An English Listening Learning System based on Brainwave Meditation Recognition Technology

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Abstract - In the context-aware learning, the learners interact with the learning environment. It is necessary to understand the learners’ learning situation in the learning process and give learners learning support according to their situation to enhance their learning performance. In the context-aware learning, how to recognize the learners’ emotions such as the attention and the meditation during learning is an important topic. In this paper, we will develop an English listening learning system based on brainwave meditation recognition technology. The learning system will detect the learner’s brainwave and then identify his meditation state during the learning. The system helps the learner through the meditation improving mechanism when his meditation decreased so that the learner could stay in a good meditation state and thus enhance his learning performance.

Keywords: e-learning technologies, learning emotion, meditation, brainwave, English listening learning, emotion recognition technology

1 Introduction

In the traditional learning, each learner learned from the same textbook. But, each learner had his own learning emotion. Some learner was happy to learn and some was anxious to learn. Thus, there were only few learners can have good learning performance. The learning performance could be improved if we apply emotion recognition technology to help learners to improve their learning emotion.

1.1 Learning emotion

The attention and the meditation are two familiar learning emotions. The learners’ attention is an important factor during the learning process. Savage et al. [1] found that the learners’ attention and learning performance have a significant positive correlation. On the other hand, some scholars found when learners are in the state with calm, clear, pleasant and relax, they could enhance their self-efficacy and concentration. Gockel et al. [2] found that a short 10 minutes of mindfulness training could make self-efficacy improved. Jain et al. [3] found that mindfulness meditation and body relax have the effect of positive emotions, and further to reduce the distracting effect. Thus, the learning emotions such as the attention and the meditation will affect learners’ learning performance.

1.2 Emotion recognition technology

In general, there are some ways to identify learning emotions such as facial expression recognition, voice recognition and physiological signal recognition. Physiological signal recognition has the high accuracy to identify the learner’s learning emotion. In this paper, the headphone NeuroSky MindSet [4] is utilized to deal with the brainwave signal. The quantified brainwave value could identify the attention state and the meditation state of the learner. Chen and Huang [5] used Mindset to build a Web-based reading annotation system which included the attention alarm and monitoring. The system could enhance the learners’ reading comprehension and sustained attention. The study also confirmed MindSet having good accuracy and comfort.

1.3 Research motivation

In the past, most of scholars had discussed the effect the attention but not meditation [6]. Hence we design an English listening learning system using MindSet to identify learners’ meditation states. We want to explore the affective of learning performance by the meditation, and to find out the correlation between the meditation and the attention during the learning.

2 Methods

We will use the MindSet to observe learners’ brainwave while they’re learning, and identify their meditation and attention. We will divide the learners into 2 groups. There are 1 experimental group and 1 control group. The experimental group will be aided by the system with the meditation improving mechanism; the control group will be aided by the system without the meditation improving mechanism.

2.1 Experimental group

The process of the experimental group is shown in Fig.1. First, the learner login the English listening learning system and starts learning. Meanwhile, MindSet will start to identify the learner’s meditation. If the learner’s meditation fell behind the standard, the system will pause the learning, and provide the meditation improving mechanism; the control group will be aided by the system without the meditation improving mechanism.
then return to 5 seconds before the stopped English listening film so that the learner could continue the learning. The system process is followed till finishing the English listening learning.

2.2 Meditation improving mechanism

When the learner’s meditation decreases, the system would pause the learning and provide the meditation improving mechanism as shown in Fig.2. The mechanism displays a pendulum and the pendulum will begin to swing with the same speed of the beat sound. The learner will take breath according to the speed of swing pendulum. It will let the learner enter a state of relaxation. We expect that the mechanism could increase the learner’s meditation. When the learner's meditation is raised, the learner can continue to learn. The system will replay 10 seconds English listening film before the pause and then provide the quiz according to this 10 seconds English listening film so that the learner could be pleasant and confident to continue the learning.

3 Conclusions

We expect to be able to produce the following results through our experiment.

3.1 Meditation will affect the learners’ learning performance

Through comparing the pretest and the posttest of learners on English listening ability, we expect learners in experimental group will improve their learning performance significantly by using the meditation improving mechanism.

3.2 Meditation and attention are related

With the aid of our system, we expect learners in the experimental group will increase not only their meditation but also their attention. We want to find out the correlation between the meditation and the attention. Thus, the meditation and the attention are both the important factors to affect the learning performance of English Listening.

4 References


