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COMPARISON OF JAWS AND NVDA AS ASSISTIVE TECHNOLOGY FOR COLLEGE STUDENTS WITH SPECIAL NEEDS AT UNIVERSITAS NEGERI SURABAYA

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Abstrak

Teknologi Asistif adalah poin penting yang tidak dapat dilepaskan dari Mahasiswa dengan Kebutuhan Khusus sebagai saran pendukung dalam perkuliahan. Ini juga berdasarkan Pasal 5 ayat (2) huruf g Permendikbud nomor 46 tahun 2014; di mana salah satu dari mereka menyebutkan bahwa universitas harus memiliki buku bicara. untuk Mahasiswa Berkebutuhan Khusus aplikasi adalah dukungan dalam kegiatan sehari-hari, terutama dalam proses perkuliahan untuk memfasilitasi siswa ini dalam memproses informasi yang disampaikan dalam proses diskusi. Beberapa aplikasi yang digunakan oleh Mahasiswa Berkebutuhan Khusus terutama tunanetra adalah JAWS dan NVDA. JAWS sendiri adalah Job Access With Speech yang merupakan aplikasi pembaca layar atau (*screen reader*) adalah perangkat lunak untuk membantu orang buta mengoperasikan komputer atau PC. Penelitian ini menggunakan pendekatan kualitatif dengan subjek lima siswa tunanetra. Teknik pengumpulan data melalui wawancara dan observasi. dari hasil studi lima subjek mayoritas menggunakan kombinasi dua aplikasi pada perangkat. Hasil menemukan analisis bahwa kedua aplikasi tidak mempengaruhi hasil belajar dan tidak ada yang lebih efektif, kedua aplikasi mendukung secara bersamaan ketika digunakan baik offline maupun online.

Kata Kunci: Tunanetra, teknologi asistif, pembaca layar, *JAWS* , *NVDA*

Abstract

Assistant technology is an important point that cannot be released from College Students with Special Needs as supporting advice in the lecture. This is also based on Article 5 paragraph (2) letter g Permendikbud number 46 of 2014; where one of them mentioned that universities should have a talking book. for Students with Special Needs, application is a support in daily activities, especially in the lecture process to facilitate these students in processing the information submitted in the discussion process. Some applications are used by Students with Special Needs Especially blind people are JAWS and NVDA. JAWS itself is Job Access With Speech which is a screen reader application or (screen reader) is a software for help blind people operate a computer or PC. This study uses a qualitative approach with a subject of five students with visual impairment. Technique data collection through interviews and observations. from the results of the study of five subjects the majority use a combination of the two applications on the device. Results found analysis that the two applications do not affect learning outcomes and do not exist more effectively, both applications support simultaneously when used both offline and online.

Keywords: Blind, assistive technology, screen readers, JAWS, NVDA

PRELIMINARY

Assisive technology can also be a software application that helps activities individuals in daily productivity. Likewise for Students with Needs Specifically, the application is a support in daily activities, especially in the lecture process to facilitate students in processing information delivered during the discussion process. Some applications are used by students Special Needs, Especially the Blind are JAWS and NVDA. JAWS itself is Job Access With Speech which is a screen reader application or (screen reader) is software to help blind people operate a computer or PC. JAWS is produced by the Blind and Low Vision Group (Freedom Scientific) at St. Petersburg, Florida, United States. JAWS was created for people who suffer from obstacles in vision so they are easy to use Microsoft Windows independently. But JAWS applications are more likely to be as Paid applications for its users. Whereas, NVDA (NonVisual Desktop Access) is a free screen reader application that helps students Special Needs with visual impairments in operating the computer. Both of these applications have their own differences in each (Settings, Operations, rates, features available, languages used in the application, etc.)

Based on the differences between JAWS and NVDA applications through this study raised about the comparison of the two applications based on the improvement of learning outcomes of blind students at Surabaya State University. This is also based with the world entering the era of the industrial revolution 4.0 where the use of technology which is utilizing IT runs massively in parts of the world. This is in line with the use of JAWS and NVDA applications that also utilize IT in the form Software to provide facilities for blind students. Through this research raised a comparison that is processed into a draft and then processed again into scientific articles and tutorials for using these two applications effectively because in the use of supporting applications there are problems in their operations, especially in the first time operation for MBK (Students with Special Needs). Seeing the existence of several problems that exist in the field of utilization of educational technology, especially in the scope of Surabaya State University This paper focuses on studying and researching "Comparison of JAWS and NVDA as assistive technology towards improving the learning outcomes of Blind Students at the Surabaya State University "through application user interviews namely Blind and Student documentation of learning outcomes for blind students. Expectations from the following research results is finding comparisons that give advantages to JAWS applications and NVDA towards improving learning outcomes of blind students at the State University Surabaya. Seeing the existence of several problems that exist in the field of utilization of educational technology, especially in the scope of Surabaya State University This paper focuses on studying and researching "Comparison of JAWS and NVDA as assistive technology towards improving the learning outcomes of Blind Students at the Surabaya State University "through application user interviews namely Blind

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METHOD

The research method or design used is a sequential model or explanatory design namely a combination of research methods that combine quantitative and qualitative research methods sequentially. This quantitative method serves to obtain measurable quantitative data that can be descriptive, comparative, and associative and qualitative methods playing a role in proving, deepening, expanding, weakening, and invalidating the quantitative data that has been obtained since the beginning (Sugiyanto, 2012: 415) The quantitative method is used in benchmarking assistive technology NVDA and JAWS on learning outcomes of Students with Special Needs especially on Students with visual impairment at Surabaya State University, while Qualitative comparative comparison of the same variables for different samples in-depth data comparisons were obtained,

1. Data Collection Techniques

   Data collection techniques used in this study include:

   a. Literature studies, including literature such as journals, scientific articles relating to students with special needs at the university.
   b. Field studies, including the collection of data that is primarily taken from the results of interviews, observation and documentation.

2. Data Analysis Techniques

   Data analysis techniques in qualitative data analysis, according to Nasution (1988) in (Sugiyono, 2015: 245) states the analysis has begun since formulating, and explaining the problem, before plunging into the field and continuing until writing research results. But in qualitative research, more data analysis is focused during the field process together with data collection. Technique This qualitative analysis uses an interactive model. This model has 4 components, namely: data collection, data reduction, data presentation, and drawing conclusions.

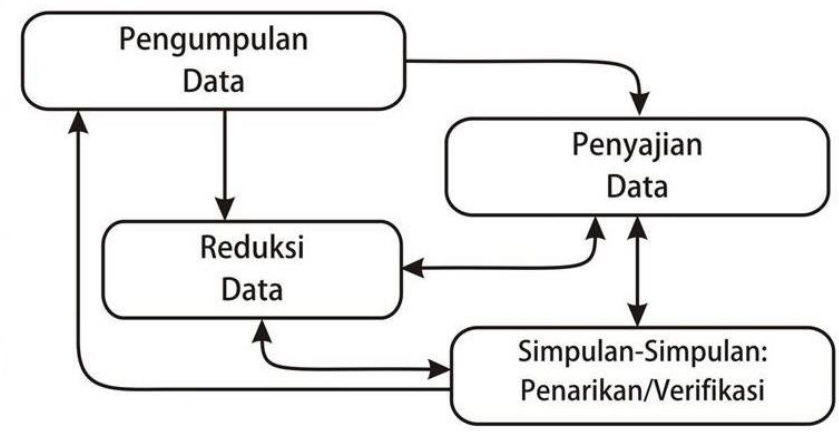

Figure 1. Data Analysis

The explanation of the interactive model is as follows:

a. Data collection

   Data collection from various sources to support research.

b. Data reduction

   The reduction process is the process of selecting or filtering from various sources data that has been collected directly. Data will be selected and adjusted structurally during the research process. Researchers will classify the data to match research objectives. Data reduction makes it easy researchers to focus on research so that it continues until the end research report.

c. Presentation of data

   The process of presenting this data is a series of results from the data present and an overview of information obtained directly. Researchers will presenting data in depth and relevant by analyzing data has been obtained.

d. Drawing conclusions

   From the results of the data obtained, the researcher will draw conclusions based on the results of data collection and theories to find out the cause and effect of formulation of the existing problems in order to obtain valid information and data based on analysis conducted by researchers.

RESULTS AND DISCUSSION

Code Question	Informant	JAWS	NVDA
A1	T	The audio features are the same	The audio features are the same
	M	The audio features the same as NVDA	The audio features are the same like Jaws
	P.	Available features are the same	Available features are the same
A2	T	Only two languages can be used, namely Language Indonesian and English	Can use other than Indonesian and English
	M	in Jaws there are only two languages, namely Indonesian (Damayanti) and English (Al quen)	on NVDA can use other than Indonesian and English.
	P.	The language features can be set as desired, however more proper to English because I was used to it since I was little	The language features can be set accordingly desires, but more proper to English because I was used to it since I was little
A3	T	The Jaws application can only read Indonesian and English	NVDA applications can read can read foreign languages the other
	M	Can only read Indonesian and English writing	Can read foreign languages besides Indonesian and English
	P.	Can read a foreign language if the language vocalizer is installed	Can read a foreign language if the language vocalizer is installed the
A4	T	able to read symbols	able to read *symbol*
	M	Able to read symbols	Able to read symbol
	P.	screen readers are able to read symbol	screen reader capable read the symbol
A5	T	able to read icons	able to read icons
	M	able to read icons	able to read icons
	P.	able to read icons	able to read icons
A6	T	able to read all kinds of file types. the important thing is the laptop can support	able to read all kinds of file types. that it's important the laptop can support
	M	Able to read all kinds file type	Able to read everything file types
	P.	Able to read all kinds file type	Able to read everything file types

A7	T	screen reader applications are able to read column tables, but read sideways	screen reader applications are able to read column tables, but read on sideways
	M	Able to read tables	Able to read tables
	P.	able to read the column table	able to read tables columnist
A8	T	right in reading words and sentences, both applications same	right in reading words or sentences, both applications are the same
	M	Right in reading words or sentence	Right in reading words and sentences
	P.	screen readers are right in reading words and sentences	screen readers are right at reading words or sentence
A9	T	there are bugs or lag but rarely.	frequent application bug or lag occurs is NVDA: no talking but seen from friends watch out walk
	M	Bugs or lags rarely occur	Sometimes experience bug or lag
	P.	there are bugs or lags but rarely	Due to the performance of the laptop used
A10	T	-	-
	M	The tone is very pronounced clear	Spoken tone very clear
	P.	the screen reader application is very clear, both Jaws and NVDA	on the screen reader application is very clear, fine Jaws and NVDA
A11	T	Pronounced clearly	Pronounced clearly
	M	The pronunciation is very clear	Pronounced pronunciation very clear
	P.	The pronunciation is pronounced on a clear screen reader application, both Jaws and NVDA	The pronunciation is pronounced on a clear screen reader application, both Jaws or NVDA
A12	T	the latest jaws for windows 2010 require internet so there will be lots of pop ads during installation, and block it must be one one.	There are no pop up ads on the screen reader application
	M	There are no pop up ads	There are no pop up ads
	P.	There are no pop up ads on the layer reader application, if there are pop up ads on the web, they can be read	There are no pop up ads on the layer reader application, if there are any pop ups advertisements on the web can be read

A13	T	-	-
	M	Able to read the toolbar	Able to read toolbar
	P.	a screen reader application is able to read the toolbar	screen reader application is able to read toolbar
A14	T	unable to translate picture	Not capable translate images
	M	Unable to translate picture	Not capable translate images
	P.	-	-
A15	T	unable to translate subtitles on video	unable to translate subtitles on video
	M	Unable to translate subtitles on video	Not capable translate subtitles on video
	P.	unable to translate subtitles on video	Not capable translate subtitles on video
B1	T	The volume settings in the reader application can follow the device settings and set the application itself	The volume settings in the reader application can follow the device settings and set the application itself
	M	Volume settings can follow the settings on a computer device	Volume settings can follow the settings on a computer device
	P.	The volume settings in the reader application can follow the device settings and set the application itself	The volume settings in the reader application can follow the device settings and set the application itself
B2	T	Yes, the sound on the screen reader application can be translated by clean ears without interruption	Yes, the sound on the screen reader application can be translated by a clean ear without disruption
	M	The sound produced can be translated cleanly and clearly without interference	The sound produced can be translated cleanly and clearly without interruption
	P.	The sound on the screen reader application can be translated by clean ears without interruption	The sounds on the screen reader application can be translated by clean ears without interference

B3	T	voiceover on the screen reader application can be changed to English	voiceover in a screen reader application can be changed to Language English
	M	Voiceover can be changed to English	Voiceover can be changed to English
	P.	voiceover on the screen reader application can be changed to Indonesian	voiceover in a screen reader application can be changed to Language Indonesia
B4	T	-	there is a lag in the voiceover on the reader application NVDA screen
	M	There is no lag in voiceover	There is no lag in voiceover
	P.	There is no lag in voiceover on a good screen reader application Jaws and NVDA	There is no lag in voiceover on the application good screen reader Jaws or NVDA
B5	T	Voiceover in screen reader applications does not disturb the ear	Voiceover on screen reader applications doesn't make ears disturbed
	M	Very reader screen intonation clear	Screen reader intonation very clear
	P.	Voiceover in screen reader applications does not disturb the ear	Voiceover on screen reader applications doesn't make ears disturbed
B6	T	the intonation of the screen reader application is very clear	very intonation on a screen reader application clear
	M	Pause every word can be understood	Pause every word you can understood
	P.	, the intonation of the screen reader application is very clear	**,** very intonation on a screen reader application clear
B7	T	pausing every word on the application can be understood	pausing every word on the application can be understood
	M	Pause on each word can be understood	pauses on each word can be understood
	P.	pausing each word can be understood	Pause every word you can understood
C1	T	JAWS installation is a bit complicated	NVDA installation is not too complicated
	M	easy during installation	a little complicated
	P.	JAWS is easier	NVDA is a little complicated

C2	T	Can set yourself	can set yourself
	M	can setup yourself	can setup yourself
	P.	can set yourself	can set yourself
C3	T	There are no bugs when paired with other applications	no bugs if juxtaposed with other applications
	M	There are no bugs when paired with other applications	There are no bugs when compared with another application
	P.	ever, when opening an application that eats a lot of ram	ever, when opening applications that eat ram a lot
C4	T	What is done is to contact Windows Narrator, the application be my eyes	What is done is to contact windows narrator, be my eyes application
	M	Restart the laptop	restart on the laptop
	P.	restart the laptop	restart on the laptop
C5	T	There is no influence	no influence
	M	no influence	no influence
	P.	no influence	no influence
C6	T	the battery becomes wasteful	the battery becomes wasteful
	M	the battery becomes wasteful	the battery becomes wasteful
	P.	the battery becomes wasteful	the battery becomes wasteful
C7	T	No, so far the component damage has not been caused by a screen reader application	No, so far the damage has not been caused by the component screen reader application
	M	No, so far the component damage has not been caused by a screen reader application	No, so far the damage has not been caused by the component screen reader application
	P.	No, so far the component damage has not been caused by a screen reader application	No, so far the component damage not caused by a screen reader application
D1	T	To reach the desired sentence can be tricked by converting to notepad	To reach the desired sentence can be tricked by converting to notepad
	M	Using Control + G	Using Control + G.
	P.	To reach the desired sentence you can use shortcuts in documents such as chapters, subchapters and ctrl + F search	To reach the desired sentence you can use shortcuts in documents such as chapters, subchapters and ctrl + F search

D2	T	Adjustable speed	can be arranged its speed
	M	-	-
	P.	Quick, back again depends on the performance of the laptop	Quick, back again depending on performance the laptop
D3	T	-	-
	M	-	-
	P.	JAWS IDR 14,000,000 for 5 PCs, NVDA Free	JAWS for IDR 14,000,000 5 PCs, NVDA Free
D4	T	no need	no need
	M	Yes, using supporting tools such as Open Book Scanning & Reader	Yes, using supporting tools such as Open Book Scanning & Reader
	P.	Yes, use a headset for college	Yes, use headset for college

CONCLUSION

Based on the results of research and discussion in this study, it was obtained as a conclusion as follows:

1. Application of NVDA and Jaws as assistive technology for students with specific needs at Surabaya State University strongly supports the learning process students with special needs at Unesa. both applications feature-wise, performance, audio, and accessibility have their advantages and disadvantages same or different.
2. There are differences in the application of NVDA and Jaws as assistive technology for students with special needs at Surabaya State University, it's just that these differences do not have a major effect on the use of the application where applications can complement each other. From the results of this study, it can be conclusions in the form of both applications have advantages and disadvantages on each of them (installation, features, readability, volume, etc.) so need to be used simultaneously so that both offline use and online accessibility is unlimited. Also related to results Student learning depends on the student's motivation, utilization The application returns to users who use it efficiently and appropriately.

Student learning outcomes are not influenced by the two applications, NVDA and Jaws are only a tool to support visual translation audio forms. Learning outcomes are tied to learning motivation and deep user goals application utilization.

Suggestion

Based on the results of the study found several conclusions that can be pulled into several. These recommendations include the following:

1. Learning outcomes are not influenced by the use of the application alone but by utilization of these students, is used to access literacy or just used as an additional tool without the purpose of accessing the student should focus on using the features of both applications for literacy fulfillment or to support the achievement of learning outcomes in lectures.
2. Campus can involve regular students as facilitators for configuration the two applications are through a training program and introduction to both applications so, if there are problems in the installation of the software it can be overcome with the help of regular students as colleagues.

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