

USING WEB-BASED LEARNING ENVIRONMENTS IN THE VISUAL ARTS

Using multimedia in teaching visual arts in a web-based learning environment

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Summary: This article focuses on the characteristics of video-mediated instruction within the visual arts in web-based learning environments.

E-learning in visual arts subjects has largely been based upon digital learning platforms, or so-called LMS (Learning Management Systems). These E-learning models have generally built on traditions from correspondence schools. Correspondence schools use the postal services to send educational material and instructions, while most of the web schools use various LMS for the distribution of educational materials and electronic mail for communication between teachers and students (Amari 2006).

Two factors have particularly helped facilitate web-based training. One is the development of hardware and software which have made video-mediated communication relatively simple, and the other is improved access to broadband, which makes this type of communication possible.

Instruction in visual arts subjects depends upon visual mediation and is more effective with rapid response to visual presentations. Web-based studies in the visual arts therefore need to exploit new developments in video-mediated communication.

This article will further describe a course in digital image processing (15 ECTS) which was established in response to an initiative from the Department of Art and Design at Telemark University College.

Key expressions: the visual arts, e-learning, art, design, distance learning, visual skills, web-based learning environments, digital images, video-mediated communication, Media Synchronicity, Telepresence.

Introduction

The Internet is the fastest-growing channel for communication. On a worldwide basis, it is estimated that around a billion people have access to the Internet, and the number is constantly increasing. In the age group 12 years and above in Norway, over 3.3 million have access to Internet (Møglestue 2007). There are only small variations between men and women with respect to access to and use of Internet. There are larger gaps between various age and educational groups. Access to Internet is greater in private homes than at work or in the schools (Statistisk sentralbyrå 2007).

In its earlier years, the Internet was used primarily to exchange static information. Possibly the most common application was to convert information brochures to HTML pages and post them on the Internet. Gradually, web pages began to exploit the possibilities offered by new web technology, such as multimodality and interactive functions. These demanded greater bandwidth to and from the users. Today, there are around a million private broadband subscriptions in Norway (Statistisk sentralbyrå 2007). Broadband access is especially interesting with regard to multimedia content production and multimedia distribution over the Internet.

The use of the Internet as a medium for communication has shown an increasing tendency towards a more audio-visual based and synchronous form of communication. A distinction must be made between synchronous and asynchronous forms of communication. Synchronous communication takes place in real-time, as in telephone- or video-conferences, while information in asynchronous communication is stored until the recipient chooses to receive it, as with letters in one's mailbox, or e-mail.

Completely synchronous communication over the Internet is still quite a ways down the road, but the possibilities are much greater now than they were just a few years ago. Participation and the use of programmes which allow users to send and share videos, photos and audio files over the Internet are widely used. Yahoo Messenger, MSN Live Messenger and Skype are examples of popular products in this market.

Around the world, there is growing interest in video-mediated communication for a variety of purposes including education, tele-medicine, tele-psychiatry and shopping. Video-mediated communication has become a valuable resource in education, enabling users to have access to educational material which might otherwise be difficult or impossible to obtain. How may these new developments be applied to educational situations within the field of visual arts?

Building on Theory

When we teach, we use various media, either in the classroom or as e-learning. In the classroom, we use media such as language and gestures. In digital learning environments, we use media such as the Internet and e-mail. Understanding how media and their properties influence the recipient will help us when selecting the correct medium in any given teaching situation.

There are a number of technology-related theories which describe how technology influences group processes. These theories involve the interaction between social relationships and communication technology.

The Media Richness Theory

One of the most popular theories is the *Media Richness Theory*. This theory describes the capacity of a communication medium to convey information which reduces ambiguity in the information which is communicated (Daft, Lengel, and Trevino 1987). Media richness is evaluated through a combination of four criteria: feedback, language variety, multiple cues and personal focus.

The media in this theory are arranged in a hierarchy reflecting how rich the media is for the transfer of information. It ranges face-to-face as having the highest media richness, followed by telephone and e-mail and brochures with lower media richness, and memos and notes with the lowest level of media richness.

The choice of medium is dependent on the uncertainty and ambiguity of the task. Face-to-face is considered the richest communication medium. Face-to-face communication allows rapid feedback. The message may be modified, clarified and reinterpreted

immediately. It is also the most suitable method for reducing ambiguity in a statement. Media with lower information richness, such as e-mail, are suitable for tasks in which there is less uncertainty. Therefore, the choice of medium (or media) should reflect the problem's uncertainty and ambiguity (Daft, Lengel, and Trevino 1987).

However, this model is now inadequate, due to the development of new media associated with the Internet and the convergence of many forms of communication. As a result of the expansion of broadband and improvements in hardware and software for video-mediated communication, the boundary between face-to-face and other forms of communication has become more fluid. In some cases, one might find an understanding of this theory useful when selecting and using various media.

Dennis A. and Valacich, J. (Dennis and Valacich 1999) conclude, in their testing of *Media Richness Theory*, that the theory would be useful in explaining “old” media, but not the new media based upon audio- and video-mediated communication.

Media Synchronicity

The theory of Media Synchronicity (Dennis and Valacich 1999) claims that each act of communication comprises two fundamental processes: conveyance and convergence. Conveyance involves an exchange of information, and convergence processes aim at reaching a common understanding of the information passed between participants in the communication. The theory claims further that a set of five media capabilities are important in communication: immediacy of feedback, parallelism, symbol variety, reprocessability and rehearsability. In order to execute a task most effectively the capabilities of the chosen medium should be matched to these processes (Dennis and Valacich 1999). The best medium will depend on which of the five capabilities are most important for a given situation.

	Feedback	Parallelism	Symbol variety	Rehearsability	Reprocessability
Face-to-face	High	Low	Low-high	Low	Low
Video conference	Medium-high	Low	Low-high	Low	Low
Telephone	Medium	Low	Low	Low	Low
Instant messaging	Medium	Medium	Low-medium	Low-medium	Low-medium
Synchronous groupware	Low-medium	High	Low-high	Medium-high	High
Asynchronous groupware	Low-medium	High	Low-high	High	High
E-mail	Low-medium	Medium	Low-high	High	High
Written mail	Low	High	Low-medium	High	High

Fig. 1: Comparison of different media in relation to their various characteristics

Effective communication depends on matching media capabilities to the needs of the fundamental communication processes, conveyance and convergence. The relationships between the communication process and the media capabilities will also vary between established and newly formed groups, and will change over time.

The richest medium is therefore the one which to the greatest degree has those capabilities that required in a given situation. This will depend on the participants, the task and the social context, and how these influence each other. To conclude that face-to-face communication is the richest medium is therefore not always correct.

It is therefore important to use various media in web-based teaching as well as in classroom-based teaching. Choice of media should be related to the task that is going to be executed. Using e-mail may be appropriate when one is going to inform many students of some pertinent information, whereas a video-conference may be the most effective in a one-to-one guidance context.

Telepresence

A supplement to Media Synchronicity is the theory of Telepresence. Telepresence (Minsky, 1980) describes a medium's ability to enable a person to feel as if they were present when they are not. Steuer (Steuer 1992) defines Telepresence as the subjective experience of being in the same room when we are actually physically in different places. He presents this in the following model:

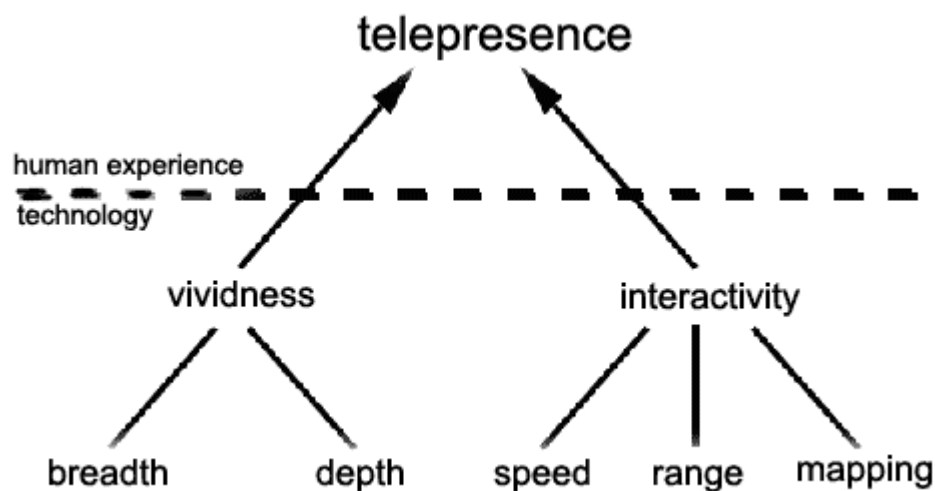


Fig. 2: Technological variables which influence Telepresence (Steuer 1992)

In this model the experience of being present is based on the sense impressions and the technology which makes the situation possible. Vividness and interactivity are two variables which reveal a medium's ability to create an experience of being present. 'Speed' refers to the speed at which an input can be assimilated in a mediated environment. Range refers to the number of action possibilities at any one time. Mapping refers to the system's ability to make changes in a mediated environment in a natural and predictable manner. Breadth refers to the number of senses which are simultaneously presented and which to a high degree parallels the media richness theory. Depth refers to the dispersion within each of these perception channels and which to a high degree parallels the medium's bandwidth (Steuer 1992).

The use of video-mediated communication in a web-based teaching context creates a high

level of the feeling of being present. It is rich with regard to both interactivity and vividness.

A web-based study in digital image-processing

The Department of Art and Design at Telemark University College has arranged several web-based courses and studies in digital image processing. In these courses and studies the web-based platform Fronter was used, enabling students to access teaching material as well as e-mail for communication between the participants.

These courses were based on asynchronous communication between the teacher(s) and students. The lectures were published in note form and published in Fronter, together with assignments and links for relevant course literature. Students were provided with access to these documents and were able to download them or read them on their computer screens. Fronter also offers students the opportunity to submit assignments online.

When students experienced a practical problem or question, they formulated this in writing and then sent it to the teacher in question using e-mail. The teacher would then read and answer the e-mail, and provide guidance. However, students were not always capable of formulating practical problems simply and sometimes needed to write 2 or 3 e-mails in order to arrive at an understanding with the teacher regarding what the problem involved in order to receive guidance. On other occasions, the teacher spent time drafting illustrated guidance in WORD and then sent this to the student. However, this was a time-consuming process, and the student could become frustrated and lose motivation for working further on the assignment in question.

The elements in an asynchronous communication of this type in a web-based teaching context provide little or no feeling of being 'present' (the theory of *Telepresence*: Steuer, 1992). There is little vividness or interactivity. Neither does it utilise to the maximum the possibilities which are inherent in the medium of the Internet. In order to execute a task in the most effective manner the capabilities of the chosen medium should be matched to the five processes as described in the theory *Media Synchronicity* (Dennis and Valacich, 1999).

Video-mediated teaching

On the basis of our experience within the field we have developed and made available a new web-based course in visual arts (digital image-processing) in which we use video-mediated communication. Video-mediated communication provides new possibilities for direct communication with students via the Internet. The new web-based course in digital image processing (15 ECTS) has been developed to meet the challenges within *Visual Communication*, which constitutes a principal area in the Arts and Crafts curriculum within the new Norwegian National Curriculum, the Knowledge Promotion Curriculum

Equipment and programmes

In order to participate in this web-based course students must have access to the Internet and have the following equipment: a multimedia-enabled PC, a web camera, a headset

and an image processing programme. We use the online learning platform Fronter, and the web and video conferencing system Meetcon. Both Fronter and Meetcon only require the web browser Internet Explorer. Running Meetcon only requires the installation of an ActiveX component during the start-up, and the configuration of sound in the microphone and loudspeakers for the headset.

The course in practice

The course began with a workshop at Telemark University College at Notodden. The aim of this workshop was to provide the students with an opportunity to meet each other as well as the teacher. Students were given important course information during this introduction, and were introduced to the interface and the use of Fronter and Meetcon. The students were given a username and a password for Fronter. In the “study room” in Fronter a link is available which connects the students directly to the virtual classroom. During the workshop instructions were also given regarding a practical assignment which several students later worked on and submitted via Fronter.

The course includes both theoretical material and practical assignments. Emphasis is placed on various types of digital formats by means of lectures, theoretical material and assignments. These may for example include digital sound, for instance recordings of lectures/other texts; or video recordings of lectures/demonstrations; or text-based compendia in PDF/WORD formats. These are made accessible to the students via Fronter.

In addition to the first workshop on campus, the course includes four web-based workshops. In these workshops the lectures take on a face-to-face aspect: all of the students can ‘see’ each other and the lecturer, and students are also able to ask the lecturer questions directly. Students receive individual guidance and group assignments within the same system. The guidance periods may possibly become more effective when the students are able to engage in two-way communication.

Web-based workshop

Four web-based workshop was held during the semester. The students connected to the video-mediated classroom at the agreed time by clicking on the link in Fronter.

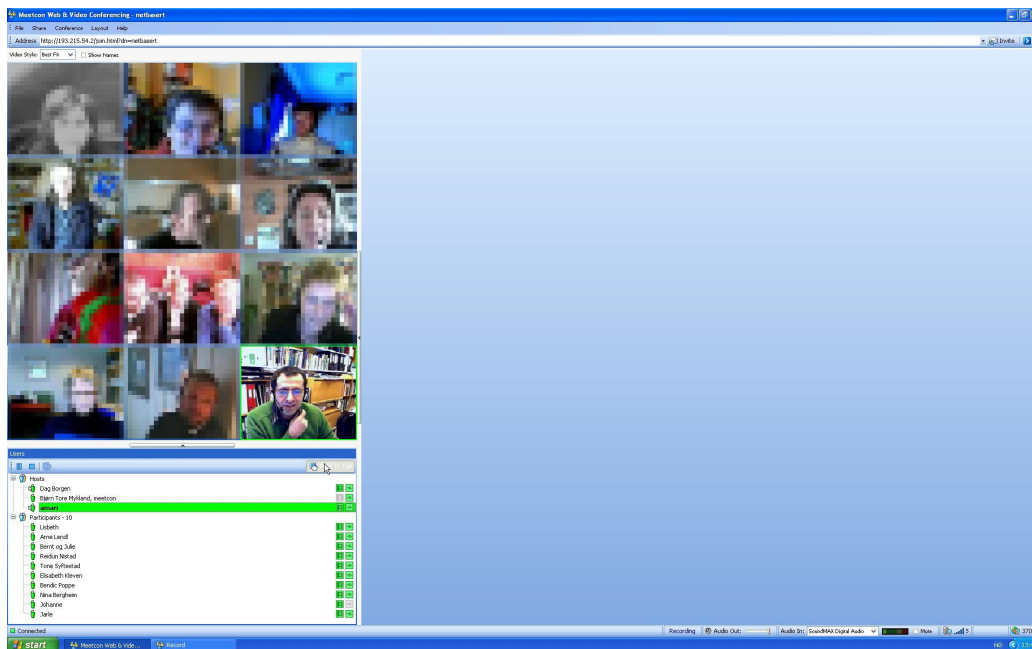


Figure. 3: Web and video-conferencing system Meetcon with video images of the students.

The teacher and the students can ‘see’ each other, talk and send text messages.

The first workshop began with the teacher displaying a Word document which contained the day’s programme and the content of the workshop. Other document types may also be displayed in a simple manner using this system.



Figure. 4: Screen image of a web-based workshop displaying a Word document.

The participants were able to read the Word document and listen to the teacher using their headsets. During the lecture the teacher was also asked questions directly, which he was able to answer immediately. This was followed by a demonstration of the

instructions for the next assignment in the digital image-processing programme Photoshop Elements 5.0.

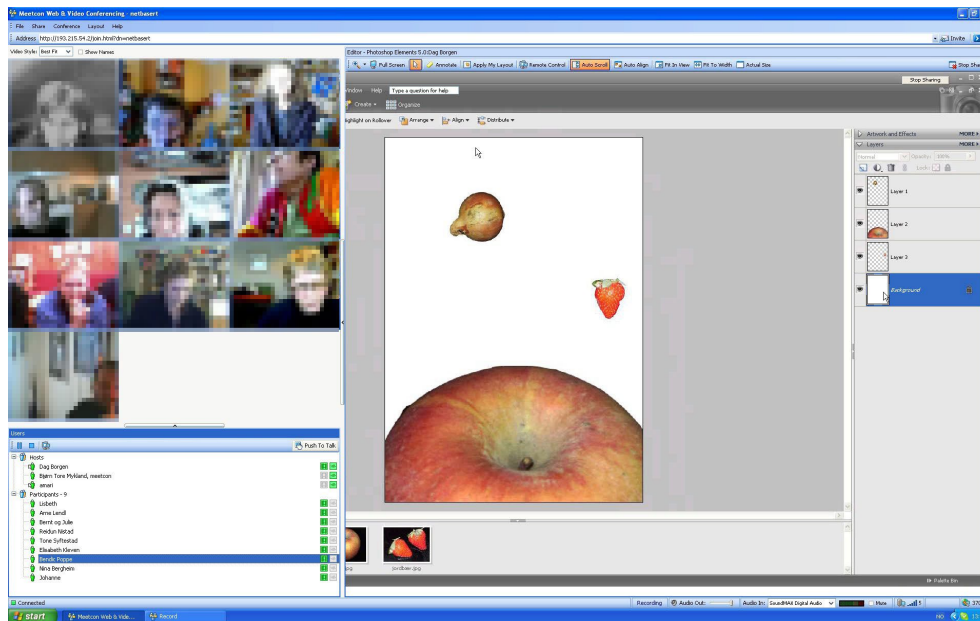


Figure 5: Screen image of a web-based workshop showing a software programme image.

Video-mediated guidance

During the period between the web-based workshops, students are offered the option of video-mediated guidance. They agree on a time for 'meeting' with the teacher, and are then able to discuss their problems and questions directly with the teacher. In addition to the video discussion, the teacher and the student are able to share the same desktop and screen image. The guidance discussion may concern both the technical aspects of the software and the formal aesthetic aspects of a particular image.

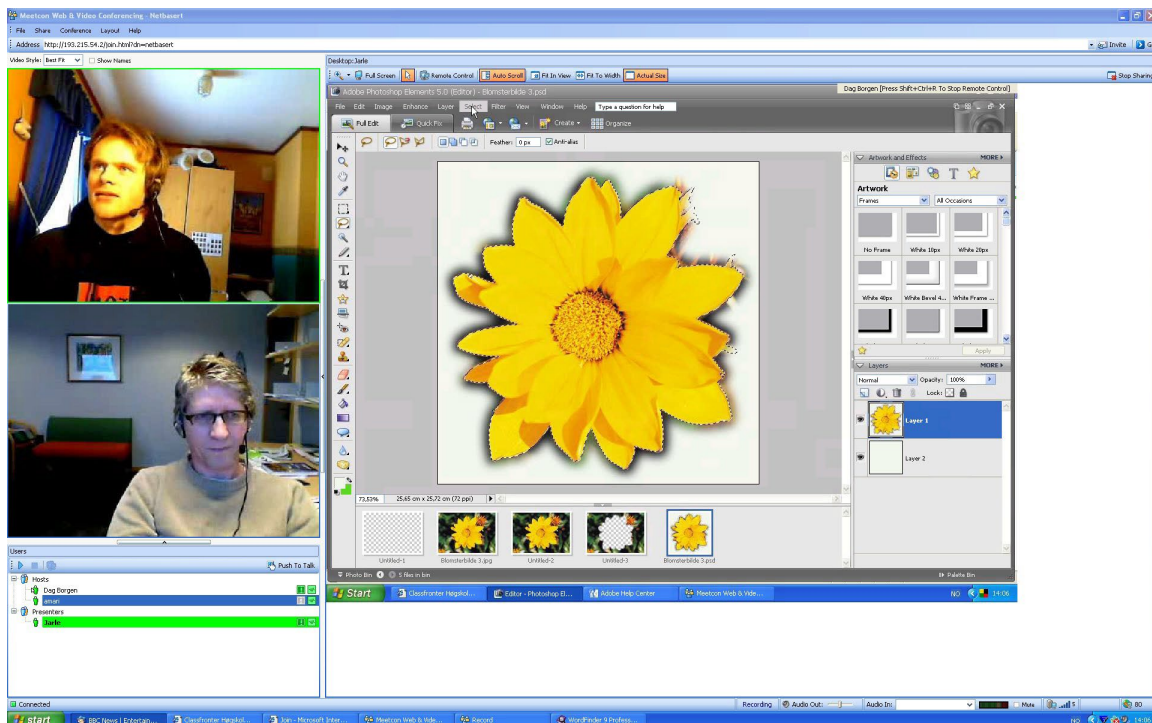


Figure 6: Screen image of a video-mediated guidance session.

Sound

There were some problems initially with the sound, and it took some time before this was sorted out. The problem concerned high noise levels and echoes. The weakness with the system is that if one of the participants uses a poorly functioning headset then this may cause problems with the sound for the whole group. In order to eliminate this there is a function in the programme which switches off the sound; students who then want to talk need to push a button ('push to talk'). This simulates the physical act of putting one's hand up in a classroom situation. Although it is considered important that one can see each other's faces in this type of communication, the sound is also a very important factor. Poor sound is very frustrating and destructive for this type of teaching situation. It is therefore strongly recommended that high quality headsets and microphones are selected for this type of course.

Conclusion

Telepresence (Steuer 1992) refers to a mediated sense of feeling 'present'. Today it is possible to achieve a high level of presence despite geographic distances with the use of fairly standard programmes and hardware. These are also becoming cheaper and more widely used. With graphic software the situation is the same. Standard computers are now also powerful enough to use image-processing software. This situation may be exploited to meet the ever-increasing need for visual skills in the media world in which we live today.

Educational institutions will meet new challenges with regard to their web-based courses as more users gain access to broadband. Transferring multimedia content is not advisable

using a modem or ISDN, because of limited transmission capacity. However, with broadband there is the possibility of video-mediated communication and the planning of digital content using pod-casting/streaming of video and sound.

Web-based study programmes and courses have in the past mainly been static presentations, involving the copying of lecture notes or chapters in a textbook and publishing them on the Internet. The medium's possibilities using multimodality and interactivity have not yet been fully exploited. In a web-based learning environment the choice of media will be related to the task which is to be executed. This fact is underlined by the theory of media synchronicity (Dennis and Valacich 1999). For instance, e-mail may be suitable when one needs to send a piece of information to many students, while a video-conference may be most effective in a one-to-one guidance situation. The presentation of lectures in the form of texts, sound recordings and video will be suited to the individual students' learning styles and learning strategies.

A web-based course is at its most effective when all of the possibilities which the technology makes possible are fully utilised. Using these possibilities an individual teaching form may be established, which will avoid merely copying the traditional teaching and learning methods of correspondence schools.

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