Claude MÜLLER[1], Flavio DI GIUSTO, Sandra GROSS & Stefan KORUNA (Zürich)

Teaching in the Digital Age: Adaptation and Competency Development for Academics

Abstract

When lecturers join a university, they generally possess high-level, domain-specific expertise. In addition, as a result of their education and professional experience, teachers also have good information and communication technology (ICT) competencies. But when examining lecturers' pedagogical skills and knowledge of digital technologies, a completely different picture emerges: Both are often only rudimentary. Plugging these competency gaps is a key goal in the process of socialization and development of new university lecturers.

This paper demonstrates how new university lecturers can effectively identify and close these competency gaps – something considered important for the institutionalization of e-learning at universities. To support this process, the School of Management and Law (SML) at the Zurich University of Applied Sciences (ZHAW) has developed the self-evaluation-based online tool, e-Reflection. This tool not only helps to identify competency gaps, it also provides lecturers with advice on how these deficiencies can be rectified effectively.

The results are valuable to schools/universities wanting to set up a catalogue of e-learning skills necessary for their lecturers. In addition, we aim to demonstrate how it is possible to manage and support teacher development in order to institutionalize e-learning.

Keywords

Teacher development, teacher socialization, ICT literacy, e-learning competencies, self-evaluation-based online application

---

[1] email: claude.muellerwerder@zhaw.ch

Workshop Report

1   Introduction

Lecturers at universities of applied sciences must have both a solid academic background in addition to in-depth, professional, practical experience in their discipline. In many cases, they do not pursue a classical academic career but leave university before or immediately after their doctorate studies. Following a period of employment outside higher education they return to universities (of applied sciences) as lecturers.

The return and entry into an academic profession at a university of applied sciences is an intensive process which places high demands on an individual's capabilities in terms of adaptation and development. Faced with the core elements of academic socialization − knowledge acquisition, investment, and involvement (WEIDMAN, TWALE & STEIN, 2001) − lecturers are challenged to acquire new attitudes, conceptions, and competencies. At the same time, they need to become academically socialized in a new sociocultural, disciplinary, and professional environment. As a result of both their academic education and working experience outside higher education, lecturers at universities of applied sciences will possess a high degree of domain-specific expertise. However, as a pedagogical qualification is not normally a prerequisite for lecturing at universities (of applied sciences), the pedagogical skills of lecturers are often rudimentary (HANDKE, 2014) and lecturers tend to adopt the teaching styles and habits they were exposed to during their own education. This practice becomes highly contentious and even problematic when the lecturer's university adopts a different pedagogical philosophy and a specific educational focus such as digital learning. In such cases, it becomes a *sine qua non* that new lecturers undergo a specific introduction to and development of the required set of pedagogical and technical skills.

At the School of Management and Law (SML) at the Zurich University of Applied Sciences (ZHAW) digital learning has been part of the curriculum for some time. To ensure that digital learning is well-embedded within the SML undergraduate and postgraduate degree programs, a coherent e-learning strategy has been developed and implemented (MÜLLER, LÜBCKE, ALDER & JOHNER, 2015). The

school's e-learning strategy states that the use of digital media is now a compulsory part of classroom teaching in all study programs. Furthermore, the strategy specifies that e-learning resources must be made available for guided and autonomous self-study in all courses. Up until 2014, the SML offered two study program formats: Full-time and part-time education. In autumn 2015, a new format called FLEX was added: FLEX is based on blended learning and reduces the time students spend on classroom activities by 50%.

The introduction of e-learning and new learning media in higher education frequently meets resistance or opposition (BURDEN & JONES, 2015). Since the results of introducing digital learning are often disappointing, the SML's digital learning strategy is based jointly on an integrated perspective and the recommendations of change management research in higher education (KNOSTER & PESHAK GEORGE, 2006). Based on the SML vision for teaching, appropriate incentives were established and all the necessary resources allocated to fulfill the school's plan of action. EDINGER, REIMER & VAN DER VLIES (2013) observe that lecturer e-competencies are of key importance regarding the successful institutionalization of e-learning and for this reason special emphasis is placed on the development of these skills. Within the SML e-learning strategy, the following requirements have been specified for its lecturers (ZHAW SML, 2015):

The lecturers need to have

- *the necessary technical ICT skills for teaching (ICT literacy), and*
- *profound knowledge in the area of media pedagogy for the design of e-learning (e-learning competencies).*

Today, it is assumed that university lecturers possess more than just the minimum technical ability in terms of ICT literacy (THILLOSEN & HANSEN, 2009). A lecturer's assumed high level of ICT literacy stems from the fact that information and communication technologies form an integral part of most educational programs. In addition, ICT literacy is now a necessary part of almost any professional activity, inside or outside higher education, and there is an abundance of courses for developing these skills further. However, when looking at lecturer knowledge

of digital educational technologies, an altogether different picture emerges since these technologies have not been part of their academic education or professional activities. As lecturers/teachers often have only a basic understanding of digital educational technologies, a significant knowledge gap can be observed (BREMER, 2010; SMITH, 2005). For this reason, the SML decided to determine and positively promote lecturer development of pedagogical media competencies. As these skills are not evenly distributed and because learning is a highly individual and specific activity, the first step towards closing the knowledge gap is to identify each lecturer's pedagogical media competencies. Based on the profile created, appropriate training will be recommended.

Our aim is to show which e-competencies teachers need to develop in order to teach with the aid of digital technologies both inside and outside the classroom. In this paper, the term 'e-competencies' has been used both for technical (ICT literacy) and pedagogical (e-learning competencies) knowledge and skills with the goal of identifying the skill set required by our teachers to utilize digital technologies successfully. The paper initially describes the basic e-competencies required for e-learning, then introduces readers to the SML case study, and finally discusses its findings. We trust that our research will prove valuable to any school planning to set up a catalogue of skills necessary for e-learning. On the basis of this, universities will be able to determine and monitor the development of e-competence among their teaching staff.

2 Required E-Competencies for Lecturers

2.1 Literature Review

The identification of key competencies for e-learning is one of the central objectives of e-learning research (e.g., BARAN, CORREIA & THOMPSON, 2011). All of the literature reviewed by us asserts that university teachers must carry out a variety of roles in e-learning environments, which are often rooted in traditional

teacher functions. However, to perform well in e-learning environments, lecturers have to adopt and develop new competencies which go beyond traditional teaching skills (ALVAREZ, GUASCH & ESPASA, 2009). Many authors agree that technological competencies are a key factor in the success or failure of university e-learning initiatives (BIGATEL, RAGAN, KENNAN, MAY & REDMOND, 2012; WILLIAMS, 2003). Yet, despite all the technological advances, the pedagogical role of the teacher is still seen as the key to successful student learning (GULBAHAR & KALELIOGLU, 2015; BAWANE & SPECTOR, 2009). In analyzing the literature regarding the necessary competencies for e-learning, two aspects stand out: Firstly, the large spectrum of skills which appear to be relevant to e-learning and, secondly, that there is no general agreement regarding which skills are really key to creating successful e-learning products.

MUÑOZ CARRIL, GONZÁLEZ SANMAMED & HERNÁNDEZ SELLÉS (2013) and BARAN et al. (2011) point out that the skills and competencies necessary for the institutionalization of e-learning at universities are highly specific to each organization and its e-learning strategy. Accordingly, the roles and tasks of university lecturers cannot be defined in general terms but have to be derived from their respective university e-learning strategies (MUÑOZ CARRIL et al., 2013). A university e-learning strategy not only defines the roles and tasks of its lecturers but also defines which e-competencies are relevant or not. This means that for each university and its lecturers a unique profile of e-competencies has to be defined. It therefore follows that university teachers "are required to possess a diverse set of competencies and their extent of utilization relies on the context or role they are required to perform and also the kind of resources and support available" (BAWANE & SPECTOR, 2009, p. 387).

ALVAREZ et al. (2009, p. 322) confirm the relationship of role, task, and underlying competencies: "Competency as skill [...] refers to abilities to perform roles and carry out tasks according to standard expectations [...] it is necessary to clarify teacher roles whilst at the same time specifying which competencies call for these roles within the particularities of the tasks university teachers must carry out in online learning environments."

Based on its e-learning strategy, the SML had to identify the e-competencies necessary for e-learning to accomplish its objectives. Thus the question arose as to how these e-competencies which were lacking could be identified. BIGATEL et al. (2012) and PALLOFF & PRATT (2011) have suggested that lecturers should identify these competency gaps for themselves and remedy any deficiency by means of appropriate training.

2.2 Defined E-Competencies at SML

Based on an integrated process analysis, the SML evaluated the roles, tasks, and obligations of its lecturers, as well as identifying and defining their specific ICT and e-learning competency requirements. As part of an iterative process involving both internal (E-Learning-Specialists SML) and external specialists (Blended-Learning-Group, ZHAW), sub-competencies had been identified and validated (see Table 1 and Appendix).

After the identification of the relevant competencies and sub-competencies, the SML operationalized the competency dimensions with specific action items. These items represent the basis for the e-Reflection tool to identify lecturers' e-learning competencies based on self-evaluation.

Table 1: Defined E-Competencies at the SML

ICT Literacy Competencies	E-Learning Competencies
Mobile Working	Moodle Navigation
Word Processing	Moodle Tools
Image Editing	Moodle Learning Control
PDF	Mahara
Multifunctional Devices	Mobile Response Tool (Clicker Tool)
Audio-Visual Devices	Video Studio

Eventoweb

Library

PowerPoint

E-Teaching Skills

Knowledge Protection

3   e-Reflection: Tool for Self-Evaluation and Competence Development

3.1   Introduction to the e-Reflection Tool

The Center of Innovative Teaching and Learning at the SML has developed an online application, the 'e-Reflection' tool, which lecturers can utilize to perform a self-evaluation of their ICT literacy and e-learning competencies.

In the evaluation process, lecturers determine whether or not they have specific e-learning competencies. They assess their ability to complete certain actions in specific working situations (for examples, see Figure 1) using a dichotomous scale ('yes/no' option). Respective actions are classified as beginner level or advanced level. Based on these responses, the tool calculates competencies both for the level of each lecturer and at the aggregated SML level. In a normative process, the school can set a benchmark with three different proficiency levels and it can change the benchmark over time or for different groups. For example, it might raise the benchmark after a specific time or adjust it according to a lecturer's job description and proficiency. In this way, it is possible for the organization to manage competence development at an aggregated level.

Figure 1: Examples of Self-Evaluation Items in e-Reflection

On an individual level, the tool evaluates a lecturer's answers and generates a single-page report. One key feature of this tool is the advice function which provides information on how lecturers can further develop their skills according to the results of the evaluation (Figure 2). If the competency level falls below a certain threshold, the tool generates recommendations automatically. The report shows possible training courses within the school or university and provides access to teaching manuals for self-study.

Report Core Competencies in ICT and E-Learning (Instructors)

lisorosi

Please print this report and discuss it with your superior.

Print

☐ Include learning recommendation (might be more than one page)

Note: Choose output target "PDF", to save this form as PDF.

Level **1** Few competencies (Learning recommendations to acquire basic competencies) orange

Level **2** Basic competencies (learning recommendation - for further development) light green

Level **3** Very good competencies (no learning recommendation but provided) dark green

I. ICT-Skills

Competence	Status	Level	Learning recommendations
1. Mobile Working	17%	1	The ZHAW Workstation
			Collab – Basic Knowledge
			Collab – Advanced Knowledge
			Collab Instructions
2. Word Processing	100%	3	There are no recommendations for level 3
			Further recommendations
3. Image Editing	0%	1	Image Editing with Photoshop
4. PDF	79%	2	There are no recommendations for level 2
5. Multifunctional Devices	13%	1	Printing, Copying, and Scanning with the Campuscard
			Printing & Copying Instructions

Figure 2: Report with Recommendations

The back-end user can easily utilize or customize the tool according to different competency evaluations and reports. The tool will also be developed further in competency areas once the SML has gained sufficient experience of self-evaluation for ICT literacy in e-learning.

3.2   The Self-Evaluation Process

The SML requires self-evaluation by all new lecturers and periodically from other faculty staff. Lecturers agree to use the tool once a year and to discuss the findings plus any recommended training courses with their superiors (ZHAW SML, 2015).

The process is as follows:

- HR sends an e-mail to staff (lecturers and faculty members) alerting them to use the e-Reflection tool to check their ICT and e-learning competencies in preparation for their annual employee evaluation.
- The system generates a code for each questionnaire started. Only the interviewee knows his/her code. Interim results can be saved and the questionnaire resumed later.
- The results of the questionnaire are analyzed and aggregated. Individual results are anonymous and known only to the interviewee. The e-Reflection tool is intended for use as an anonymous self-evaluation tool. Lecturers and faculty staff should feel supported rather than intimidated by the tool.
- After completing the questionnaire, the interviewee prints out the report and discusses it with his/her superior. The findings flow directly into the annual goal-setting discussions.

The overall aim of this process is to enhance the quality of teaching at the SML and to promote the further development of higher education with the support of e-learning.

4   Results and Discussion

In 2015 the SML at ZHAW conducted the first e-learning competency evaluation. Self-evaluation was anonymous and the results were not traceable back to an individual person. Table 2 shows the aggregated results from 130 participants (n=130).

ICT Literacy Competencies	Ø Points	Max. Points	Ø Status
Mobile Working	7.19	17	42 %
Word Processing	9.5	10	95 %
Image Editing	7.11	8	89 %
PDF	10.15	14	72 %
Multifunctional Devices	6.43	8	80 %
Audio-Visual Devices	3.52	5	70 %
Eventoweb	4.93	6	82 %
Library	3.07	4	77 %
E-Learning Competencies	Ø Points	Max. Points	Ø Status
Moodle Navigation	7	9	78 %
Moodle Tools	3.65	11	33 %
Moodle Learning Control	4.01	7	57 %
Mahara	2.5	13	19 %
Mobile Response Tool	1.14	5	23 %
Video Studio	1.62	9	18 %
PowerPoint	10.32	11	94 %
E-Teaching Skills	3.5	6	58 %
Knowledge Protection	4.1	6	68 %

Table 2: Aggregated Results of the Lecturer's ICT Literacy and E-Learning Competencies

As the results in table 2 show, lecturers are strong in text and image editing (ICT skills, 95% and 89%) and in PowerPoint and Moodle navigation (e-learning skills, 94% and 78%). However, weaknesses were identified in mobile working (ICT skills, 42%) and in the use of Moodle tools and Mahara (e-learning skills, 19% and

33%). The greatest areas for improvement in e-learning were in the use of Video Studio and the Mobile Response Tool. These results (deficiencies) did not come unexpectedly; HANDKE (2014) has already criticized university lecturers' lack of knowledge in the area of e-learning tools. Additionally, those tools had only recently been introduced at SML.
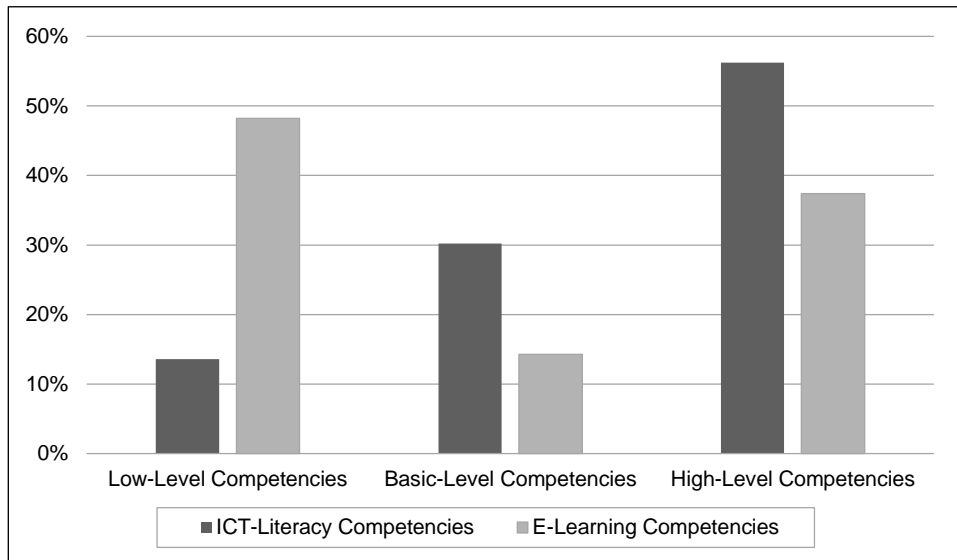

Figure 3: Aggregated Results of Lecturer ICT and E-Learning Competencies

The results in figure 3 show that SML lecturers possess a very high level of ICT literacy. However, in the area of e-learning competencies lecturers suffer from considerable skill gaps.

Based on these results, e-learning activities at the SML will be expanded. In addition to existing courses for individual e-learning and ICT tools, the SML will offer a new comprehensive course: "Advanced Studies in Digital Learning". Here pro-

fessionals with a background in higher education pedagogy can learn how to set up teaching and learning processes in e-learning environments.

A strong emphasis is placed by the SML on providing support in enculturation and socialization to lecturers in their new roles through digital means. e-Reflection and other self-evaluation tools are therefore an important step for teachers in developing digital literacy and applying these skills and competencies to their respective courses. The e-Reflection tool can be easily adapted to suit other university environments.

5 References

Alvarez, I., Guasch, T., & Espasa, A. (2009) University teacher roles and competencies in online learning environments. *European Journal of Teacher Education, 32*(3), 321-336.

Baran, E., Correia, A.-P., & Thompson, A. (2011). Transforming online teaching practice: Critical analysis of the literature on the roles and competencies of online teachers. *Distance Education, 32*(3), 421-439.

Bawane, J., & Spector, J. (2009). Prioritization of online instructor roles: Implications for competency-based teacher education programs. *Distance Education, 30*(3), 383-397.

Bigatel, P. M., Ragan, L. C., Kennan, S., May, J., & Redmond, B. F. (2012). The Identification of Competencies for Online Teaching Success. *Journal of Asynchronous Learning Networks, 16*(1), 59-71.

Bremer, C. (2010, July). *Fit for e-learning? Trainings for e-learning competencies.* Paper presented at the 2nd International Conference on Education and New Learning Technologies, Barcelona.

Burden, K., & Jones, S. (2015). Barriers and solutions to innovation in teacher education. *e-learning Papers, 44.* Retrieved December 28, 2015.

Edinger, E.-Ch., Reimer, R. T. D., & van der Vlies, S. (2013). Teach the Teachers – E-Learning in Further Education for Lecturers in Higher Education. *Bulletin of the IEEE Technical Committee on Learning Technology, 15*(4), 2-5.

Gulbahar, Y., & Kalelioglu, F. (2015). Competencies for e-Instructors. *Contemporary Educational Technology, 6*(2), 140-154.

Handke, J. (2014). *Patient Hochschullehre*. Marburg: Tectum.

Knoster, T. P., & Peshak George, H. (2006). Realizing durable and systematic behaviour change in schools: Guiding questions. *Communiqué – Newspaper of the National Association of School Psychologists, 30*(6), 34-37.

Müller, C., Lübcke, M., Alder, M., & Johner, R. (2015). Dauerhaft digital: Systematische Entwicklung und Implementation einer E-Learning-Strategie. *Zeitschrift für Hochschulentwicklung, 10*(2), 155-171.

Muñoz Carril, P. C., González Sanmamed, M., & Hernández Sellés, N. (2013). Pedagogical Roles and Competencies of University Teachers Practicing in the E-Learning Environment. *The International Review of Research in Open and Distance Learning, 14*(3), 62-487.

Palloff, R. M., & Pratt, K. (2011). *The excellent online instructor*. New York, NY: Wiley.

Thillosen, A., & Hansen, H. (2009). Technik und Didaktik im E-Learning: Wer muss was können? In U. Dittler, J. Krameritsch, N. Nistor, C. Schwarz, & A. Thillosen (Eds.), *E-Learning: Eine Zwischenbilanz* (pp. 133-148). Münster: Waxmann.

Smith, T. C. (2005). Fifty-one competencies for online instruction. *The Journal of Educators Online, 2*(2), 1-18.

Weidman, J., Twale, D., & Stein, E. (2001). Socialization of graduate and professional students in higher education: A perilous passage? *ASHE-ERIC Higher Education Report 28*, 1-138. San Francisco, CA: Jossey-Bass.

Williams, P. E. (2003). Roles and competences for distance education programs in higher institutions. *American Journal Education, 17*(1), 45-57.

Zürcher Hochschule für Angewandte Wissenschaften (ZHAW) School of Management and Law (SML) (2015). *E-Learning-Konzept 2015-2018.* Winterthur: ZHAW, SML.

Authors

Prof. Dr. Claude MÜLLER || ZHAW School of Management and Law || CH-8401 Winterthur

www.zhaw.ch/zid

muew@zhaw.ch

Flavio DI GIUSTO || ZHAW School of Management and Law || CH-8401 Winterthur

www.zhaw.ch/zid

digi@zhaw.ch

Dr. Sandra GROSS || ZHAW School of Management and Law || CH-8401 Winterthur

www.sml.zhaw.ch/wi

groa@zhaw.ch

Dr. Stefan KORUNA || ZHAW School of Management and Law || CH-8401 Winterthur

www.sml.zhaw.ch/wi

koru@zhaw.ch

Appendix

Table 3: ICT Literacy

Mobile Working	Instructors at the ZHAW School of Management and Law also utilize the ZHAW network while they are not on campus. Instructors use the Connect Mobile Tool (VPN) to establish a network connection and use the collaboration platform while they are away from their ZHAW work stations.
Word Processing	Instructors at the ZHAW School of Management and Law use the range of MS Office tools to create texts, presentations, and tables.
Image Editing	Instructors at the ZHAW School of Management and Law upload images from various sources to an image editing program and carry out simple modifications.
PDF	Instructors at the ZHAW School of Management and Law modify PDFs to suit their requirements.
Multifunctional Devices	Instructors at the ZHAW School of Management and Law print, copy, and scan documents using multifunctional devices.
Audio-Visual Devices	Instructors at the ZHAW School of Management and Law employ hi-tech audio-visual devices (projector, microphone, and sound system) to provide multimedia support where appropriate.
Eventoweb	Instructors at the ZHAW School of Management and Law utilize Eventoweb for administrative purposes. Instructors use Eventoweb to check timetables, to submit grades, and to reserve rooms.
Library	Instructors at the ZHAW School of Management and Law take advantage of the wide range of media offered by the university library. Instructors retrieve materials physically and/or electronically.

Table 4: E-Learning Competencies

Moodle Navigation	Instructors at the ZHAW School of Management and Law are familiar with the e-learning platform Moodle. They update their personal profile, customize the navigation bar, and manage courses, participants, and content.
Moodle Tools	Instructors set up Moodle tools and use them effectively as the situation requires.
Moodle Learning Control	Instructors know how to use their Moodle access rights effectively to support successful learning.
Mahara	Instructors at the ZHAW School of Management and Law use the e-portfolio method in Mahara
Mobile Response Tool	Instructors at the ZHAW School of Management and Law use the Mobile Response Tool to get feedback from students wherever they are and to conduct surveys or polls.
Videostudio	Instructors at the ZHAW School of Management and Law use the SML video studio to produce their own video sequences for classes and customers. The studio is equipped to produce short instructional videos.
Powerpoint	Instructors at the ZHAW School of Management and Law create, format, and print presentations to show in class.
E-Teaching Skills	Instructors integrate e-learning elements as the situation requires in order to support effective learning.
Knowledge Protection	Instructors handle sensitive data with care; they protect data from unauthorized access and manipulation.