LEARNER-CONTENT-INTERFACE AS AN APPROACH FOR SELF-RELIANT AND STUDENT-CENTERED LEARNING

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ABSTRACT

Conceptualization and implementation of computer supported teaching and training is currently not tailored to the paradigm of learner centration. Many technical solutions lack transparency and consistency regarding the supported learner activities. An insight into learners activities correlated to learning tasks is needed. In this paper we outline recent developments in university's higher education concepts. We introduce InterLect as a tool to observe student's activities in lecture content acquisition and describe first insights and questions derived using this tool in a lecture scenario. Based on a new understanding of activity transformation cycles, an elaborated didactical design is modeled, which allows to address and observe learning activities. Ideas for a valid evaluation process are derived in order to investigate efficiency of the digital tool within the didactical framework.

KEYWORDS

Learner Centred Tools, Evaluation, lecture acquisition

1. INTRODUCTION

Digitalization increases in all areas of live and especially in science. This has also initiated a process of change in academic research and teaching. Numerous developments in digital teaching and learning are offering new designs for academic teaching and learning. On the one hand scientists utilize existing digital developments for their own research and interchange with others, on the other hand scientists are involved in the development of new designs for teaching and learning (Donk, 2013). Focused on studies and teaching we describe the dynamic progress of digitalization in the last years with the changed interaction and communication between lecturers and students, students and students or between lectures and lectures: collaborative tools and new digital teaching-learning-offerings are increasing research topics. In recent years, this progress of broken up existing teaching and learning formats has also led in Germany to various approaches and discussions about digitalization on university, see e.g. the Higher Education Forum of Digitalization of the German Rector's Conference. The discussion focusses the adjustment of learning environments related not only with focus on technical aspects.

With this paper we take part in the current discussion of the digitalization of teaching and learning and therefore we present Interlect as a tool for student centered learning.

Biggs teaching model (Biggs, 1999) describes three levels of teaching competences: the first level "What The Student Is?", the second level "What The Teacher Does?", which is defined as the improvement in management of learning and teaching, and the third level "What the Students Does?". This third level explains a learner-centered approach that relies on observation of the learner and learning activities. We adopt the described activities on teaching-learning-offerings and digitalization in a transition from the second level "What The Teacher Does?" to the third level "What The Students Does?". Thus it is no longer a single question of motivation and autonomy of studies with digital learning and teaching. Another aspect is the transparence in processes between the various stakeholders and moreover the analysis of desires and needs of students in comparison with the goals of teachers, the used teaching methods etc. (see therefore (Biggs,

1999), (Hattie, 2008)). For this purpose we take into account the specific challenge of the observation of learning processes. Therefore we single out this specific challenge in this paper by presenting a learner-content-interface, the so called InterLect-Tool (Nicolay, 2015). InterLect stands for Lecture Content Interface.

The reminder of the paper is structured as follows: In the following paper, we outline the motivation for this tool and give a specification of the existing InterLect-Tool with first outlooks to the didactical design and evaluation of Interlect.

2. INTERLECT - A TOOL FOR STUDENT CENTERED LEARNING

2.1 Description of the Lecture-Content-Interface

In case of a lecture scenario current approaches, such as Tweedback (Vetterick, 2013) or TopHat (TopHat, 2014), establish an interface between audience and lecturer. Classroom response systems are used to interactively quiz the audience by utilizing multiple choice tests or collecting questions from the audience using a ranked question boards. In terms of transparency concerning student's activity in relation to lecture content, these systems are limited due to an aggregation of feedback and limited depth in insights to student's content processing.

Our approach bridges the gap between students' activities and current lecture content. To observe the learner's processing of lecture content in lecture scenarios, we introduced a system named InterLect (Nicolay, 2015). InterLect consists of two major parts. First, a web-based presentation toolkit for the lecturer that allows a straight forward presentation and sharing of lecture slides in lecture scenarios. Second, a web-based audience client receiving current presented lecture slides. The audience client is built to run on any mobile device or laptop without installation and serves as an annotation interface to current lecture content. Received lecture slides are displayed as scrollable list allowing an easy tracking of lecture content and fast lookup of bygone information. Entered annotations are displayed together with the slides and embody a student's lecture script. To annotate lecture content students can select a slide from the list by taping and perform basal marking processes described in the next paragraphs and discussed in detail in section 3.

To increase the narrative density of a lecture, slides can be highlighted by the use of bookmarks. Bookmarks are intended to serve as anchor, highlighting specific sections of a lecture. Displayed as overlay to the list of shared lecture content, they extend tracking of information with a self-defined overall structure.

To quickly mark content, we implemented a set of binary buttons. These buttons can be edited by the student to define a quick access to a solid set of memorizations into further learning iteration steps "Important for the exam" or "Look into later". Furthermore, these buttons can be used to mark content with conflicts such as "Need examples" or "Missing information".

The system allows the annotation of lecture content with notes. A note consists of plain text and can be extended by the use of hash-tags, denoted by a leading "#"-symbol and references denoted by a leading "@"-symbol. While the plain text allows input of loose information, a key feature is the use of hash-tags to associate content and annotations to distinctive keywords. These keywords are intended to represent associative nodes interconnecting different pieces of lecture information. References can be used to link additional slides to a note or attach external resources using Unified Resource Identifiers (URI).

Shared lecture content as well as performed annotations by the audience are stored using an anonymous user-ID in our database. Besides these observations of processing information in lecture scenarios, the system allows a qualitative interrogation of performed annotations. Therefore an automatically generated questionnaire can be triggered, which asks students for their reason behind specific inputs.

2.2 First Achievements

As part of a first field test, InterLect was used in two lecture series with topics "Empirical Evaluation" and "Cognitive Systems", at the University of Rostock. Both series took one semester. Each of them was regularly visited by 10-15 students. The system was used by students without instructions on handling and purpose. The aim was to resolve technical issues for the evaluation described in this paper as well as to

collect first insights in usability and affordance of the system. Due to the low number of participants, we only collected rough first insights in affordance and usage.

Students showed a very passive utilization of InterLect. At the first lecture of both series the system was introduced as optional tool to receive and annotate lecture slides in order to have a personalized script. In parallel lecture slides have been available via common channels, such as the Universities LMS StudIP (Bohnsack, 2014). Nevertheless, all attending participants to a lecture connected to the system during the lessons to receive and lookup presented slides on their devices. Observations showed, only 2-4 students where actively taking notes during the lessons. All note taking students used InterLect to write and attach their annotations to current lecture content.

A first look into collected notes revealed a primary utilization of free note text and hash-tags. Students did neither bookmark sections of the lecture nor mark content with later processing goals or conflicts. Even though InterLect suggests formerly used hash-tags for reuse and students used semantically similar tags, such as ”measuring”, ”measurement”, and ”measuring-instrument”, we observed students intuitively did not reuse formerly used tags to link different pieces of lecture content to one associative keyword. To verify comprehension and mapping competence of students, exercises where used to enquire students to build mental maps about learned lecture content. All students performed this task successfully.

2.3 Didactical Design

In order to support learning activities by a didactical design we focus on a bottom-up process of planning learning processes to focus on the needs and acceptance of learners. (Sahl, 2015) Those processes should go beyond transfer and documentation of content within a lesson. Our didactical design have to include all activities - from individual works to lessons - and shall adapt to the affordances of any environment relevant to this individual. Bottom-up learning takes place within scenarios of (inter-) action where learners have to apply, reflect and develop their individual skills to solve problems and fulfill tasks. It is based on the individual learning level of a subject, combining formal and informal aspects to a complex behavior and developing dynamically within the scope of needs a learner has and environmental affordances. (Laurillard, 2012)

Against the backdrop of these prerequisites lecture content reception has to be described as an active and generative practice of searching for inter-relations between the situational constraints a learner tries to cope with and material stimuli from a university course or other media of teaching. Reception of lecture content is about building focus and emphasizing areas of interest within given material depending on individual coping with situational affordances. Therefore we have to establish a situational framework (fig. 1) in order to explore how and why students utilize InterLect as a means to run lecture content processing. This framework allows predicting requirements, students have to fulfill within learning tasks. Furthermore it shall describe a unified set of steps, which constitute task-solving processes.

A situational framework of learning is no static entity. According to Activity Theory (Engeström, 2001) (Wansga 2011) (Nouri and Cerratto-Pargman 2015) situated learning takes place where learners run through transformation processes in order to fulfill tasks. These processes, described by Engeström, are accelerated by specifications and contradictions, which arise from coordination between the task and individual abilities of a learner. We plan to apply at least three different, interrelated task sets, which develop from knowledge transfer to knowledge elaboration. These task sets will be featured by different teaching/learning arrangements. In result, transformation processes will be iterated and enhanced at different stages with gradually increasing learner autonomy and responsibility. InterLect will be applied throughout the whole process. Observation and measurement of InterLect usage shall clarify to what extend options like coding, linking and annotation of content support learners to align different modes of content processing with situational constraints they try to cope with.

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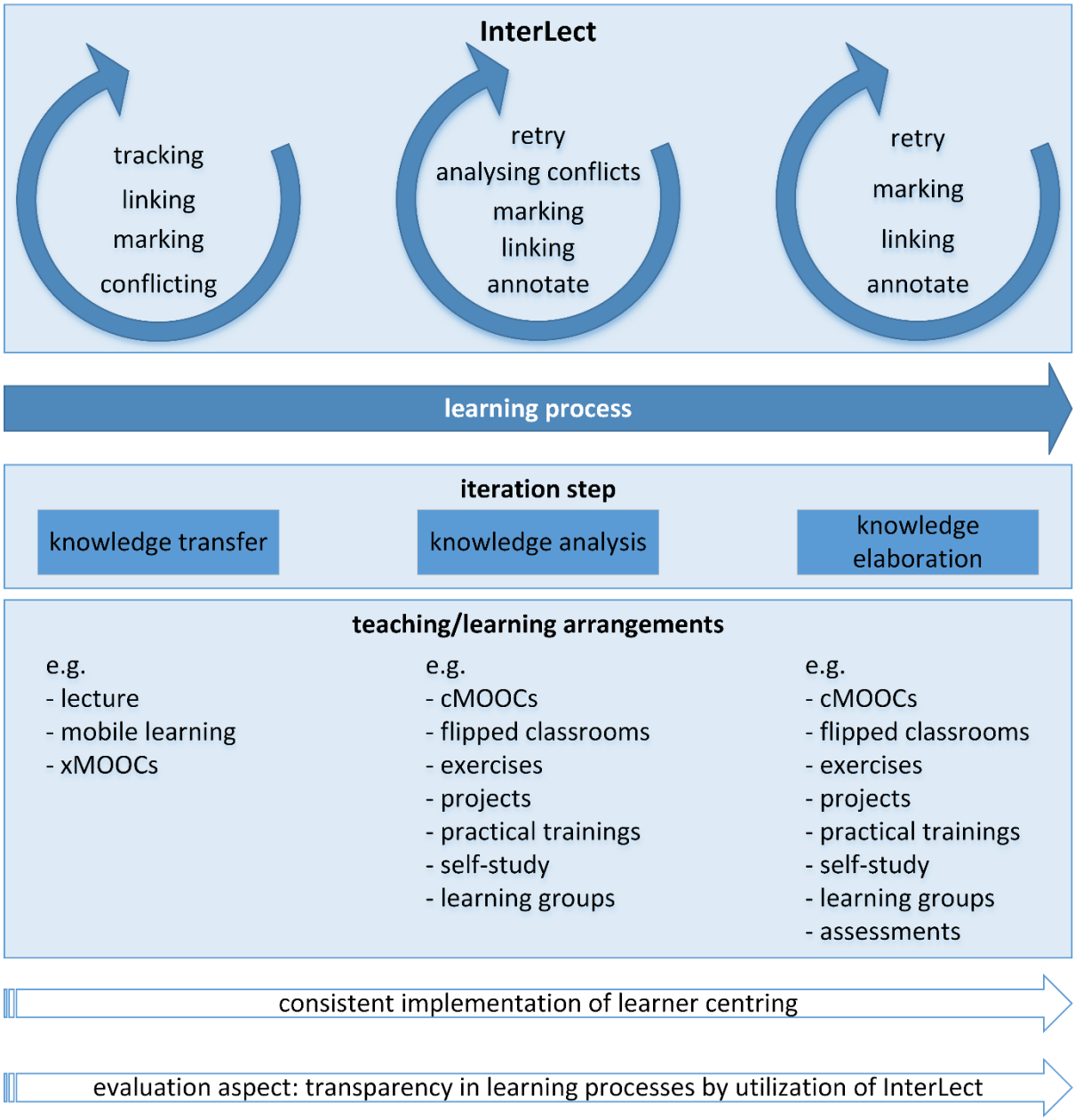

Figure 1. learner-centered application of teaching technologies using the example of InterLect

3. CONCLUSION AND OUTLOOK

First implementation steps proved viability and practicability of InterLect. Analysis of the first experiences revealed decisive benefits that can be expected from a user-content-interface within a learner-centered approach on learning. So far content acquisition relies on situated learning processes, which modify the way, learners adapt their treatment of learning content. A deeper understanding into the way a user-content-interface supports learner activities implies a comprehensive analysis and design of learning processes. Based on activity theory, a didactical framework to implement and evaluate digital support of learner-centered teaching has been developed. That supplies crucial prerequisites to precisely address and observe learning activities within a digitally promoted learning complex.

In the course of the development of InterLect we focus a systematic evaluation of the tool. Basing on the given analysis of the didactical design, we have to develop an evaluation design. For a longitudinal analysis qualitative and quantitative methods have to be considered, to evaluate the acceptance of the tool InterLect. Thereby we also have to focus on the benefits for learners and teachers in using InterLect.

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