Use of Multimedia in Gross Infective Pathogen Experimental Teaching

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Abstract

The experimental teaching on gross infective pathogen such as mycobacterium tuberculosis, SARS virus, HIV, bacillus pestis buboniceae, vibrio cholerae, hepatitis virus, Prion etc. was confined because of their severe infectivity. Based on multimedia mix experimental teaching, our study innovated the traditional teaching mode of pathogen biology experimental class. We combined the experimental technology and research method of pathogenic organisms with basic operations to optimize the experiment teaching process. We also promoted the process of manufacture and utilization of gross infective pathogens courseware. By stimulating the study interesting, we effectively helped the students to master knowledge and raise capability. Our objective is to identify the focal points and difficulties, resolve the problems, intensify reform of teaching and improve the teaching quality of pathogen biology experimental class.

1. Introduction

Pathogen biology is an important component of life science and a basic subject related tightly with clinical medicine, preventive medicine, nursing, Chinese medical science, the traditional Chinese medicine, medical imageology and medical ecosomatics etc. Pathogen biology experimental class is also a very important clinical basic experimental class which can help medical students to deepen the recognition and comprehension to the basic theory of pathogen biology. At the same time, it also can make students to master the basic study and research method and experimental technology of pathogen biology and culture their capability of observation, analysis, solving problem and independent working. The principal study content of pathogen biology is morphosis. Therefore, using multimedia in teaching is essential and defiant in it. Since authenticity is very important in Medical Education, more and more multimedia technology such as image processing and computer animation is widely used in medical teaching. These technologies can effectively express difficult points of traditional medical teaching and promote the development of Medical Education. Meanwhile, it helps students to build up creativity.
consciousness and scrupulous science style and cooperation character so as to make satisfactory groundwork for the future clinical work and study.

Abundant legens and figures are needed in the teaching of pathogen biology, but in traditional teaching process, only wall charts and a few legens helped students to understand and master the related knowledge. These teaching methods couldn’t give students a deep subjective impression. Along with rapid development of internet technology, teachers can get more limpid pictures of microorganisms under optical microscopes or electronic microscopes through internet. This avoids many problems in traditional teaching process such as blurred pictures or monotonous colors. In microbiology, structure and function is impartible. Through multimedia teaching method, students have a deepgoing understand to structure of microorganism and can satisfactory comprehend the relative metaphysical function. Multimedia teaching is iconic and lively so as to improve students’ interesting in pathogen biology. With the development of life science, knowledge of pathogen biology increases rapidly, on the contrary, teaching time has been shortened in many universities for the need of reform of instruction. For this reason, how to impart generous knowledge to students in limited time becomes a tickler for each teacher. It requests teachers to concentrate or simplify the content, at the same time, to reform the old teaching method in order to adapt to new status. During traditional teaching process, teachers had to spend much time in writing on the blackboard, hanging ideograph etc. Nevertheless, multimedia teaching which is only needed show the courseware prepared in class can help to omit time and solve the contradiction between fewer teaching hours and more teaching content. Meanwhile, without hurrying up to write down the notes and with the possibility of downloading the related courseware from webserver after class, students have enough time to follow teachers’ idea closely in class so that more knowledge will be imparted and the teaching effect will also be improved apparently.

2. Purpose

Our purpose is to break through traditional experimental teaching pattern, reform the teaching structure, promote the manufacture and application of multimedia courseware in the teaching of gross infective pathogen and research a new teaching model consistent with contemporary education thinking. Teaching design should be reasonable so as to accomplish the best teaching effect and identify the feature of multimedia mix teaching.

3. Students

We selected 120 students of grade 2 clinical medicine profession for our teaching innovation. The total teaching hours for pathogen biology is 54 hour and of the total, 12 hour is for experimental class.

4. Methods

4.1. Make the multimedia courseware of gross infective pathogen.

We collected the related pictures, word materials, cases of gross infective pathogen from many channels such as internet and then arranged them again. We contacted with anti-tuberculosis clinic centre, center for disease control and Chinese Academy of Sciences institute of viruses and recorded the empirical study process about some gross infective pathogen. The record included experimental operation, explaining and announcements etc. We made all above content into multimedia courseware which has flash, picture, voice explain and word.
4.2. Determine the teaching content & teaching objective.

All contents were divided into different points and determine extensional teaching objective. It means to divide the knowledge of each class into several points, then according to different learning levels requested by teaching outline, the teaching objective is determined into understanding, familiarity and mastering. We also renewedly integrated the content of pathogen biology experimental class and added the content of some gross infective pathogen such as mycobacterium tuberculosis, SARS virus, HIV virus, bacillus pestis buboniceae, vibrio cholerae, hepatitis virus and Prion. The separated culture and biochemistry identification techniques were combined with basic operation of microbiology. Method of enlightenment and facilities of computer interactive laboratory were applied. The reform of instruction was mainly accomplished based on multimedia mix.

4.3. Consummate teaching structure and form multimedia mix method.

According to the character and need of teaching objective and content, pertinent instruction medium was selected. During this course, theory was efficiently integrated with practice so that the students could observe the samples clearly and deepen impression. Four sets of teaching video recording were bought to make teaching content more directly. Multimedia mix increased the information capacity. Modern media combined with traditional media and participated the whole class together. Three-dimensional model of “learning content to teaching objective to media selection” was designed. During teaching process, multimedia also combined with microscope to accomplish the optimization of teaching.

4.4. Improve examination.

The experimental content about gross infective pathogen was added in experiment examination. Similar to theory examination, this score also possessed a part of proportion in the term score of pathogen biology in order to cause students’ attention.

4.5. Analyze effect of reform.

The related status of experiment examination was analyzed. Survey paper had been designed in the investigation and feedback suggestion of students was also be analyzed.

5. Results

The evaluation showed the practice effect of this new teaching model is very distinguished. It sufficiently plays media mix group effect based on modern teaching media. It optimizes the education propagation process and improves significantly teaching effect. Moreover, questionnaire of reform of instruction has been designed to get the students’ true idea and intention to reform of teaching method. Current teaching situation, main contradiction and problems, which were considered as the important base of teaching design and reform, were also analyzed conscientiously. 120 students of grade 2 clinical medicine profession became the investigated object. After finishing teaching reform, survey including teaching method, whole effect and how to improve study interesting etc. was conducted. The result displays that compared with traditional teaching method, multimedia experimental teaching got better effect. Compared with non-reform classes, the excellent rate (P<0.001) and pass rate (P<0.01) of reform classes were all significant deviation (Tab.1 and Tab.2). The teaching effect after reform is approved by most of the students.
Table 1. Experiment exam comparison between reform classes and non-reform classes.

<table>
<thead>
<tr>
<th>Class</th>
<th>Excellent students</th>
<th>Fine students</th>
<th>Pass students</th>
<th>Fail students</th>
<th>Total pass students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reform</td>
<td>13</td>
<td>20</td>
<td>19</td>
<td>8</td>
<td>52</td>
</tr>
<tr>
<td>Reform</td>
<td>48</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 2. Excellent rate and pass rate comparison between reform classes and non-reform classes.

<table>
<thead>
<tr>
<th></th>
<th>Non-reform classes (%)</th>
<th>Reform classes (%)</th>
<th>$\mu$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent rate</td>
<td>13</td>
<td>20</td>
<td>11.89</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pass rate</td>
<td>48</td>
<td>10</td>
<td>2.92</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

6. Summary

The conclusion of our teaching reform confirms that multimedia plays a very important role in experimental teaching of pathogen biology. In other words, it is necessary to use multimedia in experimental teaching of pathogen biology. By researching for teaching practice in recent years, the multimedia mix model has been applied in microbiology. It is successful to introduce the related experiment content of gross infective pathogen into the teaching of pathogen biology by the means of multimedia mix. Introducing gross infective pathogen into experiment class is also an important reform of teaching means. Teachers should research for new teaching means forever during education and get quintessence from traditional education so as to get more achievement in the future.

References


