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Future Media Adoption in Learning and Teaching: Current Study Design from the Perspective of Cultural Studies

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ABSTRACT

A lot of effort is put into studies to find more elaborated forecasts of future media adoption in learning and teaching. In this chapter, some methods of futurology, such as the Delphi method or the scenario technique will be sketched. Afterwards, this current study design will be critically considered from the perspective of cultural studies. For this, the terms of media and culture will be introduced and Debray's approach of mediology and the adaptation on education will be discussed. Through this, we aim to illustrate that the current study designs could be enhanced by a bigger awareness of the insights of the cultural studies and their adaptations for education, the pedagogical media theory. The presented approach does not explicitly deal with the processes of adoption of new educational media systems on a practical level. But pedagogical media theories and studies on cultural and social changes and media provide a basic framework for various specific approaches dealing with the future of technology enhanced learning: Just as we can hardly understand how it feels to live in an oral culture, we are not able to imagine how we will think, act and communicate in the future of the evolving new "mediosphere".

KEY TERMS

Educational Technology, Educational Technology Implementation, Research Techniques, Strategic Planning In Education, Technological Innovations, Technology Mediated Learning, Technology-Enhanced Learning, Mediology, Pedagogical Media Theory

INTRODUCTION

The invention of the World Wide Web in 1993 brought forth intensive discussions about the effect of (new) media on education. Indeed, the basic conditions for learning and teaching have changed a lot in the last decades, especially in the last years with the advent of Web 2.0. The Internet is a nearly ubiquitous medium providing fast access to information. Mobile devices especially allow for access to the Internet nearly independent from time and space. Although reality shows that not every student is naturally used to this new possibilities, these technologies reflect how the learning possibilities are changing.

Not surprisingly, a lot of discussion and also research is done to get more and better insights in future media adoption within learning and teaching. The dominant approach is currently to ask a group of experts in a more or less methodological sound way on what they think about future media adoption in education. From our point, this can be criticised for several reasons, but in this

chapter we will concentrate on one point: Cultural studies in the field of media and education illustrate the problems of an estimation of future adoption. We will therefore describe theories and ideas of a pedagogical media theory. Afterwards, we will sum up our findings of this confrontation.

CURRENT STUDY DESIGN: USING THE WISDOM OF CROWDS OF EXPERTS

There are several methods available for use from the field. Futurology is derived from ideas about the future development of media within learning and teaching. In the following, we describe some methods of futurology, building on the idea of the “wisdom of crowds of experts” to illustrate each approach with some exemplary current studies. These approaches build on the idea that widespread information research and knowledge building should be the source for forecasts. The opinion of experts or crowds of experts are seen as superior to the knowledge of one person due to synergy effects and several perspectives on developments. In the following we describe the Delphi method, the scenario technique, and the method of road mapping as such approaches. All are already used in the field of educational technologies and media within learning and teaching. Additionally, we will sketch the methodology of the Horizon report with its own, newly derived format.

Delphi method

The *Delphi method* involves experts from different related disciplines in two-step moderated group discussion to identify possible future developments. This strategy is described as helpful when new technological trends or innovations with a wide range of given possibilities should be discussed. There are several examples where these methods were used to get insights about future developments. For example, the Delphi method has been used for a prediction of future adoption of online assessment within higher education in Germany. Schaffert (2004) brings together the answers and ideas of 48 experts in a two-step process based on questionnaires. The experts came to the (not very surprising) conclusion that a moderate rise in of the adoption of online assessment is expected, especially in branches, where the usage of computers is a daily routine.

The scenario technique

According to Steinmüller (2002), the *scenario technique* is one of the most commonly used future analysis methods because it offers one of the widest approaches, including other well established prediction methods (Grunwald, 2002, p. 226). The scenario technique offers a method for deriving a set of predictions based on a present status and their most relevant influencing factors. The method is based on the strategic military developments of the 1950s, where scenarios were used to identify different outcomes of complex situations. Scenario technique tries to develop "orientation knowledge", which aims at a better understanding of what will happen in the near future. The scenario technique is typically applied in a set of three scenarios: “(1) a surprise free projection, describing the baseline and most likely scenario, (2) the worst case projection, offering the pessimistic scenario, and (3) the best case projection, referring to positive changes in the relevant area.” (Boon et al. 2005, p. 207). Scenario construction aims to describe a plausible range of possibilities for the future, integrating qualitative and quantitative information from different sources into a coherent picture, it runs the risk of predicting an imaginary future (Boon

et al., 2005). Concerning our topic of media adoption within learning and teaching, there are several studies which use the scenarios technique. For example, the Institute for Prospective Technological Studies used the scenario technique to get an impression about the future of learning. It “uses scenarios as a tool for calling into question current decisions without any expectation that the scenario used today will correspond to the scenario developed tomorrow” (Miller, Shapiro & Hilding-Hamann, 2008, p. 23). Hamburg, Busse & Marin (2005) propose e-learning scenarios as a base for decision making in organisations.

Road mapping

Another approach to forecast future developments is the *road mapping method*. Road mapping serves as a framework for strategic decisions. Typically, road mapping is a systematic collection of central challenges and opportunities for action and an illustration of development goals and milestones on a time axis (Kosow & Gaßner, 2008, p. 65). Four main forms of road mapping can be distinguished (Kosow & Gaßner, 2008), road mapping enterprises, branches, research and development and problem oriented road mapping. Similar to the scenario technique, several alternative roadmaps can be developed. Additionally, road mapping can include back casting from (several variations of) future development and describe what factors and milestones are responsible. One example of road mapping in the field of media for learning is work done within a EU-project dealing with Open Educational Resources (OER). The OLCOS Roadmap 2012 on Open Educational Practises and Resources (Geser, 2007) explores possible pathways toward a higher level of production, sharing and usage of OER and provides recommendations on required measures to support decision making at the level of educational policy and institutions. The roadmap emphasises a knowledge based society demanding competencies and skills requiring innovative educational practices based on open sharing and evaluation of ideas, fostering of creativity, and teamwork among the learners.

Another design: The approach of the Horizon report

Additionally, we describe the *methodology of the Horizon report* (Johnson, Levine & Smith, 2009), one of the most popular studies in the field of future developments of learning and teaching. Based on the ideas of the Delphi method, the Horizon report team used Wiki technology to collect nearly a "hundred technologies, as well as dozens of meaningful trends and challenges are examined for possible inclusion in the report" (p. 30), and then provide their experts with RSS-feeds and other materials with deeper discussion of learning trends or technologies. For the 2009 report, 45 international experts and practitioners were asked to find answers to the five Horizon report questions. For example, the first is: "What would you list among the established technologies that learning-focused institutions should all be using broadly today to support or enhance teaching, learning, research, or creative expression?" (ibid.). Each answer of the advisory board members is placed into a vote system that allows members to weight their selections. For the current issue, from "more than 80 technologies originally considered, the twelve that emerged at the top of the initial ranking process (...) were further researched" (ibid.).

In the latest report the first trend with a time-to-adoption horizon of one year or less are “mobiles”: The authors describes the rapid pace of innovation of mobile applications, namely through concrete applications and numbers of users. The authors came to the tentative conclusions that mobile devices are “challenging our ideas of how they should be used and presenting additional options with each new generation of mobiles” (p. 9): It is “clear that

mobiles are already well on the way to becoming a universal tool for communication of all kinds” (ibid.); concerning education that means: “The variety and quality of educational content is growing at a fantastic pace” (ibid.).

A CRITICAL VIEW ON THESE DESIGNS

When we did our research on current publications concerning e-learning trends and the future of technology enhanced learning, we got the impression a lot of current studies are still presented with a lack of description concerning their theoretical and methodological framework (e. g. Siozos & Palaigeorgiou, 2008; Sinclair, McClaren, & Griffin, 2006). Boon et al. analysed four studies from the years 2000 to 2002 and came to a similar conclusion, “It is remarkable that trend studies in the domain of e-learning are hardly based on sound methodological approaches” (p. 210). Besides this general remark on current studies, the study design of crowd wisdom itself produces additional problems:

As all these methods build on the idea of the crowd intelligence of experts in the field of media for learning and teaching, one effect is these methods build upon the (personal) histories of people: One’s own experiences and (implicit) assumptions about learning and media or technologies are possible, perhaps even the most important, factors for people: Even if they are professionals in the field of media in education, prior knowledge and personal attitudes are key factors how to handle media in a general way; for example being optimistic, being critical, or being pessimistic. Theories that explain “technology acceptance” can be a source for further argumentation. For example, the technology acceptance model (Pituch & Lee, 2006) “appears to be the most widely accepted theory among information systems research for studying users’ system acceptance behavior” (Rezaei et al., 2008, p. 86). According to this model the two key determinants of technology acceptance are the beliefs about the perceived usefulness of technology and the perceived ease of use. Both are influenced by external variables such as Internet experience, computer anxiety, computer self-efficacy (Rezaei et al., 2008, p. 86), and lead to a specific intention. Whereas this last variable is often seen as a factor in the use of e-learning of distance learners, similar effects should obviously be found in the forecasting of media adoption within education.

Even in a (at first glance) homogeneous group of educational scientists, the attitudes, beliefs, and opinions concerning (new) media vary a lot: Additionally, the cultural background seems to play a role. According to Klebl (2007) there are three metaphors or images in use to describe the role or affect of technologies or media on education. The German literature nearly always used the “potential” which derives from media usage; for example, new or better opportunities of media usage in education, which have to be developed and evaluated within learning and teaching experiences. A more common usage contributed from non-German literature seems to use more often the terms “catalyst” or “lever”. Whereas the catalyst can be used to get similar or even faster results with smaller input and effort, the lever effect can only be used if the goals of the usage of technologies are already known (Klebl, 2007 refers to Venezky & Davis, 2002, p. 14). Additionally, the educational discipline or background influences and shapes the opinion and attitude about (new) media (see Sesink, 2008, p. 13f). New media are seen as endangering the “real” self-education from a critical perspective, where the main idea is to conserve an underlying educational concern (e. g. Hentig, 2002). In contrast, media educationalists gaze at new media as something new and challenging, which should be implemented in education. Last, but not least, media didactics and learning scientist look on new media as something that can make learning

more effective and efficient. Following this finding, the background of the experts within studies should be explored and discussed carefully.

Additionally, the inclusion of several experts and their interactions (as in the Delphi method) and/or aggregation of data lead to general statements with adjusted and mean values. In other words, these values and conclusions can also be seen as mainstream. Even if all experts are well selected, this effect can also foil the idea of the generation of non-standard, non-usual or creative development of ideas on future developments. A related effect is that these methods tend to argue on the base of linear developments.

To sum up, the awareness that these approaches of study design are limited seems to be small. In the following, we want to introduce the relation of media, culture and education from a more general perspective. Through this, we aim to illustrate that the current study designs could be enhanced by a bigger awareness of the insights of the cultural studies and their adaptations for education, the pedagogical media theory.

THE CULTURAL PERSPECTIVE

The research methods described above are mainly focused on finding out about upcoming media didactical trends and innovations of teaching and learning on an application-orientated level. In different quantitative and qualitative studies the current and the potential future use of educational technologies is analysed. Next to this vast scientific discourse on future adoption of educational technologies a more theoretical discourse that is located in the field of cultural studies is more and more linked to the research area of media and education. Anthropologist, sociological and media-theoretical perspectives are taken to research fundamental correlations of media, culture and education (Meyer, 2002; Fromme & Sesink, 2008; Wesch, 2008; Baecker, 2007). These socio-cultural approaches form the basis to interpret and understand changes of media and their implications for processes of learning and teaching.

Medium and culture

In the current discussions on the relation of media and education, the term *media* is very often reduced to electronic media technologies, only referring to technical devices such as computers, mobile phones or to a technical infrastructure such as the Internet. Yet, to have a closer look at the effects of the still so-called *new media* on educational processes and to anticipate the adoption of new media in an educational context the definition of medium needs to be widened.

Technical media are certain systems of encoding, storing, distributing and receiving information and knowledge – including writing and book print as well as electronic media. In several media theories the influence of technical media on the representation and construction of knowledge and reality, as well as on our perception and our thinking, and therefore also on cultural processes is discussed. Jack Goody (1986), Walter Ong (1987), Eric H. Havelock (1988) and others researched the impact of writing on socio-cultural processes, focusing on the contrast of orality and literacy. Following their argumentation that the technical medium influences socio-cultural structures Marshall McLuhan (1994) emphasises the importance of the technical structures and the form of a medium, resulting in the famous statement: “The medium is the message”. He understands technical media as “extensions of men” (1994), which optimise or replace human actions. Friedrich Kittler (1986) goes beyond McLuhan, stating a technical apriority. According to Kittler the cultural development is a result of the development of media.

We do not have to take over such a strong technical deterministic perspective but these theories all focus on one common aspect: the correlation of the history of culture and the history of media. Changes of media have always brought forth changes of communication, a different handling and organisation of knowledge and information, and different processes of teaching and learning. These changes do not remain on an application-oriented level of cultural practices but also affect the underlying culture, such as symbolic forms, social organization, or distribution of power.

Mediology

For finding out about the interdependencies of media systems, social processes, symbolic forms and systems, the mediological approach according to Régis Debray provides a methodical basis. Debray's understanding of the term medium includes four characterizing elements: A process of symbolising (such as a word, writing, image), a social communication code, a material device for storing and storage, and a dispositive of records that is connected to a specific network of distribution, such as a handwritten manuscript, the book print or TV. Also educational institutions – and therefore also processes of learning and teaching – are part of a medium. To pass over, for example, the alphabetic writing a technical means such as paper or books, institutions such as editing houses and schools and teachers are necessary.

Not the media systems themselves are in the focus of research, instead the mediations are, the “informal in-between” (Debray, 2004, p. 68). Following Régis Debray's mediological considerations, cultural ages can be distinguished due to the technical media of transmission. Debray identifies four of these so called “mediospheres”: the logosphere, the graphosphere, the videosphere and the currently evolving digital mediosphere or hypersphere: “From the 15th century up to yesterday the book print gave distinction to the graphosphere. Today we are surrounded by the videosphere in which due to a altered sense of time the moment crows over permanence, the direct over the indirect, the reactive over the discursive. The videosphere is about to fade to a kind of hypersphere, mainly characterised by digital signals.” (Debray 2001/2002, p. 6, translated by the authors)

	Writing (Logosphere)	Printing (Graphosphere)	Audiovisual (Videosphere)
Spiritual Class Holding Sacred Power in Society	Church (prophets and clerics) Dogma is sacrosanct	Lay Intelligentsia (teachers and doctors) Knowledge is sacrosanct	Media (diffusers and producers) Information is sacrosanct
Statement of Personal Authority	God Told Me (Gospel truth)	I Read It In A Book (truth of the printed word)	I saw it on the TV (truth of the broadcast image)

Table 1. Parts of the overview of the aspects of the three mediospheres by Régis Debray (1991, cited and translated in Reader, 1995, 58f.)

To understand the evolving digital mediosphere and, therefore, to be able to make predictions on media adoption processes in education on a cultural level, it is necessary to define alterations from the previous mediosphere that considerably coined our educational system, the graphosphere. According to Debray, the graphosphere starts with the invention of the book print. The graphic reproduction of books by copyists as an established media system is replaced by printing books. With the transition from an oral to a typographic culture, from the logosphere to the graphosphere, the human being as a learning individual came to the fore. In the logosphere the individual was a rather passive recipient of information (“God told me”). However, the growing transmission of printed information brought forward increasingly active studies of typographic media (“I read it in a book”). To learn meant to learn reading and writing in order to be able to conceptualise the world. The subjective grasp of the world was no longer primarily a result of orally transmitted interpretations of scripts, mostly imparted by the clerics. The ability to read and to write enabled the individual to delve into the transmitted messages independently (Schwalbe & Meyer, 2009). At the same time the development of printing presses and networks of distribution brought forward the massive reproduction of printed information. We reckon that only these technological, social and economic developments made the alphabetization of the populace necessary – and therefore led to the introduction of a general school system.

At this moment, with the development of the Internet and especially the World Wide Web, we are experiencing the emergence of a new technical medium of transmission, anticipated to have similar effects on cultural and educational processes as the introduction of the printed book (Debray, 2004; Castells, 2005; Baecker, 2007). It is not yet clear, how this coming digital mediosphere will be shaped. The sense of time and space is changing in comparison to the graphosphere; knowledge and information can be easily communicated over long distances, but the duration of the communicated information is very often getting shorter.

This corresponds with an increasing use of mobile devices, which are characterised by the convergence of different options for communication. It is one of the trends of the Horizon Report (Johnson, Levine & Smith, 2009, p. 8) mentioned above and is expected to provide an always available device for content delivery and data capture. Due to a permanent access to the Internet the instant communication independent from time and space using different codes (images, videos, writing, and speech) is always growing. It will be normal to be always online and connected.

Another characteristic of the digital mediasphere, next to the observation of a changing relation of time and space, is the evolvement of new forms of knowledge production. The

possibilities of participation on the web bring to the fore collaborating processes in generating knowledge. The educated individual is confronted with the wisdom of the crowds.

Medium and education

A mediological perspective on media and education is provided by Torsten Meyer (2008) with his *Pedagogical Media Theory*. His argumentation is based on a broader definition of the term medium in a cultural context. According to Meyer it is not possible to understand a medium as a system separate from us but more as a "milieu" we are living in. He claims the medium to be a realm of possibilities providing the basis for our actions and communications, or in other words: as culture, influencing our socialisation. This understanding of the term medium is closely connected to Michel Foucault's "archive" as a "historical a priori" (Foucault, 1969, cited in Meyer, 2008, p. 265) – or as Meyer calls it a "media-cultural-historical a priori": an age-specific set of conditions of cognitive, communicative, and social processing. The cultural techniques related to the medium affect our cognition, but we are hardly aware of the impact – the media-cultural-historical a priori can thus be described "as a kind of age-specific blind spot of thinking, knowing, gaining insight" (Meyer, 2008, p. 265). Blind spot means, we do not realise it is a spot we cannot see. It is the media educators' responsibility to make this blind spot visible – to raise awareness of the influence of the medial milieu on our thinking and our culture. The method Meyer uses to become aware of the current cultural changes related to the development of media, is to analyse former changes of the medium and the associated cultural effects.

Meyer describes one phenomenon that is in his opinion a crucial characteristic of an upcoming digital mediosphere: In reference to Jean-Francois Lyotard (1989) he states that the nature of knowledge in the "computerised society" is changing. Due to the ubiquitous computer technology it becomes to something that is more and more becomes some kind of external product. This of course is deeply affecting educational institutions and processes of teaching and learning (Meyer 2008, p. 91).

The trend towards mobile devices providing permanent access to the Internet (Johnson, Levine & Smith, 2009, p. 8) supports the theory of an increasing externalization of knowledge due to a different medium we are living in. The possibility of accessing knowledge bases such as Wikipedia, independent from time and space, supersedes the need for remembering factual knowledge.

How these ideas challenges study design

The presented approach does not explicitly deal with the processes of adoption of new educational media systems on a practical level. It does not solve the challenges of (i) a prognosis or forecast of new trends of technology enhanced learning or (ii) a revelation how these trends will influence the reality of learning. Pedagogical media theories and studies on cultural and social changes in relation to the development of media provide a basic framework for various specific approaches dealing with the future of technology enhanced learning: Just as we can hardly understand how it feels to live in an oral culture (cf. Markus, 2006), we are not able to imagine how we will think, act and communicate in the future of the evolving new mediosphere – our thinking is still affected by the graphosphere. Meyer (2008) comes to the point, in line with Sesink (2006) that we cannot just perceive the new media systems as new devices to support educational processes while at the same time sticking to a traditional system. We, rather, have to

be aware of the process of cultural change, probably demanding re-thinking our concepts of learning, teaching and re-structuring the current educational system.

SUMMARY AND DISCUSSION

We described current study design from a critical perspective and introduce pedagogical media theories to illustrate the challenges of a change of media systems and the limited possibilities to handle with it on a methodological level. To illustrate the two different ways to look at and discuss (future) media adoption for learning and teaching, the following figure illustrates that the “frame” of symbolic forms, cultural organizations and social processes includes the perspective on applications and cultural practices (figure 1).



Figure 1: Frames of (future) media adoption

With our confrontation of current study design with ideas from the cultural studies in combination with pedagogical media theory we focused on two very different theoretical approaches, playing on two different levels of argumentations: Whereas the mediological approach is focusing on cultural studies provides an abstract and general perspective the study design concretely describe methodologies. Nevertheless, we think this confrontation is fruitful for further studies and reflections on future media adoption.

As we have shown within this chapter, current study design on future media adoption struggles from the perspective of pedagogical media theory with the following challenges:

- The current mediosphere strongly influences the thinking on media, and therefore the thinking of all, including experts in current study design without possibility to reflect this phenomenon.
- We are still settled and related to a typographic culture of the graphosphere; we have no clear idea on how another (future) mediosphere can and will influence our thinking about media.
- Finally, we have to be aware of the process of cultural change, probably demanding re-thinking our concepts of “learning” and “teaching”.

This chapter gives no overview about existing theories on future adoption of media. But in fact, there are some. They build for example on sociological ideas adapted for future media adoption in learning and teaching: From the perspective of social science, the theory of "Social Construction of Technology" or the "Actor Network Theory" (Latour 2007) describes and

analyses the relationship and interdependences of education and technologies (Klebl, 2007). For instance, the "Social Construction of Technology" (SCOT) approach was developed by Pinch and Bijker (1987) and focuses on how human actions within different social groups shape technology and its usage. SCOT is also used as a methodology. For example, Klebl (2008) analysed the "One Laptop per Child" (OLPC) initiative and the Open Educational Resources movement, Gyambrah (2007) used it as a theoretical base for his descriptive comparison of e-learning technologies and their applications in higher education in Germany, the United Kingdom and the United States.

As far as we can see, our overview in this chapter emphasises an approach of cultural studies as one resource to get a clearer view on (possible) argumentations and could lead to more thoughtful handling of study design or of studies that builds on such designs.

POSSIBLE FUTURE RESEARCH DIRECTIONS

One question that is important for the described approach of mediology is how institutions of learning deal with the cultural and technological changes due to innovations of technology enhanced learning? Not only the adoption process of learners and educators needs to be taken into account but also the impact of technology on the roles of teachers within processes of teaching and learning. Due to new technologies and media systems, new forms of communication and collaboration are evolving; the handling of knowledge is changing. To be able to participate actively in this process of change and to take an active, formative role in re-structuring institutions of learning for a digital mediosphere, we need a profound understanding of the past, current and future influences of media and technology on learning and teaching, on the technical and social infrastructures within institutions of learning and on their function within society.

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