AN APP FOR THE CATHEDRAL IN FREIBERG – AN INTERDISCIPLINARY PROJECT SEMINAR

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ABSTRACT

This project seminar aims at creating and evaluating a manual for interdisciplinary projects as part of a learning process. Working together, pedagogies and students from different disciplines assess tools and recommendations for successful collaborations while developing an app for the cathedral in Freiberg.

As part of the project the students gain expertise in project management and are introduced to techniques form other disciplines which complement their work for the app. The results of the project seminar and the manual may be assigned to other interdisciplinary projects.

KEYWORDS

Team Project based Learning, Team Teaching, Cross-disciplinary Learning, Evaluation, Research Seminar, Higher Education

1. PROJECT BASED LEARNING AS LEARNING APPROACH

A major aspect related to a research and presentation of Cultural Heritage objects is their visualisation for the public. Thus media are mostly created within projects by interdisciplinary teams (Münster, 2013). Moreover, a project's success and efficiency highly relies on experience related to both, an application of professional knowledge and interdisciplinary cooperation skills.

While these scenarios are increasingly relevant for a practical work for example in museums, they currently play just a minor role in academic education of historians or media developers. A well introduced approach to acquire competencies to deal with complex and multi-perspective problems via Project based learning (PBL) as "learning by doing", originally introduced by Dewey (Dewey and Dewey, 1915). By definition project based learning is a "student-centered approach in which students determine what they need to learn" in order to solve nontrivial, real-world problems and where "teachers act as facilitators" to foster both problem solving and learning progress (Barrows, 2002). In comparison to other learning designs PBL promises a greater satisfaction and level of engagement of students as well as a higher level of long-term retention of acquired competencies (Strobel and van Barneveld, 2009).

While performed by student work groups as teams during project based learning skills like a cooperative ability, critical reasoning, creative thinking, responsibility, and communication are promoted (Moursund, 2003, Lee and Lim, 2012). PBL is particularly effective when combined with computer technology and introduces students especially from humanities to new tools (Chang and Lee, 2010). Potential problems result for example from a non-equal contribution of team mates to the final outcome and a fair negotiation of individual contributions as well as a high management load and a lack of transparency for teachers about project group activities and social constellations (Lee and Lim, 2012).

2. THE PROJECT

Based on the assumption that skills for interdisciplinary project work which will be highly useful when entering the job market are best acquired within a practical project (Strobel and van Barneveld, 2009), a guide for such projects might encourage more teachers to use them as a practice related educational strategy.

The project seminar is a student project where an app is created within an educational project with the outcome of a manual for interdisciplinary student projects. Supported by the S*axon Centre for Teaching and Learning in Higher Education*, this project seminar is cooperation between the *Institute of Art and Music Studies* and the *Media Center* of the *TU Dresden* as well as the *Chair for German Literature and Medieval Studies* of the *TU Chemnitz*. The project started in April of 2014 with 30 student participants at both bachelor and master level. A final presentation of the results was set for October 2014. Students involved in the project belong to the fields of art history, linguistic and geo science. The students of the humanities research aspects of architecture within the cathedral and its purpose for communication with the community. Visualisations like reconstructions and animations by the geo based students emphasise the results.

The development and observation of the project seminar as a collaboration between students and pedagogies of a variety of disciplines ensures the practical relevance as well as the transferability concerning other interdisciplinary projects. Reflections and explication of methods and results during the seminar are fundamental to ensure the success of the project and the manual as a final outcome.

2.1 Learning Conception

A general learning objective of the project is to support a development of several competencies of learners. While team project based learning on multimedia addresses complex tasks a learning conception and related learning objectives base on clues from various explanation models.

2.1.1 Gain Experience

While knowledge in academic learning mostly focuses on explicit and theoretical knowledge, its practical application in complex scenarios is seldom part of academic education. According to a problem solving process a solution quality highly depends on prior real or imagined experiences of individuals for a certain situation (Tsoukas, 2006) and the availability of extant patterns for a solution (Simon, 1972). Moreover, these schemes highly depend on disciplinary prerequisites and a professional qualification (Goodwin, 1994) and are fundamental for Cognitive Load theory (Collins et al., 1987, Hatcher et al., 1996) as an explanation model for the cognitive processes of learning. Implications for our project are to set learning objectives for gaining practical expertise on application of academic knowledge, performing cross-disciplinary teamwork and applying gained expertise to a certain use case consecutively. Another main challenge for the students is to define an original task, a level of support and required outcomes.

2.1.2 Development of Teamwork-related Competencies

Each part of the cathedral was handled by a single cross-disciplinary student team (1-5 members). Following implications from cognitive load theory during the early stages of cooperation a more intensive guidance and supervision of these groups as well as a predefined schedule are required to reduce cognitive workload affected – beside the former described acquisition of personal competencies - by team-building processes and organisational learning (Wegner, 1986, Argyris and Schön, 1978). Moreover, as suggested by project management a self-organisation of teams has to be monitored continuously (Turner, 1999). Due to these reasons research assistants ensure the dissemination of information, questions and progress between the teachers and student teams. A competent assistant should be available for each discipline involved or required. The high workload of management and monitoring tasks during the project seminar calls for the involvement of assistants (Dunlap, 2005).

2.1.3 Enhance Abilities for Interdisciplinary Communication

Practice based competencies and experience are closely related to implicit knowledge (Polanyi, 1966). A major challenge for team work and interdisciplinary cooperation is the expression and explication of knowledge (Schön, 1983). Another closely related challenge of knowledge transfer processes in cross-disciplinary projects results from differing disciplinary terminologies. While more sophisticated code patterns like language require a synchronisation of individual interpretation and understanding (Wilkes-Gibbs and Clark, 1992) architectural structures as natural (Tversky, 2002), in sense of "everyday experienced" visual media are highly suitable to build a common ground for interdisciplinary communication (Münster et al.). Architecture can support a communication of more abstract and sophisticated concepts like a construction order as a boundary object (Star and Griesemer, 1989).

2.1.4 Enable Competencies to Create Knowledge Media

A transfer of individual and team mental models into multimedia content is challenging in many ways. As highlighted for visual and textual media by Mintzberg and Westley (Mintzberg and Westley, 2010) mental processing for a creation of media highly differs and different media are suitable for different information. While the targeted application can contain various media, competencies for selecting, processing and combining of media need to be developed. Another issue is related to the adjustment of the proposed application for visitors. Due to this process a role switching takes place and student work groups work as designers of learning media proposed to others, anticipating user needs for usability and user experience and instructional design.

2.2 Layout of the Project

Based on implications for structuring a practice-based learning process (Collins et al., 1987) as far as processes of the working world, the seminar follows the typical layout of a project. A basic timetable sets deadlines for different tasks within the project seminar. As the seminars components dedicated to knowledge acquisition and educational instructions, the courses and study trips are designed to fit the projects timetable. Each of the three cooperating partners offers a course for knowledge building in their field of expertise as well as skills in project management. Previously acquired theoretical knowledge is channelled and adapted in order to help solve the assignment. The students heavily influence the courses by pointing out current issues and needs. The final result of the students work is an app for smartphones which provides information on the cathedrals architecture for its visitors. The content and its visualisations for the cathedral app are carried out by teams with students from different fields of study. The student-student interaction fosters and demands an active participation and engagement of each student within the team (Lee and Lim, 2012). With the help of acquired project management skills the students plan and supervise the project's tasks and timetable within the group. Developing a common ground and language, taking on responsibility, supervising and motivating each other are challenges that need to be overcome. The seminar introduces the students to technology-supported PBL (communication tools, research tools, scaffolding tools, project management tools, tele collaboration tools) as well as multimedia technology-assisted PBL (production tools that enable students to organize and present their work through multimedia) (Chang and Lee, 2010). Every student takes over the role as mentor for their own discipline while identifying possibilities other disciplines may provide. Additionally to working on the app, the students are also involved in the creating of the guide for interdisciplinary projects through their feedback. Alternating periods of project work and reflection about the proceedings and their results form a recurring pattern. Four study trips to the cathedral in Freiberg and a public presentation of the app are intended. Every trip focusses on certain tasks or project steps like the introduction of the teams and the research objects, exploration of the object, data acquisition and presentation of the results. During the trips the teachers engage in team teaching in order to encourage multiple perspectives, promote dialogue, increase participation and improve evaluation and feedback (Anderson and Speck, 1998). By definition team teaching involves two or more teachers sharing teaching expertise and engaging in reflective dialogue with each other (Chang and Lee, 2010). The "interactive nature of team teaching may be a potential source of intellectual stimulation and cognitive development for learners as well as faculty" (Hatcher et al., 1996).

2.3 Evaluation and Feedback

A concept for formative evaluation of the seminar was adapted to process and specify the perception of challenges and goals, develop and exam certain provisions and determine the quality and suitability of the teaching concept (Kromrey, 2001). In order to gain insight into the success and acceptance of the seminar, the study trips are accompanied by evaluations to provide "frequent opportunities for formative assessment by both students and teachers" (Barron et al., 1998). Due to the recurring trips, the evaluations are carried out iteratively and in loops. A loop consisted of: perception of challenges, acquisition of information, adjustment of the seminar. Therefore, questionnaires and group discussions are used to ask questions, collect answers, inform about, discuss and evaluate solutions and progress. The group discussions function as qualitative interviews where subjective opinions and individual experiences are taken into account as well as general

directions for all participants and an explorative approach of issues may be distinguished. Comments and feedback by all participants will be considered and turned into recommendations for interdisciplinary student projects relying on team project based learning. A coordination committee consisting of teachers and research assistants collects and prepares the project's results for the adjustment of courses as well as the publication of a manual for interdisciplinary student projects.

3. PRELIMINARY IMPLICATIONS

After currently three of four study trips including questionnaires, group discussions and additional feedback some preliminary implications can be drawn. The projects progress concerning the app as well as the manual has been positively reviewed by all participants. A special appeal is provided by the concept of a research project carried out with a variety of disciplines involved. Thanks to the high degree of individual supervision by the teachers and assistants, the general dedication to the project exceeds the dedication in common seminars by far. The seminar has shown that working in teams is still a novelty to students from humanities. Because of study routines and the focus on research they are used to working alone. Dividing the workload and relying on team mates proved to be a challenge, but the experiences during the project changed their attitude towards team projects positively. Taking over as mentors of their discipline builds up their confidence within the group and helps to face and solve problems collectively. A few recommendations based on student's feedback were already identified. The students note the importance of advertising the project correctly. It needs to be emphasized that it is a research project which differs greatly from common projects concerning the approached and the expected results. Uncertainties about the involvement of all disciplines regarding a time budget and assignments caused reluctance amongst some students. Suggestions for coping with the concern are to keep the involvement of every discipline transparent and include it in the advertising of the seminar. The students agree on the need to have a course where all participants attend apart from the study trips. The course may focus on project management and help the teams set up a basis for communication, time management and a group hierarchy as opposed to dealing with it during the other courses separately. While setting up the concept of the seminar the engagement of the students was underestimated. Advice, tutorials and instructions prepared by students for each other may be promoted and demanded. The app for the cathedrals has proved to be a very nice incentive for the students. Seeing that their work and effort will be put to further use and be appreciated by visitors has increased the student's motivation and builds pressure to excel. The publicly accessibly app may also be a reference for future job applications.

4. CONCLUSION

Focusing on the learning scenario by a perspective of problem solving "making a picture of problems require[s] deeper integration of ideas" and a more intense coordination between team members (Mintzberg and Westley, 2010). Even if visual communication strategies would foster to build a common ground for interdisciplinary communication (Münster et al., 2014) and promote long term retention of learning outcomes, other learning scenarios may ease an entry and accessibility for students. The experiences and knowledge acquired during the project equips the students with a variety of essential skills for a career entry. However, seminar projects require a high degree of supervision and much time to be carried out (Blumenfeld et al., 1991, Barron et al., 1998). Coordination by e.g. research assistants is just as necessary as a well prepared layout of the project. Moreover, it is necessary to focus "on questions or problems that "drive" students to encounter" (Thomas, 2000). Featuring collective purpose as the final result of the project is a very effective way to motivate students and help overcome difficulties by working together.

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