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Towards Strategic Management of Faculty in the Use of ICT – Approaches for Assessing eCompetence

Abstract

eCompetence of faculty represents one aspect of technology-driven educational innovation in universities. While conceptual approaches to eCompetence and a range of measures for faculty development in the use of ICT in teaching and learning have evolved, there is a need for additional research on adequate methods and instruments for competence diagnosis and assessment. Based on a desktop study, this paper compares a range of methods for assessing and measuring eCompetence of academic teachers.

Keywords

eCompetence, educational innovation, faculty development, competence assessment

Auf dem Weg zu einem strategischen Personalmanagement von akademischen Lehrenden in der Nutzung von ICT – Ansätze zur Messung von eCompetence

Zusammenfassung

Die eCompetence von akademischen Lehrenden stellt einen Aspekt der technologiebasierten Innovation von Universitäten dar. Während konzeptionelle Ansätze für eCompetence und eine Reihe von Maßnahmen für Personalentwicklung von Lehrenden in der Nutzung neuer Technologien entwickelt worden sind, gibt es einen Bedarf für zusätzliche Forschung zu angemessenen Methoden und Instrumenten der Kompetenzdiagnostik und Kompetenzbewertung. Dieser Beitrag vergleicht auf Basis einer Desktop-Studie eine Reihe von Methoden, um die eCompetence von akademischen Lehrenden einzuschätzen und zu messen.

Schlüsselwörter

eCompetence, Bildungsinnovation, hochschuldidaktische Weiterbildung, Kompetenzmessung

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1 eCompetence of Faculty and Innovation of Higher Education

The topics of competence development in general and of eCompetence in particular are closely linked to wider policy reflections on ICT-driven societal and educational change (ODL Liaison Committee 2006, BREYER 2006). In the higher education area, recent discussions have evolved in eLearning on the strategic challenge to implement new technologies in a sustainable way into universities (EULER & SEUFERT 2004; DUDERSTADT, ATKINS & VAN HOUWELING 2003). eCompetence research represents one aspect within this discussion. Its main interest is on the *role of the human factor* in technology-driven innovation in universities.

Faculty is playing a key role in education innovation. They are the process owners or gatekeepers of the research and teaching activities within universities (KERRES, EULER, SEUFERT, HASANBEGOVIC & VOSS 2005). Higher education teachers define and plan the curricula. Digital tools offer a wide range of options to enhance teaching and learning in universities, if they are embedded into innovative pedagogical concepts. But the design of innovative teaching scenarios is demanding new competences from the academia. Staff members need to be aware of and to understand the innovative potential of the technology that is available for their research and teaching activities. As a consequence they *need to develop competences* to cope with the technological challenges in their workplace (SALMON 2004).

There is some work on this topic available. With reference to the action competence model, SCHNECKENBERG & WILDT have proposed a *generic concept of eCompetence*. In this concept, eCompetence is understood as the ability to use ICT in teaching and learning in a meaningful way. One can identify the following key components: the university teacher - which bears the competence as his or her general cognitive disposition to act, the teaching and learning scenarios – which embed or rely on the use of ICT as the particular context in which the performance of the university teacher is situated, and the students that interact with the teacher or with each other in the specific teaching and learning scenario (SCHNECKENBERG & WILDT 2006). Kerres et al and Salmon have both specified in their work *eTeaching competence profiles* for academic teachers for a range of ideal eLearning scenarios (KERRES et al 2005, SALMON 2006). KERRES et al have also proposed in their study a *portfolio of measures* for eTeaching competence development.

One problem for the establishment of faculty competence development measures is that we do not know a lot about the expertise level of academic teachers in the use of ICT. In the US some empirical research in this field has been carried out. HAGNER has made an interview survey on faculty engagement in eLearning innovation, which collects information on items like resources, incentives and reward mechanisms for the innovative behaviour of the interviewed academic teachers (HAGNER 2001). ZEMSKY & MASSY have gathered data from faculty members and from administrators in six US universities, focusing on their attitudes, expectations and uses of eLearning (ZEMSKY & MASSY 2004). While

both surveys focus primarily on motivational and attitudinal factors for the use of ICT, there is currently no data available for *the cognitive level* of teaching expertise of individual teachers in eLearning scenarios. But how can we define concise measures for faculty competence development without gaining more insight into their existing competence profiles and learning needs?

2 Research Method

This paper relies on a desktop study of relevant research literature on competence assessment in cognitive psychology, social sciences and educational sciences. A comparative analysis discusses a range of assessment methods, which could be applied to measure eCompetence of academic staff. The main research questions of this paper are: How can eCompetence of academic staff be measured? Which competence diagnosis tools are adequate for the target group of academic staff?

3 Approaches to Measure eCompetence of Faculty

The eCompetence concept integrates a high number of variables which influence the competence and performance of the teacher in a given eLearning scenario. On the basis of this complex context, we need to think about adequate methods and instruments that can be used to measure eCompetence of academic teachers. Still, the eCompetence concept contains one *important constraint* for the selection of adequate methods: the measurement of individual eCompetence is always related to a particular institutional innovation scheme. Only in relation to the detailed institutional strategy, which has been taken by a university, individual eCompetence measurement is possible and purposeful.

This methodical constraint is expressed in a research project of the Dutch Digital University, which has developed an instrument named 'professionalisation tailored to the organisation'. This instrument can be used to realise an *inventory of competencies* related to the innovation readiness of a group of faculty members. In the field of ICT, individual competence measurement gives an insight into the personal eCompetence of the teacher which is related to the eCompetence of the group of involved stakeholders in the innovation process, the shared vision of the innovation results and the relevant wider institutional context. But the results are only relevant for the specific organisational context of the group (STALMEIER 2006). Keeping in mind this constraint, we can consider a *range of methods and instruments* that might be applied to measure the individual eCompetence of the academic teacher.

Approaches to measure competence are often based on *psychological diagnosis instruments and psychometric tools*. The diagnosis of eCompetence on the basis of quantitative psychological and physiological performance indicators which are recorded in a media laboratory environment could generate valuable data for a reconstruction of the motivational background of the personal competence development interest. WEINERT remarks at one point: "If one wants to infer

properties of individual competencies from inter-individual performance differences, one has to account for motivational factors by varying assessment conditions." (WEINERT 1999, p. 19). The variation of assessment conditions for performance indicators can only be feasibly controlled and measured in psychological laboratories. In academic practice, to implement psychometric diagnosis for academic staff would proof problematic – given both the challenge to set up such an laboratory situation for a real teaching performance in a university course, and the opposing attitudes of the academic target group towards having their teaching performance assessed in a laboratory situation.

The same hindrance of academic opposition would probably apply to *external assessment through tests*. External assessment through testing is not really feasible for academic staff members. Scientists, in particular when having reached professorate status, may find it hard to accept external test systems as method for assessing their personal competences. So, while in theory external assessment through testing academic teachers might be a way to measure competence, in practice academic culture is reluctant to having applied this method widely.

A third option in this type of measurement is the *external assessment of the teacher's eCompetence by the students*. A widely used assessment format is, e.g., a questionnaire for students that enquires about the teaching performance of the lecturer in a given ICT-enriched learning environment. The outcomes of the student assessment can efficiently be compared with a self-assessment of the academic teacher on his or her eCompetence and thereby serve as a cross-reference for the data interpretation.

Self-assessment is in fact widely a used and accepted option for the target group of academic staff. It can for example be based on a checklist of individual eCompetence profiles, that the university has developed as target values on the background of its specific innovation model. A more challenging task in the self-assessment of the teacher's eCompetence is the motivational dimension. The general motivational influences on the performance of the academic teacher in a specific eContext cannot be directly measured. What can be measured, are competence-specific motivational attitudes. In this regard, promising approaches focus on aspects of the self-concept and self-efficacy beliefs of the academic teacher about the origins and use of specific competencies (WEINERT 2001).

In this research perspective, MCCLELLAND and BOYATZIS have developed a methodology for assessing work-related competence in the corporate sector, which could be applied to diagnose eCompetence of academic teachers in universities.

This methodology is called the *behavioural event interview* – which is based again on the critical incident interview. This critical incident interview asks the interviewees to reflect on their behaviour in critical situations they encountered in their workplace. In the behavioural event interview, researchers first select two sample groups within the organisation, where the study is carried out: the first group are outstanding, and the second group are average job performers in a specific work context. Next, the researchers take in-depth interviews with the actors from both sample groups: the interview questions focus on the way the interviewees do their work.

The clue within the interview is thereby to emphasise the questioning on critical situations: the specific research focus is on those decisions and those actions which the interviewees have taken in critical situations, when the work processes have been developing exceptionally well or bad for them. After having taken and recorded the interviews, the transcripts are analysed and specific behavioural indicators which can be identified and extracted from the reflections of the actors are notated. These indicators are then clustered into a set of competences for both sample groups of the study. The contrasting selection of the two sample groups helps to identify more clearly those competences of the outstanding performers which make a difference and are the foundation for their success in the work context (ADAMS 1997, BOYATZIS 1982).

One method of competence measurement, which is recently becoming quite popular in the higher education context, is the *ePortfolio approach*. The main idea behind the ePortfolio is to map and to electronically document individual competences in a specific field, which have been acquired in the personal development process (BATSON 2002). The ePortfolio does not differentiate between formal, non-formal and informal learning processes. As a method, the ePortfolio could be understood as a form of self-assessment of individual competences. The method itself does not differ much from the questionnaire-based self-assessment, the different format allows nonetheless a more flexible mapping and documentation of individual competences.

One concrete example where the ePortfolio approach is applied for mapping and managing Competence of academic teachers, is the TieVie network of Finnish universities. TieVie is a Finnish nationwide support service project of the Finnish Virtual University providing training in the use of ICT in educational settings. The training is intended to all the teachers and other staff members in Finnish universities, with participants from all 21 universities in Finland. During the training, the participants document all the work products, which they have done during the course, in an electronic portfolio. The purpose of the ePortfolio is twofold: it is used for as self-reflection tool for the personal competence development of academic teachers; and most of the portfolio documentation is accessible for all stakeholders involved in the innovation process, except one reflection part, which is restricted to private use (RUOTSALAINEN, TENHULA & VASKURI 2005). A second example on the use of ePortfolios in higher education institutions is given by the SURF Foundation of the Netherlands. A detailed description of the models used, and the implementation contexts is given by AALDERINK and VEUGELERS, who predict, that the ePortfolio – as competence mapping model, and the 'folio thinking' - as conceptual approach in the field, will remain a strong trend in the near future in the Netherlands (AALDERINK & VEUGELERS 2005).

Another feasible option for measuring and assessing eCompetence of academic staff could be a *peer review evaluation*. The peer review is deeply rooted in the academic tradition. The precondition to measure eCompetence in a peer review approach is nonetheless the existence of a community of practice, where academic teachers meet and share each others ideas and perceptions on the use of ICT in teaching and learning activities. Once again the peer review of the individual teacher's competence and performance would necessarily be based on a set of

common values or criteria that this community shares (WENGER 2006). This is a consensus-based model, which is recently linked with the discussion on faculty readiness for technological innovation processes in universities. A prominent input into this debate has been given by HAGNER, who has made a classification of four different types of faculty members in relation to technological innovation readiness.

The peer review method of competence assessment in a single university would have to develop indicators based on the different faculty member types and relate the assessments to this classification. Hagner writes on this method: "Conduct an assessment of faculty readiness that includes both their existing level of use and what they would like to do given the right conditions. Make sure you learn what they consider the 'right conditions' to be." (HAGNER 2001, p. 11).

Finally, the *KKR – Kasseler Kompetenzraster* – tries to assess group competences in a specific work context. The KKR is one instrument for the analysis of group processes in order to understand competence development and to assess existing competence levels within a group. The KKR approach is quite work-intense – it calculates 30 hours assessment work for the analysis of a group session, and the group size is restricted to 5-7 persons maximum (KAUFFELD, GROTE & FRIELING 2003). The scalability of the KKR is thus limited and its operationalisation in university contexts questionable. Still, network analysis or group competence measurement approaches like HAGNER'S faculty typology or the KKR can be interpreted for our research field as strong indicator that the individual eCompetence of the academic teacher has to be observed in relation to the particular performance context.

4 Conclusions

The discussion of approaches to measure eCompetence of academic staff members has started with a conceptual clarification of the eCompetence term. The general concept of competence is used in many different ways in the research literature. A meaningful definition of the competence term can only be reached, when it is applied to a specific context. In the case of eCompetence research this context is set by the conditions, in which ICT-enriched educational processes in higher education take place. We have discussed *individual eCompetence*, considering its inherent key components - the individual teacher, the pedagogical model, the ICT options and the student group, and we have referred to specifications of eCompetence profiles is different eLearning scenarios.

With a view on the design of *concise competence development measures for faculty*, we have discussed a spectrum of methods and instruments that could be feasible for measuring and assessing eCompetence of academic teachers. Some methodologies may be more favourable and adaptive to the particular academic environment and the willingness of scientists to participate in assessment sessions.

Some proposed measurement approaches are applicable to assess individual competences. There are also approaches that assess distributed group competences.

For all described methods it is important to recognise the decisive role of the context: eCompetence can only be measured in a meaningful way according to ICT strategy objectives and standards that are set in specific institutional contexts and conditions.

There is a tension between educational endeavours to standardise competence profiles and measures at policy level - one current example is the definition of a European eCompetence Framework for the ICT supply sector, which is organised by CEN – the European Committee of Standardisation, and the particular variables and performance conditions in real contexts (CEN 2006). The wider the definition of eCompetence is spanned, the less concrete and specific are the implied conceptual assumptions – see, e.g., the key competence definition of the European Commission (European Commission COM 548 final, 2005). The same relation applies to methods and instruments for measuring competences: The wider and more universal the approach to measure competences is chosen, the less valuable are the results and the interpretation of the collected data. There is *no easy, scalable solution for macro-level competence development strategies* for academic staff in higher education. We rather need to think in terms of *modularised competence management approaches* which are based on the local assessment and diagnosis of faculty expertise in eLearning. These portfolios of learning options for faculty have to fit into the specific institutional approach for ICT integration in which they are being developed.

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