 \pm 0.54$	-0.78	0.44
Instructors were willing to solve students' questions both in and after class	$4.07 \pm 0.65$	$4.13 \pm 0.59$	-0.59	0.55
Instructors paid attention on each student	$3.46 \pm 0.83$	$3.84 \pm 0.71$	-3.23	$< 0.001$
Students can achieve their instructors easily after class	$3.38 \pm 0.92$	$3.64 \pm 0.84$	-1.93	0.06
Instructors would compare the meaningful of different theories	$3.64 \pm 0.76$	$3.92 \pm 0.62$	-2.68	0.01
Instructors would introduce the background of each content	$3.83 \pm 0.72$	$4.04 \pm 0.52$	-2.10	0.04
Instructors would provide others' thoughts appropriately	$3.67 \pm 0.80$	$4.03 \pm 0.54$	-3.37	$< 0.001$
Instructors would introduce the situation of certain academic area	$3.70 \pm 0.80$	$4.03 \pm 0.58$	-3.02	$< 0.001$
The final grade was meaningful	$3.54 \pm 0.71$	$3.69 \pm 0.71$	-1.35	0.18
The way of evaluating students was fair	$3.67 \pm 0.78$	$3.77 \pm 0.67$	-0.89	0.37
The content of examination is based on the main idea of each lecture	$3.73 \pm 0.70$	$3.81 \pm 0.69$	-0.71	0.48
Mandatory reading and exercise were meaningful	$3.83 \pm 0.75$	$4.06 \pm 0.52$	-2.30	0.02
Readings, take-home exercise and labs were beneficial to understand this course	$3.82 \pm 0.78$	$4.00 \pm 0.56$	-1.67	0.10
Compared to other courses, I want to say this course is:	$3.60 \pm 0.73$	$3.95 \pm 0.63$	-3.27	$< 0.001$
Compared to other instructors, I want to say this instructor is:	$3.79 \pm 0.61$	$4.04 \pm 0.52$	-2.81	0.01
In all, I consider this teaching mode as:	$3.80 \pm 0.61$	$4.12 \pm 0.49$	-3.69	$< 0.001$

Table 2 The SEEQ evaluation of the MCE and control groups after the semester

Question	MCE group (after)	Control group (after)	t	P
I found this course to be intellectually challenging and motivating	$3.84 \pm 0.69$	$3.69 \pm 0.68$	-1.31	0.19
I have learned something that I think is valuable	$3.83 \pm 0.73$	$4.09 \pm 0.42$	-2.54	0.01
Due to this course, my interest in this subject has been increased	$3.86 \pm 0.77$	$4.14 \pm 0.56$	-2.45	0.02
I have learned and understood the subject of this course	$3.68 \pm 0.75$	$3.88 \pm 0.57$	-1.77	0.08
Instructors of this course was very enthusiastic about this course	$4.16 \pm 0.59$	$4.35 \pm 0.60$	-1.99	0.05
Instructors were quite energetic about this course	$4.10 \pm 0.58$	$4.38 \pm 0.58$	-2.89	$\leq 0.001$
The personality of instructors increased the attraction of lectures	$4.03 \pm 0.58$	$4.18 \pm 0.66$	-1.52	0.13
The teaching method of instructors were quite attractive to me	$3.90 \pm 0.64$	$3.92 \pm 0.80$	-0.22	0.82
The explanation of instructors was clear	$4.00 \pm 0.46$	$4.17 \pm 0.57$	-1.95	0.05
Instructors prepared and explained this course carefully	$4.06 \pm 0.50$	$4.31 \pm 0.58$	-2.68	0.01
I can catch up the progress of this course because the academic goal was consistent with the actual lecture.	$3.90 \pm 0.70$	$3.92 \pm 0.64$	-0.24	0.81
The way of this teaching method was easy to take notes	$3.73 \pm 0.75$	$3.75 \pm 0.88$	-0.19	0.85
Encourage students to participate into class discussions	$4.06 \pm 0.61$	$3.82 \pm 0.73$	-2.22	0.03
Invite students to share their thoughts and knowledge	$4.03 \pm 0.67$	$3.77 \pm 0.75$	-2.16	0.03
Encourage students to ask questions and give meaningful answers	$4.04 \pm 0.59$	$3.88 \pm 0.67$	-1.52	0.13
Encourage students to express their thoughts	$4.03 \pm 0.61$	$3.86 \pm 0.58$	-1.64	0.10
Instructors were very nice to each student	$4.16 \pm 0.54$	$4.28 \pm 0.55$	-1.33	0.19
Instructors were willing to solve students' questions both in and after class	$4.13 \pm 0.59$	$4.29 \pm 0.55$	-1.68	0.10
Instructors paid attention on each student	$3.84 \pm 0.71$	$3.89 \pm 0.77$	-0.39	0.70
Students can achieve their instructors easily after class	$3.64 \pm 0.84$	$3.55 \pm 0.90$	-0.56	0.57
Instructors would compare the meaningful of different theories	$3.92 \pm 0.62$	$4.09 \pm 0.63$	-1.61	0.11
Instructors would introduce the background of each content	$4.04 \pm 0.52$	$4.22 \pm 0.60$	-1.87	0.06
Instructors would provide others' thoughts appropriately	$4.03 \pm 0.54$	$4.09 \pm 0.63$	-0.68	0.50
Instructors would introduce the situation of certain academic area	$4.03 \pm 0.58$	$4.28 \pm 0.52$	-2.69	0.01
The final grade was meaningful	$3.69 \pm 0.71$	$3.83 \pm 0.70$	-1.20	0.23
The way of evaluating students was fair	$3.77 \pm 0.67$	$4.00 \pm 0.61$	-2.16	0.03
The content of examination is based on the main idea of each lecture	$3.81 \pm 0.69$	$3.98 \pm 0.76$	-1.47	0.14
Mandatory reading and exercise were meaningful	$4.06 \pm 0.52$	$4.18 \pm 0.61$	-1.26	0.21
Readings, take-home exercise and labs were beneficial to understand this course	$4.00 \pm 0.56$	$4.06 \pm 0.63$	-0.61	0.54
Compared to other courses, I want to say this course is:	$3.95 \pm 0.63$	$4.06 \pm 0.63$	-1.07	0.29
Compared to other instructors, I want to say this instructor is:	$4.04 \pm 0.52$	$4.22 \pm 0.54$	-1.96	0.05
In all, I consider this teaching mode as:	$4.12 \pm 0.49$	$4.17 \pm 0.57$	-0.59	0.56

## Figures

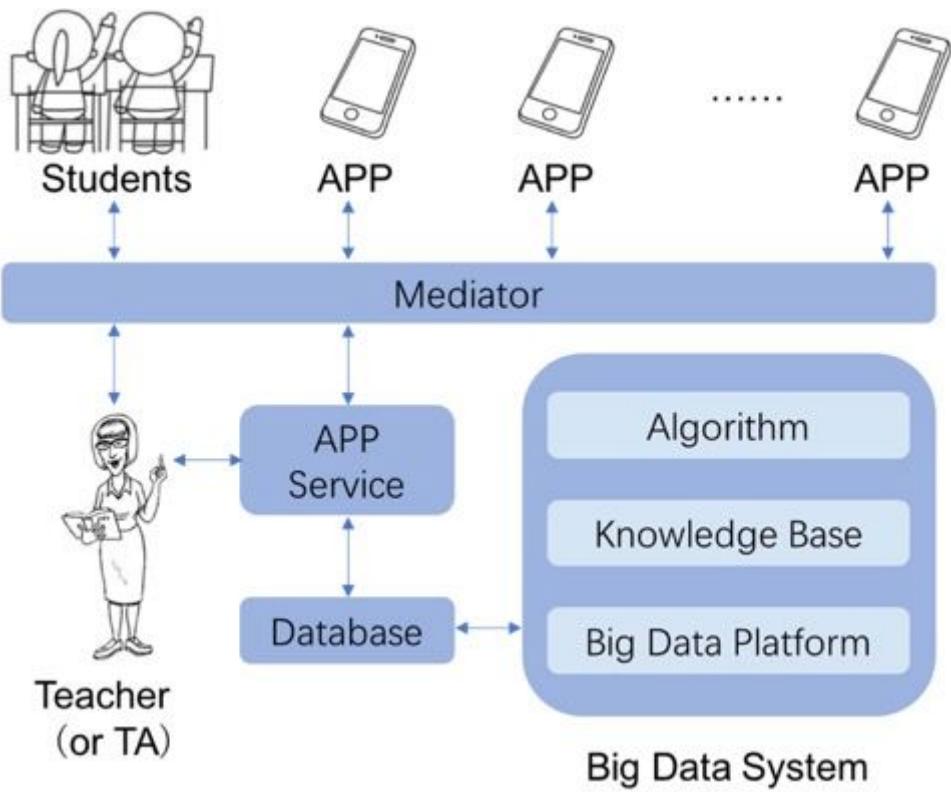


Figure 1

Architecture of MCE



**Figure 2**

QR code for MCE

## 个人资料

Name : \_\_\_\_\_

Mobile : \_\_\_\_\_

Class : \_\_\_\_\_

Student No : \_\_\_\_\_

Save

Homepag

Nutrition Department

Figure 3

Login page of MCE

[Preview](#)[Quiz](#)[Debate](#)[Evaluation](#)

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1 Nutrition and Metabolic Diseases

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2 Nutrition and Hepatobiliary & Pancreatic Diseases

---

3 Nutrition and Osteoporosis & Hematological Diseases

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4 Nutrition and Respiratory System Diseases

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5 Nutrition and Renal Diseases

---

6 Nutrition and Digestive Diseases

---

7 Nutrition and Cardiovascular Diseases

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8 Nutrition and Neoplastic Diseases

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Figure 4

Homepage of MCE



Preview

**Quiz**

Debate

Evaluation

**Instruction :**

- 1. The quiz will be provided on the app 10 minutes before the end of the lecture and collected 5 minutes after the end.**
- 2. Each quiz will include 10 Multiple Choice.**
- 3. Your score of quiz will be counted as a part of your final performance in Nutrition course.**
- 4. Your answer will be immutable after you finish each quiz, so please be serious on each answer.**

**Figure 5**

Quiz homepage



## Content

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1    2    3    4    5    6    7    8

**1. Soy beans are low in amino acids named:**

- A. Threonine
- B. Lysine
- C. Methionine
- D. Leucine

**Answer : C**

**2. Which food contains highest content of palmitic acid:**

- A. Palm oil
- B. Soybean oil
- C. Peanut oil
- D. Sunflower oil

**Answer: A**

**3. The caloric quotients of protein, fat and carbohydrate should be:**

- A. 4, 9, 4 Kcal/g
- B. 4, 9, 4 KJ/g
- C. 16.81, 37.56, 16.74 Kcal/g
- D. 37.56, 16.81, 16.74 KJ/g

**Answer: A**

**Figure 6**

Quiz results page

[Preview](#)[Quiz](#)[Debate](#)[Evaluation](#)**Sept. 21: Do we need meat ?****Pro:** Yes**Names:** Yufan Tang, Xiaoyun Ma, Xi Zhao, Zhenmin Qian,  
Zhinan Wang**Cons:** No**Names:** Yuejian Zhang, Yin Xia, Lvyi Peng, Xinyu Liushen**Sept. 28: Should we drink skim milk necessarily ?****Pro:** Yes**Names:** Peiyun Zong, Jiaqi Yuan, Xinyue Yuan, Mingming Yan, Mengyue Li**Cons:** No**Names:** Yujie Zhu, Xin Meng, Tiannan Chen, Liu Sun,  
Lingrui Meng**Sept. 30: Should we impose restrictions on animal food  
for Nonalcoholic Fatty Liver Disease ?****Pro:** Yes**Names:** Juntao Li, Fengquan Jiang, Meizirun Wang, Hao Chen, Ke Li**Cons:** No**Names:** Yan Liang, Kun Feng, Junhan Yang, Jie He,  
Yingxiu Tan**Figure 7**

Menu for the in-class debate center