Assistive Technology for the Disabilities in the Mitigation Training

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Abstract. Disaster mitigation must be understood by all parties, including persons with disabilities who are categorized as particularly vulnerable to disaster impacts. This paper aims to see the application of appropriate assistive technology for persons with disabilities in a disaster emergency in the setting of disaster training and simulations conducted at SLB Negeri 1 Bantul. The right and accessible technology will help and facilitate disabilities in coping with disasters. Engineering training materials and the use of assistive technology for disabilities are concise necessary, this is done to accommodate the types, characteristics, needs, and services of disabilities in disaster mitigation and simulation activities. This training using assistive technology is carried out for disabilities to accommodate all rights and improve the functions and independence of individuals with disabilities so that they have active participation in disaster mitigation and simulation activities.

1. Introduction
The earthquake that occurred in Yogyakarta became a very valuable lesson for all residents. Cross generations of residents of Yogyakarta still remember it as an extraordinary disaster, and it affects the pattern of people's lives. Even though 14 years have passed, we must always learn from what happened. Bantul is a district that was heavily affected by the 2006 earthquake. Seeing the potential for disasters in Bantul Regency, training in an effort to improve disaster response and mitigation attitudes is vital to be carried out immediately. It is well known that the potential for natural disasters on earth (earthquakes, tsunamis, landslides, and volcanoes) in the Bantul area is very high. Therefore, mitigation efforts must be taken seriously with the support of all stakeholders. Mitigation is an effort to minimize the impact of a disaster that will occur. One of the mitigation efforts is increasing public awareness [1] [2].

The training was conducted at SLB Negeri 1 Bantul. This school was chosen because it is located between the potential tectonic earthquake area and the volcanic earthquake area of Merapi. SLB Negeri 1 Bantul is located in Kasihan District, which is in an earthquake-prone zone. SLB Negeri 1 Bantul is located in an area with a high potential for earthquakes. Earthquakes can occur from volcanic activity of Mount Merapi or tectonic earthquakes by plate movements or faults.

According to the principal of SLB Negeri 1 Bantul, there has never been any socialization on disaster response and simulations for dealing with earthquakes in SLB Negeri 1 Bantul. In fact, according to him,
this is important as a provision for teachers and students in dealing with earthquake disasters and if you see the potential for disasters in Bantul Regency which is quite high and needs special handling for students with special needs. Seeing the various facts above, disaster response and mitigation attitudes are important as a form of education to all parties on how to deal with natural disasters, especially earthquakes. Mitigation includes protective measures that can be initiated from preparation before the disaster takes place, assessing disaster hazards, disaster management, in the form of rescue, rehabilitation and relocation [3].

The training will be conducted in the form of disaster response training which will begin with the dissemination of types of disasters, potential disasters in partner areas, making earthquake response videos, training through disaster response videos, and simulating disaster response In addition, in the context of disaster mitigation, counseling is conducted on how to deal with earthquake disasters, both during and after an earthquake.

Some things that need to be considered in activities carried out in the context of providing disaster emergency information on disabilities is that we must provide information that is accessible/accessible and easily understood by persons with disabilities [4]. In addition to accessible materials, supporting equipment is needed in the delivery of information and disaster simulation activities that can be used by persons with disabilities. The training approach is certainly very different from people who do not have physical, motor, sensory, intelligence and emotional disorders. So at the time of training must provide some tools and adjustments that can accommodate people with disabilities [5].

2. Method

The method used in implementing the application of this assistive technology is by observing, studying the literature, analyzing the needs, and applying the assistive technology [6] [7].

2.1. Observation

Observations were made by observing the location of the implementation of the application of assistive technology. Observations were made by collecting data about the location to obtain an initial picture of the condition of the object of research.

2.2. Study of literature

Literature study was conducted by looking for references on the application of assistive technology for disabilities. Literature study aims to obtain reference data to be synchronized with the observation results.

2.3. Needs Analysis

Needs analysis was carried out by conducting interviews with students and teachers about needs in disaster response. The results of the interviews will be synchronized with the results of observations and literature studies to find the right technology to be applied to the object.

2.4. Application of Assistive Technology

The application of assistive technology is the implementation of observations, literature studies, and needs analysis. This application was carried out several times in order to obtain the most effective and efficient technology and application procedures.

3. Results and Discussion
The implementation of the application of assistive technology to persons with disabilities has resulted in findings about the appropriate procedures and forms of technology to be applied. The findings are presented in the following results and discussion.

3.1. Results

The disaster-safe school policy is a series of child-friendly schools. This is the aspiration of the Indonesian nation to be seen as a country capable of providing services and needs of children, providing safe schools, using learning rights according to their rights, some of the points above are some of the contents of the UN convention on children's rights. Issues in fulfilling children's rights, including students with disabilities in schools must be a concern for all components of society, schools, government, and academics [8].

The training and disaster simulation activities carried out at SLB Negeri 1 Bantul make every effort to provide accessible services for students with special needs. Learning in training and simulation activities must be adjusted to the potentials and limitations of each student. Students who get an assistive technology approach in this activity are students who are blind, deaf, and mentally disabled. These three types of students have barriers in sensory, physical, motoric which require modification through the help of technology. Technology assistance is a tool used by persons with disabilities to support, train, or replace functions due to a malfunction in the body or structure, technology assistance can be in the form of equipment, instruments, or software. Through these supporting tools, disabilities can increase participation and independence. Apart from this, assistive technology also supports disabilities in accessing and fulfilling their rights, so that they can bridge the gaps they previously had. For example, a blind person cannot read or absorb information from a printed sheet or print. They can be helped by braille text, or via audio. This is what is meant by minimizing the gap in obtaining information [9].

The implementation of the use of assistive technology for persons with disabilities in disaster mitigation training held at SLB Negeri 1 Bantul is as follows:

3.1.1. Disabilities with reduced mobility

Students who experience mobility problems are approached by emergency doors / classroom doors, evacuation routes for mobility obstacles must be sterile and avoid furniture that hinders wheelchair speed, and bring them closer to friends who do not experience physical obstacles so that they can help the evacuation process.

3.1.2. Disabilities with visual impairments

Blind people should be accustomed to using a smartphone device with talkback in it. They were taught how to access accurate information and resources about disasters. When disaster strikes, they get an early warning system via smartphones and sirens. Panic button is used for SOS / inform the coordinates where they are. This is done because the shape of the building, the access road may be damaged due to the disaster.

3.1.3. Disabilities with hearing impairments

For a deaf person, they rely heavily on information through visuals and vibrations. During mitigation activities, the material can be presented in the form of moving images, videos, or serial images, because they have difficulty understanding texts that contain abstract sentences. Equipment modifications can be made to the early warning system, using warning lights and vibration systems on tables or classroom equipment. In addition, they can also use smartphone applications that support obtaining disaster
information from credible sources. For deaf people who still have residual hearing. Can be maximized by using a hearing aid / hearing aids.

3.1.4. Disabilities with cognitive/mental impairments

For a student who experiences intellectual barriers. Continuous training needs to be done. They require the drill method at the time of instruction. Equipment needed in a disaster emergency eg picture to instruction, smartphone with adapted task lists. This equipment is used as a result of low intelligence ability which is difficult to memorize and difficult to understand sequential instructions (Figure 1, Figure 2 and Figure 3). During the mitigation training, they were provided with print-based and digital sequential instructions that were accessed via a smartphone.
3.2. Discussion

Based on its function, Assistive Technology (AT) can be used to: 1) Access other tools, 2) Improve communication, 3) Improve academic performance, and 4) Improve independent life skills. The use of AT to access other tools in question is the use of ATs so that other devices that are not specially designed can be used for certain needs. Use of AT to modify or adapt other tools so that they can be used specifically by certain people such as disabled people.

The term Assistive Technology refers broadly to any technology that can develop the abilities of students with special needs who face learning barriers. Therefore, a variety of materials, services, systems and equipment can be considered as assistive technology. For example, materials such as books recorded on tapes, services such as note-taking and tutors, systems such as braille, and equipment such as large-button calculators and computers can be considered assistive technology. The advantages of assistive technology can be considered, and can dramatically improve the standard of living of children with special needs, both inside and outside the classroom. Regardless of the child's physical or intellectual disability, it is quite possible that some form of assistive technology can facilitate the child's successful education and inclusion.

There are several studies on assistive technology for disabilities in disasters. Alert or alarm devices use sound, light, vibration, or a combination of these techniques to alert someone when a particular event is happening.

The application of assistive technology for disabilities must become a full awareness for disabilities, teachers, parents, and society. Assistive technology requires compatibility with the type and characteristics of each barrier. This means that the product must meet children's needs and environmental conditions. Devices must be safe and durable [10].

Figure 3. GPS and Panic Button in Android for Hearing Impairments
The availability of assistive technology requires consideration of several principles to match what disabilities expect, namely the principles of accessibility, adaptability, availability, affordability, acceptability, and quality. The principle of accessibility deepens the physical and cognitive accessibility, meaning that they require easy access to available building facilities or buildings, have lighting, signs, sirens, braille signs, and other types of visualization. Meanwhile, cognitive accessibility refers to the information provided, both in the form of verbal instructions, simple writing, language, symbols that are more concrete and easy to understand [11] [12] [13].

The role of Assistive Technology in disaster management for the elderly, and children is important because of their vulnerability to disasters. The vulnerability can start from the absence of technology as a signal of the beginning of a disaster, understanding the understanding of the signal from the emerging hazard signal. In addition, the lack of movement, speed, and insufficient understanding of mitigation are the reasons why it is necessary to immediately have positive technology, especially for disabilities, the elderly and children. [14]

4. Conclusions

The application of assistive technology for persons with disabilities is tailored to the needs of each individual based on conditions of deficiency. The application of this assistive technology aims to increase the preparedness and ability of persons with disabilities in dealing with disasters. So that in the end people with disabilities have the ability to save themselves when a disaster occurs, especially in schools and other locations with the signs and tools specially provided for them. It is hoped that stakeholders and authorities in the regions will also pay attention to the availability of this assistive technology in public facilities in order to minimize the negative impact of disasters, especially for disabilities.

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