

KAMUBISAKUL application to Facilitate students with hearing impairments to follow the lecture process

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Abstract: There are 20 students with special needs at Lambung Mangkurat University, 9 of which are students with hearing impairments. The obstacles experienced by students with hearing impairments during the lecture process are mainly communication problems, especially receptive language (the ability to understand the interlocutor). Not all lecturers understand the needs and characteristics of students with hearing impairments and sign language skills. However, students with special needs are required to follow and succeed in meeting the learning targets set by the lecturer. Therefore we need assistive technology (assistive) that can help students with special needs. In this case, students with hearing impairments make it easier for them to learn and achieve the expected targets. This research aims to develop assistive technology for students with hearing impairments to attend the lecture process. This study used a descriptive method with a qualitative approach, and the type of research used in this study was the Research and Development (RnD) type. This study selected research subjects using the purposive sampling technique to select nine students with hearing impairments at Lambung Mangkurat University. The stages in this research begin with: (1) Literature Study; (2) Needs Analysis; (3) Assessment; (4) FGD or Application Design; (5) Making the KAMUBISAKUL Application; (6) Trial of KAMUBISAKUL Application; (7) Dissemination of the KAMUBISAKUL Application; and (8) Evaluation. Assistive technology development carried out by the research team resulted in an application called KAMUBISAKUL. Based on research, this application is helpful for students with hearing impairments in interpreting essential terms used in lectures. These terms relate to information about the course enrollment flow, UKT (Tuition Fee) payment, lectures, names of college's rooms. This application is helpful for students with hearing impairments in interpreting essential terms used in lectures. These terms relate to information about the course enrollment flow, UKT payment, lectures, names of rooms in lectures. This application is helpful for students with hearing impairments in interpreting essential terms used in lectures. These terms relate to information about the course enrollment flow, UKT payment, lectures, names of rooms in lectures.

Keywords: Students with Hearing Impairment; Assistive Technology; KAMUBISAKUL application

INTRODUCTION

Language is an important means of conveying or receiving information in everyday life. Language has various forms that are not only limited to verbal language. Language is a tool used by fellow humans in interacting through the exchange of linguistic symbols, both verbal and nonverbal (Haraha, 2018).

Effendi (in Muhamad, 2018: 259) states that daily experiences show that the variety of spoken language is more than writing. The spoken variety differs from the written style because someone in a conversation utters a speech with specific stresses, tones, rhythms, pauses, or songs to clarify the meaning and intent of the speech.

Unlike the case with someone with hearing impairments. Hearing impairment in a person causes problems in language development, both receptive language (understanding spoken language) and expressive language (expressing orally and in speech). Barriers to language and speaking skills, both receptively and expressively, result in individuals with hearing impairments having difficulty communicating with their audience, which

generally uses verbal language as a medium of communication.

In language acquisition, individuals with hearing impairments are not taught about meaningful words but learn to connect experiences and language symbols obtained through what they see. After that, individuals with hearing impairments will begin to understand the relationship between language symbols and objects or events that occur, and receptive language is formed. This condition raises special needs that should be given services to facilitate the communication of someone with hearing impairments, which is a student with special needs in tertiary education.

One of the efforts to provide accessible services for students with hearing impairments is to develop assistive technology. Based on its function, assistive technology can be used to 1) Access other tools, 2) Improve communication, 3) Improve academic performance, and 4) Improve independent life skills (Sugiarmin, 2010).

One form of accessible services that can be provided to develop student understanding or even

prospective students with hearing impairments in participating in academic and non-academic activities in tertiary institutions is by providing infrastructure in the form of applications to make it easier for them to obtain the same educational rights as listening students.

The application contains information about packaged lectures in sign language and videos to give an impression and meaning to the vocabulary for candidates or students with hearing impairments.

Based on the data obtained, as many as 20 students with special needs study at Lambung Mangkurat University. The nine are students with hearing impairments. The main obstacle experienced by students with hearing impairments during the lecture process is communication problems, namely receptive language (the ability to understand the interlocutor). Not all lecturers understand the needs and characteristics of students with hearing impairments and sign language skills. However, students with special needs are required to follow and succeed in meeting the learning targets set by the lecturer. Therefore, it is necessary to have assistive technology (assistive) to help students with special needs with hearing impairments. Thus, it is easier for them to follow the learning and achieve the expected targets.

Based on the results of the initial assessment carried out through observation and interviews, it is known that there are difficulties experienced in following the lecture process. The difference in patterns, methods, and media of communication is one factor that hinders the teaching and learning process. In addition, the lack of adequate language skills modalities possessed by most students with hearing impairments also becomes an obstacle in attending lectures. The existence of a need as described above shows that students with hearing impairments need accessibility in order to make it easier for them to attend lectures as well as develop receptive and expressive language through the use of sign language, with hearing/text, expression/mimic barriers and so on other than just oral / speaking.

Sign Language prioritizes manual communication, body language, and speechless lips to communicate combined with orientation hand forms and hand gestures, arms, bodies, and facial expressions to express a thought (Setyawan, Tolle, & Kharisma, 2018).

Based on the explanation above, there is a solution that can overcome the problems that occur, namely by developing an application based on Indonesian Sign Language (Bisindo) by presenting various menus related to student activities in higher education, both for old and new students such as college registration procedures, the obligation to pay UKT (Tuition Fee), pre-requisites for lectures by making a lecture contract,

and participating in lecture activities by identifying lecturers, courses taken, compulsory exams are called the KAMUBISAKUL (Lecture Sign Language Dictionary) application which aims to make it easier students with hearing impairments participate in learning in higher education and create accessible learning for students with hearing impairments.

METHOD

This study uses a descriptive method with a qualitative approach. The type of research used in this study is Research and Development (RnD), which aims to produce practical applications for students with hearing impairments. According to Sugiyono (in Syadidul & Supriadi, 2019), R & R research is a research method used to produce a product and, after that, tests its effectiveness.

The selection of research subjects used the purposive sampling technique, which is how to take subjects based on the criteria of the research team (HR, 2019). The subjects in this study were nine students with hearing impairments studying in the Special Education Study Program, Faculty of Teacher Training and Education. The data collection techniques used in this study were observation, interviews, and documentation. In addition, this study uses data analysis techniques according to Milles and Huberman (in Anggito & Setiawan, 2018), namely:

Data reduction, namely sorting out data that is considered necessary, aims to focus on essential things, making it easier for researchers to understand data.

Display data is a presentation of some information obtained in order to conclude.

Data verification is reviewing the data that has been collected in order to conclude to get research results.

The data validation test in this study was conducted by experts who are competent in their fields, namely the GERKATIN Community and JBI (Sign Language Interpreters). There are six steps in the research process, including (1) identifying research problems, (2) studying the literature, (3) specifying research objectives, (4) collecting data, (5) analyzing and interpreting data, and (6) reporting and evaluating research (Creswell, 2012). Based on this, this research has a research framework that is used in the process of completing this research to produce a solution which can be described in the figure 1.

Based on the research framework, a discussion of each stage of the research carried out can be described, namely:

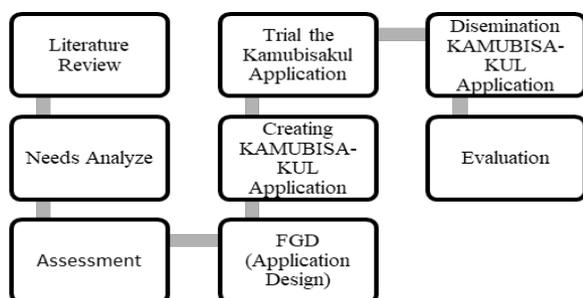


Figure 1. Research Framework

Table 1. Terms in College Registration

No.	Sign Vocabulary (Term in College Registration)
1.	Independent Path Registration
2.	Independent Path Examination
3.	Independent Path Selection Results
4.	Re-register on the Independent Line

Table 2. Terms in UKT Payments

No.	Sign Vocabulary (Term in UKT Payment)
1.	UKT (Single Tuition Fee)
2.	KRS (Study Plan Card)
3.	Study Plan Consul
4.	KRS filling
5.	Approve KRS

Table 3. Terms in Lectures

No.	Sign Vocabulary (Term in Lecture)
1.	Number of Courses
2.	List of attendees
3.	UTS
4.	UAS
5.	Course Value
6.	Remedial
7.	Class Schedule
8.	Observation
9.	Identification
10.	Assessment
11.	PPL
12.	Proposal
13.	Journal
14.	Essay
15.	Trial
16.	Judicium
17.	Graduation

Study of literature

At this stage, the researcher tries to find theoretical foundations that can be used to find solutions to the problems experienced. These theoretical foundations were obtained from various scientific journals and internet media to complement the need for knowledge, concepts, and theories.

Needs Analysis, The needs analysis refers to the actual conditions experienced by students with hearing impairments related to the special needs that services must provide during lectures.

Assessment, The assessment is carried out using the sign language ability instrument for lectures to collect data about students’ language skills with hearing impairments through observation and interviews.

Forum Group Discussion , *Forum Group Discussion* was conducted to formulate a draft application that will be used by inviting students with hearing impairments, deaf friends from Gerkatin, the Deaf Community, and Local JBI.

Making the KAMUBISAKUL Application, The KAMUBISAKUL application was developed with content formulated in the Group Discussion Forum.

Trial the KAMUBISAKUL application, The trial was conducted in order to determine the effectiveness of using KAMUBISAKUL for students with hearing impairments.

Dissemination of the KAMUBISAKUL Application, The dissemination of the Kamubisaku application consists of two stages. First, it is carried out by inviting volunteers, students with hearing impairments, deaf friends from GERKATIN, and prospective new students with hearing impairments.

Evaluation, The evaluation is carried out to assess the appropriateness of using the KAMUBISAKUL application for students with hearing impairments in lectures.

FINDING AND DISCUSSION

Finding

Barriers to language skills experienced by students with hearing impairments give rise to special needs, namely the need to identify how much vocabulary they have and receptive language skills to develop language and speech skills through various special services and exceptional facilities according to their needs. Based on the needs analysis, an assessment was carried out using sign language skills through observation and interviews. The following is the sign vocabulary used in assessing students with hearing impairments to interpret terms in lectures.

Table 4. Terms in Lecture Room Names

No.	Sign Vocabulary (Term in Lecture)
1.	Floor I
2.	PLB Laboratory
3.	PLB Lecturer Room
4.	Floor II
5.	RA room. Kartini
6.	Fuad Hasan room
7.	KH room. A. Dahlan
8.	Floor III
9.	Ki Hajar Dewantara Hall
10.	Library

Table 5. Terms on the Names of Lecturers

No.	Sign Vocabulary (Term in Lecture)
1.	Mr. Utomo
2.	Mrs. Ratih
3.	Mother Evi
4.	Ms. Hayatun
5.	Mr. Imam
6.	Mr. Amka
7.	Mr. Andi
8.	Mother Goddess
9.	Mrs. Jaleha
10.	Mrs. Mirna

Assessment related to the ability of sign language terms was carried out on nine students with hearing impairments. The assessment results carried out on students with hearing impairments showed that most of them still did not know the cues of the various terms used in the lectures mentioned above. So far, they are still using the spelling system using sign alphabets to indicate several terms in lectures.

The research team initiated a focus group discussion to determine the content displayed on the KAMUBISAKUL application. As a result, focus group discussions were held on October 24, 2020, and October 25, 2020, by inviting students with hearing impairments, deaf friends from Gerkatina, the Deaf Community, and the local JBI. The focus group discussion resulted in an agreement regarding the content of the KAMUBISAKUL application, which contained:

Lecture List Menu

The lecture list menu signal is that the left palm is raised upwards facing the cover's face, while the right palm facing the cover is hit into the left hand from the tip of the finger towards the fold of the elbow for four strokes. Then the index and middle fingers form a V while the thumb is positioned in the middle of the two fingers. This movement is directed towards the signal

and is attached to the forehead then moved forward. The lecture list menu consists of submenus which include cues: Independent Path Registration; Independent Path Examination; Independent Path Selection Results; Re-register on the Independent Line; *UKT Payment Menu*.

The fingers of the left hand that is supine, pointing forward in front of the chest, are bent twice. Then the right hand is facing forward with the middle finger, ring finger, and pinkie bent while the thumb and forefinger form a U. Then, the right hand is facedown facing forward in front of the chest with the thumb, middle finger, ring finger, and little finger bent. While the index finger that is slanted and points downward is attached to the index finger of the right hand that is pointing up to form the letter K. Then the index finger of the right hand that is pointing up with the forehead is attached to the index finger of the left hand that is pointed in front of the chest in the form of the letter T. a submenu that includes cues from: Single Tuition Fee (UKT); Study Plan Card (KRS); Study Design Consultation; KRS filling; *Approve KRS; Lecture Menu*

The index and middle fingers form a V while the thumb is positioned in the middle of the two fingers. This movement is directed towards the signal and is attached to the forehead then moved forward. The lecture menu consists of submenus which include cues from: Number of courses; List of attendees; Middle Test; Final Test; Course Value; Remedial; Class Schedule; Observation; Identification; Assessment; PPL; Proposal; Journal; Essay; Trial; Judicium; Graduation; Papers; Report; Presentation; Duty; Research; *Lecturer Name Menu*

The left hand is placed at the side of the body with the fingers open facing to the right. Then the thumb and index finger of the hand form a U letter, while the other three fingers are bent and placed on the palm and moved forward towards the finger. The lecturer name menu consists of submenus which include cues from: Dr. Utomo, M.Pd; Dewi Ratih Rapisia, M.Pd; Eviani Damastuti, M.Pd; Hayatun Thaibah, M.Psi, PSYCHOLOGY; Dr. Imam Yuwono, M.Pd; Dr. Amka, M.Si; Siti Jaleha, M.Pd; Agus Pratomo Andi Widodo, M.Pd; Mirnawati, M.Pd; Dewi Ekasari Kusumastuti, M.Pd; *Lecture Room Menu*.

The right and left hands are placed in front of the chest and attached in a prone position, but the thumb, ring finger, and little finger are bent. Therefore, the right hand is moved to the right, and the left hand is moved towards the left simultaneously. Then the index and middle fingers form a V while the thumb is positioned in the middle of the two fingers. This movement is directed towards the signal and is attached to the forehead then moved forward. The lecture room menu consists of submenus which include cues from: PLB Laboratory; PLB Lecturer Room; RA room. Kartini; Fuad Hasan room; KH room. Ahmad Dahlan; Ki Hajar Dewantara Hall; Library.



Figure 3. KAMUBISAKUL Application Trial Activities



Figure 4. Dissemination activities for the KAMUBISAKUL application

After formulating the content that will fill in the application, the research team began to develop the KAMUBISAKUL application with IT experts who also have special education backgrounds. The following is a display of the Lecture Sign Language Dictionary (KAMUBISAKUL) application that has been designed for students with hearing impairments, namely:

Based on the appearance of the menu above, when the user clicks on one of the menus, it will display the words “play,” which contains a signal from the selected menu. At the bottom, there is the menu’s name, and if it is selected, a sub-menu will appear. When the user clicks on the sub-menu, a video signal will appear from the selected sub-menu, and at the bottom of the signal, there is a brief explanation of the sub-menu.

After developing the KAMUBISAKUL application, to determine the effectiveness of using the application for students with hearing impairments, the Team conducted a trial application on November 21, 2020. Based on trials conducted, the feedback from students with hearing impairments was positive. The advantages of this application that students with hearing impairments can feel are a column containing vocabulary descriptions that can make it easier for them to understand the meaning of terms in lectures.

The KAMUBISAKUL application also provides photos/images to maximize the visualization of students with hearing impairments. For example, photos available in this application are photos of lecturers

and lecture rooms. However, students with hearing impairments experience a little confusion when they first try to use the KAMUBISAKUL application. It is happening because there are no tutorials or instructions for using the application.

In addition, many menus have to be clicked, so it requires several steps before returning to the initial view. This application has a different appearance, namely that no colors and photos of lecturers and rooms appear if installed on the Android OS version 8.1. Then this application is not yet available for IOS users. The home feature in this application is not yet available, and on the sentence Floor 1,2,3, there is still no sign video.

In the first trial of the KAMUBISAKUL application, there were some errors in the technical application. Then, for the second trial held on November 22, 2020, an error entered a video signal like in the Ahmad Dahlan lecture room. According to students with hearing impairments, several gesture movements were incorrect, namely the name sign Mr. Dr. Imam Yuwono, M.Pd, exam word sign, space word sign, and research word sign. In the word Assessment, there is an error in writing Asismen. There is no abbreviation of these abbreviations for UTS (middle test) and (final test). For the third trial, which was held on November 23, 2020, the application can be appropriately installed on all Android OS, errors in the system and content in the application have been fixed.

The next stage after implementing the application trial is the dissemination activity. In the first phase of the dissemination activity, held on November 28, 2020, the Team invited volunteers, students with hearing impairments, and deaf friends from GERKATIN. Their responses, especially deaf friends from GERKATIN, are very interested in the KAMUBISAKUL application. Even though some do not understand some terms in lectures, there is a vocabulary description column that can help them understand the meaning or meaning of each of these terms.

For volunteers and students with hearing impairments, the KAMUBISAKUL application is beneficial because they no longer need to spell/spell alphabet signs for terms that previously had no signs, such as UKT, UTS (middle test), UAS (final test). Then the KAMUBISAKUL application is beneficial for new students who have hearing impairments because they will easily understand various lecture terms through this application.

Unlike the first stage of dissemination, the second stage of the dissemination activity was held on November 29, 2020, and the Team invited students with hearing impairments who wanted to continue their education at Lambung Mangkurat University College. Although in the stage 2 dissemination activity, the target is different from the first stage, it is intended that students with

hearing impairments when entering college, both when they want to register for college to sit in lectures, can already know the terms that are usually used in lectures. Therefore, this KAMUBISAKUL application is helpful for students with hearing impairments and very useful for hearing people who will communicate with those with hearing impairments.

The final stage in developing the KAMUBISAKUL application is an evaluation activity. Based on the evaluation results, the KAMUBISAKUL application development follows the assistive technology development procedure for MBK with Hearing Impairment. Because this technology development process begins with conducting a special needs assessment related to the terms used by students during the lecture process.

Based on the assessment results, MBK with hearing impairments need aids to improve their language skills or recovery terms that can support their ability to follow the lecture process. Sign language regarding terms in the lecture process was agreed upon through an FGD with students with hearing impairments, deaf friends from Gerkatina, the Deaf Community, and the Local JBI. Creating the KAMUBISAKUL application content involves deaf and hard of hearing students, volunteers, the Deaf community, and the local JBI, especially in making sign language videos according to the agreement of the FGD results and making applications in collaboration with IT experts with Special Education backgrounds, so that the KAMUBISAKUL application can be produced into a functional and valuable application for students with hearing impairments.

Discussion

As one of the inclusion universities that has accepted students with special needs, in this case, students with hearing impairments, the tertiary institution should provide innovation or technological convenience for the continuity of lectures for students with special needs.

Hearing impairment is a condition in which a person experiences difficulty or cannot hear at all due to limited or malfunctioning hearing aids. A person with hearing impairment has a high risk of hearing experience problems, including phonology, morphology, and syntax (Sundstrom & Samuelsson, 2018).

It is also related to a person with hearing impairment with a different experience from someone who can hear. It has the consequence that they are at risk of experiencing difficulties interpreting the information they receive verbally in a different way. This condition also results in someone with hearing impairments having difficulty interpreting the learning material provided by lecturers in lectures because they

must require comprehensive language skills (Meinzen-Derr, Wiley, R. McAuley, & Grether, 2017).

MA Hersh and MA Johnson (in Budhi, Yuli, Ratnawulan, Dede, & Luqmanul, 2019) Communication carried out in everyday life is often done through sound signals in the form of lectures in class. Even though someone with a hearing impairment may not be able to use sound signals to communicate effectively, students with hearing impairments emphasize their visual abilities in understanding the material given in the lecture.

One of the services provided is by utilizing assistive technology development. Based on its function, assistive technology can be used to 1) Access other tools, 2) Improve communication, 3) Improve academic performance, and 4) Improve independent life skills (Sugiarmin, 2010).

Some of the assistive technology functions have been represented by the application developed by the researcher, namely KAMUBISAKUL. Based on the research conducted, it can be seen that this application helps students with hearing impairments to communicate and understand the meanings of terms in lectures. The development of vocabulary that students understand with hearing impairments will more or less affect academic performance during lectures. In addition, easy access to this application allows students with hearing impairments to understand the meaning of important terms used in lectures independently.

CONCLUSION

Based on the research conducted, it can be concluded that the development of the KAMUBISAKUL application can help students or prospective students with hearing impairments in interpreting essential terms used in lectures. For example, these terms are related to information about the course registration flow, UKT payment, lectures, lecturers' names, and the names of lecture rooms.

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