

**SOBA: AN INTERACTIVE WEB APPLICATION TOOL FOR
CLASSROOM ACTIVITIES**



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Abstract:

The purpose of this study will enable students to learn collaboratively in class using shared display groupware. In the current scenario of collaborative learning in a technological aspect, collaborative learning only exists through shared groupware display. Not to mention that in class, students are only expected to sit down and listen to their teachers. This web app will enable students to participate in class discussion by answering questions of the teacher through an electronic device. This study will attempt to help students learn interactively with their teacher. Moreover, this study will determine if through this web app the class or student paid more attention in the lecture through a usability testing.

General Terms: Collaborative Learning, Interactive Class, Usability Testing, Web Application

Additional Key Words and Phrases: Web Development, E-Learning

1. INTRODUCTION

1.1 Background of the Study

In the usual class scenario, students are asked to sit down, asked to be quiet and listen to their teachers, just like children in the old days. Students are surrounded by technology such as the internet, smartphone mobiles, computer, laptops and other gadgets & gizmos. But, they rarely use it whenever they are in school. (Weitz, 2008). In today's time, the youth has already accepted the ideas of wireless technologies integration and use of the mobile devices in the process of learning. They understand the functionalities and capabilities and provided flexibility and mobility that students need in their learning are basic advantages of that new form of education. (Yordanova, 2007). According to Gelderblom and Kotzé (2009), there are benefits of developmentally appropriate computer experiences for children. With this, there is a technology that can let the users interact and collaborate with each other in order to achieve a similar goal. Other than the use of technology in class, one of the main reason for this study is for class participation during discussions. According to (Rocca, 2010), some reasons why students won't participate in class is the lack of confidence, students would feel apprehension during class discussion and they are afraid of sharing their ideas because they don't want to be embarrassed.

1.2 Problem Statement

The main problem of the study is how to implement an interactive web application for a classrooms.

The specific problems of the study are as follows:

- (1) What makes an interactive learning tool engaging for the users?
- (2) What are aspects of interactive learning that will be included in web application.

What are the other types of a classroom setup that will be effective for an interactive web application?

1.3 Objectives

The main objective of the study is to implement an interactive web application for a classrooms.

The specific objectives of the study are as follows:

- 1 To make an interactive web application engaging for the users
- (3) To know the aspects of interactive learning that will be included in the web application.
- (4) To know the other types of a classroom setup that will be effective for an interactive web application.

1.4 Significance of the Study

This study will be a significant endeavor in promoting an interactive learning environment in a classroom setup. This study will also be beneficial to the students who are shy to participate in class by raising their hand, to those students who tend to be scared if their answers are incorrect and avoid to be embarrassed and it is also an effective learning in their classroom setting. As for the teacher's side, this will help the professors using the application to further know how the students were able to understand what he/she has discussed in class.

1.5 Scope and Limitations

The scope of this paper is that it focuses in promoting interactive learning in class. This study's set-up would create an environment where students can use their smartphones where they can answer the teacher's raised questions with their devices and have it sent to a server. The teacher will then be able to view the students who answered the question though a poll and will be able to see the student's names anonymously to avoid any tension in class, in case they don't want to be called.

The limitation of this study is that the users should be in a class. The types of questionnaires are only limited to True or False and Multiple Choice. The questionnaire useless in an open-ended discussion. Lastly, any version of Internet Explorer as of now (2016, March) is not working well with the project.

2. REVIEW OR RELATED LITERATURE

2.1 Problem

2.1.1 *Co-Located Collaborative Learning Video Game with Single Display Groupware*

Juan F. Weitz, proponent of Co-Located Collaborative Learning Video Game with Single Display Groupware study, had a problem of children lacking fun activities in the classroom. Since it was described in that the current classroom set up is that the child should just sit down quietly and listen to their teachers. This kind of situation made them think how to use technology to make the classroom more fun, so the children be more motivated to learn, not only the curricula's contents, but

also social skills, such as collaboration. These skills are essential for children's successful development in the society (Weitz, 2008).

1 Making classrooms socio-technical environments for supporting collaborative learning

According to Liu et.al from National Central University, Taiwan, was that personal devices without peripherals like LCD or whiteboard can effect face to face collaboration because personal devices are used. The problem of the study was that does classroom technologies cooperate on personal devices to augment collaborative learning experience in classrooms (Liu et.al, 2009).

2.1.1 The Design of Shared Display Groupware for Supporting Interdisciplinary Collaborative Learning

A study with regards to the Design of Shared Display Groupware for Supporting Interdisciplinary Collaborative Learning by Masanori Sugimoto, states that although interdisciplinary learning is becoming a significant research topic in higher education, issues still exist among unequal participation, difficult integration of knowledge, communication, and terminology (Liu et al, 2012).

2.1.2 Student Participation in the College Classroom: An Extended Multidisciplinary Literature Review

There are reasons why students would not participate during class discussions. In the paper written by Kelly A. Rocca entitled, Student Participation in the College Classroom: An Extended Multidisciplinary Literature Review, students are more likely not to participate in class because of lack of Confidence and Classroom Apprehension. They would feel intimidated by their professors and classmates or they are also feeling apprehensive in class because they are scared of being scolded or laughed at (Rocca, 2010).

2.2 Approach

2.2.1 Co-Located Collaborative Learning Video Game with Single Display Groupware

Juan Weitz, proponent of the study, Co-Located Collaborative Learning Video Game with Single Display Groupware, stated his approach for his study was with the use of Role game. Role game is a Computer-supported collaborative learning (CSCL) video game which were played by three students sitting in front of a single screen and each of the students have their very own input devices. Role games were inspired by video console games and it allow students to learn by doing, acquiring social abilities and mastering subject matter in a context of collaboration. Role Game' educational objectives are to count, recognize and order objects. Another objective of the game is to develop social and communication abilities. It also provides a system development environment for building collaborative educational video game activities. An easy to use and flexible high-level editor is used. With Role Game's files, activities can be created and educational context adapted without having to program the different levels or guarantee compatibility. After indicating the game's activity level in a drop-down box, there were different elements of the activity that were defined using a series of tabs for the different element types and advance configuration. The teacher constructs the different communications that make up the activity with working tabs left to right. The ordering of the tabs

reflects a logical pattern that ensures the definitions necessary for the options on any given tab have already been made on the previous ones (Weitz, 2008).

A usability test was made to evaluate the results of the experiment on the basis of the three sets of observation guidelines. The first set measured the level of user satisfaction, covering both motivational elements that makes the game attractive to the users and the essential elements of the user’s expectation of video games. The second set of observation measured the system’s user efficiency, analyzing the effort required to master the software, hardware and the game strategies. The last set measured collaboration in the building mutual strategies to achieve the game objectives. These findings were complemented by the observations in the teacher’s logbook and an interview with the teacher at the end of the experiment (Weitz, 2008).

2.2.2 Making classrooms socio-technical environments for supporting collaborative learning

The approach of the study of Liu et.al about making classrooms socio-technical environments for supporting collaborative learning: the role of personal devices and boundary objects. They used Shared display groupware of SDG but they didn’t use a game set up. The way they evaluated included a group with 1:1 ration of student to tablet respectively. They observed the group and used nonverbal interaction patterns. These patterns are diagrams using arrows of how to determine what the focus of the people. These non-verbal cues included (1) watching personal devices, (2) pointing at personal devices, (3) watching the shared display, and (4) pointing by hand at the shared display.

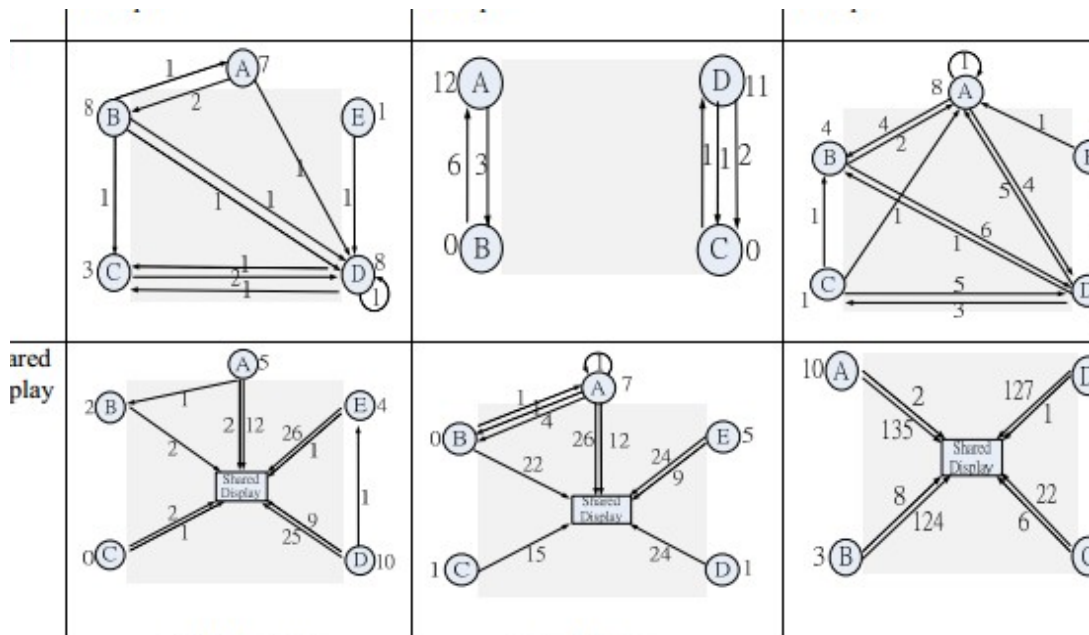


Figure 1: Non-verbal interaction patterns of groups in two different setting

Fig. 1 displays the non-verbal interaction pattern demonstrated by the three groups in 1:1 settings and in the environment with shared display. Each round node in the patterns represents a student. The number next to student node displays the number of discussion threads initiated by the student. In addition, an arrow pointing to another student indicates a student was looking at another

student's personal screen. This study analyzed students' visual focus during each utterance of student conversation. The number attached to an arrow represents the frequency, i.e. the number of utterances, during which a student took visual notice on a certain device. Similarly, dotted arrows represent students' hand pointing behaviors (Liu et al, 2009).

2.3 Methods

2.3.1 *A Study of Peer Interactions between One-to-one and Shared display Collaborative Learning in a Technology-enriched classroom*

The study Liu et.al about the study of Peer Interactions between One-to-one and Shared display Collaborative Learning in a Technology-enriched classroom, which attempts to investigate how students interact with each other when they are using handheld devices in collaborative learning activities. This study involved fifteen graduate students who enrolled in the course Statistics and data mining techniques at National Central University (Taiwan). During the class, the teacher first outlined the learning content of the class. One of the students then presented the learning content related the topics assigned. After students' presentation, students then began to collaborate solve problems given by the teacher. This study was to assess peer interactions when students use different equipment in the classroom and find the appropriate way of technical support for collaborative learning with handheld devices. Therefore, the experiments were carried out in two different environmental settings, which are Tablet-PC-Only and Shared-display. In the Tablet-PC-Only setting, students used only Tablet PC for both individual learning tasks and collaborative learning activities in the classroom, while they could utilize the shared display groupware in the Shared-Display setting (Liu et al, 2009).

2.3.2 *Co-located collaborative Learning video game with single Display groupware*

The methods from the study of Weitz about co-located collaborative Learning video game with single Display groupware. The proponents did the experiment in the first semester of 2005, a prototype of a collaborative game for Pocket PC was developed (SDG technology with multi-mouse was only available at the end of 2006) (Weitz, 2008).

According to Zurita and Nussbaum (2004), Computer Supported Collaborative Learning (CSCL) can be implemented using handheld devices on a wireless network. This game was named "Role Game" and it is a three player collaborative game as described before. The software architecture is based on a layer model shown in Table 1-1.

Table 11-1

Interface
GAPI
Game Engine
Network
Wi-Fi

The game was implemented in C# Language using the Compact Framework 1.1 .Net and the Game API library (GAPI). This library provides graphical support for games in Pockets PC.

The study of Liu et.al about making classrooms socio-technical environments for supporting collaborative learning. The method of this study was that there were fifteen graduate students enrolled in the course "Statistics and Data Mining Techniques," at National Central University (Taiwan). These fifteen Students solved the statistics problems assigned by the teacher collaboratively in the experimental classroom. The students were divided into three groups. The teacher presented problems, which the students had to collaborate to solve. To enforce personal accountability, students were asked to solve the given problems by themselves before discussing them with their peers. Group members then conferred with each other to organize a group solution. The interaction between group members and the process of discussion was observed in order to gain an understanding of how they interacted with the aid of personal devices and boundary objects (Liu et al, 2012).

2.3.3 Usability Testing Essentials

This method is from the book Usability Testing Essentials by Carol Barnum. The book is a guide on how to do a usability testing in users and how it works. It talks about the process on how to gather data from users. It shows that there is a pre-test questionnaire, a post test- questionnaire, followed by the reactions cards.

3. METHODOLOGY

3.1 Gathering of Data and development

The first step in doing this project is to gather possible data that will help the proponents in knowing what ways that are both user friendly are and at the same time fast and efficient. First, the proponents wanted to know how to create a Wi-Fi access point that will allow at most 40 students to connect to the router, before that the proponents used ADHOC as a substitute for minor testing. The proponents were able research during the development stage of the website. Moreover, JavaScript (JSON), AJAX was used for functionalities, Bootstrap for the user interface of the teacher and

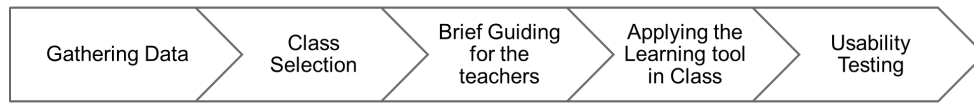


Figure 2: Gather data and Development

student, MySql for the database and lastly, WAMP for the server.

3.2 Class Selection

The purpose of the application is to help students and teachers communicate and collaborate with each other during class discussion. The developers talked to an economics teacher that always process her discussion every class and before a quiz. And an EDP teacher that would like to try a different method of teaching. The proponents chose the two classes because 1) the economics teacher enjoys class discussions that would involve on class voting. 2) The EDP teacher would like to know how his class was able to understand his topic

3.3 Applying the Learning Tool in Class

When implementing the learning tool in class, the proponents should be present as well to perform a usability testing that will help justify that the program is successful for collaborating and class engagement. During the applying the learning tool in class, the teacher would give instructions to his/her class on what to do.

3.3.1 Process

FRUSTRATED	FRU	FRU	FRU	FRU	FRU	FRU	FRU	FRU	FRU
DELIGHTED	DEL	DEL	DEL	DEL	DEL	DEL	DEL	DEL	DEL
NEUTRAL	NEU	NEU	NEU	NEU	NEU	NEU	NEU	NEU	NEU

Table 2: Data Collection Instrument 1

The data logger would then encircle the first affective state that the participant is exhibiting. This process would also be connected to the Data Collection Instrument 2 which is discussed below.

3.4.4 Data Collection 2

Each task given to the user, the data logger should indicate the time it took for the participant to complete the task, the level of success and if there were any problems that arose during the process.

4. CONCEPTUAL FRAMEWORK

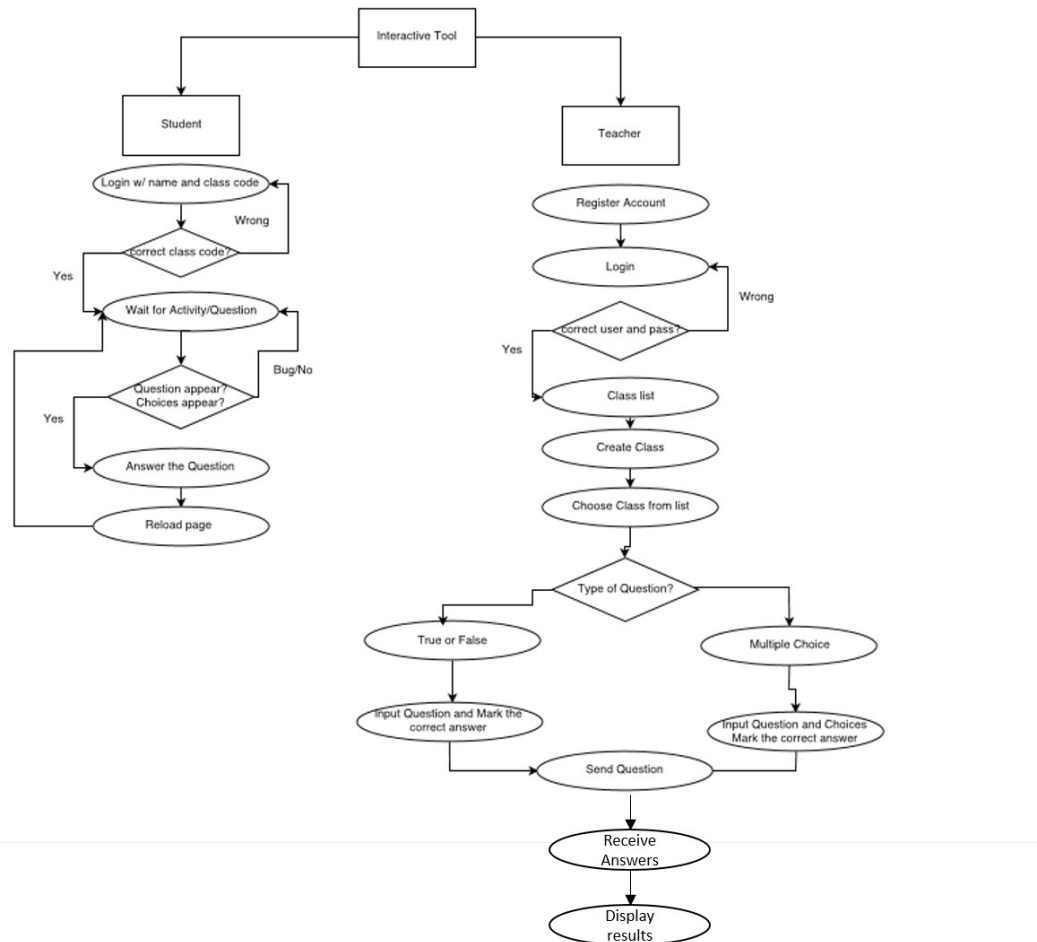


Figure 4: Conceptual Framework

5. THEORETICAL BACKGROUND

5.1 Learning tool

Learning tool are tools to enhance learning to students. Learning and research resources including learning guides, cheat sheets, quizzes, quick look-ups and fast references.

5.2 Collaborative Learning

Collaborative learning is learning in group. Students/People will collaborate to achieve a goal and at the same time they acquire learning. They take advantage of each other's skills and communication are required for the goal to achieve.

5.3 Local Area Network

A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a small geographic area such as an office building or home.

5.4 Usability Testing

Usability testing is the best way to understand how real users experience your website or application. Unlike interviews or focus groups that attempt to get users to accurately self-report their own behavior or preferences, a well-designed user test measures actual performance on mission-critical tasks.

5.5 Web Application

A Web-based application refers to any program that is accessed over a network connection using HTTP, rather than existing within a device's memory. Web-based applications often run inside a Web browser.

5.6 Web Development

Web development refers to building, creating, and maintaining websites. It includes aspects such as web design, web publishing, web programming, and database management. Web development includes many types of web content creation. Some examples include hand coding web pages in a text editor, building a website in a program like Dreamweaver, and updating a blog via a blogging website. In recent years, content management systems like WordPress, Drupal, and Joomla have also become popular means of web development. These tools make it easy for anyone to create and edit their own website using a web-based interface.

5.7 Tools

5.7.1 Frameworks

5.7.1.1 Java Script JSON

JSON- JavaScript Object Notation. It is a light weight data interchange format. It is easy for human beings to read and write. It is also easy for computer to parse and Generate it based on a subset of Java Script Programming Language, Standard ECMA-262 3rd Edition- December 1999. It is like a

wrap for an array that consists of objects. It is universal to all languages. Even if it's an array of PHP, it can be read as a JavaScript because of JSON.

JavaScript programming is a type of web development that is generally not considered part of web design

5.7.1.2 *AJAX*

Ajax is a set of web development techniques using many web technologies on the client side to create asynchronous web applications.

5.7.1.3 *Notepad++*

Notepad ++ is an IDE used by the proponents. It is a free source code editor which supports several programming language running under the MS Windows environment

5.7.1.4 *Bootstrap*

Bootstrap is a sleek intuitive and powerful mobile first-end framework for faster and easier web development.

5.7.1.5 *Photoshop*

Tools used as mock-screen for the initial design of the website. It is a photo or graphics editing software.

6. RESULTS AND DISCUSSION

6.1 Discussion

6.1.1 Desktop Implementation

6.1.1.1 *Teacher Modules*

6.1.1.1.1 Register and Login

File name: login.php