Application of Mind Map and PBL Teaching Method in Medical Teaching

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Keywords: Mind Map; PBL Teaching Method; Medical Teaching; Effect

Abstract: This paper discusses the application effect of mind map and PBL teaching method in medical imaging teaching by adopting experimental method. 100 randomly selected students from a college clinical medicine are randomly divided into two groups, the experimental group (using the combination of mind map and PBL teaching methods) and the control group (general teaching method). The effect of the mind map combined with the PBL teaching method in medical imaging teaching is significant and worthy of promotion.

1. Introduction

Mind mapping refers to the use of the form of combination of pictures and texts to present various subordinate relations in medicine in the form of pictures and texts, so that the subject to be studied in medicine can establish relations with different images [1-3]. Therefore, in a sense, mind mapping is more of a teaching aid tool, which can enable teachers to impart medical knowledge to students more accurately and vividly, and students can accept and master the knowledge more easily, thus improving the efficiency of learning and teaching. PBL teaching, on the other hand, is a learning method that starts from problems and takes it as the guidance to guide students to learn, so as to improve their learning efficiency. After verification, the results show that: applying this teaching method to the teaching of clinical medicine can achieve good learning effect, mind mapping and PBL teaching method can greatly stimulate students' learning potential, so as to improve the teaching effect [4-5]. This paper focuses on the application of mind mapping and PBL teaching method in the teaching of college imaging [6].

2. Research Methods

2.1. Research Object

100 undergraduates majoring in clinical medicine are randomly selected and divided into experimental group and control group, 50 each. Among them, the experimental group implemented mind mapping combined with PBL teaching method, and the control group implemented general teaching method [7-8]. There is no difference in the level of theoretical courses, and with the same level of teaching teachers.

2.2. Research Method

Through the teacher's explanation and experiment, the students finally made their own mind map, and determined that mind map and PBL teaching method have positive effects in medical teaching. Implementation process: the students in the experimental group and the control group are randomly assigned to the teacher. The control group received general medical instruction, while the experimental group received mind mapping and PBL [9].

Assessment method: after both the experimental group and the control group have finished the assigned courses, the teacher will conduct on-site assessment and analyze the results.
3. Result

3.1. Mind Map Drawn by the Experimental Group

In this study, the bone and joint system is taken as an example, and the mind map drawn by the students in the experimental group is shown in Figure 1.

![Mind map of bone and joint system](image)

**Clinical preliminary diagnosis**

**Lumbar disc herniation**

**Causes of numbness in both lower extremities**

1. Intervertebral disc compression nerve root
2. Chemical stimulation of rupture of the annulus
3. Neurological ischemia

**Firstly, imaging examination methods**

**Lumbar MRI image of the patient**

**Imaging diagnosis of lumbar disc herniation, degeneration and other abnormalities**

**Compared with lumbar X-ray and CT, the advantages of MRI**

- MRI examination without radiation
- MRI examination can be multi-directional imaging
- Soft tissue and spinal cord display clear; high tissue resolution

**Figure 1. Mind map of bone and joint system**

3.2. Comparison of the Test Scores of the Two Groups

Students in both groups have completed the test. By comparing the test results, the experimental group's results are significantly higher than those of the control group, and the difference is significant (P < 0.05, see table 1).

<table>
<thead>
<tr>
<th>Group</th>
<th>Score</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>experimental group</td>
<td>8.23±1.17</td>
<td>-2.876</td>
<td>0.004</td>
</tr>
<tr>
<td>control group</td>
<td>8.65±1.36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3. Evaluation of Mind Mapping Combined with PBL Teaching Method in the Experimental Group

The results of the questionnaire show that the teaching quality of the experimental group is relatively good. Mind mapping and PBL teaching method are conducive to students' learning, improve the teaching effect of teachers, and greatly help students' learning effect, such as improving their learning ability (as is shown in table 2).

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Good</th>
<th>General</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulate interest in learning</td>
<td>84</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Improve learning initiative</td>
<td>99</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Better grasp self-study methods</td>
<td>98</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Improve self-expression ability</td>
<td>77</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>Increase students' study burden</td>
<td>13</td>
<td>17</td>
<td>70</td>
</tr>
</tbody>
</table>
4. Discussion

Medical imaging is an important part of modern medicine. With the development of modern medicine, it has become a discipline that attaches equal importance to scientific research and diagnosis and treatment. It includes anatomy, pathophysiology research, image features, clinical manifestations of diseases, diagnostic and therapeutic research programs, etc., which also includes a lot of text information and a lot of picture information. We all know that the left hemisphere of the brain is responsible for rational thinking, such as text messages, while the right hemisphere is responsible for visual information, such as picture language messages. However, mind mapping and PBL teaching principles are based on informationization and concretization of knowledge. This, in turn, is the best use of the right and left hemispheres of the brain. This is also the basic principle of applying mind mapping combined with PBL teaching method in medical imaging teaching.

4.1. Student Performance Analysis

This study combined mind mapping and PBL teaching method to apply it in the teaching of medical imaging. Through comparison, it is found that the learning effect of the experimental group is significantly better than that of the control group, and the difference is obvious. It shows that the combination of mind mapping and PBL teaching method in medical imaging teaching can achieve good teaching effect. The main reason is that mind mapping combined with PBL teaching method can make the knowledge structure specific, visual and three-dimensional. On the one hand, it is conducive to the teaching effect of teachers. Secondly, it is also of great help to students' mastery of knowledge points, which is conducive to students' memory and understanding of knowledge points. However, through the analysis we have also found that using mind mapping and PBL teaching there exist certain differences in students' test scores, student's result is not improved, its reason mainly exist the following several aspects: firstly, some objective test relevant subjects, and relatively simple, for students based on mind mapping and learning effect of PBL teaching method cannot be fully reflected; Secondly, the teaching ideas of teachers also have a certain impact on the teaching effect; Thirdly, due to the differences of individual learning ability of students, their learning effect is also affected.

4.2. Experimental Group Questionnaire Survey Results Analysis

Through a questionnaire survey on the experimental group, it is found that most students believed that mind mapping combined with PBL teaching method could stimulate their interest in learning, cultivate their self-study ability, and improve their ability to analyze and solve problems. The mind mapping constructed by students covers the medical history data, clinical manifestations, pathophysiology, imaging technology and signs, as well as differential diagnosis, which makes the teaching content more intuitive, three-dimensional and easy to remember, cultivates clinical thinking, and strengthens the ability to link theory with practice. In the survey on the long-term application prospect of mind mapping, it is found that most students agree with this teaching method, more than 90% of them think it is conducive to learning, and more than half of them think it can improve their independent learning ability, indicating that they will continue to use it in their future study and work. In addition, about 93% of students believe that this teaching mode will increase the learning burden to some extent. The reasons are as follows :(1) the first time students use this teaching method, they are not familiar with the drawing software, it takes a long time, and some students are afraid of difficulties; (2) students' knowledge reserve is insufficient and it is difficult to effectively integrate relevant knowledge points; (3) students have heavy learning tasks, many courses and short periods. For clinical teachers, this method is conducive to the preparation of lessons. When compiling teaching plans before class, students at different levels should be targeted in teaching design with clear focus, which saves time and is more conducive to students' learning.

5. Conclusion

The application of mind mapping combined with PBL teaching method in medical imaging
teaching can give play to students' subjective initiative, help students establish clinical thinking, and realize the role transformation from medical students to doctors. However, this study is only applied to bone and joint system internship. Next, we plan to apply this teaching method to other systems and theoretical courses, collect more data and feedback materials, and further evaluate the teaching effect.

References