

# Comparison of the Effectiveness of Different Accessibility Plugins Based on Important Accessibility Criteria

Alireza Darvishy and Hans-Peter Hutter

ZHAW Zurich University of Applied Sciences InIT Institute of Applied Information  
Technology Winterthur, Switzerland  
alireza.darvishy@zhaw.ch, hans-peter.hutter@zhaw.ch

**Abstract.** This paper compares two new freely available software plugins for MS PowerPoint and Word documents that we have developed at the ZHAW with similar tools with respect to important accessibility criteria. Our plugins [1, 2, 3] allow the analysis of accessibility issues and consequently the generation of fully accessible PDF documents. The document authors using these plugins require no specific accessibility knowledge. The plugins are based on a flexible software architecture concept [1] that allows the automatic generation of fully accessible PDF documents originating from various authoring tools, such as Adobe InDesign [5], Word or PowerPoint [6, 7]. Other available plugins, on the other hand, need accessibility knowledge in order to use them properly and effectively.

**Keywords:** Document accessibility, automatic generation of accessible PDF, screen reader, visual impairment, accessibility, tagged PDF, software architecture, PowerPoint and Word documents, PDF accessibility ISO standard.

## 1 Introduction

There are millions of PDF documents on the internet which are inaccessible to users with visual impairments using screen readers. In many cases, authors use authoring tools, such as Microsoft PowerPoint and Word [6, 7], to create these PDF documents. But all too often the resulting PDFs are not correctly tagged and therefore have to be manually post-processed in order to be turned into accessible PDFs. PDF tags provide a hidden structured textual representation of the PDF content that is interpreted by the screen readers. This meta-information has no effect on the visual presentation of the PDF file but is invaluable for screen readers. Manually post-processing incorrectly tagged PDFs is inefficient, very time consuming, and tedious. In addition, a separate solution is needed for each authoring tool because there is no single software solution that can be used with all the different authoring tools. A flexible software architecture was introduced in [4] to overcome these problems. The suggested architecture can be extended to include any authoring tool capable of creating PDF documents. For each authoring tool, a software accessibility plugin must be implemented that analyzes the logical structure of the document and creates an XML representation of it. This XML

file is used in combination with an untagged non-accessible PDF to create an accessible PDF version of the document.

Recently, researchers at the ZHAW developed two software accessibility plugins for Microsoft Word and PowerPoint based on the suggested architecture. The typical accessibility issues that arise when creating a PDF document with an authoring tool such as Microsoft PowerPoint or Word are, for example, missing alternative text for images, missing table headers, heading structure and document language, or incorrect reading order. Although newer versions of Microsoft PowerPoint and Word provide facilities to overcome some of the above-mentioned issues, authors are still required to have specific accessibility and authoring tool knowledge in order to fix them. The newly developed plugins for PowerPoint and Word require no special knowledge either of accessibility issues or of fixing them.

There are also some other tools available for checking accessibility issues of Microsoft Word and PowerPoint documents, which are briefly described here.

- Accessibility Checker for MS Office: The Accessibility Checker functions like a spell checker, in that it highlights any accessibility issues that may be present in a document, including hyperlinks, document structure, font, and closed captioning on any inserted audio and visual [9].
- AccessODF: AccessODF is an extension for LibreOffice Writer which helps authors to evaluate and solve accessibility issues in OpenDocument texts, including color contrast, text alternatives for images and other objects, as well as the use of proper heading styles instead of big bold text to identify headings [10].

This part describes important criteria for comparing the effectiveness of currently known accessibility plugins for MS-Word and PowerPoint documents. These plugins allow authors using MS-Word and PowerPoint to check their documents in terms of accessibility issues, to facilitate correcting them, and finally to generate accessible PDF documents.

The suggested criteria are divided into two categories:

- General criteria,
- Technical criteria.

### 1.1 General Criteria

This category contains the following criteria:

- Transparency: This defines whether the accessibility software for MS-Word and PowerPoint is immediately visible to the user. The ZHAW accessibility plugin is visible in the usual MS-Office 2010 Ribbon-style. This is important for the user to be aware of the available functionality constantly while working with MS-Word and PowerPoint. For the MS-Office Accessibility Checker this is not the case: The user has to look and find out the location of the functionality.

- Accessibility Know-How: The ZHAW accessibility plugin requires no special know-how in terms of accessibility and knowledge to fix the accessibility issues shown in the plugin. With the MS-Office plugin the user only gets messages and descriptions about accessibility issues, however she or he must know how to fix the issues in MS-Word and PowerPoint themselves.
- Learning Curve: As the ZHAW accessibility plugins require no special accessibility knowledge, using them can be learned quickly.
- Accessibility Working Set: The ZHAW accessibility plugins provide an integrated set of tools to ensure accessibility: Checking accessibility issues, providing the user with accessibility conform styles, a facility to define accessibility conform MS-Word templates, and a shortcut for creating accessible PDF documents are all in one place.

## 1.2 Technical Criteria

All tools produce different message types in order to alert the document creator about errors, warnings or hints. The following tables illustrate these in comparison.

The first table compares accessibility plugins for MS-Word, the second one for MS-PowerPoint.

## 2 Comparison of Different Plugins Based on Important Accessibility Criteria

In Table 1 we present a comparison of three different accessibility checking plugins for Word documents. Table 2 presents the comparison of two different accessibility checking plugins for PDF documents.

## 3 Conclusion

This paper compared two newly implemented accessibility plugins for Microsoft Office 2010 with other similar tools. These plugins are freely available and help authors of MS-Word and PowerPoint 2010 documents to check their documents in terms of accessibility, fix them easily and finally create accessible PDF documents. Microsoft Accessibility checkers enable authors to check accessibility issues, however, authors must still know how to fix these issues. AccessODF has similar features to the ZHAW Word Accessibility plugin but it is only available for Open Office Writer documents. The ZHAW Accessibility plugins provides authors with an analysis tool as well as facilities to fix them and create accessible PDF documents in one place.

**Table 1.** Comparison of three different accessibility checking plugins for Word documents

Accessibility Test Item	ZHAW Word Accessibility Plugin	MS Accessibility Checker	AccessODF (OpenOffice.org Writer Plugin)
Check if document title exists	Checks if document title exists (Error).	-	Checks if document title exists (Warning).
Check if table header is specified	User should specify whether the first column or first row or both are table headings or whether the table is only for layout purposes. (Error/Warning).	No header row specified (Error). No alt text for a table (Error). Table rows or columns are blank (Warning).	Checks if table heading row(s) are present (Warning).
Check if alt text is set	No alternative text provided (Error). User can mark it as decorative or informative; if it is marked as informative then there should be also an alternative text.	No alternative text for picture or object (Error).	Image has no text alternative (Title and/or Description). (Error).
Check hyperlinks	No hyperlink Screen Tip is set (Warning). User can add "Screen Tip text" or mark it as "Screen Tip not required"	No hyperlink Screen Tip is set (Warning). Heading order is not correct (Hint).	Language of a hyperlink set to „None“ (Error).
Check heading hierarchy	Heading order is not correct (Error) User can set a heading to "style body", "text style", or "outline level".		Heading order is not correct (Error).
Check language settings	Language settings can be checked.	-	Checks for missing language identification for the document and for language changes inside it (Warnings).
Check Contrast	-	-	Checks for insufficient contrast between background and font color (Error).

Table 2. Comparison of two different accessibility checking plugins for PDF documents

Accessibility Test Item	PowerPoint Accessibility PlugIn	MS Accessibility Checker
Check if slide title exists	Checks if slide title exists (Error).	Checks if slide title exists (Error).
Check if alt text is set	No text provided (Error). User can mark it as decorative or informative; if it is marked as informative then there should be also an alternative text.	No alternative text is specified (Error).
Check if table header is specified	User should specify if first column or first row or both are table headings or the table is a layout table (Error/Warning).	No header row specified (Error). No alt text for a table (Error). Table rows or columns are blank (Warning).
Check language settings	Is language set correctly (Question). User can mark it as correct, as the exact language or as default language.	-
Check reading order	Is Reading order correct (Question)	Is reading order correct (Hint).
Check if hyperlink Screen Tip is set	No Screen Tip provided (Question). User can specify if “no Screen Tip is required” or “add a text”.	Unclear Hyperlink text (Warning).
Check font size	Different font sizes (Warning). User can mark it as verified or change it.	-

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