VIKO –an e-learning tool for information literacy support to all students

by Sigvor Kvale & Karen Johanne Buset

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This article describes how an e-learning tool for information literacy can support student learning, and focuses on how to make the program accessible for all students. VIKO is an interactive e-learning tool based on information literacy; it is divided into seven modules and provides a complete course with interactive tests. VIKO was released in 2004, and is successfully implemented in the NTNU (The Norwegian University of Science and Technology, Trondheim) system. VIKO version 2 will implement the Web Content Accessibility Guidelines from WAI, to provide equal access and equal opportunity for students with disabilities.

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In order to increase the quality of higher education in Norway, the Norwegian Parliament implemented the national Quality Reform Programme in 2001. This programme focuses on the promotion of problem-based learning and active student participation. Students are expected to write several papers throughout the term, in addition to traditional exams, and are expected to find and use information from various sources.

Among the consequences for the libraries at universities and colleges was an increased demand for library services. The libraries had to change their focus from traditional reference services to user education; thus encouraging students to become "information literate", and thereby helping them gain the skills required to locate sources of information, as well as evaluate, select and use them.

It became a challenge for the libraries to offer suitable user education to all students. At the NTNU Library[1] we saw the need to provide a tool to increase students' information literacy, and to reach all students irrespective of library opening hours. We decided that a web tutorial in information literacy was a suitable tool, and in 2003, the NTNU Library started the VIKO Project. (Buset and Kvale, 2004)

VIKO - Your Guide to Information Literacy[2]

VIKO is an acronym for "Veien til Infor-masjonskompetanse", which in English is: "Your Guide to Information Literacy". VIKO is a web based interactive course, consisting of seven modules, and can be implemented as part of other library and university courses. The modules and their component parts present ways to navigate through the information flow, and provide practical tools for finding literature, evaluating the quality of the information and writing papers and references.

VIKO aims to:

- Enhance information literacy at NTNU
- Increase quality of students' performance
- Replace basic-level user education
- Teach students essay writing and source evaluation techniques
- Support teachers in student tutoring
- Prevent plagiarism

The VIKO Website

VIKO is an in-house project designed and developed at the NTNU Library. The project was financed by the Norwegian Archive, Library and Museum Authority[3] and NTNU. VIKO version 1 was released July 1st 2004. VIKO version 2, including subject guides will be released in September 2007.

Experiences from implementation

VIKO is widely used in classes and courses at NTNU, and is also recommended in guide-lines for essay writing, and by NTNU's legal adviser as a tool for teachers to help prevent plagiarism. VIKO has been used successfully in introductory classes for new students, resulting in increased quality in academic writing, citation and bibliographic referencing.

In 2004 VIKO was implemented in the largest preparatory course at NTNU, held at the Department of Art and Media Studies with 400 students. The submitted papers displayed a significant improvement in quality of citation of bibliographical resources. The programme director considered this to be a result of the implementation of VIKO in the course.

NTNU's teaching assistant program, LA-OS, is an important link between students and teachers. The teaching assistants are graduate students, and they have the closest and most frequent contact with students at the beginner level. We therefore considered LAOS to be a good starting point for promoting VIKO. This trial proved to be successful, and VIKO is now implemented in various study programs.

Further strategies for cooperation with NTNU

We have suggested to NTNU's recently established education committee that VIKO be made compulsory for new students. Several other universities have mandatory information literacy tutorials, for example OASIS at San Francisco State University[4] and they see the benefits from having information literate students from their first year. If VIKO is made compulsory, every new student at NTNU will also learn about plagiarism and its consequences.

For the library it is a challenge to reach the students with user education at the right time in their study programme. Our solution to this was to use It's Learning – NTNU's e-learning platform and integrate VIKO as a learning resource in the university courses. By using the

e-learning platform it is easier to implement and integrate VIKO into the students' educational environment. We have developed a pilot subject guide for Scandinavian studies in VIKO. Our incentive was that students, teachers and librarians had asked for subject specific versions of VIKO for graduate students. This guide can easily fit into the subject in the e-learning platform. After completing the subject guide students should be familiar with the bibliographical sources within the subject and be able to identify, analyse and critically evaluate information resources, as well as where to find them and how to use them.

We have carried out a usability test based on Jakob Nielsen's "usability test"[5], having master level students in Scandinavian studies test the pilot guide. The response we received was very useful. The students liked the subject guide and thought they would benefit from using it in their studies. The next step will be to develop subject guides in other subjects areas.

If VIKO is to be made compulsory, a test is required to control that students really have taken this course. We have therefore developed a final test for VIKO. It is a multiple choice test, covering the most important subjects in VIKO. By taking the final test, the students can verify that they have completed VIKO as a course. The test will become available on the e-learning platform where students sign on with individual passwords, and thus it's easy to control that they have taken the test.

Equal access for students with disabilities

The NTNU Library offers library classes to students with disabilities. To meet the needs of these students, the library must provide special equipment and adjust its resources. Library instructors need adequate qualifications. If VIKO is made accessible for all, these students will have a tool for self-tuition, and the library will also have a tool to use in classes and courses.

Norwegian authorities stress the importance of enabling everyone to become digital citizens in our new "e-society". In June 2005 The Norwegian Ministry of Government Administration and Reform launched the eNorway 2009 action plan for a digital society. (Moderniseringsdepartementet, 2005). According to this plan, 80 percent of Norwegian public websites should follow quality specifications from Norway.no[6] by the end of 2007. Norway.no acts as a gateway to the public sector in Norway, and is also responsible for developing criteria for the evaluation of public web sites.

NTNU has been given the role as a "national facilitator" for accessibility to higher education in Norway for students with disabilities. They operate universell.no[7], a website for universal design and accessibility, and for individual adjustments in higher education. NTNU endeavours to ensure that students with disabilities have the same rights and opportunities as other students in higher education. NTNU will emphasise physical, pedagogical and social accessibility, and has established an "Office for Students with Disabilities" to ensure accessibility to buildings and studies for these students.

Web accessibility

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect." This well known quotation from Tim Berners-Lee, the Director of the World Wide Web Consortium, is cited on the Web Accessibility Initiative home page[8]. In reality millions of people have disabilities that affect their use of the Web. Currently most websites have accessibility barriers that make it difficult or impossible for many people to use the Web.

Web accessibility is based on principles for universal design, which means that products, services and environments are designed to be usable (without modification) for as ma-

ny people as possible, regardless of age, ability or other factors. Web accessibility means that people with disabilities can use the Web, more specifically that they can perceive, understand, navigate, and interact with the Web. They can also contribute to the Web, and in that way participate more actively in society. Designing websites with accessibility in mind can enhance usability for all users, including those with visual, auditory, physical, speech, and neurological disabilities, and also benefit people without disabilities.

It is important to distinguish accessibility from usability. Accessibility secures access to information at a website while usability means "ease of use" in navigating an interface. This implies that a website can be accessible but not usable, or usable but not accessible.

The World Wide Web Consortium (W3C)[9] Web Accessibility Initiative (WAI)[10] develops Web accessibility guidelines. The WAI guidelines are based on the fundamental technical specifications of the Web, (HTML, XML, CSS, etc.). The guidelines for content, WCAG 1.0, date back to 1999.[11] The weak points of the guidelines are a strong HTML/CSS- angle, and that they do not take in new technologies (related to Web 2.0 etc). The proposed WCAG 2.0 builds upon the work of WCAG 1.0 and contains more testable provisions that extend to a broader range of technologies, including many that are new and evolving.

How do we make VIKO accessible for students with disabilities?

Our aim for the new version of VIKO is to make it accessible for all, thus implementing the principles of universal design. I order to accomplish this, we are cooperating with the "Office for Students with Disabilities".

Blind and visually impaired users have problems with obtaining an overview and with graphical interfaces when using PCs.

They often have to use other software, called assistive technologies, to interact with the Web. Examples are

- screen magnifiers to change text font, size, spacing, colour, synchronization with speech, etc in order to improve the visual readability
- screen readers, which are used by people who are blind to read textual information through synthesized speech or Braille
- text-to-speech software, to convert text into synthetic speech

A blind person reads the screen line by line and navigates from top to bottom. Screen reading programs only read text, which means that all graphics, buttons, hypertext links etc. must have alternative text to be usable.

We had VIKO tested by The Norwegian ICT Centre for the Visually Impaired (SIKT). VIKO was tested by two persons. One blind test person used a screen reader (Jaws 5.10), while the other test person had low vision, and used a screen magnifier (ZoomText v 8.1). Both test persons used synthesized speech as a supplement.

The results of the test showed that most of VIKO was accessible and useful to the visually impaired, but there were still parts of VIKO they could not "see". The main problems were found in:

- VIKO Start page:
  The whole page is an image map, with a mouse over function to show hypertext links. Alternative text (<ALT> attribute) for hypertext links are missing. The page is not accessible using the screen reader; it is not possible to identify hypertext links to the programme modules.
- Top menu:
  Drop down menu with graphics instead of text, <ALT> attributes to describe functions are missing. Menus are not accessible

using the screen reader. There is also a problem keeping in focus when using a screen magnifier.
- Main content:
  The <H1> tag is not used for headings, which means that it is difficult to find important content.

Our solution to make VIKO accessible is simple:
- Follow guidelines and standards so that the assistive technologies can interact with VIKO. The most important standards are
  – WAI recommendation
  – HTML, as intended in the standard
  – CSS (cascading style sheets) for visual layout
- Review all VIKO web pages (coding, scripts, menus, functions) both manually and using automatic code-testing program
- Include users with disabilities in usability testing.
- Make use of expert evaluation such as SIKT and NTNU's "Office for Students with Disabilities"

We are progressing in this work, but accessibility will not be fully implemented in VIKO until later this year. (Not in the Beta-release of VIKO 2 in September.) When the standards are implemented all students will have the same opportunity to increase their information literacy, and the library will also have a tool to use when teaching students with disabilities.

Conclusion
In the process of incorporating the standards for web accessibility into VIKO, we have collaborated with various parts of the university and found that providing equal access and equal opportunity for students with disabilities can promote the library as an important partner and enhance the collaboration with the academic staff.

In our efforts to promote and integrate VIKO into NTNU's courses and classes, we have also seen that a product that meets an important demand can enhance students' learning and improve the quality of students' papers

Notes
[1] NTNU – The Norwegian University of Science and Technology is situated in Trondheim. It is the second largest university in Norway, with 20,000 students and 3000 degrees awarded each year. The NTNU Library has 10 branch libraries and has a strong focus on user education and information literacy.
More information about NTNU at http://www.ntnu.no
More information about NTNU Library at :http://www.ntnu.no/ub
[2] http://www.ntnu.no/viko
[3] http://www.abm-utvikling.no/
[4] http://oasis.sfsu.edu/
[5] Jacob Nielsen defines usability as: "Usability is a quality attribute that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process." http://www.useit.com/alertbox/20030825.html
[6] http://www.norway.no/
[7] http://universell.no – tilgjengelighet til høyere utdanning
[8] http://www.w3.org/WAI/
[9] http://www.w3.org/
[10] http://www.w3.org/WAI/
[11] http://www.w3.org/WAI/intro/wcag.php

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From http://www.regjeringen.no/upload/FAD/Vedlegg/IKT-politikk/enorge_2009_komplett.pdf..

Buset, K.J. and Kvale, S. (2007 June) Enhancing Information Literacy at NTNU: Equal Access for Students with Disabilities: How can an e-learning tool for information literacy support all students' learning? Paper presented at *The 13th Nordic Conference on Information and Documentation,* Stockholm