A preliminary study on integrating IRS with the lectures of Physics in the first year university courses

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"Physics" is an important but difficult subject for many university students. The major purpose of this paper is to introduce the educational technology, Interactive Response System (IRS), into a class of "Physics" and utilize case study method to study the effectiveness the IRS in promoting students' learning attitudes and supporting the case teacher's teaching. The study results display: (1) The integration of IRS into lectures successfully improved the learning attitude of the students; (2) The integration of IRS with the lectures made it easier for the students to dedicate themselves into the lectures; (3) No obvious changes are found from the analysis outcome of the interactions between the lecturer and the students. Because the teacher's instruction and the interaction with students are not change, students' positive attitudes may just caused by their curiosity of the novel technology (IRS). Developing the model of integrating IRS into instruction to enhance the effective interactions between teacher and students is one of the important issues in the future study.

Keywords Physics; Interactive Response System; classroom interaction; learning interesting

1. Introduction

"Physics" is the foundation of all higher sciences and knowledge. However the university student's learning efficiencies of "Physics" are commonly not impressive in many countries[1-4]. With the limitations of time and the number of students, university lectures often restrict effective dialogues between the lecturers and the students and as a result students lose the interest to learn Physics.

Effectively using the Interactive Response System (IRS) in the lecturing processes may be a good method to solve the above mentioned problem. IRS generally consists of hardware, including a set of simple personal handheld signal transmitters and a response signal receiver that are connected to a classroom computer to collect classroom members' responses, and software which is installed on a classroom computer to process the collected responses and demonstrate the results on a large display[5]. This study intends to find out whether the students' learning attitude would improve with the integration of IRS into the lecturing of Physics in university courses, and experiment on whether the interaction between the lecturer and the students would change. Finally, comments and suggestions will be proposed for future applications of IRS in the lectures of university courses.

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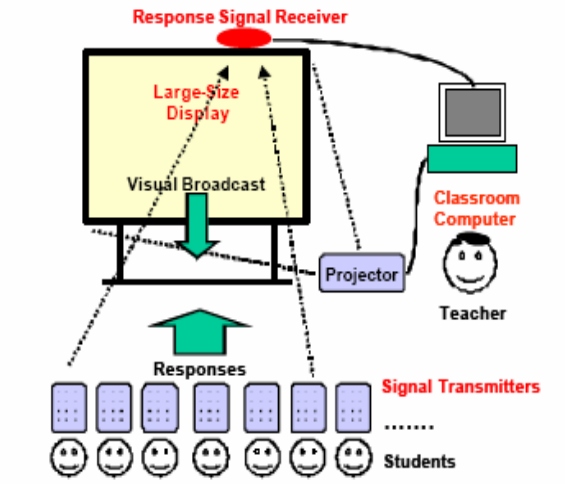

Fig. 1: Typical IRS configuration in classroom , cited from [5]

2. Methodology

This study proceeded with the method of case study analysis. The "case teacher" of this research is a teacher who highly appreciates the method of applying scientific techniques with lecturing and who has high expectations that the IRS would help improve the lecturing efficiencies. The "case class" of this study is composed of 68 repeat students of Physics from different fields of studies who lack the interest in the learning of Physics and who have had no experience with the application of IRS. This study is divided into the following two stages, which are: (1) Stage of Traditional Lecturing – to understand the beliefs of the subject lecturer's in lecturing students, and to understand the interactions between the lecturer and the students prior to the application of IRS; And (2) stage of IRS Implementation – to assist the lecturer to proceed with lecturing with the application of IRS and to collect the interaction data between the lecturer and the students at this stage.

3. Analysis results

The analysis outcomes of the course feedback questionnaires indicate that: (1) The integration of IRS into lectures successfully improved the learning attitude of the students, for example, more than 75% of the students extremely favored this type of lecturing method and wished to continue learning with this method; (2) The integration of IRS with the lectures made it easier for the students to dedicate themselves into the lectures, for example, more than 94% of the students think that this method allowed them to concentrate better than before on listening to the lectures.

However, no huge changes are found from the analysis outcome of the interactions between the lecturer and the students. For example: (1) on "lecturing behaviors", the case teacher often used "illustrating and explaining" in the past in her classes (about 67.3% of lecturing behaviors) and now 97.6% of these behaviors she still made use of the same method, while the behaviors that can enhances productive interactions, such as "problem clarifications", were not used (0%). (2) on "questioning behaviors", she often asked questions and answered by herself (about 37.8% of these question behaviors). Although the case teacher had many interaction opportunities with the students with the implementation of IRS, she seldom used the behaviors that would more effectively promote interaction, such as "inducting students to ask questions" and "calarifying students' questions".

4. Conclusion and suggestion

Generalizing the above it is seen that the integration of IRS into the Physics lectures does "excite" the students and raise their interest for the learning of Physics. However as the case teacher lacks effective interaction strategies, effective interaction between the lecturer and the students were hardly generated with the application of IRS and when the sense of "excitement" gradually disappears the students could rapidly lose interest again in the learning of Physics. Bearing in mind the research outcomes, developing an "interactive strategic procedure model" that will help the university lecturers effectively apply the new scientific learning techniques, will be the first step in successful integration of IRS into university course lectures.

References

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