E-LEARNING TRENDS AND HYPES IN ACADEMIC TEACHING. METHODOLOGY AND FINDINGS OF A TREND STUDY

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ABSTRACT

What comes next in the field of academic e-learning? Which e-learning trends will dominate the discourse at universities? Answering such questions is the basis for the adaptation of service strategies and IT-infrastructures within institutions of Higher Education. The present paper therefore introduces methodology and findings of a trend study in the field of e-teaching. The overall interest of the study was the analysis of life stages and future potentials of e-learning innovations. A content analysis has been conducted based on 427 scientific articles of leading German-speaking e-learning conferences. Thus, e-learning trends and hypes in academic teaching have been identified and characterised. The following paper focusses on two things: on the one hand, existing academic concepts of trend research in the field of e-learning will be discussed, and on the other hand, the above-mentioned study will be introduced.[i]

KEYWORDS

Trends, E-Learning, academic teaching, Higher Education, content analysis

1. INTRODUCTION

E-learning is a concept that focusses on the use of digital technologies in education. E-learning innovations are define as technological or methodological e-learning forms which are perceived as new by potential users (Fischer, 2013)

The integration of e-learning innovations is the current challenge for organisations in Higher Education in order to support learning, teaching, and administrative processes. Due to changed student needs, increased competition between organisations, different political and economic conditions, as well as new educational and technological approaches in Higher Education, institutions need to implement e-learning to generate additional educational and economic values (Seufert, 2008). But which e-learning formats can change academic teaching? Which formats dominate the current scientific discussions? Which approaches are close to a breakthrough? Which e-learning innovations have been or will be successful in Higher Education? Information about future challenges in the field of academic e-learning are needed for providing fitting conditions to teachers, like trainings, services, incentives or technologies. Therefor the present paper focusses on these questions.

In the following, academic studies and reports will be introduced in order to discuss future developments in the field of academic e-learning. In the next step, we will describe a theoretical approach to analyse and evaluate the life cycle of e-learning trends based on the degree of public discussions. Based on this, insights will be provided into a study which helped to identify and evaluate potential e-learning-trends in academic teaching in German institutions of Higher Education.

2. INSTRUMENTS FOR TREND EVALUATION

In order to identify and characterise technical innovations which will have impacts on academic teaching, the Horizon Report will be introduced in the following chapter. The Horizon Report, which is published annually, identifies and characterises technological trends that are expected to have a great importance for the

various levels of education in the following years (http://www.nmc.org), with a focus on academic teaching and learning. With the Horizon Report experts in education and technology research evaluate the short (<1 year), medium (2-3 years), and long-term (4-5 years) perspectives and effects of six technical innovations in the field of Higher Education (Bechmann, 2012).

In the recent Horizon Report (2014), Flipped Classroom, Learning Analytics, 3D Printing, Games & Gamification, Quantified Self, and Virtual Assistants (see figure 1) were identified as trends in e-learning. However, a detailed review of the last Horizon Reports demonstrates the difficulties of forecasting. For example, in 2005 and 2006, as well as in 2011, 2012, and 2013, educational games were considered as a medium-term trend (two to three years). But for all that, the dissemination of game-based e-learning formats in academic teaching has not happened so far. As a short-term trend in 2009, 2010, 2011, and 2012, mobile applications (Mobile Apps) were considered. Also here the reality in institutions of Higher Education reveals another picture. However, other e-learning formats appear unexpectedly and diffuse rapidly in the field of academic teaching. A good example for this is Massive Open Online Courses (MOOCs). For the first time MOOCs were recorded in the Horizon Report in 2013 and immediately reached number one of all e-learning trends. In fact, many MOOCs exist in Higher Education and the number of publications and scientific events about them is growing rapidly (McAuley, 2013).

Time-to-Adoption Horizon	2014	2013	2012	2011	2010	2009	2008	2007
<1 year	Flipped Classroom	Massively Open Online Courses	Mobile Apps	Mobiles	Mobile Computing	Mobiles	Grassroots Video	User-Created Content
	Learning Analytics	Tablet Computing	Tablet Computing	Electronic Books	Open Content	Cloud Computing	Collaboration Webs	Social Networking
2-3 years	3D Printing	Games and Gamification	Game-Based Learning	Game-Based-Learning	Electronic Books	Geo-Everything	Mobile Broadband	Mobile Phones
	Games and Gamification	Learning Analytics	Learning Analytics	Augmented Reality	Simple Augmented Reality	The Personal Web	Data Mashups	Virtual Worlds
4-5 years	Quantified Self	3D Printing	Gesture-Based Computing	Gesture-Based Computing	Gesture-Based Learning	Sementic-Aware Applications	Collective Intelligence	The New Scholarship
	Virtual Assistant	Wearable Technology	Internet of Things	Learning Analytics	Visual Data Analysis	Smart Objects	Social Operating System	Multiplayer Education Gaming

Figure 1. Trends in e-learning based on the Horizon Reports (2007 to 2013)

As the Horizon Report shows, the life cycle of e-learning innovations is not linear. Often new e-learning approaches appear suddenly on the agenda and dominate the scientific discussion at universities for a limited time. But they then disappear abruptly from the agenda as fast as they appeared. That is why forecasting is difficult. For the identification of trends and the assessment of future potentials, scientific instruments and methods are needed. One of these instruments is the Innovation Hype Cycle by Gartner Group (See in: http://www.gartner.com/technology/home.jsp).

The Hype Cycle is an analytic instrument developed and used by the IT research and advisory firm Gartner to represent the maturity, adoption, and social application of emerging technologies (see figure 2).
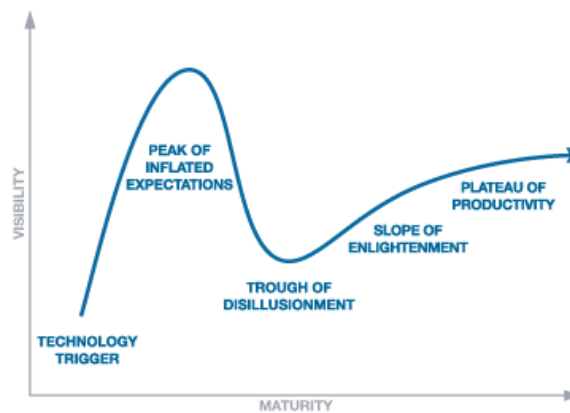

Figure 2. Gartner Hype Cycle (Gartner, 2014)

The Innovation Hype Cycle establishes a connection between the productive use of technologies and the public communication about it. This makes it possible to derive future potential of individual innovations by analyzing previous or current discourses. According the Innovation Hype Cycle the life cycle of technologies contains five phases. In the first phase (Technology Trigger), a technology breakthrough kicks off things. Based on early proof-of-concept stories, the interest of the public grows. In the second phase, early publicity produces a number of success stories. Growing public interest is then followed by the Peak of Inflated Expectations. In the next step (Trough of Disillusionment) public interest wanes because of failed experiments and implementations as well as the emergence of negative effects of the technology. The public interest grows again within the next phase. More examples of how organisations or users can benefit from the technology come to the fore, therefore the technology enters the Slope of Enlightenment. In the last phase, mainstream adoption starts and the Plateau of Productivity is reached. The technology's market applicability and relevance are clear and paying off. As the above description of the Innovation Hype Cycle shows, public attention or discussion is relevant for the evaluation of technology life stages.

3. EMPIRICAL STUDY

Related to the general aim of this paper, an empirical study is now presented. The overall interest of the study was the analysis of life stages and future potentials of e-learning innovations. In order to make trends in e-learning in recent years at German universities visible, an investigation was carried out in 2014. The study should answer the following questions: Which e-learning formats dominate the current scientific discussions? Which approaches are close to a breakthrough? Which innovations of e-learning have been or will be successful in academic teaching?

To answer these questions, a trend study based on a content analysis was performed (Langer, 2000). It was assumed that the intensity of discussion about e-learning innovations is related to their life stage – within the innovation process – and the degree of usage in academic teaching. This idea is based on the Innovation Hype Cycle, which has been described above. Therefore we analysed the content/topics of scientific contributions of two leading German-speaking e-learning conferences and publications: Gesellschaft für Medien in der Wissenschaft (GMW, http://www.gmw-online.de) and E-Learning-Fachtagungen der Gesellschaft für Informatik e. V. (DeLFI, http://fg-elearning.gi.de/fachgruppe-e-learning/delfi-tagung). 427 scientific papers of both conferences resulted in the period from 2007 to 2013. Both conferences address scientists of German universities which apply e-learning in academic teaching. While the GMW has a strong focus on didactic innovations, e-learning applications tend to be discussed more from a technical perspective at the DeLFI. In combination both conferences demonstrate the technical and didactical potentials of e-learning innovations.

The trend study is based methodically on the approach of qualitative content analysis (Mayring, 2008). First of all, the topics of the articles were identified, by looking for keywords, and then combined into categories. In this way a system of categories was derived inductively which covers the main topics of both conferences. All conference contributions of the GMW (n=234) and DeLFI (n=193) were sorted into the category system. For practical reasons, only the abstracts of the respective contributions (n = 427) were used. The following categories of e-learning innovations were distinguished within the study:

- Social Software (keywords: wiki, blogs, social networks, social bookmarking, peer learning etc.),
- E-Assessment (keywords: online exams, online assessments, tests, evaluation etc.),
- E-Portfolio (keywords: virtual artefacts, learning blogs etc.),
- Mobile Learning (keywords: mobile applications, smartphones, tablets, mobile devices etc.),
- Audio/Video (keywords: podcasts, videocasts, learning videos, lecture recordings etc.),
- Virtual Worlds (keywords: virtual environments, 3-D, virtual laboratory, simulations etc.),
- Learning Management (keywords: course management, campus management, IT-systems etc.),
- Virtual Classroom (keywords: online meetings, webinars, video conferences etc.),
- Open Content (keywords: open learning resources, copyrights, content repositories etc.),
- MOOCs (Massive Open Online Courses).

The basic assumption of the study was that conclusions about the development potential of e-learning innovations in the German Higher Education can be drawn from the analysis of the scientific contributions

within the two selected e-learning conferences. As the Innovation Hype Cycle suggests, the degree of discussion delivers hints of the life stage of innovation. On that basis, it is assumed that frequently discussed innovations in these scientific conferences should have a high potential for academic teaching.
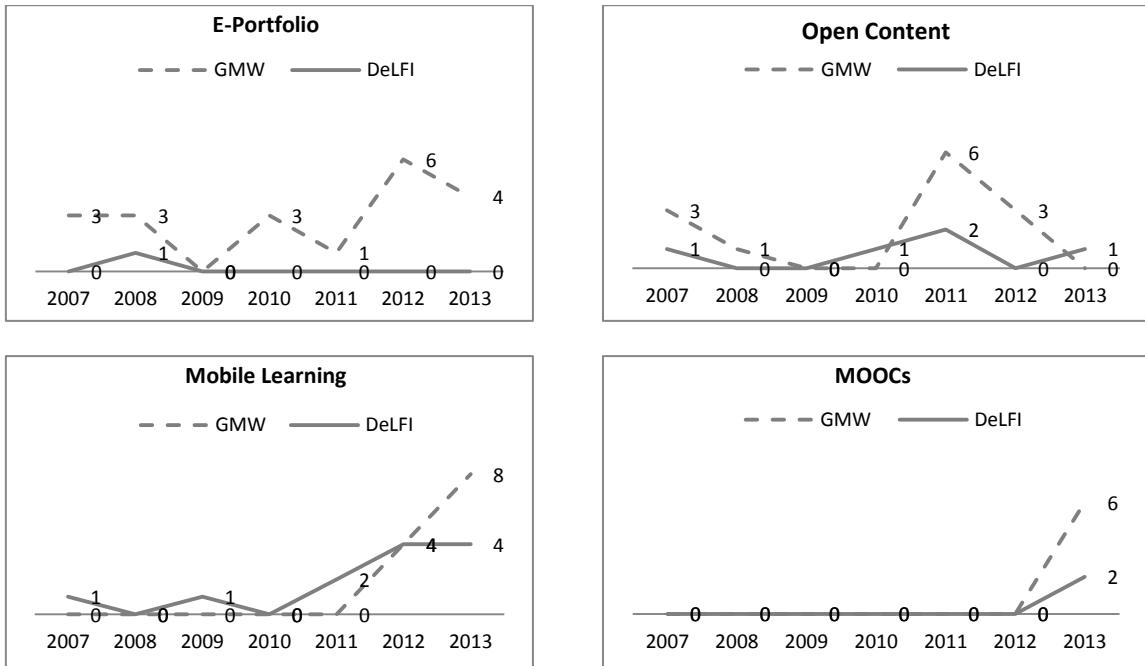
4. FINDINGS

The findings of the investigation are presented below. The figures in table 1 show how many papers of GMW and DeLFI conferences report about the respective e-learning innovations. The following assumptions can be derived from the results:

- The detailed analysis of the frequency distribution over the seven years shows trends in the investigation period. The increase of frequency goes along with an increase of importance for academic teaching.
- From the distribution of the frequencies within the two conferences, conclusions about the didactical or technical potentials of innovations can be drawn because both conferences are different in terms of their objective. The GMW is more oriented towards didactical issues, whereas the DeLFI targets increasingly technical topics.

Table 1. Findings of the study (numbers of articles per year)
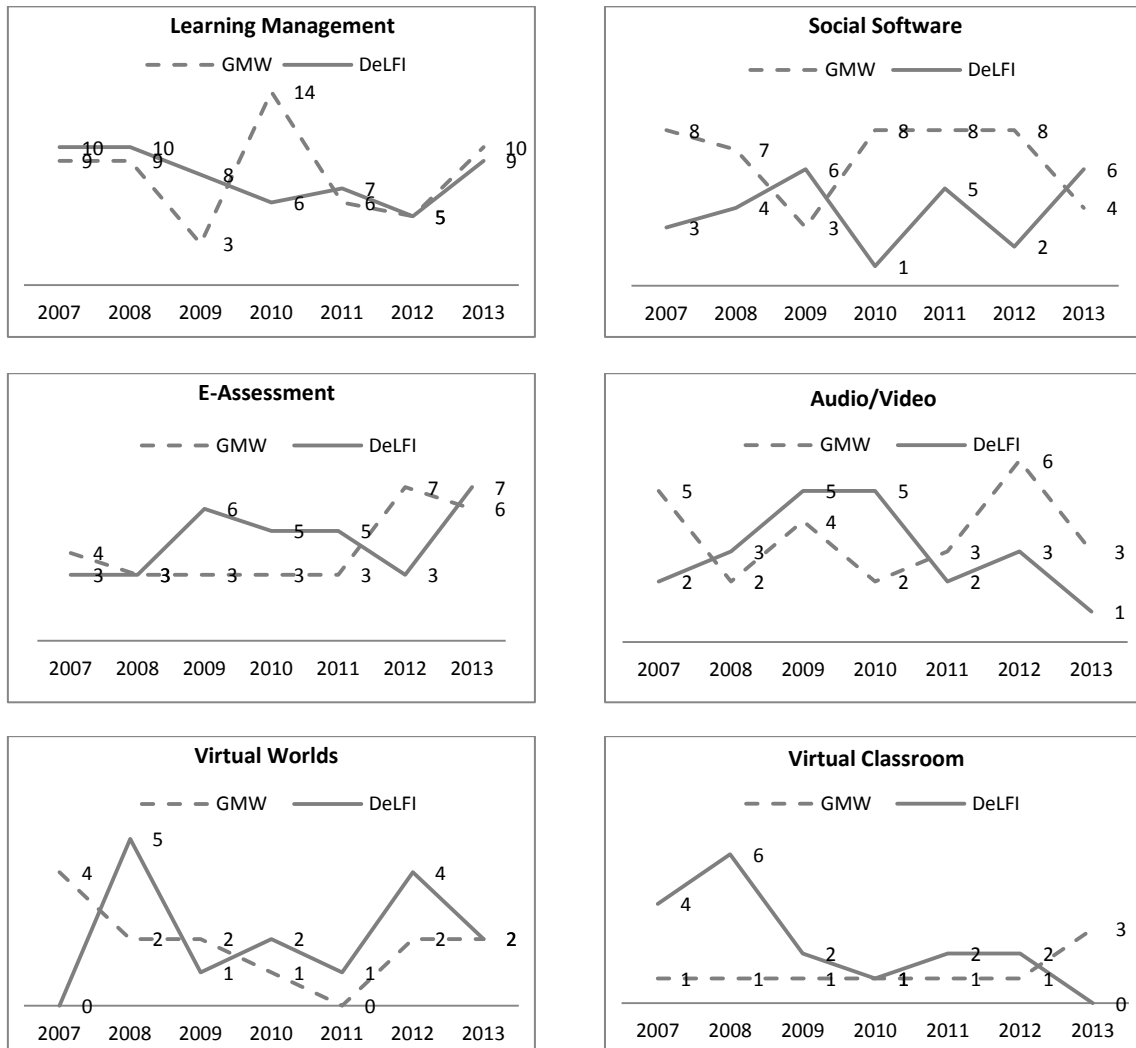
In the following, the interpretation of the findings will be presented. To achieve the prognostic targets of a trend study, striking findings of the study will be formulated in the form of assumptions. We will not leave the field of the data, but also personal experiences from our daily work with teachers as well as own observations in the field of e-learning in German speaking universities will included in the assumptions. In addition, a constant comparison with the predictions of the horizon report has been done. But first, the classification of the life stages of all selected innovations based on the Garter Hype Cycles were made (see figure).
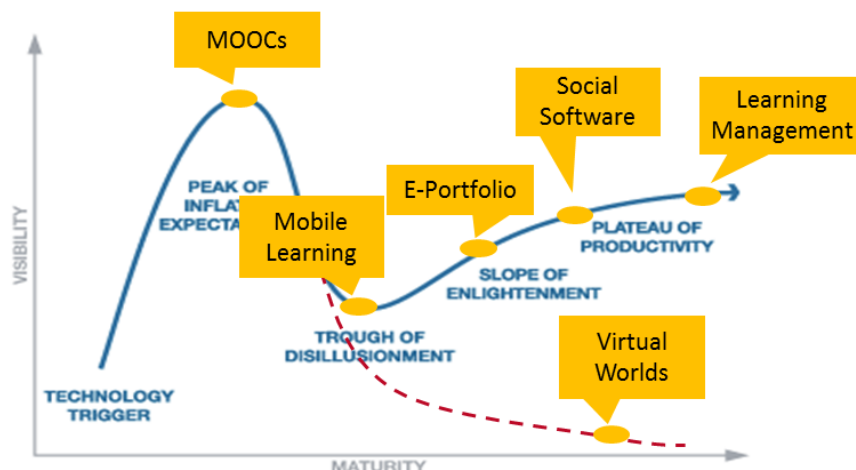

Figure 3. Life stages of selected e-learning innovations

Learning Management is the backbone of e-learning in Higher Education. Numerous articles about learning management have been presented continuously at both conferences. The decreasing degree of the scientific discussion should not be interpreted as a loss of importance, but rather for the productive usage of technologies for learning management in daily routines of academic teaching.

Considering the discussion about **Social Software**, it is striking that it is addressed much more often within the didactic-pedagogical-oriented GMW – in quantitative terms – (46) than within the DeLFI (27), since the DeLFI has a stronger focus on technical topics. It can be concluded that Social Software – and the associated learning activities like communication, co-operation, and prosumption – is currently considered primarily as a didactic innovation.

In 2007, **Virtual Worlds** were identified as a medium-term e-learning trend in the Horizon Report, with an expected breakthrough time of 2-3 years. The euphoria was triggered by the public interest related to the application Second Life. But for all that, the scientific discussion of virtual worlds decreases continuously. This is confirmed by current Google statistics (Google trends), which capture and analyse general trends related to internet search queries (see figure 3). Virtual Worlds were hypes. They could not prevail at universities and will probably disappear from the e-learning agenda in the medium-term.
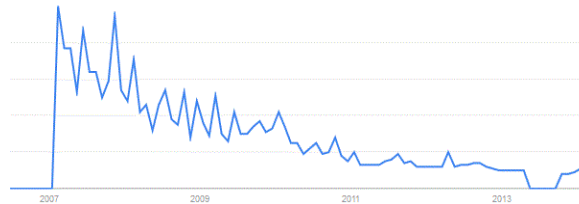

Figure 4. Internet search queries in Google, analysed by www.google.de/trends (Keyword: "Virtuelle Welten")

E-Portfolios have become established firmly in the academic discourse about e-learning. However, it is more surprising, therefore, that e-portfolios have not been included in the internationally oriented Horizon Report. It cannot be determined whether e-portfolios are merely a phenomenon in the German-speaking area of Higher Education or not. In any case, the investigation showed that e-portfolios were significantly more in focus at the GMW conferences (20). Therefore they are probably more a didactical and organisational innovation in academic teaching than a technical challenge.

From 2009 to 2012, **Mobile Learning** was number one of all e-learning trends in the Horizon Report. But what about the professional debate in the German Higher Education area? So far, mobile trends in e-learning have been rarely discussed at the investigated conferences. Until 2010 there were only two articles about this topic (in both conferences). However, mobile learning has moved into the focus of the GMW and the DeLFI during the past three years (12 papers in 2013) and now it seems to be established in the scientific discourse within German-speaking universities.

MOOCs have unexpectedly become number one among all e-learning trends in the Horizon Report 2013. Throughout the period since 2007, there had been no indications suggesting this development. Neither the acronym MOOC nor the ideas behind it (open online teaching for large groups of learners) were identified as trends in the Horizon Reports. In 2013, the first articles about MOOCs were published in the GMW (6) and Delphi (2) proceedings. The fact that MOOCs belong to the e-learning trends with the largest development potential in academic teaching is shown by the practices of many universities. Numerous MOOCs have been developed in the past few months and the public debate about MOOCs is growing. The European Knowledge Centre for Open Education currently lists nearly 500 MOOCs of European universities (http://openeducationeuropa.eu/de/european_scoreboard_moocs). However, it is too early to assess the true potential of MOOCs. We believe that MOOCs are currently on the top of the hype (peak of inflated expectations), therefore it can be assumed that the scientific discussion will decrease in the following years.

5. LIMITATIONS

The presented findings are the result of an exploratory study. With this in mind, the described research design can lead to distortions or errors, which can have impacts on the validity of the findings.

- Only abstracts of the contributions have been investigated. It is conceivable that in the complete articles topics have been addressed which are not referenced to in the abstract or that abstracts are enriched by modern (trend) terms to attract the attention of potential readers. In both cases, the assignment of the content into the categories has been incomplete or incorrect.

- For many e-learning innovations, there are no fixed technical terms in the scientific debate. The assignment of concepts to pre-defined categories is therefore difficult. Errors in the category allocation due to unclear terminology cannot be excluded.

- We analysed the frequency of reports concerning e-learning innovations. The correlation between the frequency of reporting and the future potential of innovative e-learning applications has not been established empirically, but follows plausibility considerations (Rogers, 2003; Gartner, 2014).

- Organisers of the investigated conferences often define the (main) topics. This influenced the spectrum of represented topics over all, as well as the focus of individual contributions.

- The above-presented study was conducted at German-speaking conferences and therefore reflects the situation in Germany, Switzerland, and Austria. The structure and culture of Higher Education in all three countries is comparable. As the usage of digital media highly correlates with national characteristics of the higher educational system, the findings cannot be generalised. The situation of e-teaching might be very different in English or French-speaking areas.

6. RÉSUMÉ

These above-mentioned limitations could affect the scientific quality of the results. The data and findings therefore should not be over-interpreted. Despite all the potential limitations, the data provide on the one hand a differentiated picture of the current debate focus of e-learning innovations in Higher Education. Some trends have become visible. On the other hand, the study describes a methodical approach to characterising the life cycle of innovations by analysing scientific material.

Finally, we would like introduce possible method-based extensions of the presented study for future research:
- The study could be extended to international conferences.
- The prospects of individual innovations (e.g. MOOCs) could additionally be investigated by qualitative research methods (e.g. in the form of expert interviews).
- The public discourse about e-learning in academic teaching could be investigated by using discourse analysis, to thereby bring out the role of individual actors and public institutions.

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[i] Parts of the study has been presented also at EDEN 2014 (http://www.eden-online.org/2014_zagreb.html)