

Establishing Guidelines for Accessibility of Online STEM Resources

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Affiliations

- Deaf STEM Community Alliance
- National Science Foundation (NSF)(HRD-1127955)



Overview

- Statement of the Problem
- Virtual Academic Community (VAC)
- Accessibility
 - 3 Groups
- Digital Libraries
 - Curation
- Design Process



Statement of the Problem

How can we ensure that persons with disabilities have equal access to education in Science, Technology, Math, and Engineering (STEM) fields?



Virtual Academic Community



The screenshot shows a web browser window with the URL www.rit.edu/ntid/dhhvac/. The page features a dark blue navigation menu on the left with the following items: Home, About Us, Accessibility, Project Background, Project Award Info, Project Goals, Partners & Sponsors, STEM Resources, Project Publications and Presentations, NTID Center on Access Technology, Gallery, and Contact Us. The main content area has a logo of three overlapping circles (red, blue, green) to the left of the title "The Deaf and Hard of Hearing Virtual Academic Community". Below the title, there is a welcome message: "Welcome to the Deaf and Hard of Hearing Virtual Academic Community (VAC) hosted by the Deaf STEM Community Alliance!". To the right of this text is a photograph of a man in a blue shirt sitting at a desk with a laptop, pointing at the screen. Below the photograph, there is a paragraph of text: "Supported by the National Science Foundation (HRD-1127955), the National Technical Institute for the Deaf at Rochester Institute of Technology, Camden County College, and Cornell University are constructing an on-line community to support the learning needs of students who are deaf and hard-of-hearing in the areas of science, technology, engineering, and mathematics (STEM)."

<http://www.rit.edu/ntid/dhhvac/>

Accessibility

“The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect.”

– Tim Berners-Lee, inventor of the World Wide Web

- 3 Groups
 - Deaf & Hard-of-Hearing
 - Blind & Low Vision
 - Mobility Impaired



Accessibility

Deaf & Hard-of-Hearing

Categories	Solutions
<ul style="list-style-type: none"><li>• Mild: 26-45 db.<li>• Moderate: At 46-65 db.<li>• Severe: At 66-85 db.<li>• Profound: Above 86 db.	<ol style="list-style-type: none"><li>1) Information must be easily understood.<li>2) Content must be very visual.<li>3) High Frames Per Second Rates (FPS) are required when communicating via teleconferencing.

Accessibility

Blind & Low Vision

Categories	Solutions
<ul style="list-style-type: none">● Partially sighted: Mild vision problems.● Low vision: Severe visual impairment.● Legally Blind: Very limited field of vision.● Totally Blind: No vision.	<ol style="list-style-type: none">1) Visual media must be described.2) Computer programs and accessories are required.

Accessibility

Mobility Impaired

Categories	Solutions
<ul style="list-style-type: none">• Level 1: Slightly impaired mobility.• Level 2: Intermediate impaired mobility.• Level 3: Severe impaired mobility.	<ol style="list-style-type: none">1) Limited or no ability to use a mouse.2) Computers are used in the simplest possible way to perform tasks.

Accessibility Tools



- Website Testing
 - Accessibility Rating Checklist
- Browser Accessories
 - Deaf & Hard-of-Hearing
 - Subtitles, Captions, Improve Readability
 - Blind & Low Vision
 - Screen Readers, Change Font Size, Keyboard Shortcuts
 - Mobility Impaired
 - Tabbing, Voice Recognition Software

Accessibility Checklist

A checklist has been generated using a Likert-type scale:

General Design

- # of items = 9

Readability

- # of items = 8

Navigation

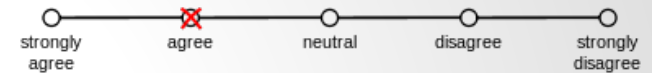
- # of items = 7

Usability

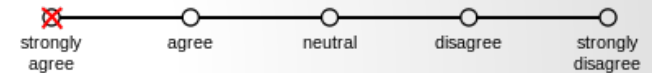
- # of items = 9

Example Likert Scale

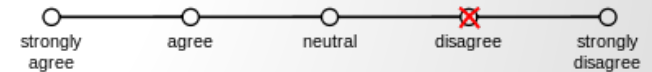
1. Wikipedia has a user friendly interface.



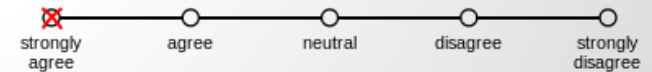
2. Wikipedia is usually my first resource for research.



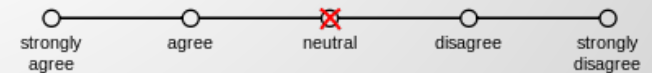
3. Wikipedia pages generally have good images.



4. Wikipedia allows users to upload pictures easily.



5. Wikipedia has a pleasing color scheme.



Digital Libraries



- Good Design vs. Bad Design
 - Curation

Accessible Design

Safari File Edit View History Bookmarks Window Help Thu 12:00 PM

Web Accessibility Initiative (WAI) - home page

http://www.w3.org/WAI/ Reader Google

RIT gmail kat.ph Gmail yahoo mail mp3skull Crazy Shit School NOVA skateboarding myCourses PNC M&T comedy STUMBLE tube youtube convert

W3C Web Accessibility initiative

WAI: Strategies, guidelines, resources to make the Web accessible to people with disabilities

W3C Home

- Web Accessibility Initiative (WAI) Home
- Getting Started
- Designing for Inclusion
- Guidelines & Techniques
- Planning & Implementing
- Evaluating Accessibility
- Presentations & Tutorials
- Getting Involved with WAI

Discover new resources for people with disabilities, policy makers, managers, and you!

αβεζ 本 语言 Translations

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

-- Tim Berners-Lee, W3C Director and inventor of the World Wide Web

Web Accessibility Initiative (WAI)

Highlights

Applying WCAG 2.0 to Non-Web ICT: First Draft Published

The First Public Working Draft of [Applying WCAG 2.0 to Non-Web Information and Communications Technologies \(WCAG2ICT\)](#) is now available for review. Please see important background information in the [Call for Review: Applying WCAG 2.0 to Non-Web ICT e-mail](#). Comments are welcome through **7 September 2012**. (2012-July-27)

Understanding WCAG 2.0: Updates in progress

The WCAG Working Group is updating a supporting document for WCAG 2.0 and a draft is available for review: [Understanding WCAG 2.0 \(Editors' Draft\)](#). (This is not an update to WCAG 2.0, which is a stable document.) To learn more about the updates, see [Understanding WCAG 2.0: Updates in progress e-mail](#). (2012-July-27)

Role Attribute Implementation and Testing

[Role Attribute 1.0](#) is published as a Candidate Recommendation. Role Attribute allows authors to add semantic information to documents, which is a requirement of [WAI-ARIA](#). Please see additional information in:

- [Role Attribute 1.0 Candidate Recommendation in Implementation and Testing e-mail](#)
- [How WAI Develops Accessibility Guidelines through the W3C Process](#)

Comments are welcome through **24 August 2012**. (2012-July-12)

Indie UI: New Independent User Interface Working Group

Today W3C WAI launched the new [Independent User Interface \(Indie UI\) Working Group](#) to develop a way for user actions to be communicated to web applications.

WAI develops...

- guidelines widely regarded as the international standard for Web accessibility
- support materials to help understand and implement Web accessibility
- resources, through international collaboration

WAI welcomes...

- participation from around the world
- volunteers to review, implement, and promote guidelines
- dedicated participants in working groups

Announcements

- Open position: [Web Accessibility Specialist \(Europe\)](#)
- Open position: [Web Accessibility Engineer](#)
- [WAI-ACT Project](#)
- [Get WAI Announcements](#)

Events, Meetings, Presentations

- At [PSEWEB Canada's University & College Digital Marketing Conference](#) in Halifax, Canada on 17 July 2012: "Embracing Accessibility - Go for the Carrots" keynote by [Shawn](#)

[\[WAI Presentations\]](#)
[\[Past WAI Events\]](#)

Documents in Progress

The WAI Interest Group (WAI IG) page lists documents in progress, such as accessibility

Skip to Content | Change text size or colors

Accessible Design

The image shows a screenshot of a YouTube video player. The video is titled "Google Glasses Project" and is uploaded by "Huzaifah Bhutto". The video content shows a person wearing Google Glasses, with a virtual map overlaying the real-world scene. The map has several points of interest labeled "A", "B", and "C", and a blue path connecting them. The map also shows categories like "Fiction", "Non-fiction", "Art", "Music", "Computer", and "Team".

The video player interface includes a search bar with "google glasses" entered, a "Subscribe" button, and a "17 videos" dropdown. The video player itself shows a progress bar at 1:06 / 2:30. Below the video, there are "Like", "Share", and "Print" buttons, along with a view count of 289,350 and a like/dislike ratio of 1,209 likes, 40 dislikes. A settings menu is open over the video, with a red box highlighting the "Settings..." option. A red arrow points from the "Settings..." option to the "Like" button.

The settings menu options are:

- Settings...
- Translate Captions BETA
- English (transcribed)
- Turn Captions Off

The right sidebar shows a list of related videos:

- Watch the 2012 Olympics Live and On-Demand by 2012NBCOlympics (335,452 views)
- Amazing Google Glasses Demonstration by minipcpro (133,339 views)
- Google Glasses (how it works) by taoistflyer (195,360 views)
- "ER BERMOQ" (O'zbek Kino) by UzCinema2 (219,114 views)
- Battlefield 5 on Google Glasses (the Marine) by TheresaCanal (1,608,444 views)
- Plies Gives A Little Girl \$10,000 Cash For Her by DREAMVISIONWORLD (491,297 views)
- Goggle - Project Dangerous Glasses by HappyToaster (392,080 views)

Inaccessible Design

The screenshot shows a Safari browser window displaying the website <http://www.thefreelibrary.com/>. The browser's address bar and search bar are visible at the top. The website content is organized into several columns and sections, many of which are inaccessible to users with disabilities.

Left Column (Navigation and Filters):

- + Add/Restore Content** (orange header)
- Publications** (blue header): Includes links for "Our Community", "Science World", and "Washington Monthly". A "see all" link is followed by "A-D E-O P-T U-Z".
- Articles by date** (blue header): Includes "Latest date", "2010-", "2005-2009", "2000-2004", "1995-1999", and "before 1995".
- Articles by topic** (blue header): Includes "Acquisitions and mergers", "Periodicals", and "Politicians".
- Authors** (blue header): Lists "Miller, Daniel", "Nusbaum, David", and "Fine, Howard". A "see all" link is present.
- Literature** (blue header): Lists "Jack London", "Mark Twain", and "Shakespeare". A "see all" link is present.

Business (15,952,914) (grey header):

- Advertising, marketing, public relations (62,095)
- Aerospace and defense industries (6,702)
- Agricultural industry (24,894)
- Architecture and design industries (8,469)
- Automobile industry (7,962)
- Banking, finance and accounting (110,201)
- Biotechnology industry (11,382)
- Business (9,734,911)
- Business, international (4,566,984)
- Business, regional (93,479)
- Chemicals, plastics and rubber (60,045)
- Computers and office automation (75,135)
- Construction and materials industries (18,995)
- Electronics and electrical industries (6,992)
- Engineering and manufacturing (44,280)
- Environmental services industry (9,628)
- Fashion, accessories and textiles (24,123)
- Food and beverage industries (163,406)
- Forest products industry (14,487)
- Health care industry (96,754)
- Home based business (20,061)
- Human resources and labor relations (27,484)
- Insurance (26,682)
- Internet and Businesses Online (18,373)
- Jobs and Careers (7,601)
- Metals, metalworking and machinery (16,815)
- Non-Profit (105)
- Petroleum, energy and mining (68,318)
- Publishing industry (180,442)
- Real estate industry (135,163)
- Retail industry (761)
- Sport, sporting goods and toys industry (23,258)
- Transportation industry (190,043)
- Travel industry (96,884)

Health (474,864) (grey header):

- Food/cooking/nutrition (36,822)
- Health, general (413,676)
- Psychology and mental health (24,366)

Humanities (311,080) (grey header):

- History (22,607)
- Humanities, general (24,333)
- Literature, writing, book reviews (121,486)
- Philosophy and religion (94,923)
- Relationships (12,660)
- Self improvement (8,346)
- Women's issues/gender studies (23,980)
- Writing and Speaking (2,745)

Law (687,191) (grey header):

- Government (94,503)
- International relations (466,188)
- Law (92,535)
- Politics (33,965)

Recreation (827,793) (grey header):

- Gambling (2,565)
- Sports and fitness (775,456)
- Travel, recreation and leisure (49,772)

Science (811,816) (grey header):

- Biological sciences (13,369)
- Chemistry (16,977)
- Computers and Internet (68,388)
- Earth sciences (5,266)
- Economics (77,235)
- Electronics (3,584)
- Environmental issues (36,198)
- Geography (710)
- High technology industry (4,722)
- Library and information science (167,670)
- Mathematics (2,264)

Communications (10,569,669) (grey header):

- Communications, general (94,134)
- Mass communications (9,897)
- News, opinion and commentary (10,427,787)
- Telecommunications industry (37,851)

Customize Your Homepage (orange header):

TheFreeLibrary.com now allows you to create your own personal homepage by adding and removing, dragging and dropping, and "using or losing" existing content windows. In addition, you can add your own bookmarks, weather information, horoscope, and RSS feeds from anywhere on the web.

Random Article (blue header):

Science News:
Mystery volcano site pinned down: Indonesian crater implicated in mid-13th century eruption.

One of the biggest mysteries in volcanology may finally be solved. An eruption long thought to have gone off in the year 1258 happened the year before in Indonesia, scientists report.

Until now, researchers have known a big volcano went off somewhere in the world around that time, spreading cooling sulfur particles around the globe. But they didn't know exactly where or when.

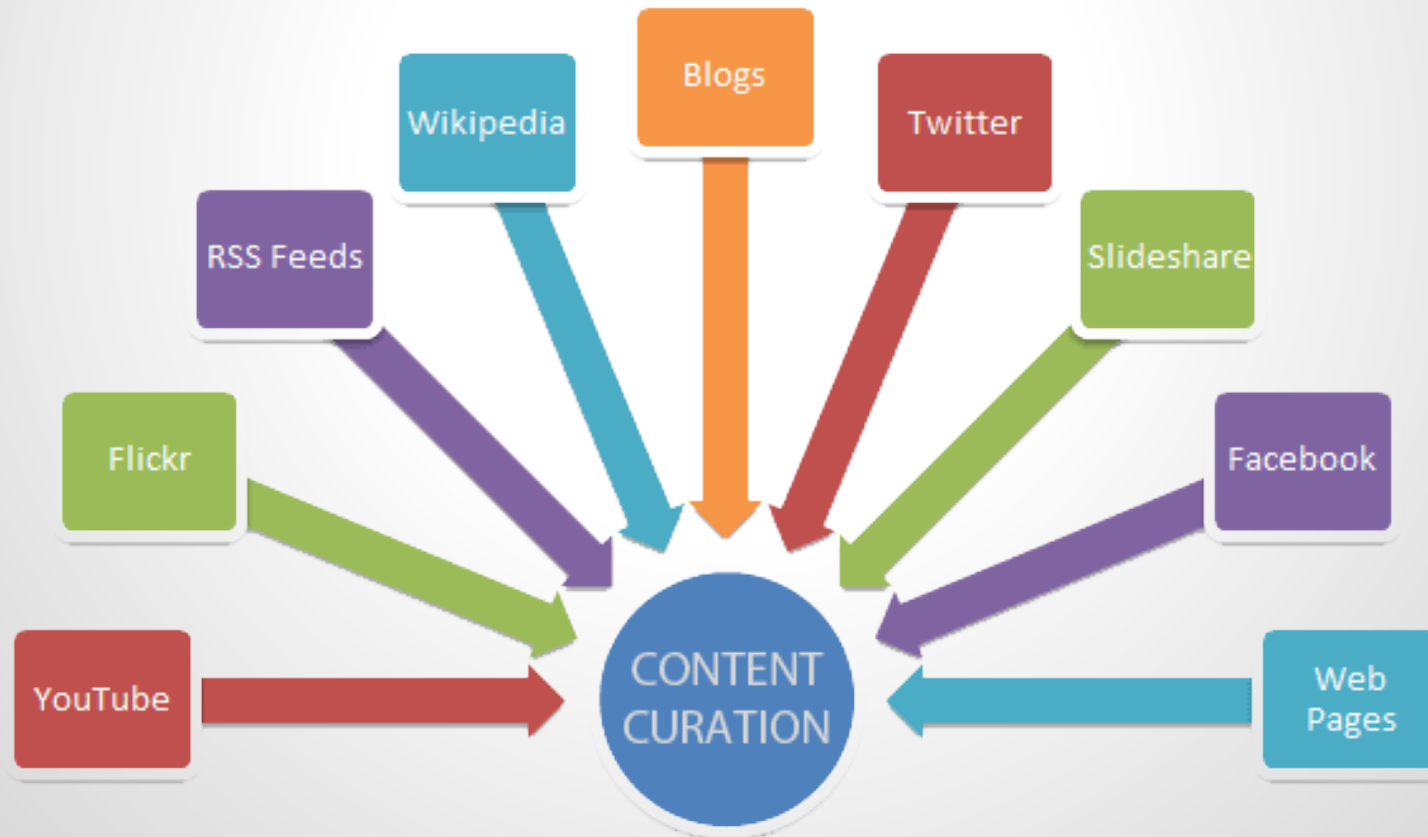
The new report remains something of a mystery. Franck Lavigne, a geoscientist at...
[keep reading this article](#)

About The Free Library (blue header):

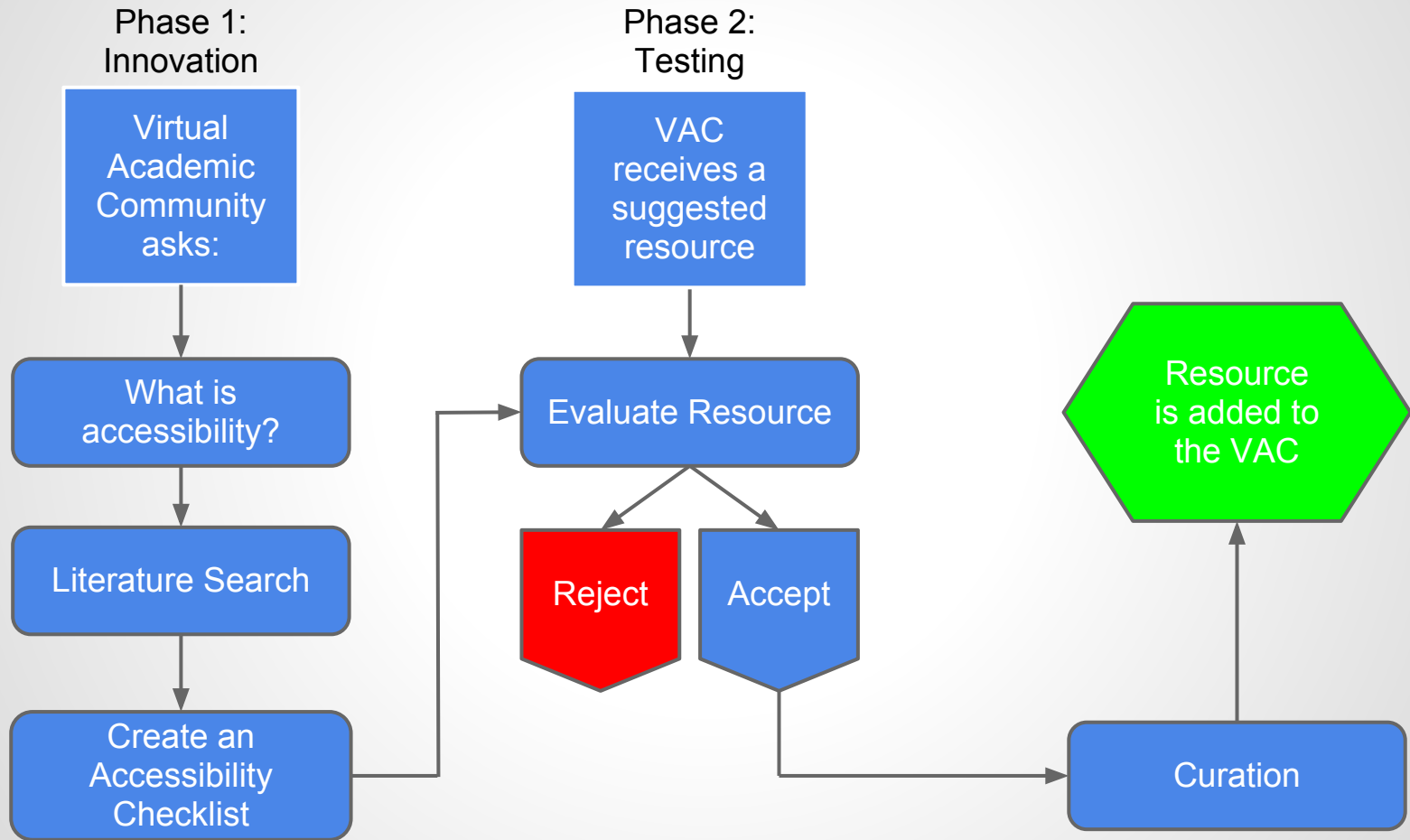
Since 2003, The Free Library has offered free, full-text versions of classic literary works from hundreds of celebrated authors, whose biographies, images, and famous quotations can also be found on the site. Recently, The Free Library has been expanded to include a massive collection of periodicals from hundreds of leading publications covering Business and Industry, Communications, Entertainment, Health, Humanities, Law, Government, Politics, Recreation and Leisure, Science and Technology, and Social Sciences. This collection includes millions of articles dating back to 1984 as well as

Curation

“A curator is an information chemist. He or she mixes atoms together in a way to build an info-molecule. Then adds Value to that molecule.” – Robert Scoble



Design Flowchart



Future Research

- Finalizing the checklist design
- Gathering STEM resources
- Evaluating website accessibility
- Organizing resources in a user friendly system

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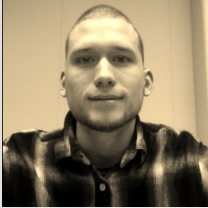
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Additional Information



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Q & A

Abstract

This presentation will describe the development of guidelines for an online academic community which is designed specifically to accommodate persons with diverse communication and access needs. The online community is a project of the Deaf Science, Technology, Engineering, and Mathematics (STEM) Community Alliance, that is funded by the National Science Foundation (NSF).

Persons with diverse access and communication needs include individuals who are Deaf & Hard-of-Hearing, Blind & Low Vision, and Mobility Impaired. Team members are developing an online community that compiles information and resources for topics involved in STEM. The goal is to make learning and communication easy for people who face challenges accessing STEM resources and learning online. Many of the Web sites and resources available today don't provide the necessary tools for learning. Ultimately, we are designing a website that incorporates all of the necessary tools and resources to meet our accessibility requirements.

The process of discovering and compiling this information is ongoing. This presentation will describe Internet access needs for diverse groups of users, examples of accessible websites, and examples of accessible STEM resources. Documentation of required guidelines is being created for future team members to follow in the next 4 - 5 years. The outcome of this research project will create an online community that can benefit anyone with diverse access and communication requirements.