

# E-learning model for People with Disabilities

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## Abstract

Everyone has the right to get knowledge for individual progress and collective progress, including the right to get knowledge with a learning process for people with disabilities. On the other hand, the learning process currently uses a lot of information technology with an e-learning system, but e-learning that is built can only be used for normal people without physical disabilities such as blind and deaf so that e-learning cannot be used for people with disabilities. The aim of this research is to help people with disabilities use e-learning. The result of this research is a model of e-learning which is specially built for people with disabilities, especially the blind and deaf.

## Keywords

E-learning, disabilities, model

## 1. Introduction

Disability, or self-limitation can be physical, cognitive, mental, sensory, emotional, developmental or some combination of these. The terms diffable and disability themselves have slightly different meanings. Difabel (different ability) is defined as someone who has the ability to carry out different activities compared to the average person, and does not necessarily mean "disabled" or disabled. Meanwhile, disability is defined as someone who has not been able to accommodate the surrounding environment, causing disability. The number of people with deaf and mute disabilities is more than 1 million people all over Indonesia (Kasim,2010).

E-Learning that is structured with the aim of using information technology or computers so that it is able to support the learning process that can be done remotely by combining the principles in the learning process with information technology and can be implemented without having to meet face to face directly between teachers and students (Mayes,2007)

In 2010, TELKOM RDC in collaboration with the National Federation for the Welfare of the Deaf Indonesia (FNKTRI) carried out further development in the form of an application and portal named i-CHAT (I Can Hear and Talk). The application is made in two modes, namely offline mode, where the user must install the program on his computer and online mode where the user can run the application by accessing the i-CHAT site at <http://www.i-chat.web.id>. The i-CHAT program is currently divided into 5 main modules, namely the dictionary module, the conditional module finger alphabets, number sign module, thematic module, and sentence composing module. i-CHAT can be accessed online by visiting the i-CHAT portal at <http://www.i-chat.web.id>. However, the application is limited to 5 modules: Dictionary, Finger Alphabet, Numbers, Thematic, and Sentence Arrangement. (Kuswari,2011)

The problem is that e-learning currently exists only for normal people, not people with dumb or deaf disabilities, so the existence of e-learning does not provide benefits for people with deaf and mute disabilities. The purpose of this research is to help people with disabilities use e-learning. The result of this research is an e-learning model for people with deaf and mute disabilities

## 2. Literature Review

### 2.1. *System People with Disabilities*

Law Number 8 of 2016 concerning Persons with Disabilities: inviting disables to enter and be involved as subjects in the formation of policies and activities related to persons with disabilities is part of fulfilling the human rights of everyone where persons with disabilities are able to be independent and without discrimination, including in the learning process. (pug-pupr.pu.go.id,2016)

Deaf is a term used to indicate circumstances hearing loss experienced by someone. In general, the deaf categorized as hearing impaired and deaf, the Deaf is a generic term denotes hearing difficulties covering the entire difficulty of hearing from mild to heavy, classified into deaf and less hear.

A deaf person is someone who is lose the ability to hearth us hindering the information processing language through hearing, good use or not use tools hearing aid, while someone less heard is someone who usually by using tools hear, the rest of the hearing is sufficient Enabling the success of the process hearing information ". The definition of the deaf is also very diverse, all of which refer to a state or condition hearing impaired children.

### 2.2 *E-Learning*

Electronic learning system or e-learning (English: Electronic learning abbreviated as E-learning) can be defined as a form of information technology applied in education in the form of a website that can be accessed anywhere. E-learning is the basis and logical consequence of the development of information and communication technology. Electronic learning shortens learning time and makes study costs more economical. E-learning facilitates interaction between students and materials, students and lecturers / teachers / instructors and fellow students. Students can share information with each other and can access learning materials at any time and repeatedly, with such conditions students can further strengthen their mastery of learning material.(Burnes,1958)

### 2.3 *Sign language*

E-learning for the Deaf is certainly different from those of humans with perfect senses. A special method is needed so that the information conveyed can be received and understood by the Deaf. The Deaf uses a special communication media language known as sign language to convey and receive information.

Therefore, E-learning for the Deaf must use sign language as its interface, whether it is demonstrated in video (information over video) or only symbols in the form of expression pictures that function as sign language. In addition, the visual design of the E-Learning itself must be attractive, eye catching but still soft, remember, the main sense for Deaf is sight, which functions as a sense of sight and a substitute for hearing.

Sign language is a language of communication that is carried out using hand movements, body movements, or facial expressions. This sign language is the language used by deaf and speech impaired persons to communicate between each other.(Supria,2016)

There is no international sign language because each country's sign language has differences Indonesia has two national sign language systems, namely Get to Know the Indonesian Sign System (BISINDO) and the Indonesian Sign Language System (SIBI). BISINDO was developed by deaf people themselves through the Indonesian Deaf Welfare Movement (GERKATIN), while SIBI was developed by normal people who adopted ASL sign language.

Deaf and speech impaired persons apply BISINDO and SIBI sign language to communicate daily. SIBI is a language method used to assist communication between deaf and speech impaired persons.

The SIBI sign language system uses hand gestures and hand gestures. In SIBI sign language, there are 26 letters (24 letters are static signs and 2 letters are dynamic hand signs such as the letters J and Z) and 10 numeric signs (numbers 0 to 9)(Ridwang,2017)

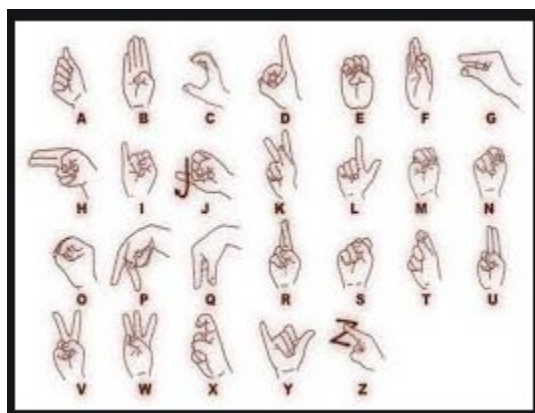


Figure 1 SIBI Symbol

There are twenty-four letters Indonesian sign language alphabet (SIBI)

#### 2.4 Learning Management System

A learning management system (LMS) is a software application or web-based technology used to plan, implement, and assess a specific learning process. Typically, a learning management system provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance online.

The LMS may also provide students with the ability to use interactive features such as threaded discussions, video conferencing, and discussion forums. LMS is also called Course Management System, or CMS.. Almost often, facilitating an online or e-learning course involves managing an asynchronous discussion forum, a synchronous chat and e-mails. These among other tenets of e-learning system promotes interaction, a significant aspect of online instruction especially if there are minimum face –to-face sessions or none at all. (Alias,2005)

#### 2.5 Model

Model is a representation of an object, objects, or ideas in simplified form of natural conditions or phenomena. Model contains information about a phenomenon that is made with the aim to study actual system phenomena. Models can be clones of an actual object, system or event that only contains information that is considered important to be studied. The word "model" is derived from the Latin mold (mold) or (pattern). The general form of the model there are four, namely the system model, mental model, verbal model, and model mathematics. A systems model is a tool we use to answer questions about a system without conducting an experiment.

The purpose of this research is to build a e-learning model for difable where some other research also builds models with different objectives such as block chain models for regional head elections (Inayatulloh,2020), the commerce learning(Inayatulloh,2020), CSF UKM models(Inayatulloh,2020), TAM for SME(Inayatulloh,2020) ,DSS model(Inayatulloh,2019) , IT Governance model for SMEs(Inayatulloh,2020).

### 3. Methods

Figure 2 explain the research methodology. This research begins with activities Identification of problems for persons with disabilities related to e-learning. The Identify tools that can be used as a solution providing e-learning content Provides an algorithm to convert material so that it can be used by persons with disabilities. Next step Providing technology that can be used as a learning facility for people with disabilities. The last step Building an e-learning model for people with disabilities

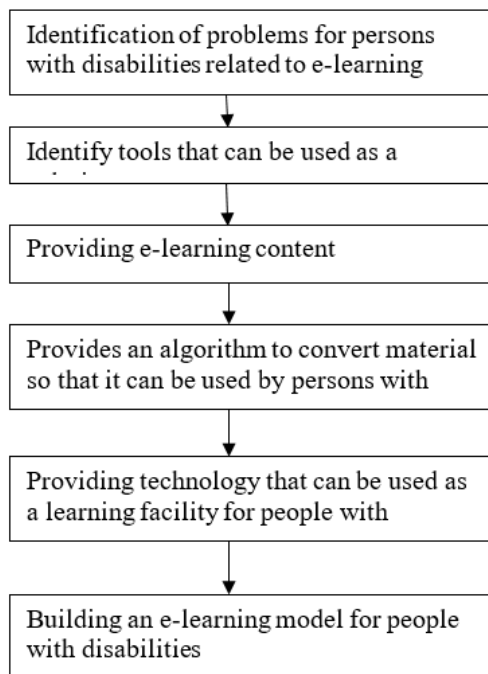


Figure 1. Research methodology

## 5. Results and Discussion

Figure 3 depicts an e-learning model for people with disabilities. The model is divided into:

1. Course material database is content learning as the main part of e-learning. This database can consist of various kinds of subject matter, curriculum, assignments and others. The subject matter also consists of several types of documents such as text, presentation files, videos, pictures and others.
2. A computer algorithm functions to convert teaching materials into files that can be used by disabled students. There are 2 types of destination files, namely the symbol "SIBI" and sound
3. The converted file is stored in the E-learning for disabled database.
4. The database is connected to the LMS or Learning Management System as an e-learning medium.
5. Braille keyboards and head seat speakers are technological tools used by persons with disabilities to interact with the e-learning system. Because blind people have limitations in the sense of sight, the process learning emphasizes other sensory organs, namely the sense of touch and the senses of hearing. Therefore, the principle that must be considered in providing teaching to blind individuals is that the media used must be actual and sound, for example the use of braille writing, embossed pictures, model objects and real objects. While the voice media are tape recorders and Screen Reader software, including JAWS, Thunder, which are used to convert text on the monitor screen into sound. The computer equipment used must be specifically for visually impaired persons, for example the use of a Braille keyboard for totally blind people or the use of a keyboard with larger letters / keys, in bright colors for low vision blind people. The Screen reader software Thunder can read / voice the text read on a web page.

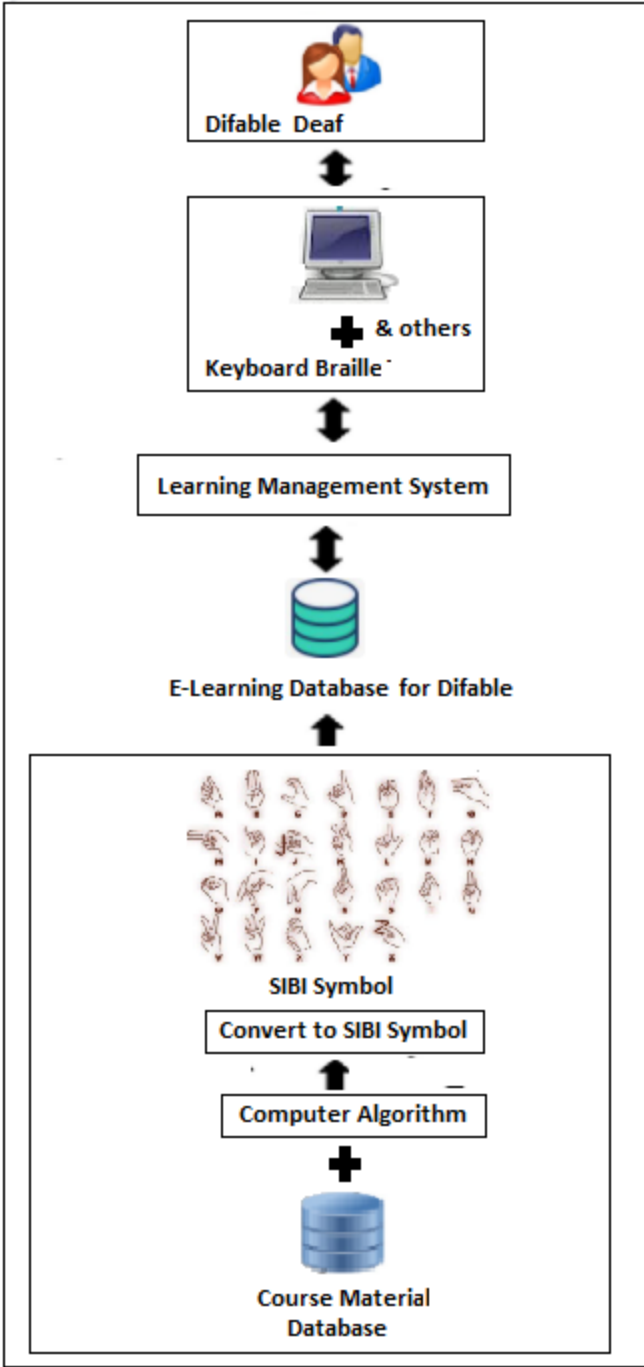


Figure 3. E-learning model for Disabilities

## 6. Conclusion

Persons with disabilities have the same rights to get learning and education, including using information technology that supports the learning process. This model was built specifically to help people with disabilities use e-learning. This model was built by paying attention to the limitations of persons with disabilities so that even with the existing limitations they can still use e-learning. One part of the model is the existence of a computer algorithm that converts teaching materials into materials that people with disabilities can understand

## References

- Kasim, E. R., Fransiska,., Lusli,., & Okta, S. (2010). Analisis Situasi Penyandang Disabilitas di Indonesia: Sebuah Desk-Review. Pusat Kajian Disabilitas, Fakultas Ilmu-Ilmu Sosial dan Politik Universitas Indonesia.
- Mayes, T., & De Freitas, S. (2007). Learning and e-learning. Rethinking pedagogy for a digital age, 13-25.
- Kuswari Hernawati(2011) ,E-Learning Untuk Siswa Berkebutuhan Khusus, Seminar Nasional Matematika dan Pendidikan Matematika dengan tema "Matematika dan Pendidikan Karakter dalam Pembelajaran" 3 Desember 2011 di Jurusan Pendidikan Matematika FMIPA UN, M.KomJurusan Pendidikan Matematika FMIPA UNYkuswari@uny.ac.id  
<https://pug-pupr.pu.go.id> > UU. No. 8 Th. 2016.
- Burnes, B. B. (1958). Who Are The Deaf?. American Annals of the Deaf, 224-228.
- Supria, Supria & Herumurti, Darlis & Nurul Khotimah, Wijayanti. (2016). Pengenalan Sistem Isyarat Bahasa Indonesia Menggunakan Kombinasi Fitur Statis Dan Fitur Dinamis Lmc Berbasis L-Gcnn. Juti: Jurnal Ilmiah Teknologi Informasi. 14. 217. 10.12962/j24068535.v14i2.a574.
- Ridwang, R. (2017). Pengenalan Bahasa Isyarat Indonesia (SIBI) Menggunakan Leap Motion Controller dan Algoritma Data Mining Naïve Bayes. Jurnal INSYPRO (Information System and Processing), 2(2).
- Alias, N. A., & Zainuddin, A. M. (2005). Innovation for better teaching and learning: Adopting the learning management system. Malaysian online journal of instructional technology, 2(2), 27-40
- Inayatulloh, Cahya, S. P. (2020, August). Block Chain Model for Regional Elections in Indonesia. In 2020 International Conference on Information Management and Technology (ICIMTech) (pp. 61-66). IEEE.
- Inayatulloh, "Successful of SMEs through Electronic Commerce Learning", International Journal of Innovation, Creativity and Change, ISSN: 2201-1315/E-ISSN: 2201-1323. July, 2020
- Inayatulloh, Hartono, I. K., & Alianto, H. (2020, August). Improving SMEs Knowledge and Performance With Cloud Computing CSF Model Approach: Systematic Literature Review. In 2020 International Conference on Information Management and Technology (ICIMTech) (pp. 664-668). IEEE.
- Inayatulloh, "Technology acceptance model (TAM) for the implementation of knowledge acquired model for SME" Proceedings of 2020 International Conference on Information Management and Technology, ICIMTech 2020, 2020, pp. 767-770, 9211279
- Inayatulloh, Hartono, I. K., & Alianto, H. (2019, August). Decision Support System Model for Badan Ekonomi Kreatif Indonesia. In 2019 International Conference on Information Management and Technology (ICIMTech) (Vol. 1, pp. 498-502). IEEE
- Inayatulloh, " IT governance training for small medium enterprises Model" Proceedings of 2020 International Conference on Information Management and Technology, ICIMTech 2020, 2020, pp. 876-880, 9211276
- Inayatulloh (2015), Early Warning System for infectious diseases, Proceeding of the 2015 9th International Conference on Telecommunication Systems Services and Applications, TSSA 2015, 2016, 7440435

## Biography

**Inayatulloh** is a candidate doctor at Bina Nusantara University's Doctor of Computer Science. Since 2000, Inayatulloh has been a lecturer at Bina Nusnantara University, school of information system. I am experienced in system development in several companies such as garment, petroleum, retail and others. Scopus indexed publications have been produced with topics related to information systems such as e-learning, e-SCM, e-CRM. E-government, block chain and others