

# Multimedia Information Systems Applications - a Taxonomy and Three Case Studies

Schahram Dustdar  
Center for Informatics (ZID), University of Art,  
Hauptplatz 8, A-4010 Linz, Austria-Europe  
dustdar@khsa.khs-linz.ac.at  
<http://www.khs-linz.ac.at/~dustdar>

## Abstract

*Multimedia information systems present a great challenge to an organization which contemplates their introduction. This paper addresses the impacts that multimedia information systems would pose to an organization. The paper investigates the organizational impacts of multimedia information systems through a proposed taxonomy.*

## 1. Introduction

Research on multimedia information systems is an interdisciplinary research area and consists of several research streams such as communication research, human-computer interaction, information systems research, organization research and computer science. Each of the mentioned research streams of multimedia information systems developed their own categorization system or systems. However, a comprehensive and well established categorization of multimedia systems - which cannot be found in literature - is essential in order to generalize research findings across systems and research disciplines.

## 2. Taxonomy of multimedia information systems

This paper argues that - for two reasons - it is a challenging task and of paramount importance for information systems research to build a comprehensive classification system for research on multimedia information systems. First, research on multimedia information systems needs to integrate research findings of disciplines such as communication research, information systems research, computer science and organization research. Second, the impacts of multimedia information systems depend on the category of the system investigated. Organizational impacts of multimedia information systems cannot be generalized, moreover, they cannot be generalized over different categories of systems, such as "personal, group and corporate" multimedia information systems as presented in this paper. However, research on multimedia information systems' organizational implications needs close and joint research efforts across research disciplines.

Since multimedia information systems consist not only of communication systems enhancing human to human communication, a taxonomy, such as that developed by Johansen [3], which differentiates between two dimensions synchronous and asynchronous communication and same place/different place, makes sense only to a limited number of multimedia information systems, in the literature termed as "computer supported cooperative work" (CSCW) systems or "group multimedia information systems", as we call it in this paper. Therefore we propose a taxonomy of multimedia information systems consisting of three categories: "personal", "group" and "corporate" multimedia information systems. Unfortunately the boundaries between these categories are not always very clean and clear. "Group multimedia information systems", such as point-to-point or multipoint conferencing systems, are currently the driving force in the multimedia information systems arena and researchers in the CSCW domain are and will investigate multimedia elements of collaborative systems. The proposed categorization of multimedia information systems consists of three layers and provides system examples in each category and relates them to probable organizational implications, which are discussed in the next section. A detailed discussion of every system example used in the table and its main characteristics would go beyond the scope of this paper. The first category is called "personal multimedia systems". Systems examples are: kiosk systems, video-on-demand, music-on-demand, multimedia databases, interactive-TV, personalized news, games. Possible organizational impacts are: a change of focus to mass information systems and to external information systems. WORLDRIDE [1] is an experimental kiosk system prototype developed at the LSE which helps its user to explore countries and learn about their culture and civilisation for the purpose of visitation in these countries as a tourist. Although WORLDRIDE was initially developed for a government department for the purpose of briefing both its officials and interested general public about areas of unrest throughout the world it was then expanded to include all countries of the world. WORLDRIDE includes all geographical information stored as multimedia objects, i.e. still and full-motion video, audio, animation text and graphics. Inevitably, WORLDRIDE brought a lot of changes both internal

and external. Long gone is the middle man who was responsible for updating the textual information from various sources. In its place, there is now a competent technologist who is responsible for retrieving information in every possible media, video, audio, etc. and keep the system up to date. The second category is called „group multimedia systems“. Systems examples are: point to point conferencing, multi-point conferencing, concurrent engineering and multimedia mail. Possible organizational impacts are: redesign of workplace, redesign of work content, redesign of processes, redesign of communication. The following section will summarise the experiences we made in some desktop multimedia conferences on the Internet. We draw on our experiences from multiple desktop multimedia conferences on the Internet and in particular we focus on a case study on urban planning using Unix-based desktop multimedia conferencing tools on the Internet. The desktop multimedia conference used the Mbone virtual network on top of the Internet and was transmitted on the Austrian part of the Internet, AConet. In some situations it was not obvious to the participants that if two participants talked at the same time some audio packets would get lost. We propose that prospective users of desktop multimedia conferencing systems should have a clear idea of what quality they can expect. Particularly we witnessed a high degree in user expectation regarding video quality. The video quality needs to have a minimum frame refresh rate of 15 frames per second to give the impression of real full motion video. This refresh rate can only be achieved in high bandwidth networks. The conference participants needed some "private-time" during decision making processes to discuss issues amongst themselves, without the feeling of being "broadcasted". Hence we propose the implementation of the functionality to direct video and audio streams to certain users within a decision making group and to implement features in software which shows the remote participant that the local site has switched to mute and therefore is not able to receive audio or video. This would help users to have a feeling of privacy and enhance security. The third category is called „corporate multimedia systems“. Systems examples are: multimedia training, multimedia broadcast, computer-telephony integration, multimedia information services. Possible organizational impacts are: redesign of IS departmental structure, redesign of IS responsibilities, redesign of service delivery channels, redesign of intra-organizational communication, enhancement of inter-organizational communication. Barclays bank is a UK-based leading financial institution and the third largest bank in the UK. Barclays has had a "Multimedia Unit" since 1986. The main tasks of the Multimedia Department at Barclays are: evaluating multimedia information systems through pilot studies, developing electronic

catalogues for retailers and Barclays Group Companies. The list of activities of the Multimedia Department shows that Barclays has attributed a crucial role for multimedia information systems to play, both internally and externally. Barclays' Chief Executive formulates the impact and future of multimedia information systems at Barclays: "As the technology of computer information and telecommunications converge it is possible to envisage a future when many banking services will be delivered direct to the home or business place via television screens" [2]. Since 1993 Barclays has focused on developing new income streams from multimedia. The huge IT resources and technical skills within the bank make them well equipped to seek to forge profitable partnerships, alliances, and joint ventures in the external marketplace. Recent developments in multimedia information systems have shown that research is mainly undertaken in "group multimedia information systems". "Personal multimedia information systems" such as kiosk systems are being widely tested in retailing and services organizations such as Argos, Woolworths, Ladbroke's and Sears, to name a few. Future multimedia technologies such as interactive TV in which the TV is turned into a two-way communication device by adding a "set-top-box", build a possible system for organizations to focus more on external IS in their development efforts. The organization can build virtual direct links to customers and can be contacted by (potential) customers via a "TV", which will be, in fact, a computer. "Corporate multimedia systems" can be differentiated to "group multimedia systems" in that sense that "corporate multimedia systems" build a core structure and backbone of multimedia information systems within an organization, whereas "group multimedia information systems" enhance human to human communications. Applications such as corporate-wide multimedia training to the desktop computer (sometimes referred to as just-in-time training), broadcast of, for example, television news programmes or financial information on stock markets on corporate-wide LANs and WANs to the desktop computer and the integration of computer and telephony build the backbone of corporate multimedia information systems and related services. Currently many commercial organizations are in the phase of exploring the World-Wide-Web as a delivery channel for multimedia information and services and are offering multimedia services on the Internet.

### 3. References

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