A LEARNER AIDS SYSTEM FOR IMPROVING THE ACCESS OF ONLINE LEARNING*

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Abstract

An increasing number of institutions are incorporating online courses and degrees into their curriculum. Online learning offers benefits which traditional learning does not, including flexibility, accessibility, and increased interaction with instructors and fellow students. Successful learning requires students to be motivated to achieve the desired learning goals. But most of the online learning environment lack of the interaction, adaptation and communication of learners with lectures contents. This paper introduces interactive aids and accessibility features to provide students with learning aids that will increases their motivation in the learning process. Learning aids and accessibility features implemented in the paper are helpful for both ordinary students and especially for students with visual impairments.

Keywords: Learning aids system, blind learning system, Accessibility, Online Learning

Introduction

Technology has become the key to a new world of education. The rapid improvement of computer and Internet technologies has dramatically increased the ways of teaching and learning. People learn in different ways. It is important to be aware of the differences between learners. New delivery mechanisms are required, including online, open and distance learning. These issues can be partially resolved by providing student-centered, self-paced, highly interactive teaching materials and introducing automatic and asynchronous teaching methods. Online learning environments have been used by a much wider variety of students. Each student may have different backgrounds, learning styles, individual preferences, and knowledge levels and disabilities.

In this paper, the main focus lies on the assumption that the learner aids system must be flexible to be suitable for both ordinary students and especially for students with disabilities. Therefore, the learner aid in this paper was designed to be assessable to both ordinary and to student with visual impairment. Students with visual impairments began joining online learning, with assistance from trained special education teachers, and today, most visually impaired students attend regular school systems where they learn in classrooms with sighted peers. The improvement of human-computer interaction techniques in the online learning systems can improve the effectiveness of the learning and solve some pedagogical, psychological problems of online learning concerning the issues of user-teacher feedback, learning material presentation for both ordinary students and especially for students with visual impairments.

Evolution of online Education

The evolution of distance education beginning with correspondence and the use of parcel post, to radio, then to television, and finally to online education. As developments in educational technology continue to advance, the ways in which deliver and receive knowledge in both the

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traditional and online classrooms will further evolve. Correspondence education relies on the self-paced learning of the student as it does not include any face-to-face interaction at all—an instructor-centered, and not student-centered, one-way communication. Distance education is defined as a method of teaching where the student and teacher are physically separated. Unlike correspondence education, today's distance education takes advantage of ever-improving, fast Internet technology. Typically, the instruction is delivered instantaneously via live chat in the virtual classroom. Some models may incorporate emails and live chats as well as audio or video recordings.

Online education is defined as a form of distance education that uses computers and the Internet as the delivery mechanism for the course content delivered online. Over time computer processor speed vastly improved and web browsers became more user-friendly, making online education more widely available. Day by day more and more online educational institutes are emerging and online education degrees are becoming increasingly popular as these institutes are providing affordable higher education with advantages of flexibility and easy accessibility among many. However, the biggest impact for online education students was lack of the interaction, adaptation and communication of learners with lectures contents and the improvement in Internet connection speeds.

Online Learning

Online Learning takes place via the Web and may include text, graphics, animation, audio, video, discussion boards, e-mail, and testing. Online learning is typically "on demand" and self-directed but may include synchronous chat, web based teleconferencing (audio graphics), or similar technology.

Online learning can be divided into three classes:

- Contact learning supported by the net
- Multiform learning in the net
- Self-studying in the net

In the first class some parts of a course can be in the net for example the delivery of learning material and the lectures are given as contact learning. The second class is multiform learning which means using multiple options in learning for example: forum discussions, help from tutors and learning objects (e-books, videos, et cetera). The third class means that the learner studies alone in the net or in a virtual learning environment without outside help.

Learner Aids Technology of Online Learning

Online learning offers benefits which traditional learning does not, including flexibility, accessibility, and increased interaction with instructors and fellow students. Interaction methods and tools provide additional possibilities for the learner to deepen their understanding of the content, such as: tests in questions and answers format, simulators, and interactive objects (e.g., images and shapes require actions and reactions). In order to clarify the ideas contained within the learning content, many different aids such as images, animations, charts, graphs, videos, texts, and many other means are used for this purpose. A well-recognized classification of interactions in online teaching and learning are (1) learner-instructor, (2) learner-learner, and (3) learner-content interaction.

Learner-instructor interactions establish an environment that encourages learners to understand the content better. This type of interaction is "regarded as essential by many educators and highly desirable by many learners". Learner-learner interactions take place "between one learner and other learners, alone or in group settings, with or without the real-time presence of an instructor". Many studies show that this type of interaction is a valuable experience and learning resource. Empirical evidence shows that students actually desire learner-learner interactions, regardless of the delivery method. Learner content interaction is defined as "the process of intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind". Different contents may require different interaction patterns, and, thus, it is difficult to have a generalized discussion about such interaction.

For student who do not use GUI, for accessing the web cannot get an overview of the structure of a text with one quick glance at the screen. Thus these users can be "lost in hyperspace" very quickly. Producing a document overview is one of the main issues to be considered in an application for surfing the Web which has a vocal interface.

Accessible and Usable Technologies

Accessibility and usability are two related but distinct concepts. Accessibility allows users access to system functionality. For users with disabilities, accessibility is treated as a technical construct that allows assistive technologies, such as screen-readers, the necessary access to interface elements. Usability refers to how well a system conforms to users' conceptualization of performing a task using it. It is a cognitive construct that depends on the task the user performs. A system that is not accessible is not usable; however, an accessible system does not guarantee usability. Accessibility problems prevent access to system features and functionality. Usability problems prevent the use of these features and functionality to meet objectives. Therefore, systems accessibility and usability are key to deriving the utility of a system.

The most used tool for accessing information on the internet and the best solution for distributing educational material for online learning is Web. A Learner aid system which has some fully accessible tools for learning may be unsatisfactory for visually disabled users if the learning methodology was designed for sighted users. Thus, the enabling technologies are very important but not enough. Similarly, a well-designed learning contents methodology, if not supported by a set of accessible tools, is not enough to allow the disabled students to learn on the net. In an educational context designing the content interaction is extremely important in order to reach a learning goal.

Online-learning environments should be usable by anyone. For this reason, it is important to also verify the accessibility and usability of e-learning collaborative tools for people with special needs. Accessibility and usability should always be considered during the design of a user interface allowing universal access to anyone. Accessibility permits users to reach on-line application content, while usability provides simple, efficient and satisfying navigation and interaction. Web content more accessible and usable for people with disabilities are organized into four principles: clear perception of content information (content perceivable), complete interaction with an interface in its functions (interface elements operable), comprehension of

meaning (content understandable), and maximizing the interface's compatibility with new assistive technologies and devices (content robustness).

Learner Aid System

The Learner aid system for online learning (LASOL) is designed an e-learning architecture based on the accessible and usable technology. It starts with an overview of the different ways disabled people work with computers and assistive technology. Access to information and communication for people with disabilities through modern technology is acknowledged as an important requirement for social inclusion.

Design Process - How online Learning aid works

At the heart of any online education is a website or portal through which students can submit their application and apply for the course they are interested in. Each time a new application is submitted to the system, administrator gets notified. An admission board (AB) will review the application of the student and will contact student in case they need any further information from them. Once the application of the student is approved they are ready to start with their respective classes.

As the learning aid system was developed for both sighted and blind students, system options will be provided to students so that they can opt for Normal mode and Assistive mode. In assistive mode, speech output will be activate for learners with visual impairments. The system model is shown in Figure 1.

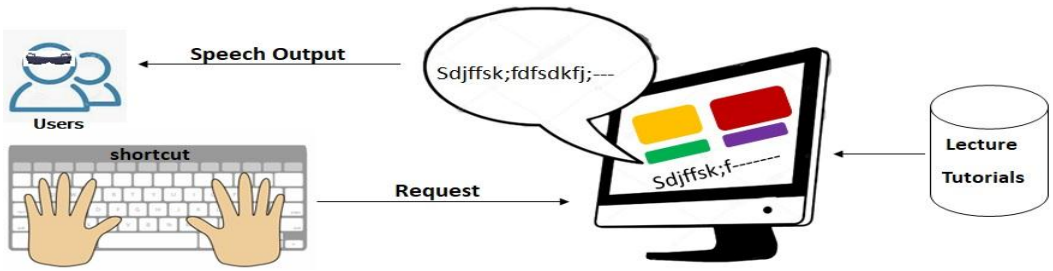

Figure 1 A Model for Learner Aid System in Online Learning

When students need to find the correct answer for a given question, they will be directed on the answer files where the paragraph with answers is highlighted. For students with visual impairments, because visual information and visual clues are not accessible to them, speech feedback will be used to read out the designated paragraph for them. To access the system functions such as browsing menus or opening a web file, shortcut keys will be used for them

Keyboard Shortcuts and Speech Outputs

An analysis of the systems currently in use indicates that each system has its own predefined shortcuts, which does not allow for efficient use and requires time to learn the various shortcuts. Keyboard shortcuts should be standardized, so the following seven basic shortcuts are recommended for navigating act in (LASOL):

1. Home page – CTRL + ALT +H(ome)
2. Content search – CTRL + ALT + S(earch)
3. Top of page – CTRL + ALT + T(op)

4. Bottom of page – CTRL +ALT+ D(own)

5. Go to menu column – CTRL + ALT + R(ead) selected file/page

6. Go to content column – CTRL + ALT + P(ause) reading

The CTRL+ALT combination was defined in order to avoid overlap with existing shortcuts employed by operating systems and application solutions (MS Office, Inter-net browsers and more).

For the accessibility output, speech output is provided powered by the Text-to-Speech (TTS) library of C# in Microsoft .Net Framework. In current system, the TTS engine is used for English language as all lectures in tutorials in current system are in English.

Implementation

To develop the learning aid system, PHP (Hypertext Processor) scripting language was used for the server side. For the front end designing, HTML, CSS and Java Script languages were used. For the backend database system, MySQL database management system was used.

Each student is given a login detail which they use to access their classes and this act as a common platform where instructor can interact with their students. This system also feature a notification area that is visible to the student each time they log in as shown in figure 2.

Figure 2 Login Feature

During the learning process, students will be able to learn online courses, answer tutorials and questions, check their answers and get feedback or the right answers from online learning aid system as shown in figure 3.

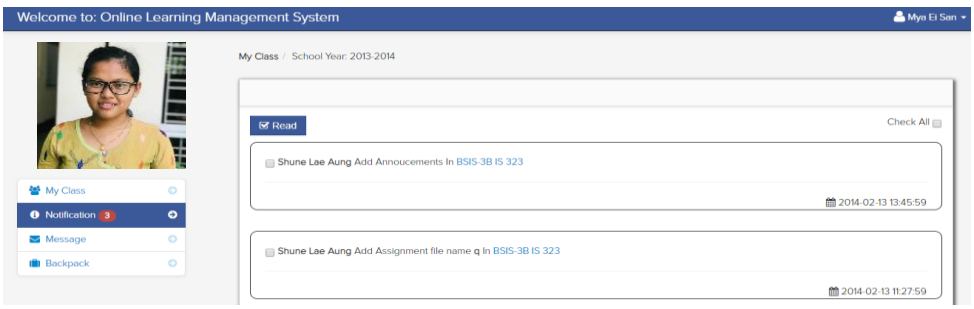

Figure 3 Student Profile

Also contain download section from where students can download lecture by Pdf format or paper format or presentation format, audio or video lectures from the instructor are shown in figure 4.

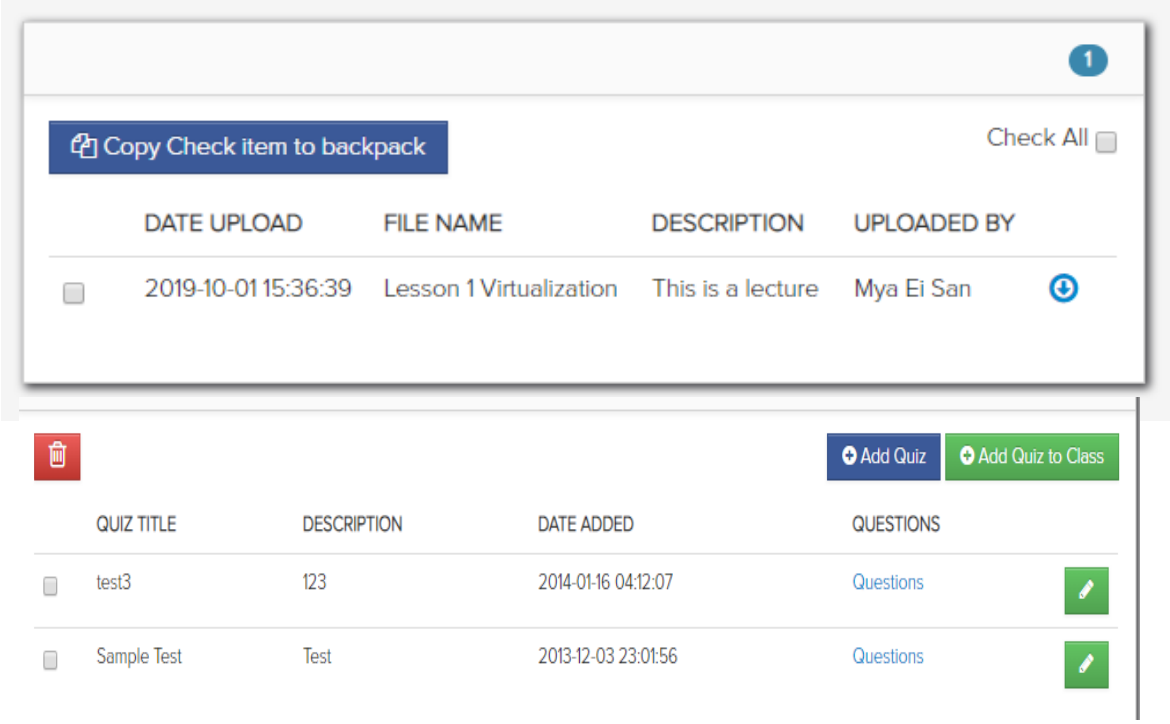

Figure 4 Learning Feature

Online classes will have chapter wise exercises and assignment as shown in Figure 5. Online students can know immediately their exercises marks and also can review the lecture which need to understand. Online student can learn their lecture by audio feature.

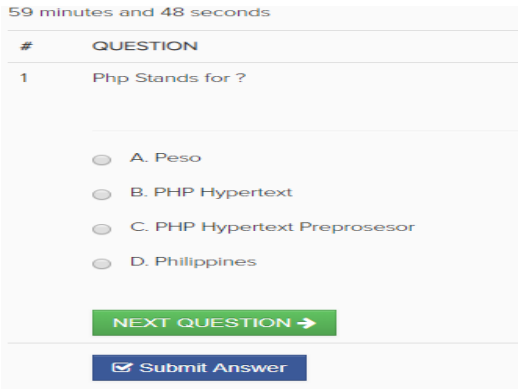

Figure 5 Exercise Feature

Result and Discussion

This paper has presented some studies about the accessibility of the e-learning and some tools to give the Internet a voice. These vocal tools have proved to be effective in supporting blind and visually impaired people in using Internet information and communication services especially for educational purposes. Our conclusions suggest that when designing technology for

people with disabilities it is necessary not simply to respond to their disadvantages but to take a more comprehensive view of their communicative and social needs as well as considering their overall capacities and knowledge. While interaction, in all its varied formats, is perceived as an effective means for learning, students tend to vary in their preferences about additional interaction in their online courses. Such variations tend to be related to individual personalities or learning style differences. Further research is needed to determine the relationships between learner preferences related to online interactions and individual differences. Rapid growth of the Internet is leading many educational institutions to offer a large variety of online courses/programs in wide range of fields. As online educational system is becoming increasingly popular and legitimate in society and corporate world, there is now a need to examine its benefits and drawbacks as well as its functioning driving the justification and design behind its foundation.

Conclusion

Online learning involves the use of digital tools for teaching and learning. It makes use of technological tools to enable learners study anytime and anywhere. It involves the training, delivery of knowledge and motivates students to interact with each other, as well as exchange and respect different point of views. It eases communication and improves the relationships that sustain learning. These technologies have to be accessible in order to enable people with disabilities to take part in education and the live-long learning.

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