

WikiTTX: A Web Collaboration Technology based Table-Top Exercise System

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Abstract. Ever since the Asian Tsunami, the avian flu epidemic and the September 11 terror attacks, more effort are put into functional and full-scale training of emergency officers, first responders as well as the communities themselves to anticipate, prepare and react to possible disasters. However, they are mostly time, resource and cost consuming. In addition, training exercises require physical presence of each and every individual involved. Table-top exercises are the least complex and most preferred training method. The popularity and success of collaboration technologies such as Wikis, Blogs and Online Chats have eased geographically distributed collaborators to work together in virtual communities. Applicable aspects of these technologies can be utilized for the development of the framework of a cost effective and web-distributed table-top exercise system. The proposed framework for a web-based table-top exercise system will help to encourage emergency officers and communities to better prepare themselves for disasters, and save lives.

Keywords: web collaboration, emergency preparedness, table-top exercise, wiki, online chat

1. Introduction

Natural and man-made disasters are occurring more frequently in recent years. From the South East Asian tsunami, the September 11 terrorist attacks, the Sichuan Earthquakes in China, to the avian flu epidemic in Hong Kong, most organizations and government officials are still unprepared for events that may occur to disrupt, injure or kill lives. Frequent training exercises will ensure government officials, first responders and the community themselves better empowered to anticipate, prepare for, and react to emergency events. Training exercises are also the most effective way to plan or test the functions, comprehensiveness, applicability, and effectiveness of an emergency preparedness action plan. There are three different types of exercises: table-top, functional, and full-scale exercises. Table-top exercises (TTX) are the least complex out of the three, and can be done frequently without affecting an organization's business activities. As the name implies, it occurs when participants sit around a table, discuss and role-play their way through scenario-based exercises. TTX is also the cheapest type of training exercise due to its role-playing method, compared to full-scale drills.

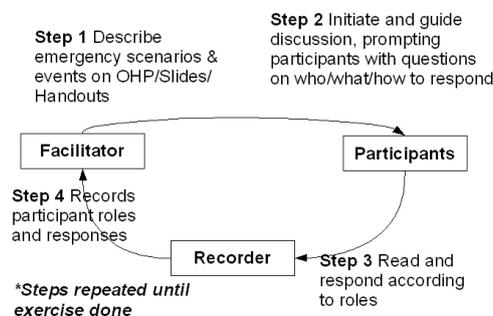


Fig 1. Conventional TTX Process Flow

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Prerequisite/Functionality	Conventional TTX
Physical location of participants	Same meeting room
Display of emergency scenarios	Slides/Handouts/OHP
Communication method	Verbal/Spoken words
Identification of roles & names	Placards (Role/Name)
Documenting exercise responses	Recorder writes on board/slides/OHP
Archival of exercise documents	Recorder compiles and type document

Table 1. Prerequisites/Functionalities of Conventional TTX

To overcome the limitation of conventional TTX, selection of suitable technology is important to ensure a practical and usable web-based TTX. In 2000, a table-top exercise called ETTX was tested online through the use of pre-arranged email communications [2]. However, the exercise ended up taking a longer time to complete and caused confusion among participants due to the asynchronous nature of communication used. Participants spent a lot of time waiting for e-mails, reading replies in multiple emails, and the facilitator had to prompting participants frequently to make sure that all participants are at the same phase of the exercise. Based on these findings, one of the basic requirements of a successful web-based table-top exercise system should include a synchronous method of communication such as Online Chat or Instant Messaging.

Various web collaboration technologies such as Wiki and Blog have gained popularity as an easy way for people to share information, discuss and make decisions online. In the following sections, this paper will discuss on web collaboration technologies, the collaboration technologies identified for a web-based TTX system, the proposed system architecture as well as its implementation. This research hopes to provide a usable and cost effective web-based TTX system using web collaboration technologies without significant changes to the process flow of conventional TTX which will help reduce the need for training the emergency officials using the new web TTX system.

2. Background

2.1. Collaboration Technologies

Collaboration technologies are software, hardware and networks that support the communication and collaboration between two or more people. Distributed collaboration is an environment for a group to collaborate within a virtual sphere of interaction. Popular collaboration technologies are Wikis, Blogs, Mailing-Lists, Bulletin Boards, Discussion Forums and Online Chat. [3]

Table 2 describes the characteristics that have been identified as a requirement of a Web-based TTX System. Table 2 excludes Bulletin Boards and Mailing-Lists as they lack most of the stated characteristics, thus are not suitable for Web-based Table-Top Exercises system. The table shows that Wiki and Blog technologies are the most suitable in terms of the highest number of characteristics that they fulfil.

Requirements of Web-based TTX	Wiki	Chat	Forum	Blog
Real-time synchronous communication		X		
Article/Document based	X			X
Media Uploadable	X	X	X	X
Logging of communication	X	X	X	X
Logging of edits	X		X	
Extensible through plug-ins	X		X	X
Article/Document locking for editing	X			X
Read/Write Access Control	X		X	X
Ease of following conversation		X		X
Search/Archival capability	X		X	X
Article/Document Management capability	X			X
Online presence visibility		X	X	

Table 2. Compatibility of Collaboration Technologies to Table-Top Exercise Requirements

However, as noted from the findings in the failed testing of ETTX, a synchronous method of communication is required to prevent confusion among TTX participants. Therefore, Online Chat technology is a functional requirement for a Web-Based Table-Top Exercise System and must therefore be included. In

addition, Wiki technology is also chosen to complement the characteristics of Online Chat. This research will now focus on these two collaboration technologies, Online Chat and Wiki for the design of a Web-Based Table-Top Exercise System. The following section will study these collaboration technologies in detail and provide an overview of existing implementations in the field of emergency preparedness.

2.2. Wiki Technology

Wiki technology is the most popular and recognizable collaboration technology [4]. A Wiki is collection of Web pages designed to enable anyone who access it to contribute or modify content, using a simplified markup language. The term Wiki, Hawaiian for ‘quick’ was given by Ward Cunningham, developer of the first Wiki application called WikiWikiWeb [5]. The best known Wiki installation is Wikipedia, the free web encyclopedia. The English language version of Wikipedia has over 2.7 million articles contributed by 146 thousand active volunteers from around the world [6]. Popular Wiki applications are MediaWiki, which Wikipedia is built on, as well as DokuWiki.

Wiki articles or pages can be quickly edited by anyone simply by using a Web-browser. Wikis are mainly ‘public’, where anyone can read and edit articles. However, access to articles can also be controlled. Wikipedia requires contributors to be registered users, and restricts the edition of certain articles where data accuracy is important to a select group of contributors. Most Wiki applications are extensible with a pluggable architecture so that developers can add-on functionalities without making changes to the main portion of the Wiki programming codes [7]. Wiki technology has been utilized in several emergency preparedness projects as a knowledge management system. Among them; FluWiki, a Wiki aimed for preparedness in an influenza epidemic [8], and emergenciWiki which was set up by researchers who wanted to test the suitability of a Wiki for emergency management [9].

2.3. Online Chat Technology

Online chat (also known as synchronous computer-mediated communication) is another collaboration technology highly utilized [10]. Online chats are real-time typed conversations that can either be privately held between two users or publicly between multiple participating users in what are called ‘chat rooms’. Online chats are different compared to Instant Messaging (IM) which allows chats to be conducted between locally installed clients using the same protocol. Online chats only need a Web browser. Examples of popular Web Chats are Meebo and eBuddy. Although online chats are mostly for social conversations, it is increasingly being used for real-time web-based discussions even at the workplace, as opposed to e-mails and forums. [11] Their conferencing capability makes it a cheap and reliable option compared to Video Conferencing or Web meeting. Most chat applications now also have chat logging capability which is useful.

The first multi-computer chat system, EMISARI (Emergency Management Information Systems And Reference Index) was developed in 1971 as an add-on in the Emergency Management System for the US Office of Emergency Preparedness [12]. Even though online chat is acknowledged as an important web-based discussion tool [13], its potential use in table-top exercise systems, and even emergency management systems have not been fully realized. Existing Wiki-based Emergency Preparedness System uses emails, forums and the Wiki pages as platforms for discussions, which are therefore not real-time. This paper will next explain the proposed design and implementation of combining both Wiki and Online Chat capabilities into a working framework for a web-enabled table-top exercise system in the following sections.

3. WikiTTX Architecture

Prerequisite/Functionality	WikiTTX
Physical location of participants	Geographically distributed
Display of emergency scenarios	Wiki pages
Communication method	Typewritten chats
Identification of roles & names	Gravatars, Avatars and Nicknames
Documenting exercise responses	Recorder copies from chat to wiki document
Archival of exercise documents	Recorder edit final wiki document
Physical presence visibility	‘Who is online’ List

Table 3. TTX Functionalities in WikiTTX

As discussed in the earlier section, this research propose the integration of Wiki and Online Chat technologies into building a web-enabled table-top exercise system, what will be called WikiTTX. Table 3 compares the prerequisites of a table-top exercise to the proposed functionality in WikiTTX. An existing stable Wiki application will be used as the core application, and chat and other required functionalities added as plugins. This is to ease development time, maintain stability of the system with easy upgrades of the Wiki engine, as well as to make use of Wiki’s plugin architecture. Unlike normal chat function, WikiTTX will have both scenarios (on a Wiki page) as well as the discussions (chat window) side-by-side. This requirement is important for TTX participants to maintain easy viewing of the table-top ‘whiteboard’ to follow the scenarios and events, as well as to participate in the real-time discussions. Built-in features in popular Wiki engines also address other important factors of a secure and user friendly web-based TTX system. Additional requirements listed in Tables 2 and 3 that are not part of Wiki core capabilities will be added through the development of new plugins or the customization of available Wiki plugins.

4. WikiTTX Implementation

In this section, the proposed WikiTTX implementation is discussed in more detail. Figure 2 shows the process flow of a table-top exercise conducted on the proposed WikiTTX system. The process flow using WikiTTX is similar to a conventional TTX to reduce the learning curve required by new users. The only difference is the mode of communication in WikiTTX is via Wiki pages and Chat windows. Figure 3 shows the GUI design with the Wiki and Chat window side-by-side, and a pointer for each of the steps in Figure 2.

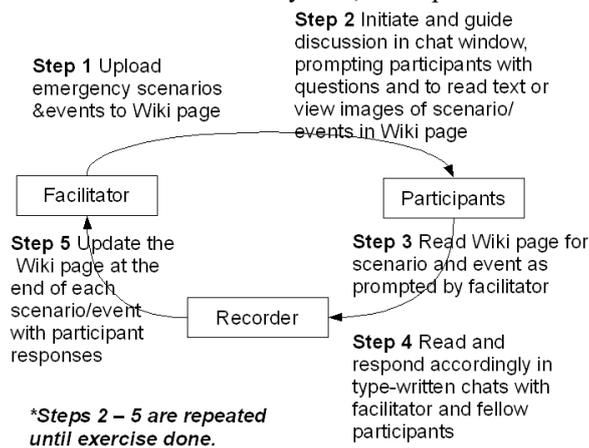


Fig 2. TTX Process Flow in WikiTTX

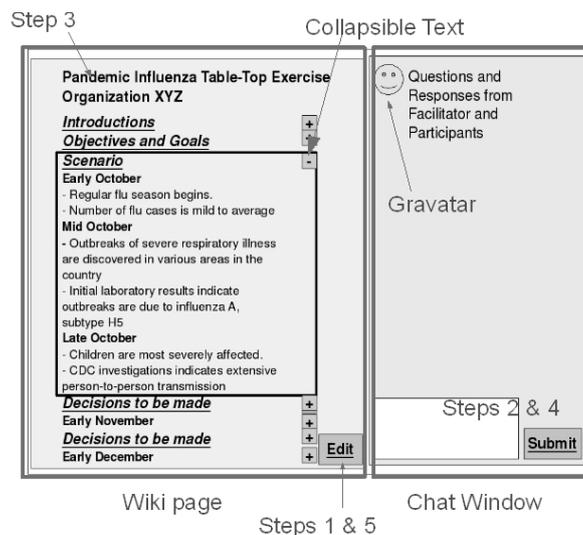


Fig 3. WikiTTX with Wiki Article and Chat window side-by-side

WikiTTX users (facilitators, participants, recorders, observers) will be created and managed via the Wiki user management functionality. Wiki user access controls generally has six control levels; *Delete*, *Upload*, *Create*, *Edit*, *Read*, *None*. *Read* and *Create* provide permission to read and create pages. *Edit* allows existing pages to be edited while *Upload* and *Delete* only affects the upload and deletion/overwriting of media files [14]. The user access levels should be assigned as follows by the system administrator; Facilitators: *Upload*, *Create*, *Read*, *Edit*; Recorders: *Edit*, *Read*; Participants: *Read*, Observers: *Read*. Sectional collapsible text is also required so that participants can concentrate at one section at a time similar to how each event is shown on a single slide or handout in conventional TTXes. Wiki page locking feature which blocks simultaneous editing of wiki pages and prevent conflict will be used to limit the editing to only Recorders and Facilitators.

Wiki pages are generally static once loaded. However, for WikiTTX, the wiki page will be edited constantly by the Recorder and the Chat window will also need to show any new chat conversations immediately. The Wiki and Chat windows refresh should however be independent of each other. Special markup tags are also required to provide better representation of each TTX event or decision. Different text colorization of user chats based on their roles and gravatars linked to a 'user profile' page are also needed. All these changes will be done either by customizing existing plugins, or creating new plugins while maintaining the core Wiki architecture.

5. Conclusion

This research proposed a framework for a web-based TTX system through the use of popular and suitable web collaboration technologies, Wiki and Chat technologies. WikiTTX would allow emergency personnels and community to conduct table-top exercises on a geographically distributed web-based system as opposed to conventional TTX methods. Design requirements for a web-based TTX system have been identified and plugins will be developed to extend the functionalities of existing Wiki and Chat applications. Currently, WikiTTX is under active development and preparation is being made to evaluate WikiTTX with emergency personnels conducting a full fledged table-top exercise.

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