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**APPENDIX**

**Table 2: The Public Effectiveness of the Historical Women's Movements in Germany Source: Excerpted and Translated from Ulla Wischermann (2016)**

| Level | Character                        | Actors and Networks   | Activities   | principal Media   | Dominant Function  |
|-------|----------------------------------|---|--|---|--|
| 1     | Culture of movement              | Personal relationships among actors                                 | Common projects, outings, leisure times  | Diaries, letters  | Internal mobilization; politics of identity                        |
| 2     | Counter-publics                  | Regional and national clubs and associations                        | Common rituals and symbols: poems, songs, badges   | Newsletters, flyers, posters books, alternative press   | Internal and external mobilization; politics of influence          |
| 3     | Complex publics / public opinion | Participants in established political publics (parties, parliament) | Action and intervention directed at the complex publics, petitions, demonstrations, civil disobedience | Addressing and being present in mass media through press releases, photographs, illustrations, commentaries | External mobilization through PR-strategies; politics of inclusion |

## INTERACTIVE VIDEO APPLICATIONS BASING ON THE MPEG-DASH STANDARD - MULTIVIEW AND HYPERMEDIA FOR E-LEARNING, INFORMATION AND ENTERTAINMENT

**Jürgen LOHR,**

Prof. Dr. Beuth University of Technology Berlin juergen.lohr@beuth-hochschule.de

**Robert STRZEBKOWSKI,**

Beuth University of Technology Berlin, Dept. Computer Science and Media robertst@beuth-hochschule.de

### ABSTRACT

*Online Video is an exponential increasing significant media format for information and learning purposes. New technical, distribution and editorial possibilities provide for content creators, teaching personal, information events and hence for companies and educational institutions new forms for the delivery and presentation of information or learning content. Students or employees in learning circumstances get new forms for the access and for the interaction with the content. There are arising new ways of individual consumption and cognitive processing of information.*

*For communication and media technologies a new standard, the DASH technology, has been developed. This standard supports many terminal devices in different networks. The Dash technology is a new technology, the fields of application of which are described in this article. The Beuth University of Applied Sciences does research on future interactive media contributions and how they can be produced, webcasted and displayed. The interactive media contributions are linked by hypermedia processes and enriched by means of the multichannel technique with many audio and video tracks.*

**Keywords:** MPEG-DASH, Interactive Media Contributions, Hypermedia Video, Multichannel, Multiview, Video-based Learning.

### **MPEG-DASH STANDARINA DAYALI İNTERAKTİF VİDEO UYGULAMALARI – E-ÖĞRENME, BİLGİ VE EĞLENCE İÇİN MULTIVIEW VE HİPERMEDYA**

### ÖZET

*Çevrim içi video enformasyon ve öğrenim amaçlı üstel artan önemli bir medya biçimidir. Yeni teknik, editöryel ve dağıtıma yönelik olanaklar içerik oluşturucu, öğretim çalışanları, enformasyon etkinlikleri ve böylece şirketler ve eğitim kurumlarına enformasyon veya öğrenim içeriğinin sunumu ve ulaşımı açısından yeni biçimler sağlamaktadır. Öğrenim halindeki öğrenci ve çalışanlar içeriğe erişme ve içerikle etkileşim içinde olmak için yeni biçimler bulmaktadır. Bireysel tüketim ve enformasyonun bilişsel sürecine dair yeni oluşan biçimler bulunmaktadır.*

*İletişim ve medya teknolojileri için yeni bir standart, DASH teknolojisi, geliştirilmiştir. Bu standart farklı ağlardaki pek çok terminal cihazı desteklemektedir. Dash teknolojisinin uygulama alanları bu çalışmada tanımlanmaktadır. Beuth Uygulamalı Bilimler Üniversitesi, gelecekteki interaktif medya destekleri ve bunların nasıl üretildiği, görüntülü veya sesli olarak internette nasıl yayınlandığı ve gösterildiği üzerine araştırma yapmaktadır. Interaktif medya destekleri hipermedya süreçleri aracılığıyla birleştirilmekte, pek çok ses ve video hileleri olan çoklu kanal tekniği ile zenginleştirilmektedir.*

**Anahtar Kelimeler:**MPEG-DASH, İnteraktif Medya Destekleri, Hipermedya Videosu, Çoklu Kanal, Multiview, Video Tabanlı Öğrenim.

## INTRODUCTION

Educational institutions as well as companies are currently recognizing online video as a very effective media format to provide learning and tutorial content or to preserve tacit/procedural knowledge (Zhang, 2006). Almost each university is looking for the introduction of digital strategies in teaching and learning processes. MOOCs – Massive Open Online Courses – are worldwide one of the main solutions of those digital strategies and still increasing phenomena. The main element of MOOCs are recorded lectures, exercises or video based tutorials (Seaton, 2014) for example to prepare students for a laboratory work. Such video based teaching or tutorial content are substantial components in the 'Flipped Classroom' approach, which is currently becoming a very attractive teaching and learning method at universities (Avdic, 2015). In the scope of this approach students are learning and preparing at home with the help of recorded lectures or exercise examples for the next meeting at the university. With the acquired knowledge based on the provided MOOCs they are more able to work on case studies, carry out exercises or to discuss and to solve problem tasks during the work time at the university. The impact of video based learning material is mostly well suited for engineering and nature sciences, which are requiring conducting and processing of technical or medical procedures. Such manually procedures and skills could be very well presented in a video form.

Video based learning content provide also quite wide range of didactical and media psychological advantages. A number of still modern constructivistic learning aspects and methods can be supported very well through video – as one of many different didactically methods. There are among others requirements for most possible closeness to the reality, for different accesses to the learning subject or for learning along a real problem (Duffy, 1996). One of the well known constructivistic approaches is the cognitive apprenticeship, in which the apprentice is learning through the observation the tasks of a skill/subject master and through the effort to apply the required skills and to compare the own working results with the master's skills (see *ibid.*). A detailed video presentation and explanation of the required skills could provide a rich base to start learning and applying the right skills (Jonassen, 2003). The use of a live video connection to a skill master could provide a situation almost comparable with the real situation, in which the master is coaching the apprentice at the same place giving him hints and corrections. Live video connection could provide also the situation of a social shared learning and working environment, of a team-based situation. Positive experiences in this area are well known from the exponential increasing video conferencing situations. Nowadays modern video communication technologies help to support and to apply increasingly number of modern teaching and learning methods. Thereby are developments in the miniaturization and in the automatization of video recording and transmission technology an important part. One of the latest developments is the massive usage of the small GoPro™ video cameras for documenting different outdoor sport activities. In connection with a smart phone or tablet there are given possibilities to stream the video picture directly from the camera to the mobile devise and then to the Internet. This media technology allows today not only the application of the mentioned above 'remote cognitive apprenticeship' method but also could help in many cases to preserve the so-called tacit/implicit knowledge.

By a respectable number of companies there is a need to preserve knowledge about procedural and manual skills in particular in the scope of assembling, disassembling, repair and service tasks in the industry area. With the help of video recording could be document and preserve the individual tacit knowledge/know-how before old employees going retired and are taking their implicit knowledge with them. The usage of 'media equipment' like GoPro or own smart phone or in the combination of both for the documentation of own work is very well suited, because the equipment is quite small and placeable at the work cloths or in the closer work environment. The operating and controlling of those media devices could be handle nowadays through speech recognition – the almost normal way, we are writing a SMS.

Another interesting technically achievements are IP-based so-called PTZ cameras (P = Pan, T = Tilt, Z = Zoom). Those cameras can be controlled remotely through an IP network, e.g. per WLAN and have integrated the tracking mechanism to track the movement of human bodies. Such video cameras could be used for recordings of the lecturer person and the pictures from the board during lectures. Combined with the screencast of the computer presentation there occurs a perfect MOOC for the students.

Until this point we have discussed only the 'classic' form of video based content as a linear, single-view video sequence. There is lot of learning content and work situations, in which more than one camera view and hence the MultiView technique is needed for an optimum of the learning effect. We can already start with the classic situation of recorded lectures, in which the optimally presentation form is to see parallel the learning subject presentation and the lecturer person. Both of the information channels nowadays should be video recorded because lot of lecture presentations consists of video sequences or animations as explanation and example media.

Other useful application of MultiView is given for example during the process of a surgery. In this situation is important for the students to see parallel the intervention at the human body/organ on detail, the situation in the operation room, e.g. the activities of the anesthetist, e.g. some of the current information displays.

For learning purposes is the use of video sequences often very useful but not sufficient. The students need additional information like text descriptions, additional pictures in different presentation formats – photograph, more abstract graphic, diagram or explaining animations (Mayer, 2009). Thereby we are talking about a multimedia learning material and a special form is Hypermedia, if the learning content is linked between a small 'nuggets' of learning content. There is a wide range of media contributions, e.g., lectures, trainings, presentations, and other fields of applications, that can be provided via hypermedia processes or by multichannel technique. Within the media contributions, a combination of any number of basic contributions or virtual basic video and audio tracks that can be synchronously processed and webcasted is possible. Media contributions that were webcasted and recorded by means of multichannel technique allow the provision of more individual information than the previous, wide-spread single channel technique does. By means of the multichannel technique users are able to select different media contributions from different channels by using an interactive application. Hence, users can chose the language and the views of a webcasted media contribution, since several audio sources and video windows are displayed.

### **1. PROJECTS “MEDIA SYSTEMS FOR BUSINESS TV” AND “VIDEO-BASED KNOWLEDGE TRANSFER”**

The research project “Media Systems for Business TV” aims at developing a system for the webcast of multichannel media contributions via public networks and business intranet. The research team uses an own developed WebTV and multimedia platform the 'BeuthBOX' as basis for the project and focuses on application scenarios for education, business communication and entertainment. Basing on the objectives of the research project we tried to enlarge the approach toward the technological feasibility, so that a steady operation of high quality and optimized processes can be realized. However, we did not focus on an economic approach that brings time, resources, working processes and finance to the fore. We rather concentrated on an approach that aims at a technological optimization in order to determine all processes, features, functions and technical resources and to adjust their combination on a media system.

The following processes are of importance for the provision of media systems: planning, recording, provision, webcast, display and follow-up of media supplies. These processes describe the complete development of media contributions in a portal system with an interactive client application on a terminal device. The WebTV/Multimedia portal BeuthBOX (Fig. 1) enables the user to select and watch videos. An editor can create and upload media contributions to a content management system (Fig. 2). Above all, recordings of university events, for instance of the “Long Night of Sciences”, have been presented in the BeuthBox portal. Currently, the BeuthBox system can only administer and display media contributions of single channel technique with one video, one audio channel and one picture. Media contributions can therefore be displayed via one output channel. In addition, there exist already special channels, the so-called “lab”, that already include first add-ons for multichannel media contributions. For this, different players are needed that the editor can determine in the content management system, e.g., type video for standard player, type Dash for player with Dash technology (Fig. 4). Fig. 5 shows the metadata for the player in the content management system, e.g., Dash player MC1.