

Web-based Peer Assessment System with an Anonymous Communication Tool

Jirarat Sitthiworachart, Mike Joy

*Department of Computer Science
University of Warwick
Coventry CV4 7AL, UK
jirarat@dcs.warwick.ac.uk*

Abstract

Peer assessment is a technique that has been successfully employed in a variety of academic disciplines, and it is considered as effective in developing students' higher cognitive skills. This paper describes the potential for web-based peer assessment with an anonymous communication tool, and reports the results of applying a novel web-based technology to the delivery of peer assessment in the context of an undergraduate computer programming course.

1. Introduction

Peer assessment is one of the effective approaches to fostering deep learning by encouraging independent learning [1]. It is often used in the context of essays, but has seldom been applied to computer programming courses. The skill of writing good software includes an understanding of different approaches to the task, and stylistic and related considerations – these can be developed by evaluating other programmers' solutions. As part of a study investigating the extent that peer assessment can promote deep learning in a programming course, we have developed a novel web-based peer assessment system [2]. We have since extended the system by developing an Anonymous Communication Device (ACD) to encourage interaction with others, which is a key element in fostering deep learning [3]. This new web-based peer assessment which includes the ACD has advantages over ordinary peer assessment because students can be more critical (due to anonymity the system provided), they can discuss online and/or leave offline messages, the processing of the marks is automated, and the lecturer can easily monitor the marking and conversation. We describe the tool and the peer

assessment process it supports, and report on its deployment on a large computer programming course.

2. Web-based Peer Assessment

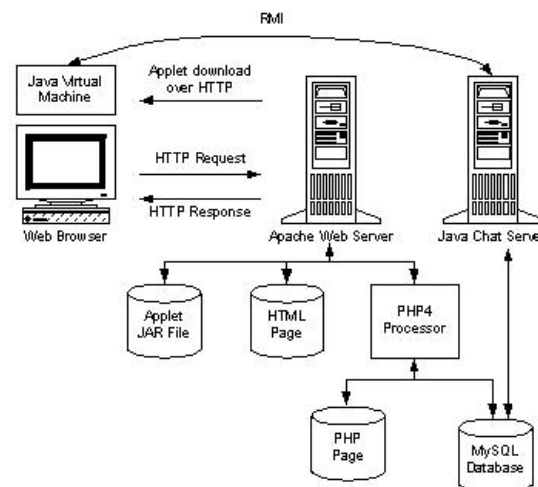


Figure 1 Architecture of the web-based peer assessment system

Web-based peer assessment system with the ACD was developed from a previous web-based peer assessment system [2]. The new web-based peer assessment is implemented using an Apache server enabled with PHP4 and accessed using a client Java applet for the ACD (see Figure 1). Students' responses to the questions forming the marking criteria were recorded in a MySQL database and were termed a "script". The ACD program itself is downloaded via http. Once the program has been downloaded, the applet creates its own connection to another server program, the chat server.

The peer assessment investigation was performed on 213 first year undergraduate students enrolled on

UNIX programming module. During the process the students mark and provide feedback on 3 assignments, and each assignment is marked by an anonymised group of 3 students, using the web-based peer assessment system and the anonymous communication tool. In this peer assessment process, there are only two stages: first, students mark the quality of programming and secondly, students mark the quality of marking, and throughout the process discuss anonymously via the ACD.

3. Anonymous Communication Device

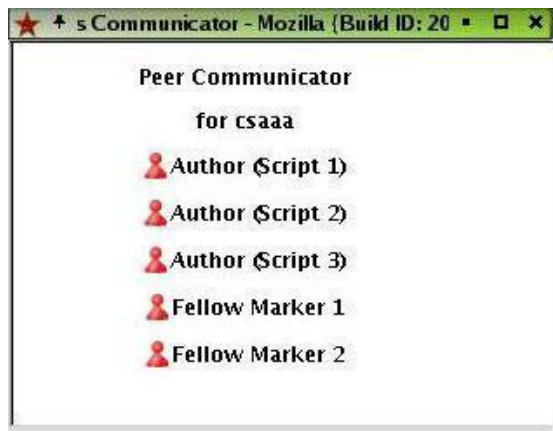


Figure 2 Anonymous communication applet

In the former peer assessment experiment [2], students marked and discussed with their group within a one- hour lab session. Some students hesitated to talk to each other for a variety of reasons. In order to overcome the problems, we have developed ACD (see Figure 2) to enable students to communicate anonymously when not collocated. This also allows an administrator to monitor student conversation, both for the purpose of evaluating the effectiveness of the tool, and intercepting inappropriate messages and conversations.

After students login and access the first step – the ACD window pops up automatically. It displays 3 script authors of the assignments that students will mark, and 2 other fellow markers who mark the same assignments. If that person is online, students can talk anonymously by clicking on the picture of that person, and a window dialogue will appear. If that person is offline, students can leave offline messages. The second step is similar, but the ACD allows the student to communicate only with 1 script author and 3 markers who marked this script in previous step.

3.1. The Monitoring interface

The monitoring web page reports all the students' conversations through the ACD and can be used to search through the conversations of each particular group. Moreover, it allows a search for undesirable dialogues, such as asking the identity of the participant, or negotiating a mark, etc., using a keyword search. This web page is available only for the system administrator.

4. Results

The students have different roles as script author, marker and feedback marker in the two stages: marking quality of the program and marking the quality of feedback in peer assessment process. They discuss the program to help them better understand and mark during each stage via the ACD. Specified topics include unknown utilities, assignment specification, program analysis, program understanding, sharing opinion, and discussion about marking.

5. Conclusions

We have described a novel web-based peer assessment system, which includes ACD for fostering deep learning in computer programming. We designed this system to provide anonymity for the whole process, in order to ensure the process is fair, to encourage students to discuss without embarrassment, and to allow the process to be closely monitored and supervised. Students have reflected on their own ideas by discussing using the ACD in a variety of roles. The preliminary results show that this peer assessment contributed positively to the students' learning experiences.

6. References

- [1] "Deep Learning, Surface Learning", *AAHE Bulletin*, 45(8), 10-13, 1993.
- [2] Sitthiworachart, J., and Joy, M., "Web-based Peer Assessment in Learning Computer Programming", The 3rd IEEE International Conference on Advanced Learning Technologies: ICALT03, Athens, Greece, 9-11 July 2003.
- [3] Biggs, J., "Assessing for Quality in Learning" *In: Assessment to Promote Deep learning, American Association for Higher Education (AAHE)*, Washington, DC, 70-73, 2001