

Revisiting the English Textbook Accessibility based on the Universal Design Learning Principles

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Abstract

Textbooks based on the teaching and learning process should be relevant to any students including students with disability, there are a lot of textbooks that are not suitable enough to provide accessible material. The goal of this study was to evaluate Universal Design for Learning (UDL) concepts in 2 online modules on UDL that were taught over one semester alongside English as a Foreign Language (EFL) lectures. The module is divided into 10 chapters that each discusses one of five categories of exploratory texts. To clarify the UDL concepts used in the curriculum, this research applied Textbook analysis using the Center for Applied Special Technology (CAST 2018) design framework. The results demonstrate that more UDL concepts, which notably provide multiple means of engagement, representation, and action & expression, can be used to provide better accommodation for blind students to support inclusion in educational materials. In addition, a strong desire to use the UDL concepts in their future teaching is encouraged through university modules. There is a discussion of restrictions and repercussions.

Keywords: Universal Design Learning (UDL), English as a Foreign Language (EFL), Blind

1. Research Background

An educational system known as inclusive education provides opportunity for students with special needs to learn and advance their learning abilities alongside ordinary students. (Mølster & Nes, 2018). Inclusive education aims for students with disabilities to learn alongside others (Sari et al., 2020). Giving students with disabilities the opportunity to learn alongside pupils who do not have disabilities is what inclusive education entails (Guillemot et al., 2022). The Convention on the Right of Person with Disabilities (CPRD) conducted by the United Nations (2006) established that “Person with disabilities can access an inclusive, quality and free primary education and secondary education on an equal basis with others in the communities in which they live” (Lang et al., 2011). In fact, challenges facing students with disabilities in learning in an inclusive context are notable, it is more difficult to teach impaired pupils English as a foreign language than it is to teach it to average students. Teaching kids with intellectual

disabilities are extremely challenging, according to (Nurchahyo, n.d.) because each student has a different disability

English Language Education Program of the Faculty of Cultural Studies, Universitas Brawijaya, has been facilitating Blind students to learn English. One of the efforts to ensure their full participation is providing accessible learning materials. Accessible learning materials are print- and technology-based educational material, including printed and electronic textbooks and the related core material that are designed or enhanced in a way that makes them usable across the widest range of learner variability, regardless of format (e.g., print, digital, graphic, audio and video).

The significance of the accessible materials is specifically ensuring that blind learners have a proper education and make sure that they can have feasible learning and teaching process. Blind can be defined as the condition of a person who is lost in sight and vision. This condition compels them to increase their other skills such as hearing and tactile skills (Lintangsari & Emaliana, 2020). Therefore, the materials in the teaching and learning process should be able to accommodate their special needs. Relating to the current condition, the textbook that is used in the learning and teaching process is not qualified enough to accommodate blind students. Universal Design Learning is a curriculum that places a strong emphasis on the requirement for flexibility and encourages professors to think about a framework for creating lessons that offer a variety of modes of representation, expression, and participation (Pliner & Johnson, 2004).

According to the Universal Design Learning principle, the material must be able 1) to support recognition learning; (2) to support strategic learning (3) to support effective learning. These three principles are founded on the idea of flexibility in the design of teaching strategies, such as offering different types of content in print, soft files, braille, and audio, offering different assignments in the form of audio, writing, projects, and visuals, as well as different rewards, and so on. Students with visual impairments said that using a screen reader instead of a human reader for tests is preferable. The principles of fairness and flexibility in use for UDL and the concept of expression for UDL would be satisfied if exams had been created with UDL principles, such as having accessibility built-in (Black et al., 2015) so this study conduct to revise the textbook so it can be more accessible for student with visual impairments.

Therefore, research into the use of accessibility and UDL principles in the construction of multimedia textbooks is critical, and the findings of this type of research should be published as soon as possible. In addition, the practice of inclusive education based on the dissemination of research results still rarely touches the basics, namely learning tools, especially textbooks, even though textbooks as a provider of learning materials can be learning facilities that increase student participation in learning at favorable times. To that end, textbooks serve as an essential teaching resource for

students who, to achieve the goal of self-directed learning, must be provided with the information they need to succeed in the real world.

2. Methodology

This chapter will discuss a brief explanation of how the research is designed and collected.

2.1 Research Design

This research uses A Textbook Analysis methodology. There are two textbooks in this research namely Reading Comprehension textbook and Critical Reading Textbook, they reason why this research conduct based on Reading Comprehension and Critical reading subject is because those subject need to emphasizing that students' reading ability must be converted and modified in such a way that it can accommodate the needs and abilities of students with disabilities, especially blind students without reducing the quality and quality of learning. The analysis is based on the Universal Design Learning (UDL) principles. The assessment indicators only have one dimension and two sub-dimensions explaining Lecture Material in the form of Word, PowerPoint, and PDF documents also Lecture Material in the form of Audio and Video as presented in Table 1.

Table 1. Assessment Indicators

LECTURE MATERIALS	
Materials in the form of PowerPoint and PDF documents	Materials in the form of Audio and Video
<ol style="list-style-type: none"> 1. Use recommended fonts such as Times New Roman, Verdana, Arial, Tahoma, Helvetica, or Colibri 2. The text is easy to read and contrasts in color from the background. For example, if the background is white, the text is black so it is easy to read. 3. Use the bullet points menu to express bullets or sub-bullets 4. Using a hyperlink with a link name that matches its content, instead of just copy and pasting the link as is. 5. Visual information such as images, graphs, and tables are equipped with Alternative Text so that it can be described by a screen reader 6. Visual information such as images, graphs, and tables come with descriptive captions or captions 7. Documents are created based on 	<ol style="list-style-type: none"> 1. The audio file features a transcript so that Blind users can access its contents. 2. Video with Caption or Subtitle 3. Visual information is complemented by clear and detailed audio descriptions (for example: using the phrase "Flower Image" instead of using the sentence "this image").

the stacking of documents using Headings, subheadings so that they can be well described by the screen reader OCR-based text so that it can be read by a screen reader.

2.2 Data Collection

The data collection was accumulated using Interrater analysis and examined by two reviewers for each book. The result of the review then calculated the reliability of the interrater to see the consistency using SPSS based on the kappa coefficient value. According to Fleiss (1975), the kappa value categories are as follows:

- If the Kappa value < 0.40 then the reliability between appraisers is low.
- If the Kappa value is $0.40 < k < 0.75$ then the reliability between appraisers is good.
- If the Kappa value > 0.75 then the reliability between appraisers is very good.

After calculating the Kappa value, we found that the reliability interrater in Reading Comprehension textbook is in the acceptable category with a Kappa coefficient value of 0.566 as presented in table 2.

Table 2. Interrater Reliability textbook Reading Comprehension

		Value	Asymptotic Standardized Errors	Approximate T ^b	Approximate Significance
Measure of Agreement	Kappa	.566	.138	3.735	.000
N of Valid Cases		22			

The reliability interrater in the Critical reading textbook is in the Very Good category with a Kappa coefficient value of 0.925 as presented in table 3.

Tabel 3. Interrater Reliability textbook Critical reading

		Value	Asymptotic Standardized Error	Approximate T ^b	Approximate Significance
Measure of Agreement	Kappa	.925	.074	5.685	.000
N of Valid Cases		22			

3. Findings and Discussions

This chapter will discuss a brief explanation of the accessibility in both Reading Comprehension and Critical Reading textbooks.

3.1 The accessibility of PowerPoint and PDF Material

Based on the research design, there are two types of material forms. The first dimension is on the PowerPoint and PDF material. There is an accessibility checklist in the data collection. The data is served in table 4.

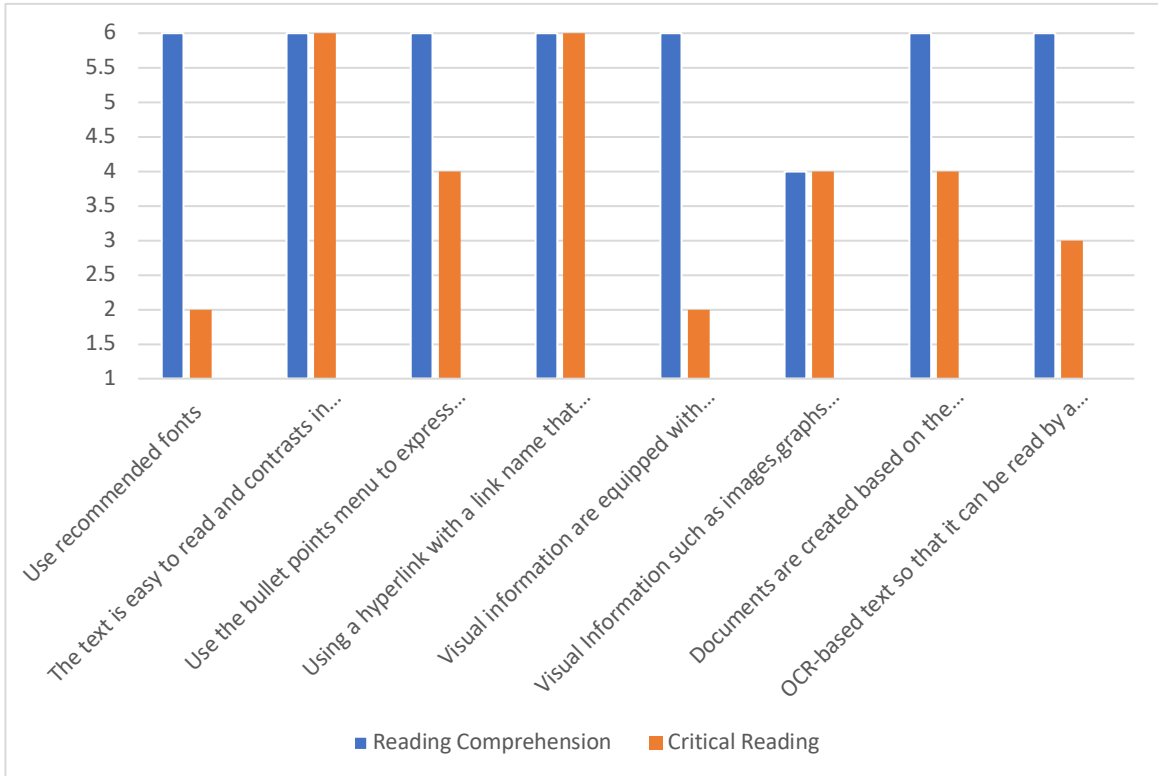


Table 4. The accessibility of PowerPoint and PDF Documents

From table 4 we are able to perceive the trend of the data collection. The statistic shows the accessibility of the material in the form of PowerPoint and PDF documents. There are several statements in assessment indicators. The first statement “Use recommended fonts such as Times New Roman, Verdana, Arial, Tahoma, Helvetica, or Colibri” in the Reading Comprehension textbook uses the recommended fonts stated. On the other hand, The Critical Reading textbook only uses Cambria font in the modules. That is the reason why the Reading Comprehension textbook is more accessible in this statement.

The second statement “the text is easy to read and contrast in color from the background” shows on the table both Reading Comprehension and Critical reading are already accessible because both the textbook contrasts the text color and the background.

The third statement is “Use the bullet points menu to express bullets or sub-bullets”. Reading Comprehension textbook already uses bullet points for the material in the book. The Critical Reading Textbook according to the reviewer the Critical reading

textbook already uses the bullet point in some material. However, there is some information that requires bullet points but still missing. The result is Reading Comprehension Textbook is more accessible than the Critical Reading textbook in form of the usage of a bullet points menu.

The fourth statement is “Using Hyperlink with a link name that matches its content”. Both the Reading Comprehension and The Critical reading textbooks already use Hyperlinks with a link name same to the content to make sure that the student easier to clicks the link and opens the material. That is why both of the books are already accessible in the form of using hyperlinks with a link name that matches its contents.

The fifth statement is “Visual information is equipped with the alternative text”. The Reading Comprehension textbook already provides visual information with an alternative text. Besides, in the Critical Reading textbook, the visual information is not equipped with an alternative text. In the form of a statement visual information is equipped with alternative text, Reading Comprehension textbook is more accessible than the Critical Reading textbook.

The sixth statement is “Visual information such as images, graphs and tables come with descriptive captions and caption”. Both textbooks already provide descriptive captions and captions in the material. But, there are some images that are only supplemented by the source without any explanation about the image. There are also graphs and tables that have no descriptions. Thus, it is necessary to provide visual information in pictures, graphs, and tables. In the form of providing descriptive captions and captions for visual information (pictures, graphs, and tables) both of the textbook is accessible.

The next statement is “Documents are created based on the stacking of documents using Headings, and subheadings so that they can be well described by the screen reader”. The book "Reading Comprehension" has been equipped with a document stack using Headings and subheadings so that it can be well described by the Screen Reader. This will make it easier for visually impaired students to access learning media. However, in the Critical Reading textbook, there are some subheadings that are not clear so it is worrying that it will be quite difficult to read by the screen reader. The Reading Comprehension textbook is more accessible in the form of stacking documents using Headings and subheadings.

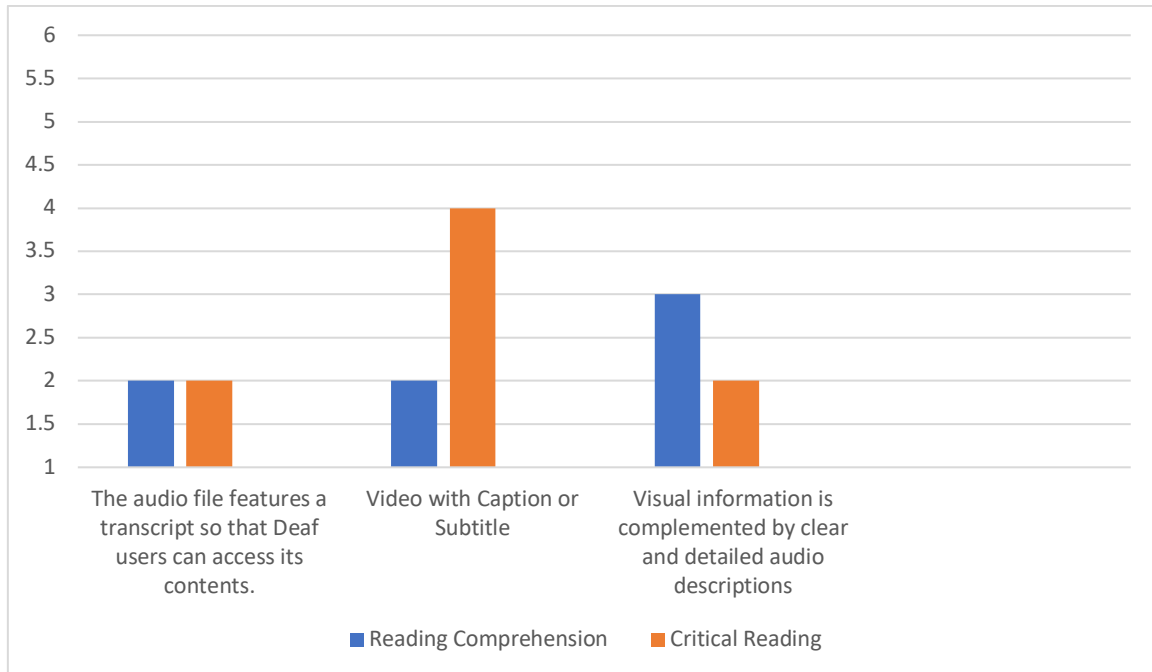
The last statement is “OCR-based text so that it can be read by a screen reader”. The text in the book "Reading Comprehension" has been based on OCR so that it can be read by a screen reader. It makes it easier for visually impaired students to understand the available texts. In the Critical Reading textbook, the text can be read by OCR applications if it pays attention to the arrangement of text, and the use of tables, headings, and subheadings. However, some module arrangements need to be considered so that they look neat and structured so that they can be read by screen

reading well. In the form of OCR-based text the Reading Comprehension textbook is more accessible.

3.2 The accessibility of Audio and Video Material

The second material is in the form of Audio and video. The data is served in table 5.

Table 5. The accessibility of Audio and Video Material



Based on table 5, the accessibility of Audio and video is measured by several questions. They are 3 questions in this dimension. As in the beginning, this section was also reviewed by two reviewers. The first question is whether the audio file features a transcript so that Deaf users can access its contents. In the Critical Reading textbook, there is no audio material that can be accessed. However, in the Reading Comprehension textbook, there are no files or materials found in the form of Audio or Video. If available, transcripts need to be provided so that Deaf users can easily access the content contained in audio and video. In conclusion, both Reading Comprehension and Critical Reading textbooks are still not accessible in the form of Transcript Audio and Video.

The second statement is whether the video with caption or subtitle. In the Reading Comprehension Textbook, there is no material available in the form of a Video. If available, it is necessary to add subtitles to the Video so that it makes it easier for Deaf users to understand the value of the Video used in the learning material. The use of video is considered necessary to provide a variety of learning media visually, especially for Deaf users. However, in the Critical Reading textbook there is material in the form of a video, it's just that it needs to be considered again whether all the video material is in accordance with the text or subtitles.

The last statement is whether the visual information is completed by clear and detailed audio descriptions. In the Reading Comprehension textbook, The availability of

the material in visual form on the book is not yet available. If there is, it is necessary to be equipped with clear and detailed audio descriptions so that even Visually Impaired users can easily understand the visual information material available. However, in the Critical Reading Textbook there is no visual information related to the use of the image accompanied by a detailed audio explanation.

4. Conclusion

This study's objective is to ascertain the implementation of the UDL principle in the online module, there are 2 modules for this research; Reading Comprehension and Critical Reading. This module chosen in this study because these two modules is used in the teaching and learning activity. This research uses a textbook analysis methodology by the measurement of kappa value and a checklist based on the UDL framework. From the finding, we can conclude that these modules are qualified based on the UDL principles. The statistic from the findings shows the trend between the two books. Suggestion for further researcher can elaborate more about the indicators material and also have more textbook in many courses.

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