

INTEGRATION OF NON-VERBAL AUDIO IN EDUCATIONAL COURSEWARE

Prasanna Ramakrisnan, Nurul Hidayah Mat Zain,
Mohd Nor Hajar Hasrol Jono, Nurmaisara Za'ba, Azlan Abdul Aziz
Universiti Teknologi MARA, Shah Alam, Malaysia
prasanna@tmsk.uitm.edu.my, nurulmz@tmsk.uitm.edu.my,
hasrol@tmsk.uitm.edu.my, maisara@tmsk.uitm.edu.my, azlanaa@tmsk.uitm.edu.my

ABSTRACT

This research will identify situations where non-verbal audio is integrated in educational courseware. Previously there were no standards to integrate the non-verbal audio in educational courseware. Practically the integration of the audio usually depends on the designer of the courseware thus it can be declared as an ineffective way to use the non-verbal audio. This research is conducted to improve the proper usage of non-verbal audio and identify which part of the educational courseware it needs to be used. An informal analysis technique was designed to identify the proper cue to add the non-verbal sound in the educational courseware. Interactions in courseware can be in the form of events, status or modes. Interaction is usually used to find information and this information will be delivered to user(s) in the form of feedback. The method was evaluated by testing the non-verbal audio at the point of interactions such as introduction, background, mouse click, button press, appearance of dialogue box, occurrence of errors and closing window. The results showed that non-verbal audio could improve usability by increasing concentration and interest among the user(s). Results also showed that user(s) were not annoyed with the audio. Thus the integration of non-verbal audio in educational courseware is shown to be effective when applied to existing courseware interface.

1. INTRODUCTION

Educational software, or courseware, is rapidly moving into the mainstream of teaching in the Malaysia higher education. More and more lecturers are using courseware as an integral part of the course lectures. There are a number of reasons for this emergence of courseware as a teaching tool. They include falling power/cost ratio of desktop computing, improved quality and availability of multimedia courseware, appreciation of pedagogical advantages of courseware and government encouragement. Unfortunately the quality of educational software in the past has left a lot to be desired. Software production has often been a 'cottage industry', the province of enthusiastic academics and amateurs with some knowledge of a programming language or authoring system. Although the educational content has often been very high the quality of the software has been patchy - interfaces have been unfriendly and difficult to use, technical support has varied from good to non-existent, bugs have been legion, and many packages have had an unnerving tendency to fall over unexpectedly. The interactive courseware with non-verbal audio in educational technology has been found to enhance learning and motivate students to

facilitate learning. However, because the use of courseware with non-verbal audio in educational technology is still in its early stages, there exists little empirical research showing the proper cue or part to add the non-verbal sound in the educational courseware. Advances in multimedia have facilitated the development of innovative courseware. Course management systems and Flash animations have made courseware an attractive option for instructors. Furthermore, the interest in using non-verbal audio in recent courseware are because "new technologies have made them more accessible" (Craig et al., 2002, p.428), and they have proven to be very effective in encouraging and motivating students to learn and change students' attitudes towards learning (André, Rist, & Müller, 1997; Barron, 2004; Johnson, Rickel, & Lester, 2000; Maes, Darrell, Blumberg, Pentland, 1995; Stone & Lester, 1996; Tu & Terzopoulos, 1994).

2. LITERATURE REVIEW

Audio and video provides a very powerful resource for learning. Boyle (1997) explains that video clips can greatly enhance the authenticity of a computer-based learning environment. This experience may be the central focus of the system or it may be an important

additional resource that students cannot normally access. However, video is a time-based phenomenon. When it starts it “takes the floor” and holds it until it is finished. This aspect of video has to be handled very carefully (Boyle, 1997). According to Teng, Tront, Muramatsu, and Agogino (2005), Multimedia provides alternatives to purely text-based content and enables the learner to visualize content in new and novel ways, perhaps addressing a particular learning style. However, as the technology to produce multimedia continually improves and bandwidth to deliver it increases, it continues to be important to ensure that if multimedia is used, 1) it is used appropriately and not gratuitously, 2) does not provide ambiguity or misconceptions, 3) it is of high visual and aural quality and 4) overall it helps learners construct inter-related (e.g. visual and numerical) knowledge. According to C.S Steffey (2001), in order to obtain the full benefits of video for learning, the video should be used as an active resource. The learners should not just view the video, they should use it. The use of computer technology and audio-visual materials in the classroom obscures an equally effective, cost-efficient means of communication. The following are suggested ways to use five audio sources in the classroom (Lisa Pertillar Brevard, 1998):

- **Music:** Courses in social studies, history, or literature/English provide fertile ground for the use of music during class time hours. Music may be used to usher in the class session to create a mood within the classroom conducive. Or it can be used to mark the transition from one topic to the next, or moving from one philosophical point of view to the next.
- **Books on Tape:** Perhaps the biggest stereotype of books on tape is that they are solely for those with visual problems or people who are simply too lazy to read the assigned. Books on tape provide a necessary human dimension to the process of reading and encourage students to read with great care and attention to detail.

- **Oral Traditions (Interviews and Oral Histories):** Interviews and oral histories provide an added dimension to the study of the use of language in humanities courses. In addition to providing specific first-hand information about a particular topic, they also give students an opportunity to participate in building a catalogue of sound for the classroom
- **Vintage Radio Programs:** An effective means of using such programs is to listen to the broadcasts and create a series of related questions that may be used as discussion topics in class or as a worksheet or handout.
- **Audio-Recorded Poetry:** The mere hearing of a poem and its varied sounds helps students remember difficult passages and decipher symbolism and metaphor.

The use of audio sources in the classroom need not be relegated to music or language laboratories. It is time to rethink the function of sound in our lives and equip our classrooms accordingly. In the mad rush to link our classrooms to the information superhighway, we must be careful not to ignore the powerful, enduring legacy of sound (Lisa Pertillar Brevard, 1998).

4. METHODOLOGY

The purpose of this study was threefold. First, it serves as to identify the situations where non-verbal audio should be integrated in educational courseware. Second, it identifies the necessity of integrating the non-verbal audio. Third, it is used to identify whether non-verbal audio should continue to be used in educational courseware. Subjects of the study were 300 students of the university, randomly selected from 5 faculties and subjects were required to use Computer and Information Processing courseware. The questionnaire was designed to contain two sections; Section A is concerned with the overall satisfaction of non-verbal audio; Section B consists of questions concerning the usage of non-verbal audio.

4. RESULTS AND FINDINGS

4.1 Overall Satisfactory Level using Non-Verbal Audio

Respondents were asked to answer questions concerning the overall satisfaction of non-verbal audio in Section A.

4.1.1 The Quality Level of Non-Verbal Audio at Satisfactory Level.

Figure 1 illustrates the results for the subjects' perception on the quality level of non-verbal audio.

Quality of Non Verbal Audio is Satisfactory

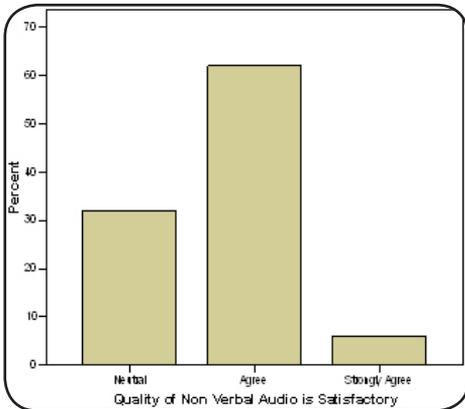


Figure 1: The Quality Level of Non Verbal Audio

4.1.2 The Non-Verbal Audio is not Annoying to User at Satisfactory Level

Figure 2 shows the overall percentage of respondents' perception on the annoying level of non-verbal audio.

Non Verbal Audio is Not Annoying to User

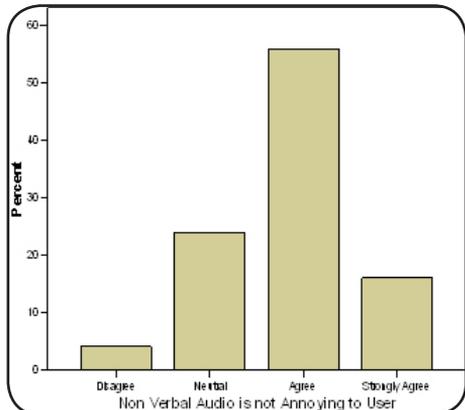


Figure 2: The Annoying Level of Non-Verbal Audio

4.1.3 The Non-Verbal Audio should be Continuously used for Courseware

Figure 3 shows the overall percentage of respondents' perception on whether the non-verbal audio should be included in other courseware.

Non Verbal Audio Should be Used in Courseware

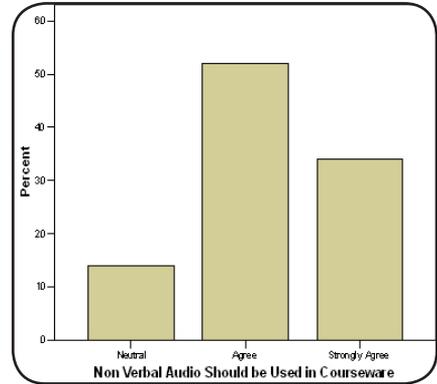


Figure 3: The Non-Verbal Audio should be Continuously used for Courseware

4.1.4 The Non-Verbal Audio Is Very Important For Learning Process

Figure 4 shows the overall percentage of respondents' perception on the important of non-verbal audio in learning process.

Non Verbal Audio is Important for Learning Process

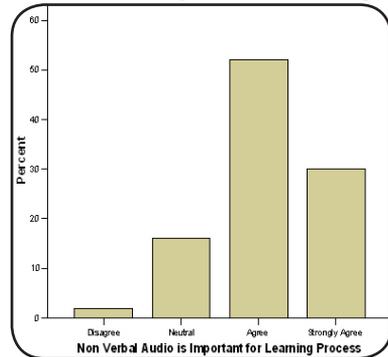


Figure 4: The Importance Level of Non-Verbal Audio in Learning Process

4.2 Usage of Non-Verbal Audio

Respondents were asked to answer questions concerning the Usage of Non-Verbal Audio variable in Section B.

4.2.1 The Non-Verbal Audio can Increase Concentration and Interest when Integrated in Courseware.

Figure 7 and 8 shows the respondents' perception on the implementa

tion of Non-Verbal Audio in Courseware.

Increase the Concentration in Learning

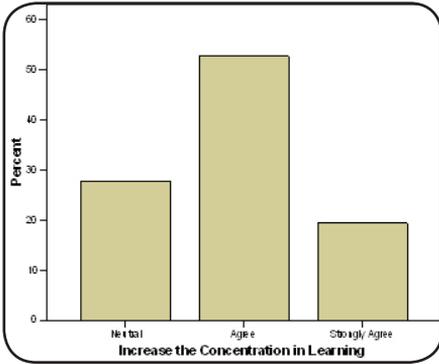


Figure 5: The Non-Verbal Audio can Increase Concentration.

Increase the Interest in Learning

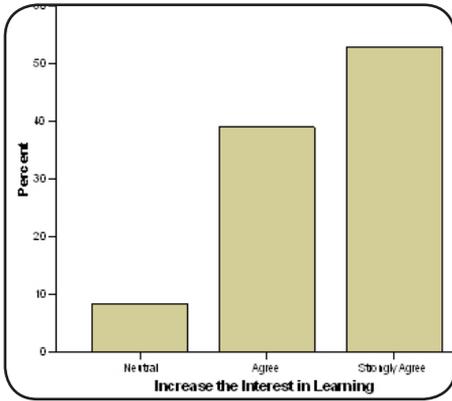


Figure 6: The Non-Verbal Audio can Increase Interest

4.2.3 The Level of Confidence on Non-Verbal Audio can Increase Learning Process.

Figure 9 illustrates the respondents' perception on the level of confidence using non-verbal audio can increase learning process

Non Verbal Audio can Increase Learning Process

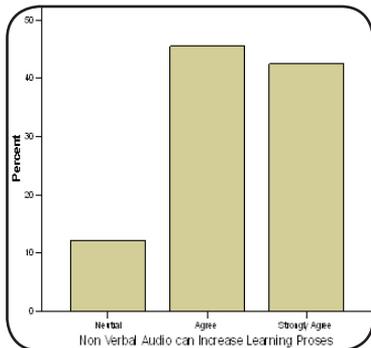


Figure 7: The Level of Confidence on Non-Verbal Audio can Increase Learning Process

4.2.4 The Situations where Non-Verbal Audio should be Used.

Figure 10 - 16 shows the perception of the respondents on the situations where non-verbal audio should be used.

Introduction

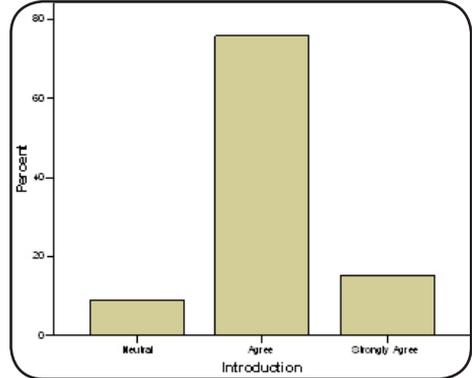


Figure 8: The usage of Non-Verbal Audio during Introduction

Button Press

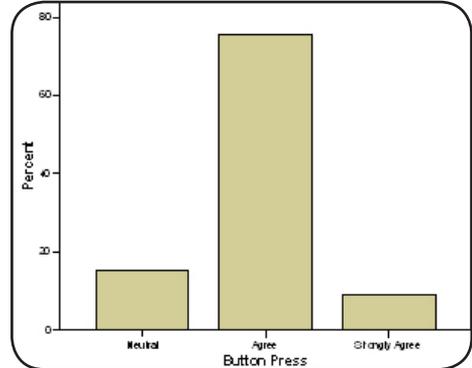


Figure 9: The usage of Non-Verbal Audio during Button Press

Mouse Click

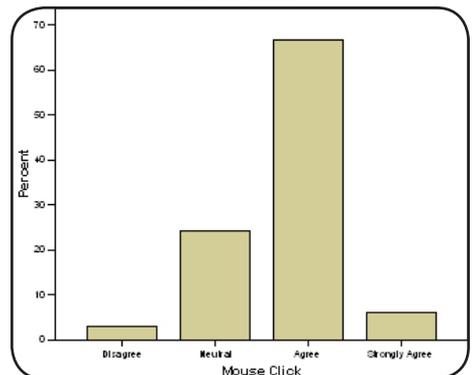


Figure 10: The usage of Non-Verbal Audio during Mouse Click

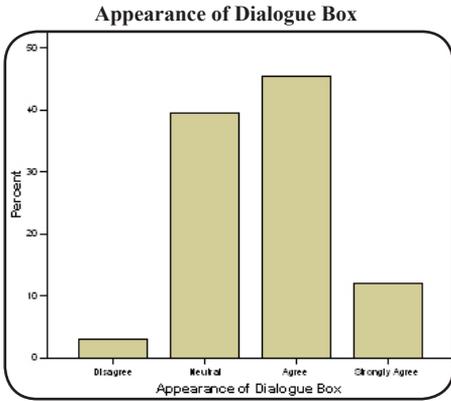


Figure 11: The usage of Non-Verbal Audio during Appearance of Dialogue Box

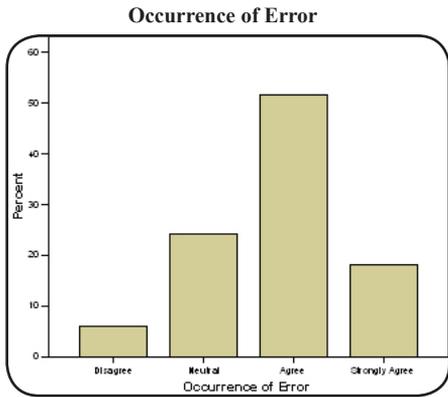


Figure 12: The usage of Non-Verbal Audio during Occurrence of Error

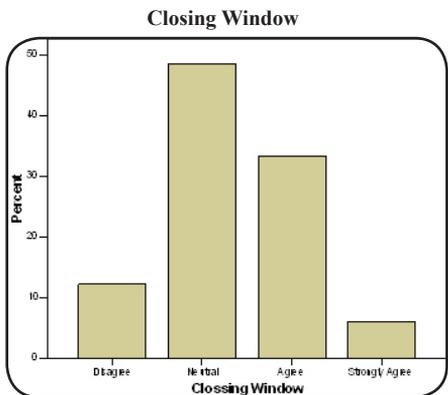


Figure 13: The usage of Non-Verbal Audio during Closing Window

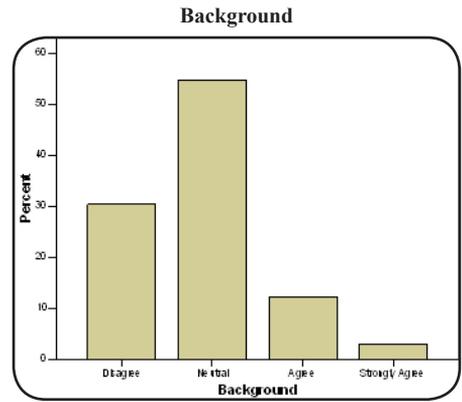


Figure 14: The usage of Non-Verbal Audio in Introduction

5. CONCLUSION AND FUTURE WORK

This research shows some of the situation where non-verbal audio can be integrated in educational courseware. From the user's perceptions, non-verbal audio is preferred during introduction, button press and mouse click, appearance of dialogue box and occurrence of error. Non-verbal audio is not preferred by user during closing a window and as a background sound. Preference shows that it is a distraction while learning. Overall non-verbal audio can be continuously used in future educational courseware to increase the learning process. This is because; using non-verbal audio can increase the concentration interest and focus of the user during the learning process. In conclusion the work in this research was aimed to decide on the situations where the non-verbal audio can be used in the educational software. As for the future research; analysis on what types of non-verbal audio should be integrated in educational software can be done.

REFERENCES

André, E., Rist, T., & Müller, J. (1997, August). WebPersona: A Life-like presentation agent for educational applications on the world wide web. Paper presented at the Proceedings of the workshop "Intelligent Educational Systems on the World Wide Web", Eighth World Conference of the AIED Society, Kobe, Japan.

Barron, A. E., & Kysilka, M. L. (1993). The effectiveness of digital audio in computerbased training. *Journal of Research on Computing in Education*, 25(3), 277-289.

Boyle, T. (1997). *Design for multimedia learning*. New York: Prentice Hall.

Brevard, L.P., *Sound advice for the classroom*, Black Issues in Higher Education, 1998.

Craig, S.D., Gholson, B., & Driscoll, D.M. (2002). Animated pedagogical agents in multimedia educational environments: Effects of agent properties, picture features, and redundancy. *Journal of Educational Psychology*, 94(2), 428-434.

Johnson, W. L., Rickel, J. W., & Lester, J. C. (2000). Animated pedagogical agents: Face-to-face interaction in interactive learning environments. *International Journal of Artificial Intelligence in Education*, 11, 47-78.

Maes, P., Darrell, T., Blumberg, B., & Pentland, A. (1995, April). The ALIVE system: Full-body interaction with autonomous agents. Paper presented at the Proceedings of the Computer Animation '95 Conference.

Steffey, C.S (2001). *The Effects of Visual and Verbal Cues in Multimedia Instruction*, Virginia Polytechnic Institute and State University.

Tront, J.G., Muramatsu, B., A. M. Agogino, & Teng, X. (2005). Best Practices in the Design, Development and Use of Courseware in Engineering Education, 35th ASEE/IEEE Frontiers in Education Conference

Tu, X., & Terzopoulos, D. (1994, April). Artificial fishes: Physics, locomotion, perception, behavior. Paper presented at the Computer Graphics Proceedings.