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Enhancement of Teaching Quality by Animation: Experience of Neurobiology-related Courses

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Abstract

The project focussed on effective ways to convey knowledge of the brain, its aging and diseases to our students, both at the undergraduate and postgraduate levels. Since the ideas and concepts are complicated, animated teaching materials were developed and used in classes. Students benefited in terms of better understanding of these complicated topics. If our students know more, they will know how to take preventive measures and these measures will help them to lead healthy lives.

Key words

Animated teaching materials, neurobiology-related courses

Introduction

Hong Kong faces the problem of an aging population. In 2004, 11.7% of our population was aged 65 or above. It is predicted by the Hong Kong SAR Government that by the year 2033, about one quarter of the population will be aged 65 or over. While healthy aging does not cause any burden to our lives, aging is often associated with various diseases. A major group of diseases associated with aging are the diseases of the central nervous system. Some well-known ones are depression and mood disorders, stroke, movement

disorders such as Parkinson's disease, and Alzheimer's disease. These diseases can cripple lives to various degrees: from minor disability, loss in movement or memory, to life-threatening conditions. These conditions are very relevant to our students as their elderly loved ones or they themselves in the future may encounter many of these conditions.

The major aim of the present project was to present information to students about brain diseases and to enhance their understanding of the nervous system. The functioning of the nervous system is in

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fact very complicated. Using animated teaching materials, it was much easier for the students to understand the concepts and the ideas.

Aims and Objectives

Our project focused on enhancing the teaching of the nervous system, the causes of different diseases in the nervous system and also on the effects of drug abuse. Undergraduate students from the Science majors and also other disciplines benefited.

Animated teaching materials for two undergraduate courses were used. The courses were *BIOL3350 Neurobiology* for students of BSc Applied Biology major and *BIOL 1620 You and Your Health*, a complementary course for non-Biology-major students. In addition, students of one postgraduate course *BIOL 4010 Advanced Topics in Biotechnology* also benefited.

The major objective was to enhance the knowledge of students on issues relating to aging, the brain and the nervous system, and health. New teaching materials included new computer-animated presentations of basic concepts on the functioning of the nervous system, on the outcomes and consequences of drug abuse, and on diseases of the brain. The materials were proven to be useful in providing an interesting learning experience for all the students (see results section). These animated presentations improved the understanding of the students on the complicated issues about the development, growth, normal functions and abnormal

conditions of the nervous system. They appeared to understand concepts better with the presentations (see results section).

Methodology

New teaching materials were developed using new computer software. Animated presentations were used throughout the courses. The animated slides were very appropriate for the explanation of complicated concepts about the normal functioning of the nervous system. In addition, the presentations also could help the students in understanding the serious consequences of drug abuse and the harmful effects of drugs on the nervous system. The animations were very good in attracting the attention of the students.

In order to assess the research results, questionnaires were distributed to the students. The results suggested that employing animated presentations enhanced the effectiveness of teaching of the complicated topics of the nervous system (see results).

Results/Findings

Results of the applications of animated presentations in the classes were assessed by means of questionnaires. Analyses of the questions in the questionnaires are provided as follows.

The total number of respondents: 29

Over 80% of students either agreed or strongly agreed that they understood the concepts of the nervous system better

after being exposed to the animated teaching materials (Figure 1). This result strongly indicated that the use of animated materials could convey a clearer and better picture of complicated ideas in teaching.

In addition, more than 90% of students thought that it was interesting to watch the animated materials in classes (Figure 2). This one-sided response by the students strongly indicated that the use of animated materials could greatly arouse the interest of students in learning. These results were satisfying as one of the major targets of the present project was to spark the interest of the students in learning the complicated concepts of the nervous system.

Also over 80% of students stated that the animated materials could help them in understanding concepts (Figure 3). This result together with the result of question 1 strongly suggested that there should be more use of animated materials in classes.

Moreover, the students responded one-sidedly on the issue of using more animated materials in classes (90%, Figure 4). They clearly showed that they preferred to see more animated materials in class. These results suggested that the experiments illustrated in the present proposal were successful.

Importantly, 93% of students agreed or strongly agreed that the animated materials could enable them to understand the complicated issues of brain disease and drug abuse better (Figure 5). Brain diseases

and the harmful effects of abused drugs were complicated and it was tedious for students to listen and learn through words alone. With animated materials, the students could form more complete pictures of the brain disease mechanisms and also the harmful effects of the drugs. Effectiveness of teaching was therefore enhanced.

One key consequence of mastering the topics covered was in the prospects of the students themselves leading healthier lives. The ultimate aims were to provide students with scientific information about the brain, and to help them to live a better life by avoiding harmful substances. These aims were reflected as 63% of students thought that the lessons had provided them with useful facts on these aspects (Figure 6).

Question 1

It was easy to understand the concept of teaching using the animation materials.

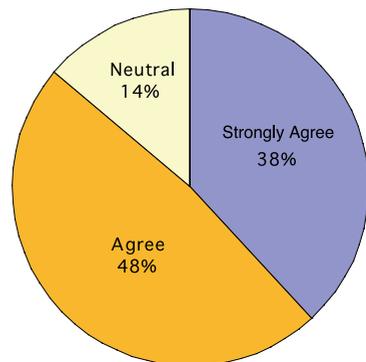


Figure 1

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Question 2

I found it very interesting to watch the animated materials.

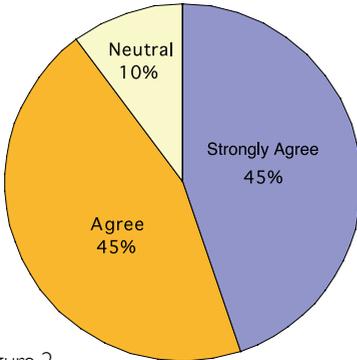


Figure 2

Question 4

I preferred to include more animated materials in class.

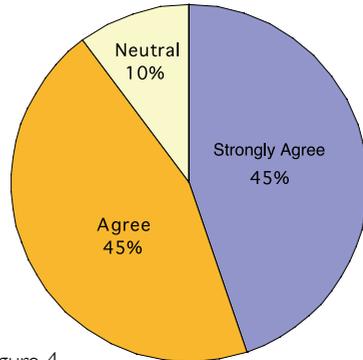


Figure 4

Question 3

I could understand the concepts better by the animated materials.

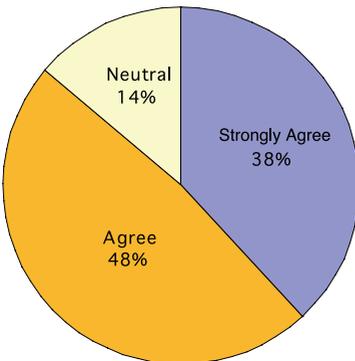


Figure 3

Question 5

I could understand diseases of the brain better with the use of animated materials.

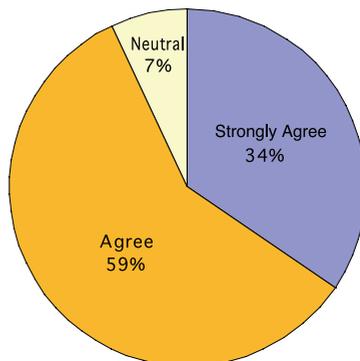


Figure 5

Question 6

With the concepts of the brain, I could plan my future healthy living better:

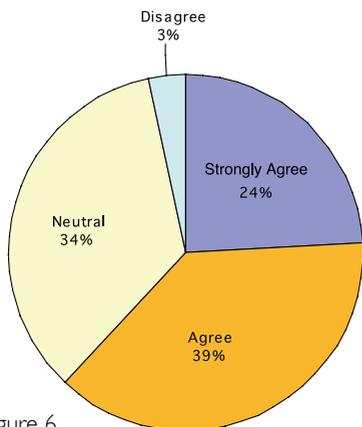
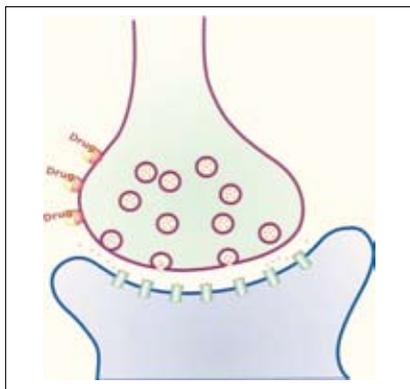


Figure 6

Figure 7

Example of the animated presentations: a picture illustrating neurotransmission of a synapse in the brain.



Discussion

The present results indicate that animated materials are very useful and extremely effective in conveying complicated concepts to students such as the functioning of the nervous system, the causes of brain diseases and the effects of drug abuse. This suggests that the current generations of students are more graphic-oriented. Students preferred to watch graphics and animations rather than words alone. They also preferred animated materials to be used in class. With the animated materials, they can understand the topic better and form more complete concepts. This knowledge may result in the students leading healthier lives. The teaching was therefore effective.

The findings of the present project are significant. One suggestion is that more animated materials should be used in class. This is more applicable to courses that involve conceptual and complicated issues. The students will be mobilized, involved in learning and will understand the concepts and ideas of the course in more comprehensive ways. The effects are obvious. However the preparation of animated materials is time-consuming. Compared with more conventional forms of teaching, the overall balance is that lengthier preparations are needed but the results are better. It is of course worth taking the extra trouble.

Enhancement on Teaching and Learning

The present project has clearly shown that using animated materials in classes can arouse students' interests in learning, especially on complicated issues and concepts, and will obtain much better results in learning outcomes. It is easier for the teaching staff to convey teaching materials to the students; it will also enhance the communication between teacher and students. The project has provided first-hand evidence that using animated materials is a good direction to move to in preparing future teaching sessions.

Limitations/Difficulties

One limitation on the project was that we had to abandon plans to arrange an exhibition on aging and brain diseases for our students. The exhibition was cancelled because of arrangement problems such as availability of venues, and also time constraints within the term. One suggestion for improvement here will be to co-organize this exhibition as part of a student activity, such as the academic weeks organized by student organizations. This will arouse the interest of students in the topics as well as enhance participation. This should further improve learning outcomes. This will be done in future.

The main difficulty for the project was the limited resources and time available for the development of animated materials. It was time-consuming to prepare the materials. Topics on the nervous system and brain

diseases involve complicated issues and a great deal of thought was needed as well as the actual animation work. So it was even more time-consuming to prepare the materials. It was however, a very worthwhile project because the results were very encouraging.

Conclusion

In conclusion, animated teaching materials can be very useful in conveying complicated concepts and ideas to students. The materials were very useful in conducting teaching of the nervous system and brain diseases. The students enjoyed the learning experience.