LET'S LOOK INTO THE FUTURE! E-LEARNING TRENDS AND HYPES IN ACADEMIC TEACHING

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Introduction

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 economical conditions as well as new educational and technological approaches in Higher Education, institutions need to implement e-learning to generate additional educational and economical 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? These questions are focused by the present paper.

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, we will give insights into a study, which helped to identify and evaluate potential e-learning-trends in academic teaching in German institutions of Higher Education. But first of all we specify the technical term e-learning innovations.

E-learning is a concept that focuses on the use of digital technologies in education. The different educational formats at one hand and different internet-based application systems on the other hand lead in a variety of e-learning forms. Therefore we define *e-learning innovations as technological or methodological e-learning forms, which are perceived as new by potential users* (Fischer, 2013).

E-learning innovations in Higher Education

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[1]. It focuses 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) have been identified as trends in e-learning. However, a detailed insight into the last Horizon Reports demonstrates the difficulties of forecast. 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 did not happen 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 shows another picture. However, other e-learning formats appear unexpectedly and diffuse rapidly in the field of academic teaching. Good examples for this are Massive Open Online Courses (MOOCs). For the first time MOOCs were recorded in the Horizon Report in 2013 and reached immediately 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 grow rapidly (McAuley et al., 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	Semantic-Aware Applications	Collective Intelligence	The New Scholarship
	Vitual 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 (from 2007 to 2013)

As the Horizon Report shows, the life cycle of e-learning innovations isn't linear. Often new e-learning approaches appear suddenly on the agenda and dominate the scientific discussion at universities for a while. But they disappear abruptly from the agenda as fast as they appeared. That's why forecast 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[2].

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[1] See in: http://www.nmc.org/ [31th January 2014].
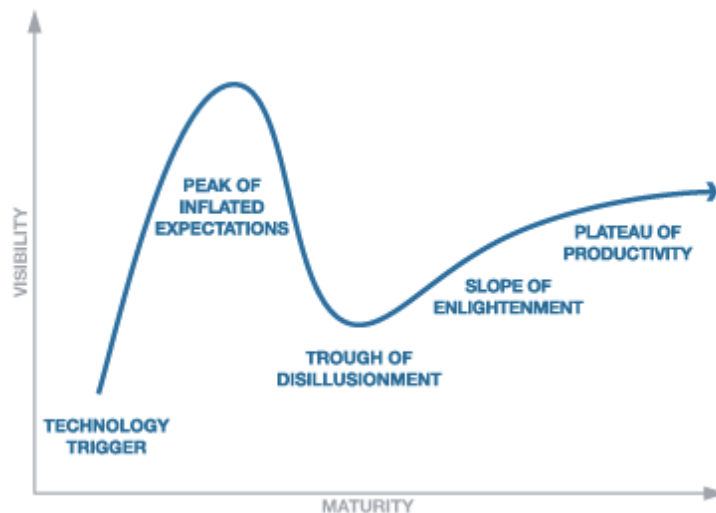[2] See in: http://www.gartner.com/technology/home.jsp [31th January 2014].

Figure 2. Gartner – Hype Cycle (Gartner, 2014)

The Hype Cycle is an analytic instrument developed and used by the IT research and advisory firm Gartner for representing the maturity, adoption and social application of emerging technologies (see Figure 2).The life cycle of technologies contains five phases. On the first phase (Technology Trigger) a technology breakthrough kicks off things. Based on early proof-of-concept stories the interest of publicity grows. On the second phase early publicity produces a number of success stories. Growing public interest is followed by the peak of inflated expectations. On the next step (Trough of Disillusionment) public interest wanes because of failed experiments and implementations as well as the emergence of negative effects of technology. The public interest grows again on the next phase. More examples of how organisations or users can benefit from the technology come to the fore, therefore the technology gets on the slope of Enlightenment. In the last phase, mainstream adoption starts and the Plateau of Productivity is reached. The technologies 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.

Empirical study

Related to the general aim of this paper, we will now present an empirical study. 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). We 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 had been described above. Therefore we analysed the content/topics of scientific contributions of leading, German speaking e-

learning conferences and publications: Gesellschaft für Medien in der Wissenschaft (GMW)[3] and E-Learning-Fachtagungen der Gesellschaft für Informatik e. V. (DeLFI)[4]. 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 on the DeLFI. In combination both conferences demonstrate the technical and didactical potentials of e-learning innovations.

The trend study bases methodically on the approach of qualitative content analysis (Mayring, 2008). First of all the topics of the articles were identified and then combined to categories. So 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 economical 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 (systems or applications to support communication and co-operation), E-Assessment (handling online exams and test scenarios), E-Portfolio (systems for collecting and evaluation of digital artifacts), Mobile Learning (mobile applications for academic learning), Audio/Video (podcasts or videos in academic teaching), Virtual Worlds (artificial, virtual environments; e.g. Second Life), Learning Management Systems (central systems for providing and managing e-learning scenarios), Virtual Classroom (systems for synchronous cooperation of groups), Open Content (systems for the provision of open learning resources; e.g. OER) and 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, we assume that frequently discussed innovations in these scientific conferences are supposed to have high potential for academic teaching.

Findings

Bellow-mentioned, the findings of the investigation are presented. Table 1 shows 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 cumulative frequencies (last column) make clear, which innovations dominated and shaped the scientific discussion during the investigation period (from 2007 to 2013).

- 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/while the DeLFI targets increasingly technical topics.

Table 1: Findings of the study (numbers of articles about the innovation per year)

GMW (n=234) / DeLFI (n=193)	2007	2008	2009	2010	2011	2012	2013	total
Learning Management	9	9	3	14	6	5	10	56
	10	10	8	6	7	5	9	55
Social Software	8	7	3	8	8	8	4	46
	3	4	6	1	5	2	6	27
E-Assessment	4	3	3	3	3	7	6	29
	3	3	6	5	5	3	7	32
Audio/ Video	5	2	4	2	3	6	3	25
	2	3	5	5	2	3	1	21
Virtual Worlds	4	2	2	1	0	2	2	13
	0	5	1	2	1	4	2	15
Virtual Classroom	1	1	1	1	1	1	3	9
	4	6	2	1	2	2	0	17
E-Portfolio	3	3	0	3	1	6	4	20
	0	1	0	0	0	0	0	1
Open Content	3	1	0	0	6	3	0	13
	1	0	0	1	2	0	1	5
Mobile Learning	0	0	0	0	0	4	8	12
	1	0	1	0	2	4	4	12
MOOCs	0	0	0	0	0	0	6	6
	0	0	0	0	0	0	2	2

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 theses.

LMS – part of our routines!

Learning management systems (LMS) are the backbone of e-learning in Higher Education. Numerous articles about LMS have been presented continuously at both conferences. The decreasing scope of the scientific discussion should not be interpreted as a loss of importance, but rather for the productive usage of LMS in daily routines of academic teaching. LMS are an essential part of academic teaching.

Social Software – didactical potentials for academic teaching!

Considering the discussion about Social Software, it is striking that these is much more addressed within the didactic-pedagogical-oriented GMW – in quantitative terms – (46) than within the DeLFI (27). 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 primary as didactic innovation.

Downfall of Virtual Worlds!

In 2007virtual 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 interests 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 learning environments could not prevail at universities and will probably disappear from the e-learning agenda in the medium-term.

Figure 3. Internet search queries in Google, analysed by www.google.de/trends
(Keyword: "Virtuelle Welten"[5])

E-Portfolio – a didactic innovation close to a breakthrough!

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

The long way of Mobile Learning!

From 2009 to 2012 mobile applications were number one of all e-learning trends in the Horizon Report. And what about the professional debate in the German Higher Education area? So far, mobile trends in e-learning were discussed rarely on 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

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[5] German translation of virtual world

years (12 papers in 2013) and now it seems to be established in the scientific discourse within German speaking universities.

What about MOOCs?

MOOCs have become unexpectedly number one among all e-learning trends in the Horizon Report 2013. Throughout the period since 2007, there were no hints for it. 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 have been published on the GMW (6) and Delphi (2) proceedings. That MOOCs belong to the e-learning trends with the largest development potential in academic teaching shows the university practice. Numerous MOOCs have been developed in the past few months[6] and the public debate about MOOCs is growing (see Figure 4). However, it is too early for assessing the true potential of MOOCs.
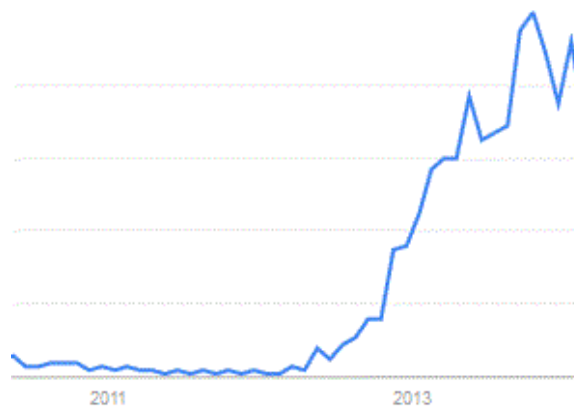

Figure 4. Internet search queries in Google, analysed by www.google.de/trends
(Keyword: "MOOCs")

Limitations

The present findings are the result of an exploratory study. Anyhow 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 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.

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[6] The European MOOCs Scoreboard, http://openeducationeuropa.eu/de/european_scoreboard_moocs [31th January 2014].

- We analysed the frequency of reports about 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 (main)topics. This influenced the spectrum of represented topics at all and the focus of individual contributions.

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 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 characterise the life cycle of innovations by analysing scientific material.

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