

The Online Digital Talking Books Production System using Audio Streaming Media Technology

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Abstract. The blind community access to books has been done mainly through audiotapes. Blind readers generally have to rely on Braille books or talking books for their study, work, or leisure. Nowadays, the blind have several barriers. Blind persons face some problems and difficulties such as chances to learn, practice, and communicate as same as normal persons do, so they are in a bad situation. This is because media and talking books are few in number. As a result, there is a need to improve the production system to help solve lack of media and talking books problem. Thus, the purpose of the present research was to develop and to evaluate an innovative production system for the blinds. This system was an audio streaming media technology over Internet. It can interact with users as well as recognize and record speech to produce digital talking books (DTB). The program demonstrated and reflected content extraction of books and streaming audio for producing DTB. The system was developed based on the result of the problems, need and tendency of digital talking books production system for the blind. Then this program was tried explain testing before it was evaluated by five experts. The Index of item Objective Congruence (IOC) is .81. The program was corrected and improved before trial with a target group. The target groups of this study consisted of 49 staff and 120 volunteers of the Blind Library in Thailand. Subjects were selected by simple random sampling. This paper outlines the theory, illustrates the process, and displays sample program of record and DTB production. Finally, the assessments of the performance of the program are presented.

Keywords: Technology in Education, Internet and Web Applications, Streaming Media Technology, Digital Talking Books.

1. Introduction (Use “Header 1” Style)

The Blinds are human beings; therefore, they have human rights to access education, facilities, and technology [1]. These people are independent because they have good jobs, take care themselves, and take responsibility their family [2]. They can do this, for they have more experience and high occupation skills, that they can earn enough money. Blind persons should have opportunities like those who are normal persons. This will be benefit not only blind persons themselves but also their families and country. Contextually, the majorities of the blind are ignored and cannot access technology and facilities [3]. However, talking books are important instruction materials that blind can use in every situation and every time without being tied to any place or without other people's help. Talking books produced for blind can create an environment to provide, enrich, inform, guide and teach subjects completely by creating an environment to learn and also develop independent learning skill to solve problems and answer question. The benefits of talking books in distance education provide an easy access, low cost and quick change of the content when it is necessary. Now whole DTB or even several whole books can be recorded onto one compact disk (CD) instead of onto many audio-tapes, with high-quality recording and output, and readers can jump quickly to different parts of a book [4, 5]. DTB support the high demands of rapid access to complex, highly structured material and additional goals of DTB development are to provide a system which is easily integrated into DTB production systems and which is able to make use of future technologies. DTB provide equal, or better, access to the

information in a book than a fully able reader of a print book [6]. But the production system has problems because product time and high cost [7, 8]. And DTB production requires sound records room and the equipment for sound record [9], and length production process and high cost [10, 11]. Seeking volunteers travel costs, and other expenses [12], impresses the expense. So the DTB are lacking.

Today, the Internet technology is an impotent tool to develop innovation has researchers rethink the way to develop innovation to user. Internet-based communication creates a variety of ways to deliver and provide electronic resources for user. Some methods, such as using Web pages to deliver text in much the same way as hard bound texts, are very familiar to user. However, a big advantage is that the Internet also supports the delivery and use of multimedia elements, such as sound, video, and interactive hypermedia [13]. Curriculum, administration, and assessment are all affected as members of the educational community experience changes in communication and commerce that are a result of the explosive expansion of the Internet [14]. Internet technology can provide flexibility and convenience. It can overcome some traditional barriers such as time and place. A user can access materials independently online [15]. For the general user occupying an increasingly large percentage of population, and with greater numbers of people having computer and Internet experience, opportunities are being made to better meet their needs, interests, and work schedules through online system [16]. Internet technology does not require extensive computer skills, although familiarity with computers and software (especially Web browsers) does help to reduce the intimidation factor. Therefore, the researcher develops DTB production using streaming media technology over internet based.

This paper will describe the utilization and characteristics of an innovative system of online DTB production system using audio streaming media technology. It begins with related work on using in production process. Then describes the results of a preliminary evaluation made with the target groups.

2. The Approach

2.1. Users' Requirements Analysis

DTB are instruction materials that blind can use in every situation and every time without being tied to any place or without other people's help. Many libraries provide popular books in large-print and talking book formats for blind or visually impaired readers. DTB usually involve someone reading text into a tape recorder, compact disk (CD), digital device and the reader uses a player device to listen to the book. Recently, however, DTB are also becoming available as digital speech files for playback on PCs equipped with a sound card. The problem from a blind or visually impaired people's point of view is that there are relatively few textbooks or field study guides available in this format.

The above context is further enhanced by the results of a study of problems, need and tendency of digital talking books production system for the blind. For the purpose of this study, we used interviews and questionnaires to study current situations, problems, need and to explore the process of the digital talking books production system for the blind people at Blind National Library of Thailand. The most important question concerned the familiarization of stakeholders with the new technologies and their possible technological knowledge. The title of the question was "the diagnosis of DTB production system needs on the new technologies". In the paragraphs to follow, we present some statistical results that were derived from questionnaires (see figure 2). The question was the following: "what is the best way to produce talking books? Please describe why you thought like that?"

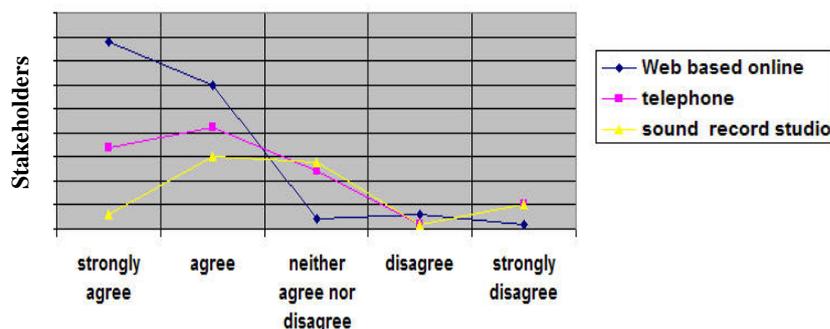


Fig. 2. Statistical Results

2.2. System Approach

The paper presents an innovative system for DTB production system and used a tool to test target group. This system was a web based system. It was developed based on the result of problems, need and tendency of digital talking books production system for the blind. Accordingly this research will consider the possibilities and limitations of visual feed back as a promising channel for DTB production. The program was designed particularly to facilitate DTB production. The basic aim of this project was to include multimedia, sound, and interactive hypermedia elements and mainly audio streaming into the online envelopment (see figure 3).

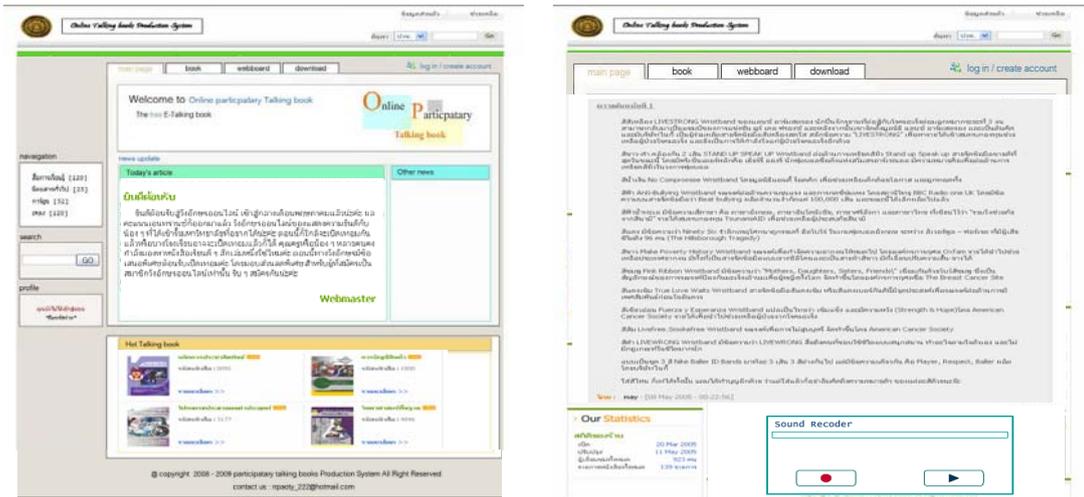


Fig. 3. Main page of online digital talking books production using audio streaming media technology.

The mainly module of audio streaming for DTB production display typical content and sound record system, then user can read by following the content and record for DTB. User interface of this module is divided into various sections frames. At the down sides of the user interface show that the audio control window, then user can produce DTB by read content on the right hand side. After that, audio's reader was showed, recorded and uploaded to audio streaming server. At the top of the user interface we put the basic buttons of using the system (see figure 3). For the audio streaming researcher took into account certain criteria for the quality of audio, like flv audio format and the high quality of audio. Finally, research present the DTB production tools of the system where all the included features can be seen.

The system provides the following features that are properly adapted to the users' special requirements:

- Content extraction: tool of content extraction for further
- Search: tool of content retrieval according to search keywords.
- News: tool of announce new information to member.
- Web board: tool of pose questions or communication with member group.
- Download: tool of delivery more material and electronic content to group of member.
- Member: tool of register new user and tracker of the statistics of the member activities
- Site map: a map of the site links and structure.

2.3. Project Architectural

In this architectural diagram, the process is started at client users who are volunteers to read books for blind libraries. After that, User just access to the web server which hosts the DTB web-recorder homepage is responding all requests from the user including DTB browsing and DTB searching functions. Once a user selects the preferred book, the web server will redirect that user to the DTB web-recorder. Then user can produce DTB by read content for record sound. In the meantime, the system works by compressing a digital audio file and then breaking it into small packets, which are sent to server over the internet like audio streaming media. When the packets reach destination server, they are decompressed audio data are pre-compressed by audio compression and encoder algorithms and then saved in storage devices. After that the

protocols pocketsize the compressed bit-streams and send the audio packets to the Internet. Packets may be dropped or experience excessive delay inside the Internet due to congestion. To improve the quality of audio transmission, continuous media distribution services are deployed in the Internet. For packets that are successfully delivered to the server, thence the data pass through the protocols before being decoded at the audio decoder and then application system just processed for reform the audio, the system consist of content format, navigation specification, and audio management. After that the audio just saved in storage devices (see figure 4).

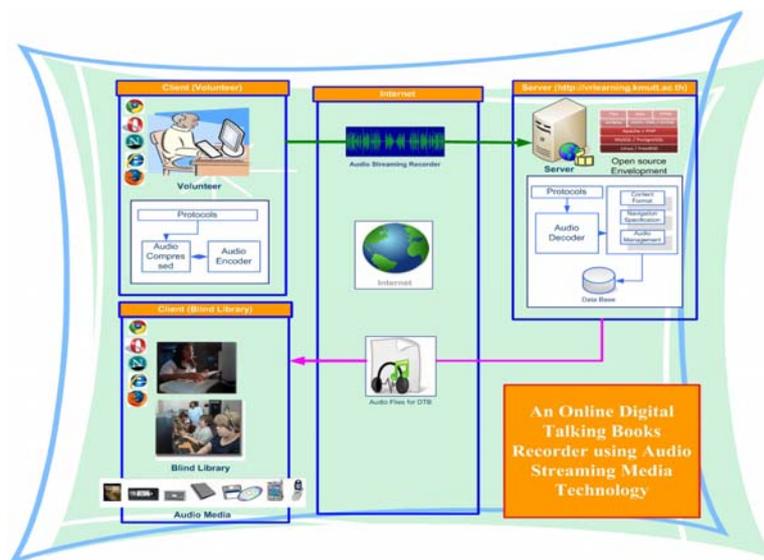


Fig. 4 Architecture of online digital talking books production using audio streaming media technology

In Fig. 4, the web server which hosts the system homepage is responding all requests from the blind libraries. The blind libraries can be downloading audio from server and then they are can convert it on the DTB format or the DAISY standard for blind user.

3. Experimental Results

An initial pilot study was conducted at the Blind Library. The population is volunteers and staff of Blind Library in Thailand and the sample consisted of forty nine staff and one hundred twenty volunteers of the Blind Library. The system was evaluated by five experts, and the Index of item Objective Congruence (IOC) is .81. The program was corrected and improved before trial with a target group. The target group consisted of staff and volunteers Blind Library in Thailand, and they were selected by simple random sampling and survey was on a 5-point Likert-type scale (1 = strongly disagree, 5 = strongly agree). On average, the target group believed that the system, they would like to use the system (4.59). The second part of the survey assessed the target group' beliefs about the technology; it was on a 5-point Likert-type scale (1= least important, 5 = most important). Target groups reported a moderate level of sense and for suggesting that the system were lifelike (4.39). However, they found the most value in the fact that the system help for DTB production (4.54) and they wanted to product DTB from this system (4.20).

The system receives information about production process from users at each step. By the repetition of these processes, the system can understand a sequence of production process, and represent them in the form of speech processing, interface and online technology. However an online DTB production system using audio streaming media technology represent works, our proposed method will make a significant contribution.

4. Conclusion and future work

All the modules of the program work together with proper. The system was completed and tested for a limited set of phonemes concentrating in Thai and English languages. An online DTB production system using audio streaming media technology was designed such that new innovative system for product DTB for

Blind people. It can be added with minimum effort, and it can also be customized easily for other applications. The project was to include multimedia, sound, and interactive hypermedia elements and mainly audio streaming into the online envelopment. User can read by following the content, record and streaming audio to streaming server for DTB in the high quality of audio. However, research present the online DTB production tools of the system where all the included features such as Content extraction, Search, News, Web board, Download, Member and Site map. In summery this system is being appropriate to users. The second approach was to present an informal study form forty nine staff and one hundred twenty volunteers of the Blind Library, and evaluated by five experts. The system performed well and its operation is supposed to be reliable, effectiveness of production system. The result has been reported.

For the further, we plan to continue our research, looking for different technique for innovative system for the online digital talking books production system such as collaboration, participant, make eradicate noise and using DAISY standard to improve the online DTB production and motivated user to use this system.

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