

Exploration of e-Learning Information Systems for Advanced Support Accessibility.

Ehab F. Amer¹

King Saud bin Abdulaziz University for Health Sciences
College of Science and Health Profession
Riyadh, Kingdom of Saudi Arabia

Abstract – This paper is aimed at identifying the nature of e-learning information system accessibility, in the context of advanced technology environment. It will particularly examine the obstacles faced by e-learning users while accessing the information system, including textual resources, navigation features, interactive content and communication instruments. There is a continued need to provide innovative improvements on the e-learning information system accessibility, to match with the changing needs of the information technology. It is not a surprise to find institutions of higher learning using outdated technology to provide access to their e-learning services, something that puts the users on a disadvantaged end. Indeed, this issue has largely been overlooked, and hence the need for an investigation. It will investigate a variety of tools that are used in e-learning to enhance accessibility of learning materials by both educators and the disabled students of higher institutions of education.

Key Words: Digital Disability, Higher Education, E-Learning, Accessibility, Learning Management, Multimedia.

1. INTRODUCTION

Virtual Learning Environments (VLEs) have widely been embraced by many institutions of higher learning. E-learning system uses complicated technology which consists of web-based, integrated communications interfaces that supports shared calendaring, file sharing, email and document publishing [1]. Although pedagogical advantages of e-learning information system are obvious, various factors which particularly result from technological advancement place obstacles on its accessibility [2]. Information technology impact on e-learning is remarkable and requires a broad analysis. "Realizing the potential of Information and communication technology needs to be accompanied by the necessary resources and human support, together with social and institutional environment that is open to innovation and change" [3].

1. BACKGROUND

1.1 Disability

According to the International Classification of Functioning Disability and Health, Disability has often been defined as a physical, mental, or psychological condition that

limits a person's activities. Disability was coupled to unique medical conditions, and was deemed as a problem residing solely in the mannered individual. Disability was deviant desolate as the result of an individual's inability to function. Interventions usually included medical rehabilitation and the provision of social assistance [4].

1.2 E-learning

E-learning basically known as the use of computer and Internet technologies to deliver a broad array of solutions to enable learning and improve performance[5]. Creating e-learning is more costly than get ready classroom materials and preparing the mentors, especially if multimedia or highly interactive methods are used. However, delivery costs for e-learning (including costs of web servers and technical support) are considerably less than those for classroom facilities, trainer time and participants' travel time lost to attend classroom sessions[6]. E-learning content must be well organized, prepared and presented to be suitable for all learners. Instructional Techniques should be used creatively to develop engaging and motivating learning experiences. While e-learning content can consist of different elements, ranging from simple learning resources to enrich the content by using a proper technique to make it useful and efficient to support disabled students[7].

1.3 Assistive & Adaptive Technology

According to the United States Assistive Technology Act of 1998, assistive technology (also called adaptive technology) which refer to any equipment or software system that helps a person with a disability work around his challenges to enable him to can learn, communicate or simply function better. There are many types of Assistive technology that help disable students with learning and attention issues. Common computer-related assistive technology products include screen magnifiers, large-key keyboards, alternative input devices like touchable screen, trackball and joystick s, speech recognition software, and text reader [8].

1.4 Accessibility

Accessibility is the ability of a website, mobile application or electronic resources to be effortlessly explored and comprehended by an extensive variety of users, including

those who have visual, sound-related, or cognitive disabilities[9].

Web accessibility benefits people disabilities. such as, a scientific principle of web accessibility in designing Web sites and related programs that are flexible to meet different user requirements, preferences, and situations. This flexibility also benefits also people with temporary disabilities like a broken arm, and people with changing abilities due to aging[10].

2. E-learning TECHNOLOGY BARRIERS

Many issues of functionality, usability and sustainability have become very serious in e-learning environment, especially when considering the unrelenting development of information technology in general. Despite the fact that a many researches have focused on the functionality, usability and maintainability of e-learning environment, little consideration has been paid to accessibility of advanced and complex support system. Accessibility of e-learning study materials has been enhanced via technological improvements and innovation of new tools with high functionality. Nevertheless, effectiveness of the e-learning accessibility has not been completely accomplished [11].

Seemingly, much more needs to be done if reasonable results are to be achieved. The Evaluation of e-learning usability has therefore remained a critical area, which higher institutions of learning needs to explore in a remarkable way. In addition, a continued evaluation of accessibility needs should be undertaken to ensure that technological advancement matches with the e-learning information system [12].

In particular, the paper will focus on those tools that support advanced technology. It has been observed that the technological advancement has taken root so fast, that the current support tools for e-learning may bring about many accessibility obstacles if corrective measures are not undertaken. The study intends to set out clearly, the barriers to e-learning accessibility as a result of emergent and advanced technology, and propose ways of developing better tools and approaches for developing e-learning accessibility [13].

In order to create an interactive classroom where all learners are respected, it is important to use a standard language that prioritizes the learners over his or her disability. Disability labels can be stigmatizing and perpetuate false stereotypes where students who are disabled are not as capable as their peers. In general, it is appropriate to reference the disability only when it is pertinent to the situation. For instance, it is better to say "The student, who has a disability" rather than "The disabled student" because it places the importance on the student, rather than on the fact that the student has a disability.

3. WEB SPEECH API

The Web Speech API aims to enable web developers to provide in a web browser where speech commands and text-to-speech features that are not available when using standard text-to-speech-recognition or screen-reader program. The API itself is rationalist of the basic discourse speech recognition and synthesis execution and can bolster both server-based and client-based/embedded recognition and synthesis. The API is intended to empower both brief (one-shot) speech input and continuous speech input. Speech recognition results are given to the website page as a list of hypotheses, alongside other applicable data for every hypothesis.

This detail is a subset of the API characterized in the HTML Speech Incubator Group Final Report [14]. That report is altogether enlightening since it is not a standards track record. All bits of that report might be viewed as informative with regards to this document, and give an enlightening to this document. This particular is a fully-functional subset of that report. Specifically, this subset excludes the underlying transport protocol, the proposed increases to HTML mark-up, and it characterizes a rearranged subset of the JavaScript API. This subset does not block future standardization of augmentations to the mark-up, API or underlying transport protocol, and in fact the Incubator Report characterizes a potential guide for such future work [15]. The table -1 shows the use cases where the speech API can support

Table -1: Speech API Cases

Speech API Cases For Advanced Support Accessibility of e-Leaning Information Systems			
1	Voice Web Speech	2	Speech Command Interface
3	Voice Activity Detection	4	Speech Translation
5	Speech Driving Directions	6	Multimodal Interaction
7	Continuous Recognition of Open Dialog	8	Multimodal Search
9	Multimodal Video Game	10	Temporal Structure of Synthesis to Provide Visual Feedback

4. HTML5 API's

The HTML5 Web Speech API revolved around for the past few years, but it takes a little bit more now to include it in e-learning information systems and website.

Earlier, you could include the attribute x-webkit-speech to any input field and it would get to be voice fit. The x-webkit-speech quality has been despise and are currently required to utilize the JavaScript API to incorporate speech recognition [16].

4.1 Voice to Text API:

it can be alternatively mention it as 'Speech Recognition API' as well. It is about to capture user's voice via input system and input devices then to convert it to text. So, basically there are a needs to voice recognition technologies and techniques here. This technique is now supported in Google Chrome browser. it uses Google's voice recognition API service. [17] bellow is a code example to implement it:

```

01  var recognizer = new webkitSpeechRecognition();
02  recognizer.lang = "en";
03  recognizer.onresult = function(event) {
04      if (event.results.length > 0) {
05          var result = event.results[event.results.length-1];
06          if(result.isFinal) {
07              console.log(result[0].transcript);
08          }
09      }
10  };
11  recognizer.start();

```

4.2 Text To Voice API:

Text to voice conversion is just a simple way to play a given text in robotic voice.

```

1      var su = new SpeechSynthesisUtterance();
2      su.lang = "en";
3      su.text = "Test";
4      speechSynthesis.speak(su);

```

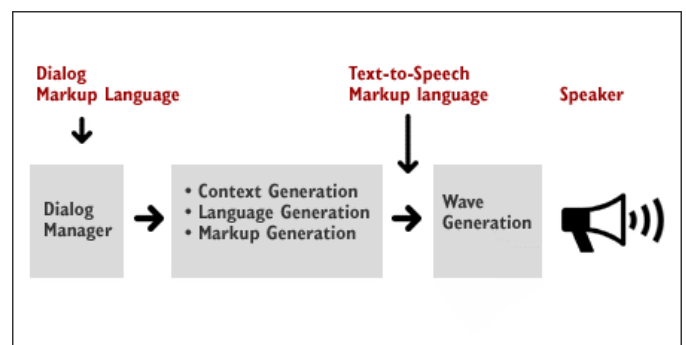


Figure 2. The Dialog Manager drives the conversation and puts out content in text form. The Text-to-Speech Markup Language adds tags for inflection or other audio cues before a wave generator creates the message for output speakers[18].

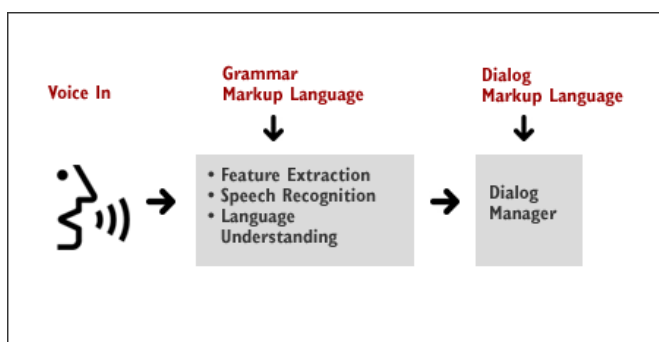


Figure 1. Speech into the voice browser device is converted into text and then parsed for meaning. The Grammar Markup Language helps make sense of the utterings. The Dialog Markup Language and Dialog Manager work to move the user through a script of choices toward a resolution, which could be giving out information or performing a transaction[18].

5. CONCLUSIONS

With a little time created and developed to personal education and a touch of online research, educators can build up the abilities and find considerably more assets for minimal cost, any classroom can be transformed into a virtual asylum of expanded learning exercises. The conceivable outcomes are practically boundless, and it will get to be distinctly simpler to utilize Web Speech API technology in the e-Learning Information Systems as more disabled students have easily access to it and learn more than ever.

The x-webkit-speech were found to be an incredible answer for be utilized to add speech input abilities to e-Learning Information Systems . There is likewise a more advanced Web Speech API. API Programming interface permits developers to add speech recognition functionality to more parts of their applications, and even synthesize speech from text.

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