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Aspects Of Methodology And Education Psychology In Project-Oriented Studies

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1. Foundations of a project-oriented higher education

What characterises a project orientation in higher education? What is the difference between project-based studies and conventional forms of studies? And which objectives does this approach have? A look into the relevant literature on the concepts: “project-based studies” (SCHMIDTHALS/CORNWALL 1977), “project method” (FREY 1998) or “project work” in universities and schools (cf. VOB/ZIEGEN-SPECK 1999) shows the following: there is no uniform understanding as to the contents and structure of project-oriented forms of teaching and learning.

NORBERT AUTENRIETH speaks of an inflationary utilisation of the term “project”. For example, he says, you will hardly find a school syllabus today which does not demand “project classes”. Savings banks offer awards for well-done projects. The mass media present projects and the people active in them (cf. AUTENRIETH 1996, page 16).

Because of these inaccuracies, for the area of higher education it is necessary to define the concept of “project work” more specifically:

BRIGITTE ECKSTEIN presents four central methods and objectives of project work in universities: Time limitation, groups work, autonomous work by the students and imparting of skills concerning methods and contents.

She writes: “‘Projects‘ are tasks of research and development which are limited in time and with which students, individually or in groups, are introduced to the contents and methods of the subject and to autonomous work” (ECKSTEIN 1978, page 134).

Thus, student work groups usually take on projects in higher education for dealing with them as independently as possible within a limited period of time. In this process, the students are actively supported by the teachers of the respective universities.

CORNWALL and SCHMIDTHALS (1977) distinguish three types of project work, referring to courses of study in natural science. They use the position of the project work in the curriculum as a crucial distinctive criterion.

Type A: Here project work represents the final part of a conventional, subject-related course of study. An essential learning goal consists in the development of an ability to work autonomously in science. In this model, the subject-related knowledge is imparted in lectures, which are followed by conventional laboratory work. Subsequently, the teachers assign topics for project work. In this model, project work hardly amounts to more than 5 to 15 percent of the whole course of study.

Type B: Here working in projects takes place parallel to the conventional systematic courses, and from the beginning of the studies. It is regarded as important here that the task be as realistic as possible, which can be achieved by including industry and the public, for example. Key qualifications, such as communication abilities or problem solving skills, shall be acquired in the project work, in addition to subject-related knowledge.

Type C: According to CORNWALL and SCHMIDTHALS, the name “project-oriented studies” in the proper sense is only correct for this model. Here, the project is regarded as a main element in a course of study. The conventional, subject-related courses are subordinate to the project work, they serve as a support of the project work. Here, the subject-related contents to be learnt are exclusively selected on the basis of the practical and theoretical requirements of the project work. The share of the project work in the whole studies can amount to 50 percent and more. Here, the students are to acquire the specialist knowledge and key qualifications on the basis of real tasks.

2. Methodological aspects. Planning and sequence of a project

For the planning and realisation of a project, Ingo Balderjahn suggest the following concept, referring to the subject of business administration: for working on a project, a realistic problem of current interest should be chosen. This problem should be as close to the future job reality of the students as possible. BALDERJAHN defines four elements to be taken into account during the conception of a project:

- ***Cooperation partners from practice:*** A suitable cooperation partner, for example from industry, should already take part in the definition of the topics for the project. There are two possibilities for this kind of cooperation: 1) The partner from practice supplies issues to be worked on, in agreement with the professor. Or: 2) The professor defines the topics and then agrees the way of working on them with the cooperation partner.
- ***Team work:*** An overall topic should be subdivided into four to five partial problems which are easy to mark off and will be dealt with by the student groups. The team groups have to coordinate the distribution of the partial tasks, respectively.
- ***Research and/or seminar papers:*** Theoretical background knowledge can be acquired by working on research and seminar papers. It is presented by the students in the plenum. Here, the students should always deal with the issues which are required for the practical work in the project.
- ***Project report:*** The solutions developed by the project teams are presented and discussed in the plenum, and they are recorded in a project report. The cooperation partner from practice should be present in the presentation, too.

BALDERJAHN recommends the following sequence for the realisation of a project. After the agreement with the partner from practice and the definition of a project topic, a working programme and a schedule should be elaborated. It is sensible to then compile the literature relevant for the project and to define topics for the research papers. After that, the overall task should be subdivided into four to five partial tasks to be dealt with by the groups, respectively.

The following table shows a survey of the presented aspects:

Concept of a project-oriented course

Elements	Objectives
<ul style="list-style-type: none"> • Partners from practice • Team work by students • Research and seminar papers • Documentation and presentation 	<ul style="list-style-type: none"> • Practically oriented subject-related and methodological competence • Social skills and competence in values
Project planning	
<ul style="list-style-type: none"> • Agreement with the partner from practice • Elaboration of a schedule and working programme • Compilation of the relevant literature • Selection of topics for research papers • Definition of team tasks 	
Project realisation	
<ul style="list-style-type: none"> • Team group work • Papers • Documentation and presentation of the results 	
Project evaluation	

(after BALDERJAHN 1999, page 204)

Please take into consideration that an ideal situation is assumed here. This, for example, applies to the cooperation with a partner from practice. A suitable cooperation partner cannot always be found. And it should be taken into account that this concept was developed for the area of business administration. It has to be modified for other courses of study.

It also becomes clear that project work often has to go hand in hand with a change of the framework conditions in higher education. This includes a slackening of the familiar curricular model. For example, it should be possible to carry out courses in blocks. Working rooms have to be made available for the project groups, as well.

3. Learning in projects

In the following, I would like to examine aspects of education psychology in project-oriented studies. Which advantages does learning in projects offer? Which learning goals do project-oriented forms of studying have?

First of all, quite generally: within the context of project work, interdisciplinary perspectives can be developed and job-related experiences can be made. In project-based studies, students are confronted with practically relevant issues. They learn to transfer theoretical knowledge to concrete tasks.

What does this mean for the quality of learning? In order to illustrate this, I will take a short look into education psychology – of course I can only present a few aspects here.

Project-oriented studies offer psychological advantages with regard to learning and motivation: in a conventional course of study, subject-related contents are usually learnt on the basis of an extrinsic motivation, generated by the examination system.

Hence they are processed and remembered less intensively than those skills the students acquire because they match the current requirements of a given issue. The self-determined way of working in projects leads to an increased motivation of the students. Working independently yields feelings of success. An increased motivation can have a positive effect on the quality of learning.

In other words: project work is based on the autonomous solution of complex problems. And it is this self-determined way of working which usually has a positive effect on the intensity of learning, because longest we remember information which we have acquired and dealt with ourselves in one way or the other. Information we have only absorbed passively, on the other hand, is quickly forgotten. According to the developmental psychologist Jean Piaget, acquiring knowledge is an act of constructing: this means that the individual striving for knowledge acquisition has to work on the “world” and open it up actively, by his or her own efforts (cf. PIAGET 1992).

According to results from education psychology:

- information is registered more intently when it is linked to strong feelings or interest; this means for teaching: it is sensible to make the students develop an attitude of questioning the subject of teaching or to resort to the students’ knowledge of everyday life;
- information is registered more intently when associations of already known facts are stimulated; this means for teaching: it makes sense to resort to the students’ prior knowledge;
- information is registered more intently when you can see its sense. Therefore teaching should try to find realistic, understandable examples or to integrate isolated knowledge into an overall context (cf. ARBEITSGRUPPE

HOCHSCHULDIDAKTISCHE WEITERBILDUNG 1998).

In principle, we can state the following: project-oriented forms of teaching have a positive effect on the quality of the learning achievements, because

- they enable the students to contribute actively with their prior knowledge,
- they enable the students to find solutions themselves and
- they have a connection to practice.

In this form of teaching, lecturers are moderators and partners in the process of learning. They are responsible for the establishment of the corresponding framework conditions. They make an offer (of teaching). The students are responsible for making use of this offer. And they are responsible for their own learning process. For the benefit of effective learning it makes sense to give the students manoeuvring space so that they can work autonomously as often as possible, to motivate them to take on responsibility for themselves. By doing so, the teachers express their appreciation of the students. This has a positive effect on the learning motivation, too.

Appreciation: With regard to appreciation, I would like to present some results from a qualitative study based on interviews with students. These students worked in a project in cooperation with a partner from industry. You can find the results of this study in the last edition of Handbuch Hochschullehre (cf. WÖRNER 2003).

- The practical relevance of the project task enabled the students to accept their work as a “real” one, as a subjectively relevant achievement. This made them take on personal responsibility. They were able to identify with the project as “their” project. And they were motivated to work on the task even if difficulties appeared.

- The students had the impression of being acknowledged as equal partners of interaction by the teachers and by the partners from practice. They felt appreciated because they were entrusted with autonomous work on meaningful tasks.
- These aspects led to an increased self-assurance in the students. The project work enhanced their confidence in their own competence of problem solution.

All told, it became clear that the motivation of the students could be promoted with the project work. They showed a high degree of identification with the assumed project task.

Up to now, I have explained that project-oriented teaching has a positive effect on the quality of learning. Finally I would like to take a more thorough look at the role of the teachers.

4. The role of the teachers

I think that all told it has become clear that many different tasks fall to the teachers in project work. These tasks exceed the function of imparting subject-related knowledge by far. This is related to a profound change of the conventional understanding of the teachers' role.

In addition to the position of those who know, the teachers also assume the role of those who ask and of equal participants in the discourse and coaches. In this context, apart from subject-related competence, teachers also need to possess educational, psychological and social skills. So those lecturers who choose this form of teaching are faced with high requirements. And in many cases, they are insufficiently prepared to meet these requirements. A continuous, accompanying further training and

consultation in higher education methodology is therefore recommendable, as well as a cooperation of the lecturers working with projects. They should exchange information on progresses and problems in project-oriented teaching. Thus, they can handle the growing demands concerning the role of the teacher productively (cf. BURDEWICK 2001).

Lecturers often express scepticism with regard to project-oriented forms of teaching. They fear that these methods decrease the efficiency of knowledge imparting. So it is often held against project work that more information can be handed down during a given period of time with presentations and lectures.

As long as the only aim consists in a reception and (short-term) storage of subject-related knowledge, this assessment might be right. But in order to achieve other teaching goals, such as the ability to learn autonomously, other forms of teaching are required, forms of teaching which enable the students to make their own experience in organising the acquisition of knowledge. This can be reached with a professional, targeted application of project work.

5. Conclusion

In summary, the following are central aspects which define the quality of working in projects:

- Working autonomy
- Practical relevance
- Learning of soft skills
- Cooperation of university and practice

All these are claims which are crucial for a professional work after graduation.
Therefore project work is an effective preparation for a future job.

Furthermore, project work is an excellent opportunity of learning to learn. Here students learn to recognise contexts. They learn to distinguish important and unimportant things, which enables them to react to the requirements in modern societies in a self-assured and flexible way. Against the background of an increasing individualisation, this ability becomes more and more important.

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