

A model of Media supported Inquiry-based Learning

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Abstract—Inquiry-based learning in higher education can be complemented by media ICT tools. However, little knowledge exists on how inquiry-based learning can benefit from systematic application of ICT. We propose a model of media supported inquiry learning based on a previous qualitative study. The model was then connected to the findings of an interview study with academic teachers concerning the use of ICT in inquiry-based courses. As a result, we present a model that explicate media supported in inquiry-based learning environments.

Index Key Words: Inquiry learning, e-learning, framework, ICT in higher education

I. THEORETICAL FRAMEWORK

The term inquiry-based learning is used to describe a variety of pedagogical approaches concerning the research-learning-nexus that involve students in research (Aditomo et al. 2013, Spronken-Smith et al. 2010). Learning and research should be combined in order to acquire education through research since there is clear evidence that students benefit from learning in a research-based environment (Jenkins et al, 2007; Levy, 2009).

Inquiry-based learning, like any type of learning, can be facilitated by the use of ICT. However, several studies show that there is a gap between institutional intentions of implementing ICT and the use of digital technologies in higher education (e.g. Stensaker et al., 2006; Lai, 2009; Schneckenberg, 2009; Danciu & Grossel, 2011; Eyyam et al., 2011). There have been considerable investments in technology-enhanced teaching and learning, yet the process of changing educational practice has been slow in taking advantage of the potential benefits. With countless

options of ICT, academic staff are facing new pedagogical challenges: They ought to integrate ICT in study courses and programs while designing new learning environments in response to the constantly changing technological development (Schneckenberg, 2009).

We would like to resolve the question which kind of media are used in inquiry-based teaching and how these two subjects can be connected in a theoretical manner. On the long term we seek to deepen our understanding about how inquiry-based learning can be technically supported and eventually present recommended actions on the political level.

II. METHODOLOGY

To address the research question, we conducted a n interview survey with academics from various universities in Germany. We invited 64 teachers with the specifics of inquiry-based teaching via email to participate in the survey. Eventually, we were able to interview 25 teachers who offer a total of 30 inquiry courses. A broad range of disciplines and scattered location (9 universities) could be covered as well.

III. FINDINGS

As a result, an overview over common usage patterns of digital tools in inquiry-based learning was yielded. We combined the results of the interviews focusing media with the model of inquiry learning that had been developed by our research group (figure 1) [citation excluded for anonymity]. The frequency of used media are displayed in a bar chart (figure 2).

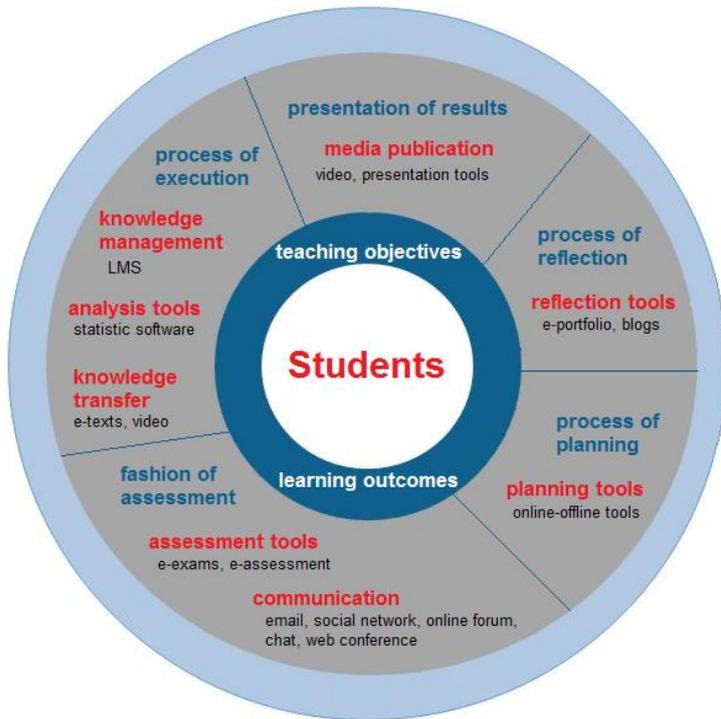


Figure 1: Adapted model of inquiry-based learning

As first category we identified the concept of using media as a product in the process of publishing scientific results. For instance, students create a video that represents their research project with the chance of broadcasting their results to a greater audience. These formats allow for more flexibility, as a formal peer reviewed assessment process is not needed in contrast to a scientific publication. In practice, video production are not common. Instead, digital presentation tools are the preferred means.

As the second category we found media as a reflecting tool for the learning process. There are e-portfolio systems at institutions or simple blogs. In both cases media is used to offer a platform for reflective thinking during the research process. The interviews with academic teachers show that blogs are a popular form of reflecting tool.

The third category is media as a planning tool. Similar to the previous category, the main argument is that inquiry-based projects tend to challenge the students' ability to organize themselves. Offering planning tools like a common calendar or a meeting scheduler can reduce factors of failure. The interviews show that online-offline-tools such as Dropbox or Google Docs are the teacher's ICT of choice.

The fourth category is media as an assessment tool. Since inquiry-based learning projects are not as structured as regular course work, formative assessment methods are adequate formats for evaluating learning outcomes. Electronic mini-exams are a way to manage projects that comprise a high amount of students. In practice, some teachers use e-exams or e-assessment tests, however electronic means of assessment are still rare.

The fifth category is media as knowledge management. Wikis and other digital tools are useful in projects that include a big accumulation of knowledge. Organizing knowledge efficiently is one of the key competencies in science that students should practice in inquiry-based learning projects. Learning Management Systems (LMS) are reliable in order to support this process, and therefore often used in inquiry teaching. Other identified media categories may overlap with media as a knowledge management, though the process is highly case dependent. Using media in terms of analytic software like SPSS only applies in disciplines that work with quantifiable data. Using media as a means of knowledge transfer is very similar to using media as knowledge management (the creator of the knowledge is limited to the teacher role). It is also dependent on the field of inquiry. In some fields, factual knowledge might not be important. Therefore, digital knowledge management or transfer might not be necessary at all. Nevertheless, electronic texts such as PDFs are highly used in all fields of academic teaching.

The seventh category is media as a means of communication. Email, social media and online forums are most mentioned when asking teachers of inquiry-based courses about employed digital tools. This category holds a specific importance for inquiry learning as the teacher's regular feedback is pivotal to the success of the project. There is also a certain type of inquiry-based learning that takes on problems in the industry. Here, the communication with business partners is essential.

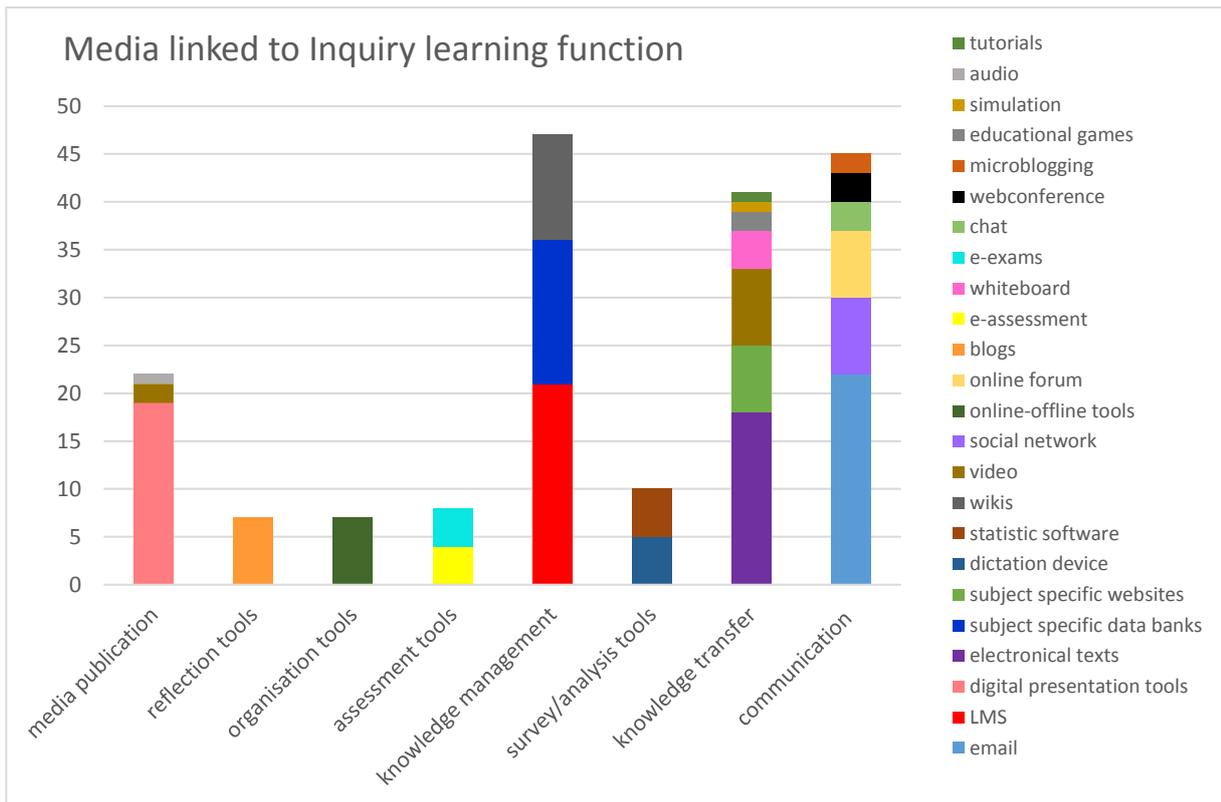


Figure 2: Frequency of media in inquiry-based courses (n=30)

IV. CONCLUSION

Our results may have impact for the discussion on strategic usage of digital media in inquiry-based learning in higher education. It is clear that there cannot be a one fits all solution, the choice of media is still dependent on multiple factors such as financial means, teachers preference, number of students in one course etc. But since the digitalization is increasing exponentially, there is a need of systematic thinking when it comes to making didactical decisions.

REFERENCES

- Aditomo, A. et al. (2013): Inquiry-based learning in higher education. Principal forms, educational objectives, and disciplinary variations. In: *Studies in Higher Education* 38 (9), pp. 1239–1258.
- Barnett, R. (ed.) (2005): *Reshaping the University. New Relationships between Research, Scholarship and Teaching*: McGraw Hill.
- Danciu, E.; Grosseck, G. (2011): Social aspects of web 2.0 technologies. Teaching or teachers' challenges? In: *Procedia - Social and Behavioral Sciences* 15, pp. 3768–3773.
- Eyyam, R.; Menevis, I.; Dogruer, N. (2011): Perceptions of teacher candidates towards Web 2.0 technologies. In: *Procedia - Social and Behavioral Sciences* 15, pp. 2663–2666.
- Jenkins, A.; Healey, M.; Zetter, R. (2007): *Linking teaching and research in disciplines and departments*. The Higher Education Academy: York.
- Lai, K. (2011): Digital technology and the culture of teaching and learning in higher education. In: *Australasian Journal of Educational Technology* (27), pp. 1263–1275.
- Levy, P. (2009): *Inquiry-based learning: a conceptual framework*. Centre for Inquiry-based Learning in the Arts and Social Sciences, University of Sheffield.
- Schneckenberg, D. (2009): Understanding the real barriers to technology-enhanced innovation in higher education. In: *Educational Research* 51 (4), pp. 411–424.
- Spronken-Smith, R.; Walker, R. (2010): Can inquiry-based learning strengthen the links between teaching and disciplinary research? In: *Studies in Higher Education* 35 (6), pp. 723–740.
- Stensaker, B.; Maassen, P.; Borgan, M.; Oftebro, M.; Karseth, B. (2007): Use, updating and integration of ICT in higher education. Linking purpose, people and pedagogy. In: *High Educ* 54 (3), pp. 417–433.