

## **Computer Trainer and Coordinator Perspective on the Use of Computers by Visually Impaired Persons in Laos People's Democratic Republic**

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### **ABSTRACT**

The study aimed at exploring perspective of computer trainers and coordinators on the use of computer by visually impaired persons. A purposive sampling method was used to select ten persons who are working among six organizations in Vientiane Capital and Savannakhet Province and collected data by using a questionnaire with descriptive statistics to describe the basic features of the data in the study. The result shows that the trainers perspective regarding barriers how to teach computer for visually impaired persons were in medium level. They lacked the skill to teach how to use computer and experience with software for visually impaired persons. They also lacked coordination in computer service and equipment loan. Regarding the trainer's opinion of visually impaired persons during training, it was found that visually impaired persons lacked exchanges among students and trainers during training, less willingness to study how to use computers, unaware on the needs to use computers, and did not feel confident in using computer technology, all in medium level. Furthermore, the needs in having state-subsidy for loans to buy equipment, have computer service center available with supplementary equipment and software, and Promoting research, innovation, application of computer suitable for visually impaired are at very high level.

**Keywords:** Computer Trainer, Visually Impaired Person, Laos PDR, Screen Reader, Screen Magnification

### **1. INTRODUCTION**

It is widely accepted that computers are quite essential tool in our lives these days. Even though mobile technology has gained its popularity, it is still necessary for serious work to be done on computers (Atzori, Iera, & Morabito, 2010). Computers has become an electronic device to use in everyday life and task (Simpson, 2013). It is very important in all of communications, educations, entertainments, and business dealings nowadays. Access to Assistive Technology (AT) to enhance the lives of persons with disabilities remains limited (Wong & Cohen, 2015). The World Health Organization estimates that only 5% - 15% of people who require and receive Assistive Technology are in low-income and middle-income countries (WHO, 2015) when integrated with teaching, technology increases the efficiency of the educational process for educators and promotes learning for students with disabilities. Technology in the classroom is not significant, more critical issue is that the teacher or educator has to use the technology (King-Sears & Evmenova, 2007).

In disability field, especially within the group of people with visual impairment, it is very important for them to be able to use computers as a tool to create documents and gain access to information (Archambault et al., 2007). Visually impaired persons (blind and low vision) are much less likely to use computers than are sighted persons (Gerber, 2003). According to the U.S. Bureau of the Census's survey of income and program participation, 2003 approximately 21% of all noninstitutionalized persons aged 15 and older with "functional limitation in seeing" have access to the internet and only 13% of sample of population can use computers with basic operation. Visually impaired person and deaf blind persons have poor or nonexistent knowledge of specific areas of assistive technology on computer training. The report concluded that the teacher education programs have an obligation to train teachers in the necessary knowledge, skills, and motivation to provide a bridge between students and technology. The teachers of visually impaired students are not prepared to use assistive technology and to teach students how to use computer and technology (Smith & Kelly, 2007). Moreover, Chaisingharn & Lalitrofwong (2004) found that the visually impaired person lacked the opportunities to use computer to study in the classroom and also made them lack the skill on the use of computers. Even though with a packed program of computer study in schools, which is designed for sighted students, it is not equipped for visually impaired student. This is because most computers do not have screen readers, voice synthesizer and specific software. Only some schools provide computers with software for visually impaired persons. Nevertheless, there are many teachers or personnel with less knowledge and experience in teaching computers for visually impaired persons as well.

The Lao Association of the Blind (2016) reported that visually impaired persons in Lao PDR that registered as members are approximately 1363 persons, and there are living in 3 parts of Lao PDR (Northern, Central and Southern). Even though the Lao Text To Speech program (Lao TTS) was developed for use with two Screen Readers Non-Visual Desktop Access (NVDA) and Job Access with Speech (JAWS), the performance is still not satisfactory because they were not free from limitation, detail in the form of images, It has only limited access to dynamic content and special text like mathematical expressions and reading out information in tabular format is also a challenge (Bose, 2014). In addition, Thai speech synthesizer PPA Tatip from Thailand Association of the Blind provided access solution through NVDA and JAWS due to similarity between two languages. Both solutions are used to help visually impaired persons in Laos gain access to information and communication technology through software. Visually impaired community still has problems obtaining computers and receive proper training. The researcher's own experience of work to provide computer service and computer training for visually impaired person at the ophthalmology center also found problems and barrier to access of computers and assistive technology for this disability group. Therefore, the researcher was interested in studying current situation on the use of computers by visually impaired persons in Laos People's Democratic Republic. This research consisted of two parts: a survey of visually impaired computer users and a survey of computer trainers. This paper will present data gathered from the survey of computer trainers only.

## **2. METHODOLOGY/MAIN CONTENT**

### **2.1 *Research Participants***

The participants in this research were selected through purposive sampling method as 10 computer trainers in Laos with the age of more than 20 years old, who were working in six different organizations including Educational Institutes, Association, and training Centers located in two

provinces: Vientiane Capital and Savannakhet Province. While most participants are trainers or teachers who were involved in computer training, some participants are support staff and center supervisor or coordinators. This group of participants will be referred to as "computer trainers" as all of them contributed to the survey and provided opinion regarding problems and needs of the country in this topic.

**Table 1.** *Visually Impaired Persons' Participant from 6 Residences.*

<b>Educational Institute/Association/Center</b>	<b>Computer trainer</b>
Vientiane Special Education School	3
Home of Light Blind School	2
Lao Association of the Blind	2
Dongkhamxang College	1
Inclusive Education Resource Center, National University of Laos	1
Phiawath Secondary School	1
<b>Total</b>	<b>10</b>

## 2.2 *Research Instruments*

This study was the survey research that use a questionnaire to collect data and sought to understand computer trainer perspective on the use of computers by visually impaired persons in Laos People's Democratic Republic. The questionnaire was divided into three sections. The first section asked about general information and demographic. Second section asked about computer services at the center and training program on the use of computers. Third section asked about problems and barriers, suggestions for improvement, implementation plan for the future.

## 2.3 *Data Analysis*

The researcher used the descriptive statistics to analyze data from the questionnaires and the Statistical Package for the Social Sciences (SPSS) program were employed to obtain frequency, percentage, mean, and standard deviation by quantitative methods analysis.

# 3. RESULTS AND DISCUSSIONS

This paper presents data collected from the survey of 10 computer trainers and coordinators from 6 organizations in Laos PDR. The positions of 10 subjects are teacher/educator, general staff, and computer trainer. The discussion will refer to all 10 subjects as trainers. The total number of trainers that answered the survey is small and considered a limitation in this survey. This survey is a part of the entire research on studying current situation on the use of computers by visually impaired persons in Laos People's Democratic Republic which consisted of two parts: a survey of visually impaired computer users and a survey of computer trainers. The results and discussion of trainer perspective on the use of computers by visually impaired persons are discussed as follows:

## 3.1 *General information about demographic*

As outlined in table 2, the ten computer trainers, were divided to 7 sighted persons (70%), 2 blind persons (20%), and 1 low vision person (10%), 6 were males (60%) and 4 were females (40%). Most of them were under 50 years of age at (70%). Half of them had completed bachelor degrees (30%) while almost one-thirds had completed master degrees (30%). Nearly half were teacher or educator at school (40%), almost one-thirds were computer trainers and general staff (30%) worked at the association (30%), university (20%) and college (10%). For income per month, 5 of them had between 1,600,000-2,000,000 LAK (about 186 to 233 US dollars) (50%) while almost one-thirds had over 2,000,000 LAK (about 233 US dollars) (30%)

**Table 2.** *General Information.*

<b>Information</b>	<b>Number</b>	<b>Percentage</b>
<b>1. Gender</b>		
Male	6	60.00
Female	4	40.00
<b>2. Type of Disability</b>		
Sighted	7	70.00
Blind	2	20.00
Low vision	1	10.00
<b>3. Age</b>		
26	1	10.00
30	1	10.00
31	1	10.00
32	1	10.00
33	1	10.00
44	1	10.00
49	1	10.00
57	3	30.00
<b>4. Marital status</b>		
Married	7	70.00
Single	3	30.00
<b>5. Educational Degree</b>		
Bachelor	5	50.00
Master	3	30.00
Diploma	2	20.00
<b>6. Workplace</b>		
School	4	40.00
Association	3	30.00
University	2	20.00
College	1	10.00
<b>7. Position</b>		
Teacher/educator	4	40.00
General staff	3	30.00
Computer trainer	3	30.00
<b>8. Income per Month</b>		
1,100,000-1,500,000 LAK	2	20.00
1,600,000-2,000,000 LAK	5	50.00
Over 2,000,000 LAK	3	30.00

### **3.2** *Computer services at the center, and training program on using computers for visually impaired persons*

As outlined in table 3, most trainers were sighted persons, well educated and had prior knowledge about visually impaired persons (80%). Moreover, they had experience working with visually impaired persons over 1 years (80%) and had knowledge about computer system for visually impaired persons (70%). In their workplace, there were approximately 6-15 computer

units (60%) which provided for visually impaired person 4-6 units (60%) using windows operating system (80%) which is widely used system and provides wide range of interfaces for disabled persons and is compatible with a wide variety of assistive technology products that meet the needs of disable persons (Saleem et al., 2014).

In training course, there were less than 5 computer trainers that spent over 50 hours (40%) per course and the trainers suggested training on basic computer (90%), Microsoft office (70%), internet and email (30%). Some challenges were visually impaired persons performed slowly on learning computers and lack of knowledge and experience of how to use computer. The reason that research data turned out this way may be because visually impaired students in Laos People's Democratic Republic were studying with sighted students in inclusive education setting, and they lacked computer or assistive technology for visually impaired students from the support of the government (Lao Disabled People's Association, 2014). Even though the government had the goal on development but the government lacks budget to support in coordination in computer service and equipment loan (Handicap International, 2017). Furthermore, inclusive education practices indicate inconsistency in service delivery regarding how to use computers and access to assistive technology (Wong & Cohen, 2015). It should be pointed out that there is nothing wrong with mainstream or inclusive education as long as proper support for visually impaired students are provided especially in two areas, use of technology and access to material.

Most software or programs that installed on computer for visually impaired persons, such as: NVDA, Lao TTS, Jaws for Window, and Thai PPA Tatip which installation problems were system interruption, installed failed, and operating system not responding. NVDA and Jaws for Window, two of the most common assistive technologies, namely a screen reader that they can access and install on computer. While, Lao TTS and Thai PPA Tatip are especially software or programs for Lao and Thai visually impaired person respectively which had problem with different windows operating system include 32 bits and 64 bits. The different findings have been reported by Bose (2014) which was found problems of screen readers in terms of limitation. Screen readers have only limited access to dynamic content and special text like mathematical expressions. In addition, and reading out information in tabular format is also a challenge, it can be read out only row by row and it is difficult to get the overview of the table.

**Table 3.** *Computer Services and Training Program for Visually Impaired Persons.*

<b>Information</b>	<b>Number</b>	<b>Percentage</b>
<b>1. How long have you been working here?</b>		
6 months	1	10.00
1 year	1	10.00
2 years	1	10.00
3 years	1	10.00
4 years	1	10.00
Over 4 years	5	50.00
<b>2. Did you have knowledge about visually impaired persons before?</b>		
Yes	8	80.00
No	2	20.00

<b>Information</b>	<b>Number</b>	<b>Percentage</b>
<b>3. Did you have prior knowledge about computer system for visually impaired persons?</b>		
Yes	7	70.00
No	3	30.00
<b>4. How long did you have experience working with visually impaired persons?</b>		
5-8 months	2	20.00
Over 1 years	8	80.00
<b>5. What is your major role in helping visually impaired persons to use computer?</b>		
Teaching	4	40.00
Coordinator	3	30.00
Training	3	30.00
ICT providing service	2	20.00
Technician	2	20.00
<b>6. How many computers are there in your workplace?</b>		
1-5 units	1	10.00
6-10 units	3	30.00
11-15 units	3	30.00
16-20 units	1	10.00
26-30 units	1	10.00
36-40 units	1	10.00
<b>7. How many computers in your workplace are provided for visually impaired person?</b>		
No	1	10.00
1-3 units	1	10.00
4-6 units	6	60.00
7-9 units	1	10.00
13-15 units	1	10.00
<b>8. What computer Operating System did you provide for visually impaired persons?</b>		
Windows Operating System	8	80.00
Apple OS X	2	20.00
<b>9. What software or programs do you installed on computer for visually impaired persons? (answer more than one choice)</b>		
NVDA	7	70.00
Lao TTS	7	70.00
Jaws for Windows	5	50.00
Thai PPA Tatip	5	50.00
Windows Magnifier	2	20.00
ZoomText	1	10.00

<b>Information</b>	<b>Number</b>	<b>Percentage</b>
<b>10. What problem did you find when you installed software or programs on computer for visually impaired persons?</b> (answer more than one choice)		
System interruption	7	70.00
Installed failed	4	40.00
Operating system not responding	3	30.00
<b>11. How long do you use for training a course?</b>		
15-20 hours	3	30.00
27-32 hours	1	10.00
33-38 hours	1	10.00
45-50 hours	1	10.00
Over 50 hours	4	40.00
<b>12. How many visually impaired person are currently in your computer training class?</b>		
No	4	40.00
1 person	1	10.00
3 persons	2	20.00
4 persons	1	10.00
5 persons	1	10.00
Over 5 persons	1	10.00
<b>13. What topic do you suggest for teaching or training to visually impaired persons?</b> (answer more than one choice)		
Basic computer	9	90.00
Microsoft office	7	70.00
Internet	4	40.00
E-mail	4	40.00
<b>14. What challenges did you find in computer training course for visually impaired persons?</b> (answer more than one choice)		
Student lack of knowledge and experience of how to use computer for visually impaired persons	4	40.00
Visually impaired persons perform slowly on learning computers	4	40.00
Lack of time to study computers	3	30.00
Visually impaired persons are lack the knowledge such as: language skill, technical terminology, and others.	2	20.00

### 3.3 Evaluate barriers and needs how to teach computer for visually impaired persons

As outlined in table 4, data shows trainer perspective in rating scale (1 to 5: very little, little, medium, high, very high) which was divided into 3 parts: 1) Teacher and educator, computer trainer, and related personnel 2) Opinion regarding visually impaired persons and 3) trainers need.

Trainer perspective toward themselves and opinion regarding visually impaired persons about level of problem are different. Trainers lack of expertise in teaching (2.90) and lack of experience in using software or programs for visually impaired persons (2.70). On the other hand, the problems of computer users related to willingness, awareness and confidence in studying and using computer technology (2.70). Data shows lack exchanges among learners and trainers during training (2.80). This occurred because many trainers and coordinators do not realize the benefit of assistive technology for visually impaired persons (Muhammad et al., 2015).

The trainer and educator would like to suggest inclusive educational center belong to ministry of education and sport to improve how to use the computer for visually impaired persons. In terms of personnel, they need to have more especially in computer service (4.50) and improve their knowledge (4.40). For equipment, they need computer service center available with supplementary equipment and software (4.40), having state-subsidized for loans to buy equipment (4.40), and providing service on a variety of computers (4.40). They also need to promote research, innovation, computer application suitable for visually impaired persons (4.50). Although some education institutions in Laos provide computer support to school and trainer or coordinator for people with visual impairment, there are no empirical data on demographic factors regarding the computer and learning technology needs of visually impaired persons as well as trainer or educator needs. Nevertheless, similar findings have been reported by Vosahlo et al. (2001), postsecondary educational institutions in Canada that provide computer supports to faculty and staff with disabilities. They do not have empirical data on demographic factors, the computer and learning technology needs of postsecondary employees with disabilities. However, we are not aware of any systematic evaluation of this issue. The difference of needs of these trainers from those in other area is that most associations, universities, and colleges have a support structure to provide services to students with disabilities (Fichten et al., 2004).

**Table 4.** Barriers and Needs How to Teach Computer for Visually Impaired Persons.

Information	Mean	SD	Scale
<b>1. Teacher and educator, computer trainer, and related personnel</b>			
- Lack of skill to teach how to use computer for visually impaired persons.	2.90	1.101	Medium
- Lack of experience in software or programs for visually impaired persons.	2.70	1.567	Medium
- Lack of coordination in computer service and equipment loan.	2.70	1.059	Medium
- Short time for teaching and training.	2.60	0.966	Little
- Lack of language skill.	2.40	1.075	Little
- Lack of knowledge in computer operating system for visually impaired persons.	2.40	1.265	Little

Information	Mean	SD	Scale
<b>2. Opinion regarding visually impaired students</b>			
- Lack of exchanges among students and trainers during training.	2.80	0.919	Medium
- Lack of willingness to study computer usage.	2.70	1.160	Medium
- Lack of awareness on needs to use a computer.	2.70	1.418	Medium
- Lack confident in using computer technology.	2.70	1.494	Medium
- Lack of language skill.	2.30	0.949	Little
- Insufficient number of computers.	2.10	0.994	Little
- Lack of experience on computer usage.	2.00	0.943	Little
- Lack of knowledge on computer usage.	1.80	0.789	Very Little
- Lack of money to buy Computer.	1.70	0.823	Very Little
<b>3. Needs</b>			
- Increase number of personnel in computer service.	4.50	0.972	Very High
- Promoting research, innovation, application of Computer suitable for visually impaired persons.	4.50	1.269	Very High
- Have computer service center available with supplementary equipment and software.	4.40	1.075	Very High
- Having state-subsidy for loans to buy equipment.	4.40	1.265	Very High
- Providing service on variety of computer.	4.40	1.265	Very High
- Providing service on variety of computer.	4.40	1.265	Very High
- Needs to improve knowledge advocacy of personnel.	4.40	1.265	Very High
- Needs to improve efficiency of existing Computer or technology.	4.10	1.524	High
- Needs to study guideline or manuals how to use computer.	3.80	1.751	High
- Needs to buy computer at reasonable prices.	3.20	1.135	Medium

#### 4. CONCLUSIONS

This paper reports on perspective of computer trainer and coordinator on the use of computers by visually impaired persons in Laos People's Democratic Republic. Although the research also surveyed visually impaired users, the analysis on the information provided by computer trainers and coordinators reflected current situation of computer training in Laos, resources available, barriers, and needs as they worked with visually impaired persons including issues to improve in the future. The problems cannot be solved completely by services and policies in current situation. The government has to support government agencies and Non-Government Organizations regarding the lack of personnel in computer services, promoting research, innovation, and accessible application of computer for visually impaired persons. Moreover, the government has to promote development of proper curriculum on the use of computers for visually impaired persons, support the budget in computer training, computer equipment, computer service and assistive technology. In addition, trainers, coordinators, support staff and visually impaired persons need to develop themselves in order to further progress in the use of technology in Laos.

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#### 5. REFERENCES

- Archambault et al. (2007). Computer games and visually impaired people. *Upgrade*, 8(2), 43-53.
- Atzori, L., Iera, A. & Morabito, G. (2010). The Internet of Things: A survey. *Computer Networks*, 54(2010), 2787–2805.
- Bose, R. (2014). *Accessibility of E-Commerce Websites for Vision Impaired Persons*. (Master dissertation), The University of Western Ontario, London.
- Chaisingharn, N. & Lalitrofwong, P. (2004). The Analysis of Utilizing Computer Technology by Students with Visual Impairments in Integrated High School in Bangkok. *NECTEC Technical Journal*, 11(57), 58-68.
- Fichten et al. (2004). Access to Information and Instructional Technologies in Higher Education I: Disability Service Providers' Perspective. *Journal of Postsecondary Education and Disability*, 17(2), 114-133.
- Gerber, E. (2003). The Benefits of and Barriers to Computer Use for Individuals Who are Visually Impaired, *Journal of Visual Impairment & Blindness*, 97(9), pp. 536-550.
- Handicap International. (2017). Federal Information– Laos Country Card. Retrieved from [https://www.handicapinternational.be/sites/default/files/paginas/bijlagen/2017\\_laos\\_en.pdf](https://www.handicapinternational.be/sites/default/files/paginas/bijlagen/2017_laos_en.pdf)
- King-Sears, M. & Evmenova, A.S. (2007). Premises, Principles, and Processes for Integrating Technology into Instruction. *Teaching Exceptional Children*, 4(1), 6-14.
- Lao Association for the Blind. (2016). Country Report 2016. Retrieved from <https://sites.google.com/site/teamlaopdr/current-sub-grant-partners/lao-association-for-the-blind-lab>
- Lao Disabled People's Association. (2014). Know your Rights. Retrieved from [http://ldpa.org.la/?page\\_id=1308](http://ldpa.org.la/?page_id=1308)
- Muhammad, A., Ahmad, W., Maryam, T. & Anwar, S. (2015). Assistive Technology for Disabled Persons. *International Conference on Recent Advances in Computer Systems (RACS 2015)*. 74-80.

- Saleem et al. (2014). Windows Interface for Disabled Person. *Pakistan Journal of Science*, 66(1), 29-35.
- Simpson, R.C. (2013). *Computer Access for People with Disabilities: A Human Factors Approach*. USA: CRC Press.
- Smith, D.W. & Kelley, P. (2007). A Survey of Assistive Technology and Teacher Preparation Programs for Individuals with Visual Impairments. *Journal of Visual Impairment & Blindness*, 101(7), 429-433.
- Vosahlo, M., Hyndman, M., Sears, P., & Sheridan, T. (2001). *Expanding Disability Resource Centers to Include Services to Faculty and Staff with Disabilities*. Presentation at the Annual AHEAD (Association on Higher Education and Disability) Conference, Portland, Oregon.
- Wong, M.E. & Cohen, L.G. (2015). Access and Challenges of Assistive Technology Application: Experience of Teachers of Students with Visual Impairments in Singapore. *Formerly Asia Pacific Disability Rehabilitation Journal*, 26(4), 138-154.
- World Health Organization. (2015). Assistive devices/technologies. Retrieved from <http://www.who.int/disabilities/technology/en/>