

**GUIDELINES OF ASSISTIVE COURSEWARE (AC)
FOR HEARING-IMPAIRED STUDENTS**

By :

FAIZAH BT MAAROF

**A thesis submitted to the Academic Dean Office in partial
Fulfilment of the requirement for the degree
Master of Science (Information Technology)
Universiti Utara Malaysia**

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ABSTRACT

The increasing number of Person With Disabilities (PWD) in Malaysia is very worrying especially to Ministry of Education because this population, eg: hearing impaired people remain disproportionately uneducated, untrained, unemployed, and poor. Accordingly many researchers work together with Information Technology (IT) experts to design and develop varieties of Assistive Technology (AT). So, AT is one of the technologies used to help this population in gaining knowledge and fortunately bridge the gap between PWD with normal people.

This study defines the disabilities and technologies suitable for the disabled which is called assistive technology (AT). Two types of AT are hardware-based and software-based. In this study, the software-based is focused, specifically in the form of courseware which is referred to as assistive courseware (AC). With concerns to develop an AC for hearing-impaired people, proper guidelines should be followed. The aim of this study is to propose guidelines for developing AC for hearing-impaired people. Adapted model, Jakob Nielsen Usability Guidelines, and User Agent Accessibility Guidelines 2.0 were based on as guidance in proposing the guidelines. In accomplishing this study waterfall methodology was adapted. IntView methodology was also adapted in developing the prototype of AC and proposed guidelines were followed. Focus groups and experts tested the prototype of AC and Heuristic Evaluation was adapted. The results of this study concluded that guidelines proposed must be followed and were important in developing AC for hearing-impaired people.

ABSTRAK

Peningkatan jumlah bilangan golongan kurang upaya di Malaysia amat membimbangkan terutamanya pihak Kementerian Pelajaran Malaysia kerana populasi, contohnya golongan yang mengalami masalah pendengaran ini didapati ketinggalan dalam pelajaran, kurang pendedahan dalam latihan, tidak bekerja dan kurang berkemampuan untuk menyara hidup mereka sendiri. Justeru, ramai pengkaji bekerjasama dengan pakar-pakar Teknologi Maklumat mereka dan membangunkan pelbagai 'Assistive Technology' (AT). AT merupakan salah satu teknologi yang digunakan untuk membantu golongan ini mencapai maklumat dan pengetahuan dan secara tidak langsung dapat merapatkan jurang diantara golongan kurang upaya dengan golongan biasa.

Kajian ini mentakrifkan AT sebagai teknologi yang bersesuaian mengikut kekurangan individu dikalangan populasi kurang upaya. AT boleh dikategorikan kepada dua iaitu hardware and software. Fokus kajian ini adalah kepada software atau perisian di dalam bentuk software yang dikenali sebagai 'Assistive Courseware' (AC). Untuk membangunkan AC bagi golongan yang menghadapi masalah pendengaran, beberapa garis panduan diperlukan untuk memastikan AC yang dibangunkan memenuhi kehendak populasi ini. Kajian ini bertujuan mencadangkan garis panduan untuk membangunkan AC bagi golongan yang menghadapi masalah pendengaran. Dalam merangka garis panduan ini, model yang telah diadaptasikan, Jakob Nielson Usability Guidelines dan User Agent Accessibility Guidelines 2.0 telah dijadikan sebagai panduan. Untuk mencapai objektif kajian, metodologi waterfall telah diadaptasikan. Manakala untuk membangunkan prototaip AC metodologi IntView turut diadaptasikan dan garis panduan yang telah dirangka telah dijadikan panduan. Bagi memastikan kepentingan setiap garis panduan yang dirangka, prototaip AC telah diuji oh kumpulan focus dan pakar. Dalam fasa ujian, Heuristic Evaluation telah diadaptasikan. Keputusan ujian menunjukkan setiap garis panduan yang dirangka amat penting dalam membangunkan AC bagi golongan yang menghadapi masalah pendengaran.

ACKNOWLEDGEMENTS

In the name of Allah, Most Gracious and Most Merciful.

“Alhamdulillah”, all praise to Allah S.W.T the almighty for the strength and endurance given to me to complete the research. Working for MSc (Information Technology) degree generally and this dissertation specifically is no doubt a challenging and enduring journey that I will cherish all my life.

Firstly and foremost I would like to express my sincere gratitude and appreciation to my supervisor Dr. Ariffin Bin Abdul Mutalib for his guidance, constructive ideas, critics, and commitment in guiding me throughout the duration of preparing this research. A sincere appreciation to teachers and form 2 hearing impaired students in Sekolah Menengah Kebangsaan Tasek Damai for their time and ideas assists me in completion of this research.

Finally, I would like to record my sincere gratitude and affection to my beloved husband. Mohammad Suwardi Bin Mohammed Yusof, my lovely children, Muhammad Uqail Adam, Muhammad Tsaqif Afiq and Nurina Adriana, and my parent, Tn. Hj. Maarof Bin Kadisan and Pn. Hjh. Sutarti Binti Nedi for their prayers, patient, understanding, love, support and sacrifice during the period of this challenging work.

My heartfelt appreciation to all those involved in making this study a reality and those who had contributed towards this profound learning experience. I'm blessed, thankful and appreciate of what I conquered. To all those people, thank you so much.

Sincere,
Faizah Binti Maarof
88956

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LIST OF ABBREVIATION

ABBREVIATION

AC	: Assistive Courseware
ACT	: Assistive Computer Technology
APCD	: <u>Asia-Pacific Development Center</u>
AT	: Assistive Technology
CAI	: Computer Assisted Instruction
CAL	: Computer Assisted Learning
CS	: Course Structure Benchmark
dB	: Decibel
HARP	: Hearing Aid Recycling Program
HITL	: Hearing Impaired Teaching and Learning Process Benchmark
ICT	: Information Computer Technology
ILTC	: Independent Living & Training Centre
IMM	: Interactive Multimedia
IQ	: Intellectual Quality
IT	: Information Technology
N/A	: Not Applicable
PAC	: Prototype Assistive Courseware Benchmark
PC	: Personal Computer
PWD	: Person With Disabilities
SEN	: Special Educational Needs
UI	: User Interface
UNDP	: United Nations Development Programme Malaysia

CHAPTER 1 INTRODUCTION

1.1 Background of Study

“For people without disabilities, technology makes things convenient; for people with disabilities, it makes things possible.”

Treviranus (2000)

The increasing number of people with disabilities (PWD) in Malaysia attracts the concerns of researchers to co-operate with the IT expertise to develop various technologies, hoping that these technologies could assist the disabled in carrying out their tasks in everyday life. The examples are accessing information and services (such as learning), and improving their quality of life. This type of technology is known as assistive technology (AT). Unluckily, most of the ATs available in the market were very expensive, whereby disabled people have to have a big amount of money to afford for the AT. This statement is supported by Dawe (2006), who in her study found out that a mother of a disabled guy had to spent big amount of money to buy an expensive communication device, called LightWriter. It is also observable that the availability of AT in Malaysia for the disabled was still lacking. AT could be designed in terms of hardware (such as a wheelchair) and software (such as assistive courseware). AT is a technology used by PWD to accomplish certain work or tasks. AT is used by disabled people who can be categorized into vision impairment, motor impairment, hearing impairment, learning disabilities, speech impairment, and cognitive impairment. The disabled use different AT depending on their category of disabilities. For example, hearing-impaired people use a system that provides highly

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