

E-Learning COach for Visually Impaired People

**TUTORIAL
S5 “Online communication”**



Official course tutorial for the E-COVIP examination

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1 Introduction

A permanent communication between the E-Learning coach and the students with synchronous and asynchronous communication tools is an inevitable key for a successful education in e-learning. The most important systems in E-Learning are the Virtual Learning Environments, also known as Learn (Content) Management Systems (Abbrev.: L(C)MS) and Virtual Conferencing Systems (Abbrev.: VCS). All modern E-Learning systems offer various integrated communication tools to provide appropriate opportunities for communication and data exchange with the whole learning group, or with the single participants individually. Unfortunately not all of the available systems provide communication tools, which are accessible for sensually impaired users. In some cases the accessibility is either reduced due to usability criteria, caused by an inappropriate and/or less logical design and structure of the Graphical User Interfaces (Abbrev.: GUI), or simple violations of accessibility regulations. To avoid any exclusion of visual and hearing impaired students, caused by information and communication barriers, the E-Learning coach must be competent to evaluate the utilized systems concerning their accessibility aspects. If such accessibility problems are detected the E-Learning coach has to find solutions to cope with these problems. This tutorial describes occurring problems and appropriate and target group oriented solutions. This tutorial is structured in two major parts.

In Part A we summarize all essential information considering problems and solutions concerning accessibility.

In Part B we add additional information how to design and create accessible documents which can be either used as teaching or information material in E-Learning courses

2 Learning Aim

In this tutorial the reader will learn special aspects of accessibility concerning features of VCS and LMS and common online communication tools. This document is intended to be a resource for E-Learning coaches. It allows them to understand the accessibility of VCS and LMS concerning the requirements of sensually impaired user. With the knowledge of special aspects of accessibility of VCS and LMS, the online teachers are able to choose the right tools and convenient alternative to teach student with sensual handicaps.

Exercise: If you want to carry out the initial exercise, follow [this link](#)

Part A Basic Information concerning Accessibility of common communication tools in E-Learning

3 Accessibility problems and recommendations for communication features of VCS

3.1 Features

Within blended-learning courses virtual conference systems suggest themselves being primarily chosen for supporting the process of synchronous communication. With VCS the training forms of tele teaching and tele cooperation can be realized in a virtual classroom, independent of the students' and the tele coach's whereabouts. Most of the available popular VCS provide multiple communication features which enable various forms of communication and cooperation via network. The history of VCS is mainly based on platforms specially designed for business conferences of companies that act in transnational contexts. Due to the occurring high data transfer-rates and the dial-up prices for the internet access, online conferences were quite expensive service until the beginning of this century. The improving infrastructure of broadband networks and the resulting decline in the prices for internet flat rates, make the use of VCS much cheaper nowadays and of course much more affordable for public use. Many developers of VCS customized their products with special features useful for e-learning purpose and distribute them as special "learning" editions.

Some of the popular VCS on the market are:

Centra ; "Centra Live"
<http://www.centra.com>

Foroso ; "Foroso Training Centre"
<http://www.foroso.de/com/products/trainingcenter.html>

Microsoft; "Live Meeting"
<http://www.microsoft.com/office/livemeeting/prodinfo/default.mspx>

Web Dialogs Unyte; "Meeting Central"
<http://www.webdialogs.com/products/mcexecutive.asp>

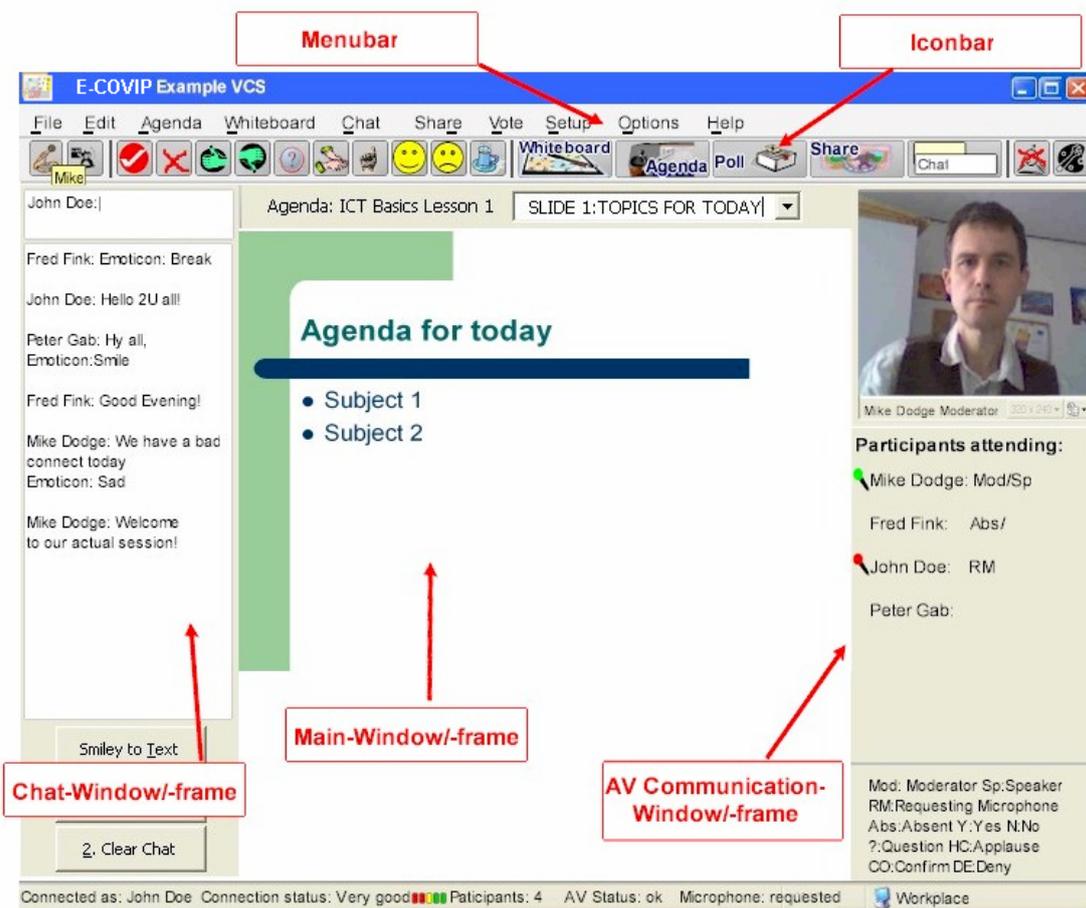
Webex; "Webex"
<http://www.webex.com/>

Concerning accessibility, the VCS "illuminate live" take special care
<http://www.illuminate.com/>

Most of such VCS have the following core features in common:

1. Voice communication
2. Chat
3. Application sharing
4. Whiteboard
5. Agenda/Billboard presentation
6. Quick Poll function

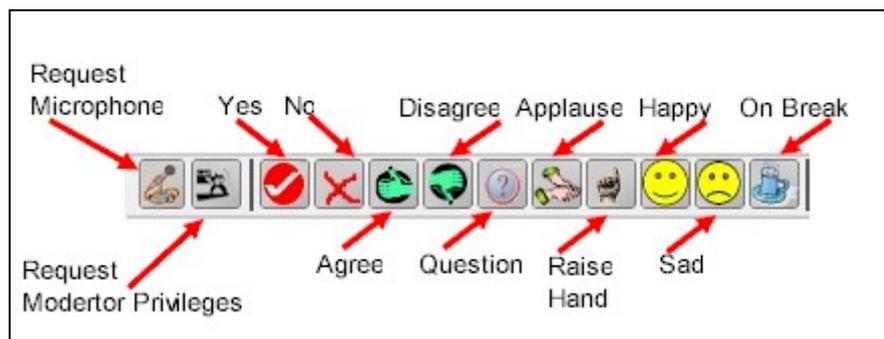
To make the VCS as versatile as possible, most of these features can be used simultaneously. This simultaneous utilization of several communication features requires a GUI, which displays these features and the current communication activities in one or several screens. A fictual example of a VCS GUI is shown in Picture 1



Picture 1 Example of a VCS GUI

In addition to the above mentioned major features, many VCS offer some additional tools to enable for the non-sensual impaired user a fast and immediate information exchange without having to wait for getting speaker's privileges. These elements can be activated in the chat and the AV frame/window to react to close answers or give the moderator an instant feedback or message. To save space on the GUI those messages appear on the GUI as graphic or Emoticon (commonly known as: "Smiley"). Also their activation is commonly enabled via Desktop icons.

A fictional example of such features is shown in Picture 2



Picture 2 Example of Non-Verbal elements

During an online conference with experienced user, it regularly happens that several of these features are used at the same time. So a running online conference requires a high vigilance of all participants. To announce new messages in the chatbox, or the changing of the actual speaker in the voice communication, sounds and/or flashing icons are provided as alert tools in many VCS.

This brief roundabout through the common features of VCS was necessary to explain the occurring problems for sensually impaired E-Learning students.

3.2 Occuring problems and solutions

Obviously it will be for students with severe hearing handicaps or even deaf student difficult to impossible to follow the voice communication. To avoid for those students any lack of information, in any case a **preliminary soundcheck** must be carried out, to evaluate if there is any chance that the concerned student can participate at the audio communication. If this is not possible, the text chat might be the most simple alternative. Another alternative might be the utilization of the implemented Video feature in combination with a webcam an interpreter for sign language. But this solution requires that

1. the student is familiar in the use of sign language
2. The lesson will takes much more time (estimate factor 2 for blind users)
3. a reliable and high performance broadband connection is available for the student and the interpreter

An additional problem for students with hearing impairment will be those alert sounds, which signalize actual activities in the various communication features. In addition to those audio signals a text or graphic announcement in a central field of the GUI should be provided.

For visually impaired students who are using screen magnifier and especially for blind students who are using a screen reader, VCS offers several major problems. The most serious problems are:

1. Some or all of the features are only usable with graphical pointing devices
2. Some or all features are only graphic oriented and not text-based.
3. Simultaneous activities are a great problem. Besides the general problem, that graphical information (like unclassified Icons and graphics) can't be

represented properly by the assistive device, the impaired student will be not aware what happens in the other communication frames. This requires all participants' high-degree attention to recognize all new chat messages, non-verbal messages and alteration of speaker's and moderator's privileges. For a person without visual handicaps, who has the visual overview to monitor the whole screen, it is possible to recognize the progress in the VCS. Users of screen magnifiers or braille terminals have a restricted overview and thus cannot follow all actions on the screen. Moreover, if these features are located in different frames or windows, switching between these windows is necessary to have access to the information. For an appropriate monitoring of the communication a system sound is required so that new information appearing can be notified in one of the communication windows. If they can be customized, it will be possible to identify, in which communication feature the new information or message can be found. If different windows are used for several features, the customizing tool should provide the option of window with newest information automatically being activated. This option is only appropriate if there is a low simultaneous communication activity. For a fast activation of the specific frame or window an access with shortcuts is recommended. For avoiding switching through different windows permanently, put all features into one window. For deaf or people with hearing disorders, it might be helpful to enlarge the graphical symbols to increase the attraction.

4. Non-Verbal elements are only represented as an icon and/or can be only executed with an Icon. To make these important elements accessible for the visually impaired user, the System should offer in the setup also a textual representation (e.g. For the emoticons the correlated meaning can be represented as short text like: "Yes", "No", "Agree", "Sad", "Smile" etc.)
5. Many Text Chat features are only represented in a graphical environment and/or can only be executed with graphical pointing devices. The chat feature is the only available synchronous communication media which remains in the system if the AV communication connection collapses. So far it is of utmost importance that also blind users have access to this feature with a screen reader device. For an unlimited access it is a prerequisite that the user can put the focus and naturally the cursor in the input field to insert text. But it is also required that the user can focus the area of the chat history, where all the dialogues are listed. This can be enabled:
 - via menu
 - via shortcut (e.g. ALT-Key function)
 - via the TAB key

If the chat feature offers the choice and display of graphic emoticons, the above mentioned recommendations must be considered. For blind and deaf users it is helpful that activities like new participants in the chat or new messages, a visual and audio signal will be activated.

For reviewing the chat communication after the conference session has been finished, it is helpful to make a copy of the history as a kind of agenda. This copy should be saveable as a simple text file. For such a copy function the following alternatives might be appropriate:

- standard "cut and paste" function
 - implemented "copy feature", executable with button
 - separate "History" feature (e.g. like "View Chat History" in Skype)
6. Application sharing may cause problems for blind computer user, who are using Screenreader software. The screen reader for synthesized speech and

the Braille display might possibly not “translate” the shared application in a correct way. In the worst case, the screen reader might cause a system crash of the software or the workstation. Concerning these momentarily existing disadvantages and probable difficulties this feature is not recommended for participants with electronic devices.

7. The whiteboard is for many E-Learning coaches an important tool in E-Learning. The whiteboard is the usual feature of VCS for simulating a blackboard. This feature offers an easy and quick exchange of information, brainstorming and collaborative work. The developed contents of a whiteboard can be saved in many VCS as a bitmap file. Most of the whiteboards are purely graphical oriented and only able to operate with a mouse or a trackball. Even textual elements like notepads and text boxes can be positioned only via optically controlled input devices. So far this feature is an inappropriate medium for blind computer users who work with screen readers. If these whiteboard features included a simple text editor, it could be an efficient and accessible tool for blind users, too.
8. For the Agenda feature the same problems like mentioned for the whiteboard commonly appear. The Agenda function makes it possible to organize a meeting and upload presentations before the session starts. It compares to a structured collection of overhead slides in traditional face-to-face lectures. Unfortunately the upload feature for the Agenda transfers the original datafiles to a Bitmap which will be not accessible. Due to the fact that in E-Learning practice the Agenda is an important organisation tool. The E-Learning coach should provide an alternative for blind users for example as a word document. If graphical content must be represented (e.g. Flowcharts in ICT training, or pictures in scientific subjects), a very powerful alternative can be tactile, or better audio tactile slides of the Talking Tactile Tablet (T3) Audio Tablet (<http://www.talktab.org>).
9. Quick polls are a very useful tool for the E-Learning coach to receive an instant feedback to certain subjects appearing during a session. Those quick-polls are usually simple Multiple Choice test based on a Java Script Applet. Although there are many accessible Applets available. Unfortunately not all VCS have such accessible poll features implemented. In such a case the E-Learning can imply ask for the individual feedback of the impaired student and should inform him about the results of this poll.

Exercise: If you want to evaluate your learning progress follow [this link](#)

3.3 Recommendations to improve accessibility of VCS

3.3.1 Customizing/Personalization of the VCS GUI setup

The multifunctional features of VCS might require a personalized setup of its GUI. Especially if the user accesses the VCS with different computers (e.g. school- and home-PC), it is a helpful feature to save these personal preferences as template or personalized setup. If customizing the GUI is allowed by the system, the following setup options should be enabled

1. Adapt font size, font style, font colour and colour setup of the system setup of the workstation **or**:
2. that font size, font style, font colour and colour setup can be configured
3. Adapt cursor setup from the system-setup of the workstation **or**:

4. that cursor size and blinking rate can be adjusted
5. If the various VCS features are running in different windows, that those are opened in full-screen mode
6. To present graphical information in textual equivalents (e.g. Emoticons, speaker/moderator privileges)

If certain features can not be customized to be represented in an accessible way, it is necessary to provide the sensually impaired student with the specific information in an alternative version. In most cases it will be helpful to send graphical information as alternative textfile in advance to the session. If minor important activities (e.g. entrance of new participants in chat or conference, change of the moderator privileges), which are displayed with a sound signal or an icon, this activity should be commented by the moderator.

If navigation and command objects are not accessible and/or executable with the keyboard, for blind users a practical utilization of such a software is hardly to realize. In such cases the E-Learning coach must decide if alternative communication software has to be used as a substitute. Fortunately some of contemporary messenger tools offer accessible features. The disadvantage of these messenger software is, that they are only practicable to use with small groups and offer not so much features like the professional VCS.

In the following chapters we'd like to introduce the reader into some of the available common messenger tools, which can be partially used with sensually impaired students as a substitute for VCS.

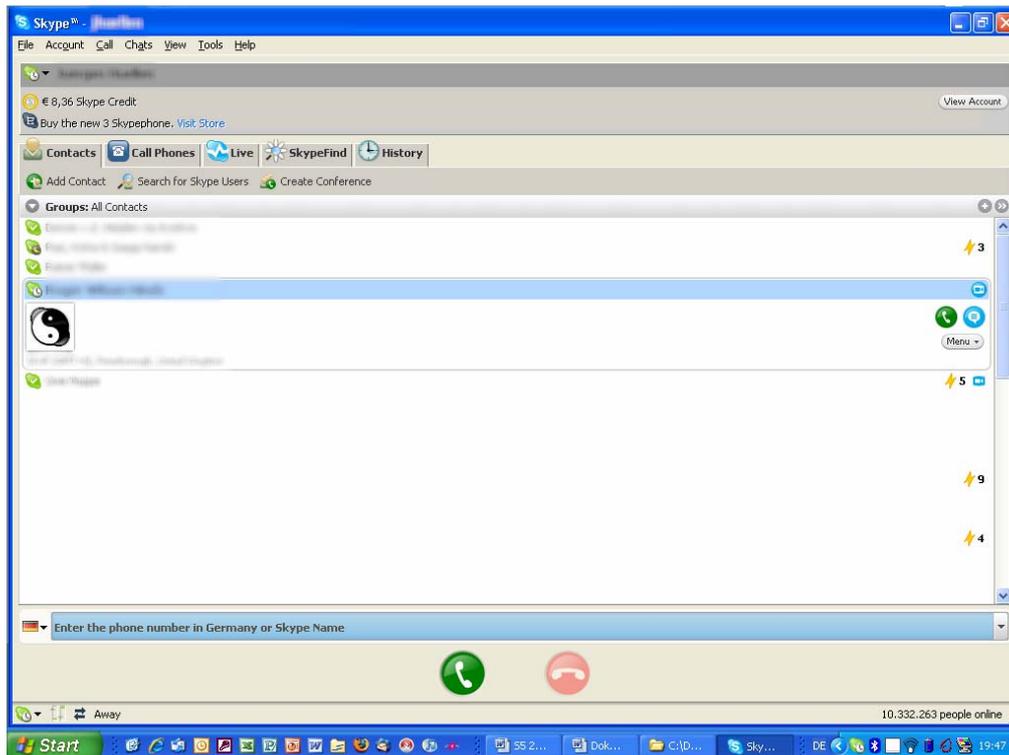
Remark

We want to point out that the comments about the features, prices and accessibility of the following products are only valid for the versions, which were released until the print date of this tutorial. Usually such communication tools enjoy a fast and consequent maintenance and improvement by the developers according to the technological progress and the services of competitors.

3.3.1.1 Skype

What is Skype?

Skype is a free software program (www.skype.com), which allows users to make telephone calls from their computers to other Skype users free of charge or to landlines and cell phones for free. With more than 100 million users it is the most popular voice communication service in the world. Additional features include; instant messaging, file transfer, short messages service, video conferencing and its ability to circumvent firewalls.



Picture 3 Screenshot of the Skype window with activated Accessible features

Advantages

1. SkypeOut option allows Skype users to call traditional telephone numbers, including mobile phones, for a fee.
2. Superior call quality
3. Easy to install
4. Presence information
5. Strong security
6. Skype passes most firewalls because no special ports must be opened
7. Numerous addons like whiteboard, application sharing are available from third-party developers.

Disadvantages

1. The biggest disadvantage would be that [VoIP] is run by a lot of power. Skype uses VoIP and is therefore sensitive to a power outage. All voice communications cease, unlike the traditional telephone service which can still be made use of if there is no electricity.

2. Closed community
3. Maximum of 9 participants per conference call
4. No moderation via microphone management possible

Operating systems

Skype versions exist for Windows XP, 2000, Vista, Windows Mobile, Mac OS X and Linux.

What Do You Need to Use Skype?

1. A computer with decent processing power and memory, including generic peripherals likes keyboard and mouse.
2. A good Internet connection, preferably broadband.
3. Sound. Make sure your sound card is working properly.
4. Speakers or earpieces.
5. A microphone.
6. The Skype software, which is freely downloadable from www.skype.com

Is Skype accessible using screenreaders and or in combination with enlargement programs?

Yes, it is accessible. Activating the commands, via the menu bar, all possibilities are accessible. Since Version 2.0, Skype offers a special "Accessibility" feature in the Menu setup.

Paging through tablet forms is possible using hotkeys: Ctrl + Tab. Selecting an item in a list through works using arrow up or down.

How to use Skype via hotkeys

Skype	
Activate <u>A</u> ccessibility / hotkeys	Alt + v, a
Activate Menubar	Alt
Call	Alt + c, Enter
Answer call	Alt + Page Up
Reject/Hang up	Alt + Page Dn
<u>S</u> earch for Skype Users	Alt + t, s
Start conference Call	Alt + c, s
- select contacts	Arrow down, Enter
- select start button	Tab, enter
	Enter

3.3.1.2 Windows Live Messenger

What is Windows Live Messenger?

Windows Live Messenger (**WLM**), still commonly referred to by the previous name of MSN Messenger (**MSN** for short), is an instant messaging client for Windows XP.

You can share folders, make PC-to-PC call and make a video-call.

Starting of with exploring the possibilities of your computer to communicate with others is Windows Live Messenger a good option to explore the possibilities.

Advantage

1. supporting PC- to - phone calls with Windows live call
2. Messages from contacts can now be time-stamped.
3. *Word wheel* search within the contact list.

Operating system

Microsoft Windows XP SP2 or Windows Vista

Is Windows Live Messenger accessible using screenreaders and or in combination with enlargement programs?

It is very accessible and using hotkeys is an option. The menu bar is always there as a back-up but knowing how to work the hotkeys gives the user a very accessible communication tool to work with.

How to use Windows Live Messenger via hotkeys/shortcuts

Windows Live Messenger	
Make a call	Ctrl + d
End a call	Ctrl + d
Select a menu from the menu bar	Alt + f for File menu Alt + c for Contact menu Alt + a for Actions menu Alt + t for Tools menu Alt + h for Help menu
Go to sharing folders	Alt + s
Move focus	Tab or Shift + tab
Open Windows Live Messenger help	F1
Find a contact that starts with a certain letter	Tab to contacts and then type the letter.
Add a contact	Alt + C and press Enter
Open the options dialog box	Alt + T + O
Mute the speaker	Ctrl + s
Mute the microphone	Ctrl + m

3.3.1.3 Gizmo

What is Gizmo?

Gizmo Project is a peer-to-peer VoIP network and of a proprietary freeware soft phone for that network.

Gizmo Project uses your internet connection (broadband or dial-up) to make calls to other computers. The connection is for free between users of the Gizmo Project.

Advantages

1. Free PC-to-PC calls to any other Gizmo user.
2. Free landline calls **to landline and mobile phones** over 60 countries.
3. Free **voicemail** service.
4. No limits on the number of call participants
5. **Chat** with Windows Live Messenger, AIM, Yahoo! Messenger, GoogleTalk, and Gizmo users.

Disadvantage

1. It exists in only one language: English.

Operating systems

Gizmo Project runs on Apple Macintosh, Microsoft Windows and Linux computers.

How to Get Started With Gizmo?

Download and install the Gizmo software.

Register online, and get a user name.

Invite your friends worldwide and other people you want to communicate with and ask them to install Gizmo and register.

Ask them to enter their landline and mobile phone numbers in their profile, and do the same.

Is Gizmo accessible using screenreaders and or in combination with enlargement programs?

Gizmo is accessible using the menubar as your navigation guide. There are no fastbuttons available which makes Gizmo not very accessible.

3.3.1.4 Brosix

What is Brosix

Brosix is a secure, powerful and easy to use Instant Messenger. Brosix Instant Messenger is a free public network. It has all the features of the Corporate version, but is free.

Advantages

1. Highly secure communication - very strong encryption applied to all the data
2. High speed servers nearby you - Brosix operates a global server infrastructure with servers located in different countries all around the globe. This way the users get connected to the closest (fastest for them) server
3. Advanced Peer-to-Peer technology for file sharing and collaboration. Most of the communication between the users is Peer-to-Peer. This optimizes the communication for high speed and security.
4. The possibility to create your own private instant messaging network.

Disadvantage

1. Poor regarding the configuration options. Resulting in restarting the computer several times.

Operating system

Windows 95/98/Me/NT/2000/XP/2003

Is Brosix accessible using screenreaders and or in combination with enlargement programs?

Brosix is accessible via the menubar but does not use hotkeys to elevate the accessibility.

3.3.1.5 VoIPStunt

What is VoIPStunt?

VoipStunt is an international VoIP service based in Germany. It works in a manner similar to Skype, in that it has a softphone application installable on a computer, and a service which can be obtained online. VoIPStunt has gained some popularity lately among softphone users due to its free calls to landline phones over some common destinations. The communication costs by using VoIPStunt may differ in some countries and should be requested.

Disadvantages

1. Using VoIPStunt, you can make calls to landline phones in the free destination countries, but these calls last only a minute!
2. If you want to make a longer call, than the provided one minute, you have to pay 10 Euros.

Advantages

1. Very easy to use GUI

Operating system

2000,Me,Windows Xp,Windows Vista

What Do You Need to Use VoIPStunt?

1. A computer with decent processing power and memory, including generic peripherals likes keyboard and mouse.
2. A good Internet connection, preferably broadband.
3. Sound. Make sure your sound card is working properly.
4. Speakers or earpieces.
5. A microphone or a headset

Is VoIPStunt accessible using screenreaders and or in combination with enlargement programs?

Yes, it has a very manageable interface and it works with hotkeys.

With Controle and Tab you can leaf through the tabforms of: Contacts, History, Start, Phone2Phone, Sms and History.

Howe to use VoIPStunt via hotkeys

VoIPStunt	
Activate Menubar	Alt
Call	Ctrl + Shift + D
Answer call	Ctrl + Shift + A
Reject/Hang up	Ctrl + Shift + H
Offhook	Ctrl + Shift + O
Clipboard Dial Hotkey	F12

3.3.1.6 Voipbuster

What is Voipbuster?

VoipBuster uses a client software with proprietary protocol. Subscribers can mutually call for free, and call for free to fixed lines in selected countries worldwide.

As a user you can make calls but actually (December 2007) no video calls can be made.

Disadvantages

1. free calls are not free as proclaimed on the internetsite of VoIPbuster.

Operating systems

Versions exist for Microsoft Windows, Mac OS X and Linux.

Where can I download Voipbuster?

www.voipbuster.com

Is Voipbuster accessible using screenreaders and or in combination with enlargement programs?

It is accessible and using hotkeys is an option. The menu bar is there and will be used more frequently than using hotkeys.

Howe to use Voipbuster via hotkeys/shortcuts

Voipbuster	
Clipboard dial	F12
Dial	Ctrl + Shift + d
Hangup	Ctrl + Shift + h
Answer	Ctrl + shift + a
Offhook	Ctrl + shift + 0

3.3.1.7 Wengophone

What is Wengophone

WengoPhone is a free software SIP* compliant Voice over Internet Protocol (VoIP) client developed by the OpenWengo community. It lets users speak to other users of SIP compliant VoIP software without charge.

It is developed by enthusiasts and developers who share the same interest in creating free software related to communication over IP.

Advantages

1. The Session Initiation Protocol (SIP) can be used to create two-party, multiparty, or multicast sessions that include Internet telephone calls, multimedia distribution, and
2. Secure PC to PC calls good quality sound

Disadvantages

1. Does not support older versions of Windows like Windows 98 and Millennium.
2. To successfully download WengoPhone you need Firefox version from 1.5.

Operating systems

Windows, Mac Os X and Linux

System requirements:

1. 300 MHz processor
2. 128 MB RAM
3. 10 MB free disk space on your hard drive
4. Sound Card, and headset with microphone
5. Internet Connection broadband: Cable, DSL, with minimum 64 kbit/s up/downstream)

Is Wengophone accessible using screenreaders and or in combination with enlargement programs?

Yes, it is accessible. The menubar is the main guideline for this free software. Pressing the Control button + the Tab button you can switch between leaves for Contact, Home, Dialpad and History.

3.3.1.8 Ekiga

What is Ekiga?

It is a free and open source VoIP and video conferencing application for [GNOME] (Linux) and Windows. An open source means that Ekiga is being modified by enthusiasts to use, change, and improve the software, and to redistribute it in modified or unmodified form. It is often developed in a public, collaborative manner.

It supports all modern VoIP features for both [SIP] and [H.323]. Ekiga is the first Open Source application to support both H.323 and SIP, as well as audio and video.

Advantages

1. Freedom to create a desktop environment that will always have the source code available. Users and builders can actively take part in improving Ekiga.
2. Accessibility: ensuring the computer can be used by anyone, regardless of technical skill or physical disability.
3. Support ensuring: It is not a closed community. Everyone who is willing to make an effort can offer solutions to effectively improve Ekiga.
4. Easy to use

Operating systems

Windows XP and Linux.

What are the minimum requirements?

1. A correctly configured firewall and NAT router/gateway
2. A working sound card.
3. You don't need a webcam. Ekiga is primarily VoIP software.
4. Having a headset is recommended if you want to prevent echo.

Is Ekiga accessible using screenreaders and or in combination with enlargement programs?

Ekiga is a pleasant media to work with and offers clear accessibility.

Exercise

To prepare the discussion during the next online-lesson, prepare the next exercise by following [this link](#)

4 Accessibility problems and recommendations for communication features of LMS

Learning (Content) Management Systems (Abbrev. L(C)MS), also commonly titled as Virtual Learning Environments, are the core software to organize E-Learning courses. Those systems allow the E-Learning coach to administrate all courses and participants and to monitor the course and learning progress. Besides the administration features, LMS contain all required learning media, like Web-Based Training Content (Abbrev.: WBT) and Multi-Media and text documents. All of the popular LMS also provide communication tools for synchronous and asynchronous communication. E-mail, Forum, Quick Poll, RSS Feeds and Chat features are the most popular implemented tools.

Meanwhile there are numerous proprietary and Open Source LMS available on the market. Considering support, usability and accessibility the Open Source LMS are from same quality as their proprietary counterparts.

Popular proprietary L(C)MS are for example:

1. Blackboard, (www.blackboard.com)
2. eLeaP, (www.eleapsoftware.com)
3. TotalLMS, (www.sumtotalsystems.com)
4. DLS, (www.ets-online.de)
5. XStream Rapid Share; (www.xstreamsoftware.com)
6. Open-EIS, (www.community4you.de)

Popular Open Source and accessible L(C)MS are:

1. Moodle, (www.moodle.org)
2. ATutor, (www.atutor.ca)
3. ILIAS, (www.ilias.de)
4. Claroline, (www.claroline.net)
5. Sakai, (www.sakaiproject.org)

Many accessibility problems in LMS are the same like in VCS. In addition to these accessibility problems a poor usability of the GUI might be an enormous handicap to understand the logic of the design and the utilization of the LMS. In particular the most common problems are:

1. Some or all of the features are only usable with graphical pointing devices
2. Login procedure is not accessible with screen reader and the keyboard
3. Some or all features are only graphic oriented and not text-based
4. The links to open or activate various features are not logically arranged on the GUI or are not easy to access via TAB key
5. The design and location of objects is not logical coherent. Similar features are not clustered or located nearby
6. The access to learning media is too complicated or needs more than 2 levels/steps
7. In the layout of the LMS too many features are displayed and “overcharge” the student with information
8. Many Text Chat features are only represented in a graphical environment and/or can only be executed with graphical pointing devices

9. Quick polls are only graphic oriented and can't being accessed with screen reader and the keyboard
10. Online test features for examinations are purely graphical oriented and can't be executed with the keyboard
11. The implemented forums are only graphic oriented or graphically designed
12. There are too many forums and mailboxes available and avoid a quick understanding and access to the correct communication tool.

Fortunately most LMS offers for the Administrators and the E-Learning coaches one or more setup features. Those features allows to customize the layout of the system to a better level of accessibility and usability for sensually impaired students. Concerning the usability a major problem especially for blind users is the complexity and the enormous variety of available features. Considering that blind users discover the computer screen line by line, it is comprehensible that a blind user who is unfamiliar with such a complexe LMS is simply overcharged. The essential rule for the start of an E-learning course wizh blind user is: **"Downsize it"** (to the essential and necessary features). For deaf users you should consider language simplification or better: keep the headlines and descriptions short and selfexplanatory. You can add more features with the degree of familiarization of your students.

In the following chapter we try to give you some recommendations how to customize the LMS and its communication tools in a more target oriented way.

4.1 Reccomendations to improve usability and accessibility of LMS

4.1.1 General setup of the LMS GUI

1. Choose a template with a high contrast between Font and background colours
2. If possible avoid in your setup a fixed font- type and –size. If this is not possible choose a non serif font (e.g. Arial, Verdana) and a fontsize of minimum 12pt.
3. Wherever possible try to keep the same structure and design of navigation objects and their nomenclature
4. Wherever possible provide this navigation objects as selfexplanatory Textlink
5. If Navigation objects can be only displayed as an icon, provide them with a selfexplanatory alternative text (ALT tag)
6. Make sure that all your navigation objects are accessible with the TAB key in the chronological order of their location in the window/frame
7. If possible activate the essential features with the AccesKey feature
8. If possible cluster the navigation tool according to their function. E.g. communication tools like Forum, mail, announcements, blog in the first line. Learning media like WBT content, document repository Wiki, FAQ in second line
9. If possible provide on the start page the structure of your LMS as textlink-based sitemap

4.1.2 Integrated E-mail

1. If the platform has an integrated e-mail system, you have to ensure that this system is accessible in all essential functions with the <TAB> key.
2. The display of the content of e-mails must be text- or HTML based.
3. The display of the postboxes should be text-based. As minimum requirement, the graphical display of the postboxes must be provided with an ALT-tag
4. The signal for a new and unread mail should be marked with a textual symbol

4.1.3 Integrated Text chat or messenger

Please consider the comments which were already mentioned in the chapter [“3.3.1 Customizing/Personalization of the VCS GUI setup”, point 5](#)

4.1.4 Forum and Bulletin Board Service (BBS)

1. If the system includes a Forum, all the threads should be accessible and executable with a text-based link.
2. Reduce at the beginning of the course the number of available forms to a necessary minimum. This will facilitate blind user to become familiar with this feature and its layout
3. The signal for new and unread threads or postings should be marked with a textual symbol

4.1.5 Tests and examination

1. If you implement tests and examination make sure that they are accessible and executable with the keyboard. Most Multiple Choice, Text Insert and open questions are accessible
2. Avoid graphic oriented testforms like “drag and drop” or flash based tests
3. If your test contains audio elements make sure that you present them with subtitles or textfile with description
4. If the implemented test is not accessible, provide your student with an equivalent test as text document. Send this file via e-mail to your student and ask him to send the completed test back to you on the same way.
5. Consider probable national examination regulations of your country for people with sensual disabilities concerning extended examination time

4.1.6 WBT and other learning content

1. The learning contents belong to the most important elements which are managed by an LMS. So it is necessary that all students can access all learning documents and WBT very quick and without awkward steps of navigation
2. If you are in doubt if the implemented WBT are accessible check the C4EA guidelines for accessibility of WBT (www.c4ea.org)

4.2 Self evaluation concerning accessibility

Even if you customize your LMS and all implemented features according to the above mentioned recommendation, it is not in any case certain that the system works as aspired with a screen reader or a screen magnifier. So far it is helpful if you check your system before the course start with a screen reader. You can download the multilingual screen reader “Thunder” from the website www.screenreader4free.eu. This screen reader contains the web browser WebbIE which is designed for the

special requirements of blind users. With this software you'll have some helpful tools to carry out a valid accessible check of your system.

Exercise: If you want to evaluate your learning progress follow [this link](#)

Part B Additional Information concerning accessibility of learning documents in E-Learning

Interactive multi-media WBT and CBT learning contents, WIKI, Course-Blogs, Learning games and Podcasts represents in the year 2007 certainly the state of art in contemporary E-Learning environments. Nevertheless are those media only an extract of potential learning media. Still popular and important are “classical” digital documents as tutorials, exercise sheets or examination query. Those documents are usually integrated in the repository of the LMS and are commonly provided in various data format. As we can see, are those documents as important as the major systems. So far it is not sufficient to provide only the technical platforms accessible. The E-Learning coach has also to consider the accessibility of those digital learning documents. Very popular are documents in the Adobe PDF format and animated presentations in Microsoft Powerpoint and Flash or Shockwave format.

The PDF (Abbreviation for “Portable Document Format”) enjoys a high popularity because it is platform independent and provides security features to protect the intellectual property rights of the author. Furthermore PDF documents can be created very versatile and easy. Scanned documents can as easy be converted to PDF as pictures and presentation slides or websites. The disadvantage is that such converted graphics can’t be represented with a screen reader. PDF files must be edited in a certain way as so called tagged PDF to make them accessible. Although ADOBE did a lot to enable accessible PDF documents, many documents are not accessible because the author either don’t know or don’t care about those accessibility features. Therefore PDF are only second choice for blind user.

Flash and Shockwave animated documents have the advantage that they offer a professional variety of animation and interaction features. This is also the reason why many contents are produced in this formats. Unfortunately those documents are almost purely graphical and so far not readable with the screen reader.

Similar problems occur with the very popular presentation software “Powerpoint” from Microsoft Corp. This software offers all E-Learning coaches the opportunity to create very easily multi-media presentations which can be converted to HTML and to visualize the learning subjects. Numerous easy-to-use animation and media tools make this software very popular. Therefore a lot of presentations exists in the education field and make their utilization in E-Learning courses as tutorial reasonable. Although implemented textfields are as such accessible, the same problems like in Flash and Shockwave occur with the animated graphics and media files.

Quite easier is the situation with tutorials which are developed with textprocessor software. Although there are several different operating systems and office suites available on the market, several formats for text documents established as standard formats. The simplest formats are the RTF and TXT formats. Because these formats don’t support sophisticated textlayouts and –attributes they are small in size and easy accessible for screen reader. Another popular dataformat is the DOC format, which was initially introduced by Winword from the Microsoft Corp. Meanwhile most of the popular textprocessor support this format and allow. Due to the fact that the

DOC file allows sophisticated text layout features, it might occur that not all documents are accessible due to implemented graphic features.

5 To create accessible text documents

5.1 General recommendations

In the tutorial S1 of E-COVIP and part A of this tutorial we explained the general problems that occur by using screen readers. This information is also valid according to text documents. In general graphical information can't be translated by screen reader into text information. For text documents you should consider these general recommendations:

1. Choose a standard font size not smaller than 12pt
2. Choose a non-Serif Font like Arial or Verdana
3. Avoid to hide non-textual information for example by different colours, emoticons or special Symbols with Fonts like "Symbol" etc.
4. Provide a good contrast between text and background
5. If your document has a large volume insert at the beginning a brief abstract

5.2 Recommendations to create accessible text documents with Microsoft® Word®

5.2.1 Structure of the document

If your document contains several chapters or subchapters, use the headline stylesheets to give the document a structure. Insert with the Menu Option "Reference" in the menu "Edit" an index. Use this menu option also to insert footnotes, cross-references and labels for graphics and tables. These features insert links and enable the user to jump to the concerned position.

5.2.2 Graphic elements

To keep the document also usable for the sighted students it will not be necessary to remove all graphics. You can add to all graphics a description with an ALT-tag. Open the context-menu of the graphic and activate the option "Web". Add in the textfield a brief description of the graphic.

5.2.3 Tables and charts

If you add a table to your text mark the first line, which is usually the headline with the label of the column as headline. You can do this very easily with the menu option "Repeat table headline" in the menu "Table". Most screen reader accept this feature and allows the user an easier orientation in this element.

5.2.4 Forms

Although forms seem to be simple text-based documents not all screen reader represent textfields properly. Locate the label or description left to the field, so that blind students know that the cursor is positioned in a field.

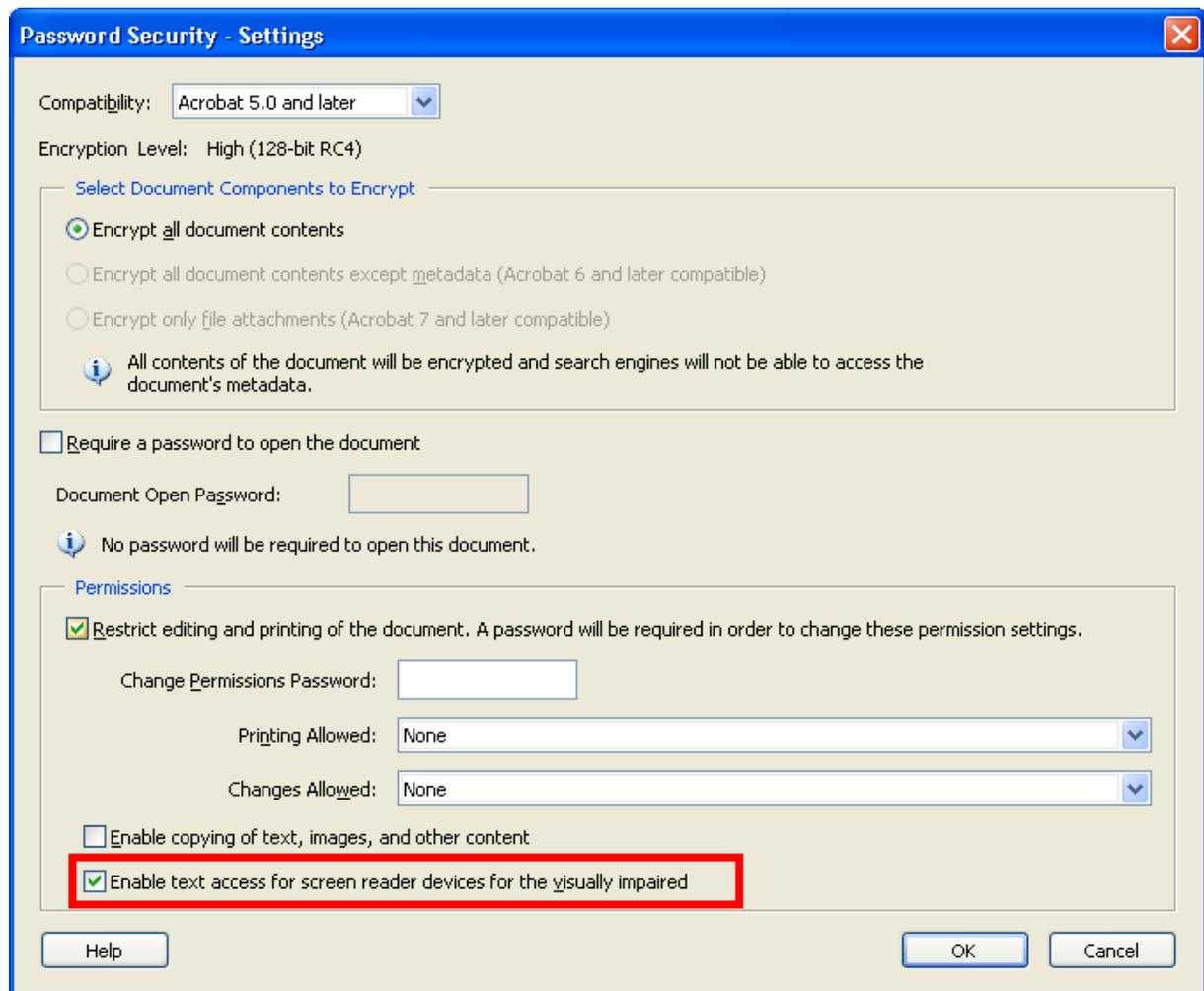
5.3 Recommendations to create accessible text documents with Adobe Acrobat®

5.3.1 Accessibility Test

Adobe Acrobat provides a very helpful accessibility test. The results and recommendations for improving the degree of accessibility can either be displayed in a brief or a detailed report. This test can be activated with the sub menu “Accessibility” in the menu “Advanced”. After opening this sub menu you can either choose the options “Quick check” or “Full check”. Depending on your selection you will receive some more or less detailed recommendations. In most cases you will be advised to add tags to graphical or any other non-specified objects.

5.3.2 Security options

If you want to protect your document in terms that you prohibit the user to copy graphics and text from your document, make sure that the checkbox “Enable text access for screen reader...” is still activated. (See Picture 4)



Picture 4 Adobe Acrobat® Security Settings

5.4 Recommendations to create accessible text documents from Microsoft® Powerpoint

Presentations usually are a combination of text- and graphics or multimedia elements. For the multimedia elements subtitles for deaf users must be implemented as mentioned before. The graphics must also have an descriptive ALT-Tag. Because not all screen reader support Powerpoint it is not certain that in any case a presentation can be accessed by blind users. If the implemented text is sufficient and self explaining, it can be helpful to copy and paste the text elements into a text processor and save the new created document as textfile. Every slide should be presented with a headline and the referring slide number. So it will be easier for the blind user to follow a commented presentation during an online session or refer in case of questions concerning the content.

6 Exercises

6.1 Exercise 1 - Introduction into subject and experience

1. Which Virtual Conferencing Systems or messenger did you use in your E-Learning courses up to now?

2. Which problems you think might have sensual handicapped users using this systems?

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6.2 Exercise 2 – Common accessibility problems with VCS

Please answer the following questions and compare your answers with the summary in chapter [Occuring problems and solutions](#)

1. What are the major accessibility problems concerning simultaneous activities in VCS?

2. What are the occurring accessibility problems of non-verbal communication elements?

3. a Which accessibility problems occur in the utilization of an Agenda and a Whiteboard?

3. b Which solutions do you propose to solve these problems?

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6.3 Exercise 3 – Alternative communication tools

After reading the descriptions of communication tools, select your favourite considering usability and accessibility. Point out the decisive features and present your result and arguments during the next online lesson within 5 minutes. Prepare your arguments on the [attached page](#) and mail this page to your e-learning coach after the lesson for uploading to our LMS.

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6.4 Exercise 4 – Improving accessibility setup of LMS

Please answer the following questions and compare your answers with the summary in chapter [Accessibility problems and recommendations for communication features of LMS](#)

1. Which accessibility problems commonly occur for sensually impaired users...

a) considering structure?

b) considering location and structure of links/navigation tools?

c) considering access to learning media?

d) considering available features?

e) considering online tests?

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7 Bibliography

The Consortium for E-Learning Accessibility(Pub.), Part 1 Common Guidelines;
Dueren 2006

The Consortium for E-Learning Accessibility (Pub.), Part 2 Guidelines LMS; Dueren
2006

The Consortium for E-Learning Accessibility (Pub.), Part 4 Guidelines VCS; Dueren
2006

Velleman, E.; Snetselar, H.; Site Seeing; Zeist, 2000

Worksheet Exercise 3 – Alternative communication tools

Participants name :

Course name :

Proposed tool :

My arguments for this tool considering:

General features :

Usability :

Accessibility :

Miscellaneous :