Let's Look to Future! E-Learning-Trends and Hypes in Academic Teaching

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Abstract

The present paper introduces methodology and findings of a trend study in the field of online education. 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 focuses 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.

Abstract in German

Wie geht es mit E-Learning weiter? Welche E-Learning-Trends dominieren an Hochschulen? Der vorliegende Beitrag liefert ein differenziertes Bild über Trends und Hypes im E-Learning an Hochschulen. Basierend auf konzeptionellen Überlegungen und empirischen Befunden, resultierend aus der inhaltsanalytischen Auswertung von 427 Fachbeitragen wissenschaftlicher E-Learning-Leitkonferenzen (GMW und DeLFI) werden Entwicklungstendenzen einzelner Anwendungen identifiziert und diskutiert.

Abstract in Polish

Niniejsza praca przedstawia metodologię i wyniki najnowszych badań naukowych w dziedzinie e-teachingu. Ogólnym przedmiotem zainteresowania badań była analiza etapów życia oraz potencjału przyszłościowego innowacji e-learningu. Zawartość analizy została przeprowadzona w oparciu o 427 artykułów naukowych powstałych w wyniku prowadzonych niemieckojęzycznych konferencji na temat e-learningu. W ten oto sposób trendy w dziedzinie e-learningu i rozgłos w szkolnictwie wyższym zostały zindentifikowane oraz zcharakteryzowane. Niniejsza praca skupia się na dwóch aspektach: z jednej strony omówiona

zostanie obecność idei trendów naukowych w obszarze e-learningu w szkolnictwie wyższym, a z drugiej strony zostaną przedstawione wyżej wymienionione badania.

Abstract in Hungarian

Jelen értekezés egy az e-oktatás területén végzett tendencia tanulmány módszertanát és eredményeit mutatja be. A tanulmány általános célja az életszakaszok és az e-learning jövőbeni innovációiban rejlő potenciál-elemzése volt. A tartalom analízis német nyelvű e-learning konferenciák 427 tudományos cikke alapján került lefolytatásra. Így azonosításra és jellemzésre kerültek az akadémiai oktatás trendjei és hype-jai. A következő értekezés két dologra összpontosít: egyrészről tárgyalja az e-learning területét érintő akadémiai tendencia-elméleti megközelítéseket, másrészről a fent említett tanulmányt mutatja be.

Abstract in Spanish

El presente artículo introduce una metodología y resultados de un estudio sobre tendencias en el campo de enseñanza en línea (e-teaching). El propósito de dicho estudio era el análisis de etapas de vida y el potencial de inovaciones de enseñanza en línea. Se realizó un análisis de contenido de 427 artículos científicos, publicados en conferencias germanoparlantes destacadas sobre la enseñanza en línea. De esta forma, se identificaron tendencias y modas en la enseñanza académica. El presente artículo se enfoca en los siguientes dos temas: Por un lado, se discuten los conceptos académicos ya existentes sobre la investigación de tendencias en el campo de enseñanza en línea. Por el otro lado, se introduce el estudio arriba mencionado.

Keywords: e-learning, innovation, higher education, content analysis, future studies

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 organizations, 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; Kleimann & Schmid, 2007). It should be noted that currently there is no common understanding of e-learning. Rather, the e-learning concept describes a variety of different forms of use of digital technologies in educational processes – from content distribution to online

testing (Fischer, 2013). The rapid technical progress and the continuous development of university didactics constantly leads to new formats of e-learning. In this paper, therefore, the term e-learning innovation is used for new technological and didactic forms of digital teaching. Thus, the definition of the term innovation bases mainly on Hauschildt (2004). E-learning innovations are new and not yet firmly anchored in institutional regulations or daily routines of academic staff (teachers or students). The long-term provision of e-learning innovations makes high demands on universities. On the one hand, teachers and students must be assisted in its use, besides technical conditions must be established to allow easy access and handling. Therefore, any e-learning innovation requires specific support services. The prospective design of the academic environment makes it therefore necessary to identify potential e-learning trends early on. The present contribution follows this approach. The following questions will be investigated. Which e-learning innovations 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 to provide fitting conditions to teachers, like trainings, services, incentives or technologies.

In the following, studies and methods 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 analyze 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.

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], 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).

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[1] See in: http://www.nmc.org/ [31 October 2015].

In the Horizon Report (2014), Flipped Classroom, Learning Analytics, 3D Printing, Games & Gamification, Quantified Self, and Virtual Assistants (see Table 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 et al., 2013).

Table 6: Trends in e-learning based on the Horizon Reports (2008 to 2014)

Time to adopt	2014	2013	2012	2011	2010	2009	2008
< 1 year	Flipped Classroom	MOOCs	Mobile Apps	Mobile Computing	Mobile Computing	Mobile Computing	User-Generated Content
	Learning Analytics	Tablet Computing	Tablet Computing	Electronic Books	Open Content	Cloud Computing	Collaborations
2-3 years	3D Printing	Games/ Gamification	Games/ Gamification	Games/ Gamification	Electronic Books	Geo Everything	Mobile Broadband
	Games/ Gamification	Learning Analytics	Learning Analytics	Augmented Reality	Augmented Reality	Personal Web	Data Mashups
4-5 years	Quantified Self	3D Printing	Gesture-based C.	Gesture-based C.	Gesture-based C.	Semantic Applications	Collective Intelligence
	Virtual Assistant	Wearable Technology	Internet of Things	Learning Analytics	Virtual Data Analysis	Smart Objects	Social Operating S.

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 the Gartner Group[2].

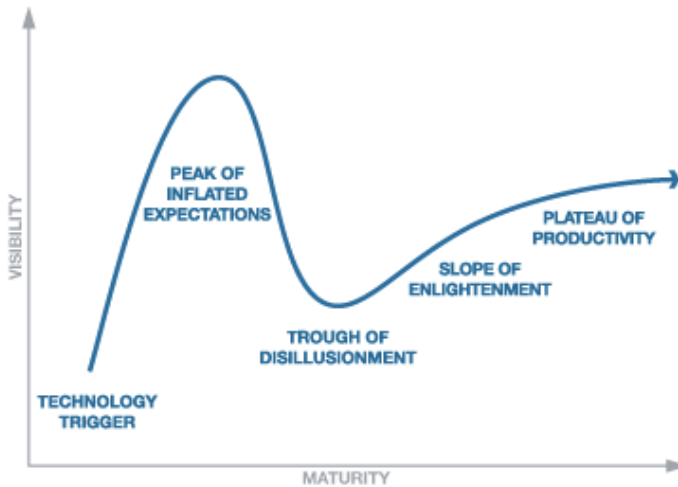[2] See in: http://www.gartner.com/technology/home.jsp [31 October 2015].

Figure 1. Gartner Hype Cycle (Gartner, 2014)

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 1). 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 organizations 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.

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). 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 has been described above. Therefore we analyzed the 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 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 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 (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), Open Content (systems for the provision of open learning resources, e.g. OER), and MOOCs (Massive Open Online Courses).

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[3] See in: http://www.gmw-online.de [31 October 2015].

[4] See in: http://fg-elearning.gi.de/fachgruppe-e-learning/delfi-tagung [31 October 2015].

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.

Findings

The findings of the investigation are presented below. Table 2 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) dictate 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 objectives. The GMW is more oriented towards didactical issues, whereas the DeLFI targets increasingly technical topics.

Table 7:   Findings of the study (number of articles concerning 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 Classroom	4	2	2	1	0	2	2	13
	0	5	1	2	1	4	2	15
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	5
	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 LMSs 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 LMSs in daily routines of academic teaching. LMSs are an essential part of academic teaching.

Social Software – didactical potentials for 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.

Downfall of virtual worlds!

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 analyze general trends related to internet search queries (see Figure 2). Virtual learning environments could not prevail at universities and will probably disappear from the e-learning agenda in the medium-term.

Figure 2. 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, 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 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. 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

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[5] German translation of "virtual worlds"

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.

What about MOOCs?

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[6] and the public debate about MOOCs is growing (see Figure 3). However, it is too early to assess the true potential of MOOCs.
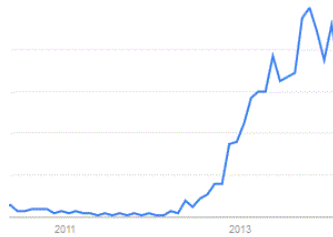

Figure 3. Internet search queries in Google, analysed by www.google.de/trends
(Keyword: *MOOCs*)

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

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[6] The European Knowledge Centre for Open Education currently listed 1771 MOOCs of European universities (http://openeducationeuropa.eu/de/european_scoreboard_moocs) on 31 October 2015.

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.

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 characterizing the life cycle of innovations by analyzing scientific material.

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