

Student Learning Communities in the Project-Centered Study Program “Problem-Solving Competencies”

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Abstract. The paper gives an overview of the approach to project-centered learning at the University of Augsburg. It outlines the study program “Problem-Solving Competencies”, which integrates self-organized learning communities into the bachelor/master program “Media and Communication”. In addition to the formal curriculum, students can participate in a diversity of projects and use a social software system as a tool for knowledge management within the project groups. Furthermore, this system functions as a means for reflection and helps to assess students’ learning outcomes based on the portfolio method.

Keywords: study program, competency development, community of practice interdisciplinary teamwork, learning projects, digital portfolios

1 Introduction

In times of tightly organized bachelor and master programs introduced during the Bologna Process, it is becoming more and more difficult for students to engage in extra-curricular activities. The modularization of study programs and the ECTS-System have led to a situation that encourages students to concentrate on the fulfillment of formal criteria rather than engage in informal educational scenarios like project-centered learning. In contrast, new technologies in the context of web 2.0 as well as their underlying philosophy of user-participation favor project-oriented activities [1].

This trend is not limited to web technology: working environments in many sectors are changing rapidly making it necessary for students to competently use emerging technologies as well as to exhibit key competencies such as self organization and social competence. Thus organizations are looking for prospective employees who qualify as knowledge workers and who already have collected practical experience in their field of study [2].

To respond to the challenges that the developments outlined above hold for higher education, we try to go beyond traditional forms of learning and teaching. By merging the constraints of educational frameworks set by Bologna with the affordances of web 2.0, we designed a study program “Problem-Solving Competencies” that focuses on project-oriented learning and reflective practice as a method to foster students’ problem-solving competencies.

2 Study Program “Problem-Solving Competencies”

The goal of the study program “Problem-Solving Competencies” is to explore the potentials of digital information and communication technologies for higher education and master the challenges of education in a knowledge-based society by establishing a participatory learning culture.

2.1 Building Blocks and Organization of the Study Program

In the study program problems are understood as situations in which a certain goal is to be reached by overcoming the adversities of a current reality. The learning process starts with a practical problem that students must solve in the course of the program. These problems are, however, not provided by a pre-developed curriculum but arise from practical necessities such as students’ initiatives to improve their own studying environment or cooperations between the Institute for Media and Educational Technology and partners from outside the university (e.g. profit or non-profit organizations). Thus students not only partake in the solution of real-life problems but also develop and communicate their project goals.

The contents and methods of the program vary according to the nature and context of the problem and are usually linked to the student’s major field of study. Students need to cover three complementary building blocks in the course of the program [3]:

- *Practical Problem-Solving.* Besides theoretical content, university courses should offer practical relevance and be oriented towards application. Thus the first building block focuses on practical problem-solving skills. Together with their fellows students co-create media contents or organize events at university or with practice partners. To foster the skills useful in today’s working environments, it is important that the developed problem solutions are used in real life settings and prove applicable in authentic contexts.
- *Social Problem-Solving.* As problem solutions are usually attained in collaboration with others, this building block focuses on the development of social competencies. By taking on different roles within project groups (like developer, manager, coach, etc.) social skills are cultivated and trained in situ. Thus, students experience the process of group formation and learn to deal with challenges like group-think or the leaving expert phenomenon. In addition, project participants learn how to grow from the status of novice to a competent group member.
- *Scientific Problem-Solving.* Since one of universities’ central issues is to provide students with the opportunity to participate in research projects, the third building block is concerned with methodologies of scientific inquiry. Students’ skills to design research studies and to evaluate project prototypes are fostered. Furthermore, their interpretation in the context of a scientific or practical goal is required. Not only doing, but reflecting the consequences of one’s actions is seen as a guiding principle of conscientious scientific practice.

Each building block requires a workload of approximately 180 hours and covers eight credit points. This amounts to cumulatively 540 hours of work which corresponds to a

minor field of study in the bachelor program “Media and Communication”. However, the credit points of the study program “Problem-Solving Competencies” are obtained voluntarily and parallel to the formal curriculum. Each participant finally receives a certificate from the Institute for Media and Education Technologies (imb) in addition to the university degree in media and communication studies, These certificates are drafted individually and contain a short description of the tasks performed in each project. They complement the bachelor or master degree and can be used as a competency profile for job applications and further professional development.

2.2 Attendance in the Program and examples of Project Groups

To attend the study program students either join existing projects that were founded by students in previous semesters or they initiate new projects by themselves. Students founding and managing their own project groups are coached by university teachers. The tasks that are to be attended to in these projects are determined individually with the project manager and must relate to the building blocks described above. The goals of the building blocks can either be covered through participation in several different projects or in one single project, depending on the number and diversity of roles and tasks a student embraces in the project groups. The following table gives an overview of the current projects of the program.

Table 1. List of project groups currently involved in the co-curricular study program¹

Project name	Description
Blickpunkt Campus	Project group that produces semi-annual reports about campus life for a local TV station.
Detektei Suni	Project group that creates radio plays in connection with the Augsburg “Kinderuni” (children’s university) as podcasts.
MuK-Graduates	Project group that organizes graduation ceremonies for the university program “Media and Communication”.
Kanal C	Project group that produces and broadcasts a weekly radio show on a local radio station.
Knowledgebay	Project group that produces audiovisual documentations of educational and scientific lectures, talks or discussions.
LMSnews	Project group that publishes evaluations of learning management systems on a website.
Mediatoren	Project group that solves conflicts between students as well as between students and teachers.
Presstige	Project group that publishes a semi-annual print magazine that covers campus life.
w.e.b. Square	Project group that publishes outstanding students’ theses that deal with e-learning and knowledge management.

Attendees of the study program must fulfill three requirements to receive accreditation: (1) Active participation in the projects is the basic requirement. In addition, students must document their performances in a final report. If the building

¹ <https://imb.phil.uni-augsburg.de/elgg/mod/browser/index.php?display=communities>

blocks were completed in separate project groups the student has to draft one report for each project. If more roles were taken on in one single project, one final report is sufficient. These reports not only serve the purpose of assessment but also as a means of documentation for following students participating in the project. In this sense the reports are a means of knowledge management that record a project group's development over time. The third requirement is that students reflect and share their personal experience made participating in the project groups. Since students self-organize their attendance in the study program, they are also responsible for its accreditation based on a learning portfolio. These portfolios not only serve the project manager or the professors of the study program as a means to assess the participant, but also enable the students to reflect on their acquirement of new skills and competencies themselves (see section 3.2).

3 Using Social Software as a Community Platform

Technologically the study program builds upon a community platform based on social software. This platform supports the participants' communication and supports project groups to self-organize their working and learning processes.

3.1 Community Platform to Support the Project Groups

The community platform enables students to set up a personal page that contains information about themselves (e.g. goals, interests, skills and fields of knowledge). In addition, the platform offers tools for blogging, publishing documents, syndicating content from the web and social networking (see also: <http://elgg.org/>). Supported by a social software system, students can easily launch virtual communities which pursue certain goals and interests. For this purpose students can set up a new community site on the platform which offers information about their project initiative. These community sites allow fellow students to inform themselves about current project activities and enable them to contact and eventually join such project groups. Thus the community platform of the study program has two fields of application:

- *Instrument for Knowledge Management.* The community sites of the platform are mainly used by members of the project groups to organize their work processes. By posting information about ongoing group activities in the community blog or by uploading documents into a shared folder, group members document the results of meetings (e.g. agenda, protocols), plan their course of activities (e.g. hosting workshops, project funding) and exchange experiences concerning achievements and failures of their work (e.g. lessons learned, best practice).
- *Instrument for Personal Reflection.* The members' personal pages on the platform serve as a means to document individual learning experiences and to transform them into knowledge through reflection. Using the platform as a portfolio tool, students can publish the products of their project activities (interviews on radio or

TV, magazine articles etc.) and reflect on those outcomes by embedding them in a coherent story of their learning processes (e.g. via blogposts, microarticles).

The social software platform depicted in figure 1 allows users to choose between different levels of access to the personal and community sites. Students decide for themselves who they share which kinds of information with.



Fig. 1. Social Software Platform to Support the Project Groups within the Study Program

3.2 Blended Assessment based on the Portfolio Method

Besides the application for knowledge management and personal reflection the social software system complements the activities of the students within the projects with portfolio work [4]. By linking the goals, the process and the results of learning via a blended assessment strategy based on the portfolio method, project-oriented learning activities are integrated into the formal curriculum of the bachelor/master program “Media and Communication”. For this integration we adopted an approach proposed by Barrett and Wilkerson [5] that uses portfolios as a multifunctional assessment method which mediates between the facilitation of the learning process (assessment *for* learning) and the evaluation of the learning outcomes (assessment *of* learning). Hence we designed a portfolio process that follows a three-step procedure:

- *Working-Portfolio*. With the Working-Portfolio students collect all materializations of knowledge (even very small artifacts) that accumulate during the learning process. In this phase they document their working experiences within their projects which is a form of reflection-in-action [6]. Weblogs and podcasts are used to reflect experiences in a simple manner that doesn't require systematic

arrangement. In addition the learner can comment on learning “products” such as text documents, drawings and photographs. This “private space” is not intended to start a dialogue with others; it therefore reduces the timidity to articulate oneself (1st person perspective).

- *Story-Portfolio*. With the Story-Portfolio students transform personal experiences into shared knowledge within a project group and arrange the collected materializations of knowledge. In this stage of the portfolio process a personal learning story is constructed presenting a form of reflection-on-action [6]. This contextual embedding forces the learner to reflect more intensively and to structure the individual learning process along meaningful dimensions of a coherent story. The social software system underlying the portfolio tool enables reciprocal commenting of the learning stories. This interconnection of the contents of the learners’ stories builds a “shared space”. The stories thus make personal learning experiences understandable for others and initiate dialogue with a real or fictive counterpart (2nd person perspective).
- *Test-Portfolio*. The Test-Portfolio consists of those materializations of knowledge the students choose to be used as indicators for their achievement of defined learning standards. Building on the previously described portfolio phases, this is not a form of reflection-on-action, but rather a form of reflection-on-reflection [6]. Thus students make reflective decisions about which artifacts should be subject to evaluation through a third person. In this context one leaves the private as well as the shared space and finally enters a “public space” that gives a transparent account of one’s learning process and the resulting learning outcomes (3rd person perspective).

This portfolio approach blends assessment for learning with the assessment of learning as summarized in figure 2.

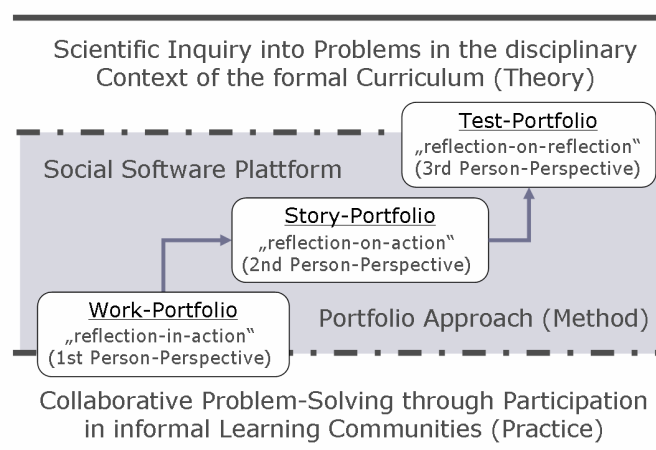


Fig. 2. Portfolio Approach to Integrate Theory and Practice in the Study Program

On the one side the transition point towards the project-centered participation in the informal communities of practice facilitates the assessment for learning, on the other side the transition point towards the formal curriculum of the bachelor/master program “Media and Communication” aims at the assessment of learning.

4 Co-Curricular Structure and Theoretical Foundation

The study program functions as an interface to combine the discipline-oriented learning settings of the formal curriculum with the project-centered learning experiences of students in the informally organized project groups. The design of this interface is based on an experiential learning approach grounded on a pragmatic philosophy of education in the tradition of John Dewey [7]. To root the learning process in experience, Dewey involved students in project work. Furthermore he suggested an educational architecture that describes an ideal learning environment as a two-story building [8]. The educational architecture derived from this metaphor is composed of three complementary types of learning and teaching:

- *Extra-Curricular Organization (Ground Floor)*. On the ground floor it places learning activities that result from the active participation in some kind of practice. This type of learning and teaching focuses on the active participation in a community of practice [9]. Starting from peripheral participation students grow towards the core of those communities, taking on different roles within the project groups and gradually embracing increasing responsibility for its organization (e.g. from novice to leader). Such communities aim at innovation and the generation of new knowledge rather than the dissemination of prevalent knowledge.
- *Curricular Organization (Upper Floor)*. On the upper floor it elevates concrete experiences from the bottom floor into a more abstract, intellectual form of knowledge based on scientific disciplines. This type of learning and teaching is characterized by an educational framework that focuses on the transfer of information from teachers to students. Students are provided with expository knowledge that functions as an advance organizer for their domain of study [10]. It resembles the traditional classroom model of education which largely rests on one-to-many communication (e.g. lectures) and includes other forms of knowledge media (e.g. web sites, films, books).
- *Co-Curricular Organization (Spiral Staircase)*. To move from the bottom to the upper floor it conceives a process of reflective inquiry that is symbolized by a spiral staircase. This type of learning and teaching is grounded in the experiences of students in the project groups and organizes the interplay between action and reflection. Students learn to reflect on action by articulating and sharing experiences. Coached by a teacher who is ahead of the learner in terms of experience and the level of expertise, students learn by reflecting on doing (e.g. designing, writing, counselling). Often it builds on models of apprenticeship [11].

The co-curricular structure of the study program “Problem-Solving Competencies” aims at linking the curricular with the extra-curricular learning activities of students.

This integration is realized through a portfolio approach illustrated in figure 2. The vertical dimension of this underlying educational architecture is also described in the work of Donald Schön:

To move “up”, in this sense, is to move from an activity to reflection *on* that activity; to move “down” is to move from reflection to an action that enacts reflection. The levels of action and reflection in action can be seen as the rungs of a ladder. Climbing up the ladder, one makes what has happened at the rung below into an object of reflection [6].

Schön’s idea of a ladder of reflection is implemented through the study program “Problem-Solving Competencies” by intertwining the abstract conceptualization of the curricular organization with the concrete experiences of the extra-curricular organization via a reflective practicum. If one frames experiential learning as a cyclical process as David Kolb [12] does, the learning process can be described in the following manner: On the one side of the reflective practicum the transition point towards the student’s learning projects emphasises active experimentation and the application of theoretical concepts in practice. On the other side of the reflective practicum the inflection point towards the courses of the bachelor/master program “Media and Communication” promotes the transformation of practical experiences into theories of action and their re-organisation in the systemic structure of the scientific disciplines through reflective observation.

5 Summary and Direction of Future Work

This paper outlined an approach that combines the constraints of Bologna with the affordances of web 2.0. Since it is crucial in today’s working environment to adapt one’s skills to emerging technologies, it should be in the interest of institutions of higher education to enable their students to use these new technologies in the course of their studies despite a formally structured curriculum. Therefore the project-centered study program “Problem-Solving Competencies” at the University of Augsburg aims at educating the students in a way that enables them to master the challenges of their future occupation in connection with their major field of study. It confronts students with real-life problems for which they develop solutions. This problem-solving process is supported by a community platform based on social software. This platform allows the students to document their work experiences and learning processes during the entire study program by using digital portfolios. This innovative learning environment is anchored at the University of Augsburg in the form of co-curricular organization.

Future employers demand that students are literate in the emerging technologies of today’s working environments. They also assume that students possess practical, social, and scientific problem-solving skills needed to successfully compete in the working world. Since students learn how to think and act in a way that is oriented towards solving real world problems in all modules of the study program, all projects have some sort of entrepreneurial character [13]. This inherent nature of the program enriches students’ learning experience by letting them cope with challenges that arise

out of their immediate surroundings at the university. They thereby learn to cope with real-life problems. These acquired, documented and certified skills are of utmost importance for potential employment opportunities. From an institutional perspective of the university, students provide added value through service activities on or off campus [14]. Together with teachers who act as mentors and incubators, participants of the study program co-create innovative forms of learning and teaching. Future generations of students can profit from these experiences.

Open learning environments that are based on real world problems can be very challenging to integrate into institutions of higher education in a sustainable manner [15]. Digital Portfolios provide the means to bridge the gap between the formal curriculum and extra-curricular activities like project work. During the implementation of digital portfolios in the study program “Problem-Solving Competencies” we learned that there are several barriers for the successful integration of new assessment methods in the every day life of students. Although students generally long for more practical engagement in higher education, we face various problems concerning the use of portfolios as an instrument to reflect individual learning experiences. On the one hand these problems seem to stem from a lack in students’ skills and motivation for reflective thinking. On the other hand there are still some organizational structures that highly impact students’ acceptance of innovative learning and teaching approaches [16].

To progress with the successful implementation of project-centered learning scenarios the problems mentioned above need to be addressed on two levels. The first represents the students’ point of view, the second deals with the learning culture in institutions of higher education: For students, traditional assessment (in the form of grades) plays an important role in attaining future job opportunities. They strive for certification and good grades. This is why they expect to learn and be taught in a way that corresponds to the prevalent forms of assessment. For institutions in higher education open learning environments like project-centered learning may be espoused as pedagogical goals, but in practice problem-solving skills and social engagement are hardly assessed by typical forms of standardized performance tests. The problem with the acceptance of open learning scenarios like project-centered learning communities, in our view, is that how we assess strongly influences how students behave. To overcome structural resistance due to inapt assessment methods, we try to foster the engagement of students in innovative educational approaches via digital portfolios. Currently we are working on the development of a theoretical framework of competencies underlying the program and refining the structure of the portfolio tool.

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