1 INTRODUCTION

1.1 Background

Collaborative learning (CL) refers to instructional methods that encourage students to work together on academic tasks. CL is not new as teachers have been using it among students through group work in completing assignments, laboratory work and projects. What is relatively new is the use of the information and communication technology (ICT) to enhance the effectiveness and increase the use of CL in the classrooms. Researchers and companies have realized this potential and have developed numerous related applications. As a result, there are many types of CL applications developed to support collaborative work among students.

The abundant availability of these applications presents the need to find ways to review them. According to Oxford Advanced Learner’s Dictionary, a review is “a survey or report of a subject” or “a report by somebody….giving her or his opinion of a book, film, etc”. A CL application has many tools and features. Before one is able to give opinion of a CL application, one has to consider the availability and the importance of the many tools features of a CL application. In this thesis, the term ‘tools’ is referring to the main category of support needed for learners’ and teachers’ collaborative activities. Each of the tools has its list of features. ICT can play an important role in supporting a CL application reviewing process. Currently, there are two types of web-based reviewing tool; non-interactive and interactive reviewing tools. Non-interactive reviewing tool can either be in the form of comparative tables of CL applications or in the form of detailed descriptions in CL application website. Users cannot make changes to the display of this information. On the other hand, an interactive reviewing tool allows users more ways to review applications such as in knowing the tools and features, in selecting and rating
features available in the applications, in comparing applications and in giving opinion. Examples of both types of reviewing tools will be given and in greater details in Chapter 3.

In this thesis, review covers the followings:

- To know about the categories of tools of a CL application suitable for learners’ and teachers’ collaborative activities. Each tool has its list of features.
- To select the available features in a CL application from a checklist of features under each category of tools.
- To compare between all reviewed CL applications in terms of the availability of the features and the rating or scoring for each category of tools and for each CL application.
- To modify the previous review of a CL application, to correct mistakes or when features in the application are added or removed from time to time due to upgrading of the application.
- To share opinions with other reviewers by adding summary of the reviewed application.
- To give a report of a CL application.

This research develops a web-based tool for secondary school teachers to review CL applications for suitability in supporting collaborative learning.

1.2 Rationale of the study

The study is motivated by two main needs, first is the need for a model that gives an overview of the tools and features of CL applications suitable for learners’ and teachers’ collaborative activities. As mentioned by Crawley (1997), there is still no agreed model so far for comparing and contrasting CL applications in terms of the availability of the tools and features supported by each application.
Second is the need to have a web-based tool for reviewing collaborative learning applications. Though there are many reviews in the Internet in the form of comparative tables or detailed descriptive reviews from developers of CL applications, they are not interactive and have no numerical indicator to determine which application meets users’ requirements. Group ratings of the importance of the tools and features by teachers contribute to this indicator. A reviewing tool can also help reviewers to get an overall picture of how the CL applications support collaborative learning (collaborative capability of CL applications). By using a web-based reviewing tool, reviewers can give opinions that can be shared among them. Thus, the existence of an automated tool to guide teachers in reviewing and comparing CL applications would be significant. It becomes even more significant when the importance of each tool and feature is based on teachers’ opinions.

1.3 Research objectives

The main objectives of the thesis are summarized as follows:

1. To formulate a model that gives an overview of the tools and features of CL applications suitable for supporting learners’ and teachers’ collaborative activities.

2. To obtain group ratings of each tool and feature of CL applications from a group of secondary school teachers. The group ratings represent the importance of the tools and features in supporting collaborative learning activities.

3. To develop a web-based reviewing tool for collaborative learning applications and evaluate its user acceptance.
1.4 Research Methodology

This thesis focuses on building a web-based tool for secondary school teachers to review CL applications. The tool is called WeRCLeA, which is an acronym for Web-based Reviewing tool for Collaborative Learning Applications. To achieve this task, the following strategies are implemented.

- A literature review on collaborative learning (CL) and computer supported collaborative learning is carried out. This is performed to get an overall understanding on the importance and benefits of CL and how CL can be supported using the new information and communication technology. A study of different CL applications is carried out. The review on existing reviewing tools is made to find good characteristics and limitations in relation to WeRCLeA. The review of the available classifications for tools and features of CL applications together with the literature review gathered in Chapter 2 leads to the formulation of a model that gives an overview of the tools and features of a CL application suitable for supporting learners’ and teachers’ collaborative activities.
- Based on the formulated model, a questionnaire is designed to allow teachers to rate the importance of the tools and features in supporting CL activities. This provides the weighted average values.
- Based on the model, weighted average values and existing reviewing tools, the functional and non-functional requirements are identified and the design of WeRCLeA is described.
- Finally, the system is implemented and tested. The result of the testing is also gathered and documented in order to identify aspects of WeRCLeA to be improved in the future.
Figure 1.1 shows the methodology applied in this research.

**Figure 0.1 : Methodology applied for WeRCLeA**

1.5 **Scope and limitation**

The following statements summarize the scope and limitation of the thesis in order to provide a general guideline to the depth of the research:

- The focus of the reviewing tool would be on the tools and features of CL applications and not on other aspects such as its technical specification or cost. The main categories for tools and features of CL applications are derived.
- The research would only involve teachers from Maktab Rendah Sains MARA Jasin and Kolej MARA Seremban representing the secondary and pre-university level. Thus, the questionnaire results may be biased towards these communities of teachers. The teachers may also base their opinion on the present ICT infrastructure in MARA.
1.6 Expected outcome

The key contributions to this project would be:

- A proposed model that gives an overview of the tools and features of CL applications to support learners and teachers’ collaborative activities.
- The importance of the tools and features (weighted average values) in supporting collaborative learning activities.
- A web-based reviewing tool for school teachers to review CL applications for suitability in supporting collaborative learning.

1.7 Thesis Organization

The other chapters in the thesis are:

Chapter 2: CL and CL Applications

This chapter covers studies on collaborative learning and computer supported collaborative learning. The chapter examines many existing CL applications and attempts to group them according to their characteristics.

Chapter 3: Existing Reviewing tools

This chapter explores existing reviewing tools and subsequently describes a web-based reviewing tool named Edutools. It looks at its good characteristics and its limitations in relation to WeRCLeA.
Chapter 4: Existing Classifications and Formulation of the Model

This chapter presents the available classifications of tools and features of CL applications. It ends by proposing a model which gives an overview of the tools and features of CL applications. The model serves as a basis for the design and development of WeRCLeA.

Chapter 5: Analysis of Questionnaire on Importance of Tools and features

This chapter describes the implementation and analysis of the questionnaire on the importance of tools and features to support learners’ and teachers’ collaborative activities. The result will be used in WeRCLeA.

Chapter 6: Analysis and Design of WeRCLeA

This chapter presents the functional and non-functional requirements of WeRCLeA. To illustrate the system processes and data flows, data flow diagrams of the system are addressed. In the design part, WeRCLeA’s data bases and its user interface designs are presented.

Chapter 7: WeRCLeA Implementation

This chapter describes the environments of development in implementing WeRCLeA. The execution of the WeRCLeA system and illustrations of WeRCLeA pages are given.

Chapter 8: WeRCLeA Evaluation and Results

This chapter highlights the evaluation processes carried out to assess WeRCLeA’s performance and effectiveness. The results are analysed and described.
Chapter 9:  Conclusion

This chapter summarises the research contributions and future enhancements.