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# Self-Regulated Learning in Teacher Education– The Significance of Individual Resources and Learning Behaviour

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## ABSTRACT

Teacher education must ensure that teachers have the prerequisites to meet different demands in their career entry phase. The presented evaluation study of 241 student teachers in their second semester of pre-service education shows that not only highly rated courses have an impact on the learning outcome of student teachers; the intensity with which student teachers use learning opportunities, their competence in learning strategies, learning orientation, and strategies of self-motivation and resilience are crucial for high learning outcomes. Results show, that evaluation of courses focusing only the estimation of the quality of the course, doesn't guarantee for a learning outcome. The intensity of usage by the students and their individual characteristics like beliefs and motives are crucial as well. Results of this study point out, that in evaluation studies it seems to be important, to take several factors factors in account to analyse the effect of education. Additional to the quality of the course, also characteristics of the learners and their intensity in dealing with the demands of the course should be taken in account.

**Keywords:** Self-regulation, teacher education, higher education, learning strategies, learning orientation, beliefs, metacognition, evaluation

## INTRODUCTION

Discussions about optimising teacher pre-service training often focus on one question: How must learning settings be designed to support student teachers in their development of competencies? In the reform NOVA 09 at the Zurich University of Teacher Education, courses were developed in which pedagogical knowledge and subject-specific didactics were combined to build up specific competencies to foster students in their learning processes. This article shows the results of the evaluation of these newly developed courses and points out, which individual characteristics have an impact on high estimates of target achievements.

In this specific courses, students work in various learning settings with a high degree of self-regulation on specific tasks to develop knowledge and acquire competencies. The goals of these courses do not focus only on acquiring factual knowledge – in the terminology of Anderson and Krathwohl (2001), the basic knowledge of each discipline – but they also gain an understanding of processes and situations, apply their acquired knowledge in their actions as teachers, analyse situations and evaluate processes in the context of real classrooms. The knowledge shall also be used to generate

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learning situations for students in primary school and to create a specific learning setting, in which students have to solve problems with teachers assisting them in their learning activities.

After an explanation of the main characteristics of pre-service teacher education in Switzerland, the theoretical framework upon which the study is based on will be explained. This derivations lead to the theoretical model the research questions are located in, in which self-evaluation takes an important part for dealing with requirements of professionalization not only student teachers have to deal with. After the description of the methodological approach used in this study the results were presented. The article closes with a discussion focusing the research questions and findings.

## Teacher Education in Switzerland

*Teacher education* in Switzerland during pre-service phase is composed of periods with classes at university to build up knowledge and reflect experience. In addition, students spend days or weeks at schools, working as teachers or assistant teachers to gain experience. This means that learning is based on deductive and inductive ways. Teachers for primary school graduate with a bachelor's degree, teachers for secondary school with a master's degree. Afterwards, the newly graduated teachers apply for school positions and work as fully responsible teachers, in the same role as experienced teachers. Therefore, it is essential that student teachers not only build up factual knowledge but also conceptual, procedural and metacognitive knowledge. They must be able to understand and apply this knowledge, analyse and evaluate situations and, based on new experiences, generate learning situations for their students. Teacher education in Switzerland is based on knowledge and experience. Linking both of them aims to build up professional competence.

Nevertheless, after the period of teacher pre-service education *beginning teachers* are challenged by new requirements, when the start to work as fully responsible teachers. The complexity of the demands they must simultaneously cope with increases abruptly when they begin as fully responsible teachers (in-service). From the first day on they must manage all the requirements on their own. To deal with this new situation, beginning teachers are forced to enlarge their competencies and adapt their knowledge to the needs of the specific situation (Keller-Schneider, 2010). From the first day on, they are solely responsible for their classes and students. Therefore, teachers in the career entry phase must cope with the requirements as advanced beginners. They must have mastered the phase of novice teachers, and enter school with the competencies of advanced beginners (Dreyfus & Dreyfus, 1986; Berliner, 2001; Neuweg, 2004; Keller-Schneider, 2010).

To manage all the requirements of the first years as fully-responsible teachers, student teachers have to learn in the pre-service period techniques of self-monitoring and self-regulation during the pre-service period of teacher education. They have to get prepared for the requirements of career entry phase. Nobody tells them in this period what to do and how to do it. Therefore, student teachers must shift from inexperienced, supported learning to increasingly self-controlled, self-monitored and self-reinforced learning that prepares them for teaching (Berliner, 2001). The development of competencies continues through learning on the job. The professional knowledge of expert teachers demonstrates a different structure; other connections are used as synergies when dealing with professional requirements (Keller-Schneider, 2010). The knowledge of beginning teachers must be enriched with experience, so they know how to use their knowledge in action, coping with varied demands and challenges.

## Theory base

### Professional knowledge and development of competence

To become capable of teaching, students in pre-service education must acquire knowledge in three different categories, according to distinctions made by Shulman (1986). Teachers need *content knowledge* of the subject matter, *pedagogical knowledge* about development, motivation, and learning and the *pedagogical content knowledge* of teaching classes and of fostering students in domain-

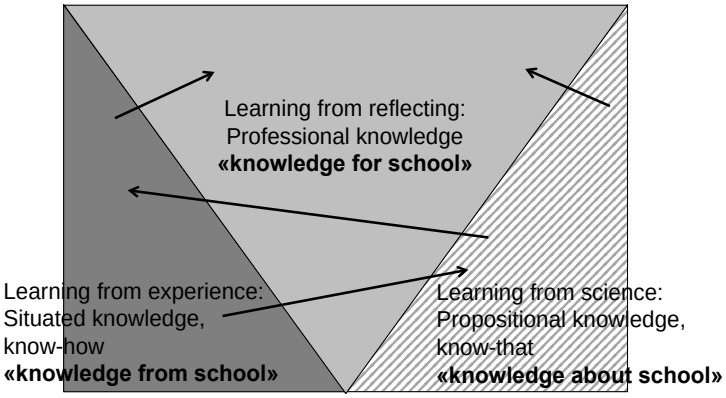


**Figure 1**: Three different types of knowledge – professional development as linking of knowledge about school and knowledge from school to knowledge for school (see Keller-Schneider, 2010, 59).

specific learning processes (Shulman, 1986; Bromme, 1992). Knowledge can be categorised in three different types, by source of origin (see Figure 1).

*Propositional or declarative knowledge*, learned from science, focuses on the 'know about'. In teacher education, this is the knowledge about school itself and its actors and processes. This knowledge is taught at school and, later, in university courses; it comprises a general view of topics and phenomena. According to Neuweg (2011), it can be called objective knowledge or book-related knowledge. But declarative knowledge about school is insufficient for teaching. Student teachers need to develop their *situated knowledge*, or *case knowledge*, through experience as assistant teachers in schools. This enables the teacher to understand how school works. Case knowledge comprises illustrations of special requirements and incidents situated in a context of a real school day. To enable them to manage the requirements of teaching during their career entry phase, student teachers are forced to link declarative and situated knowledge. During their education at the University of Teacher Education, they build up *professional knowledge*, integrated in the logic and structure of their subjective knowledge, concepts and beliefs. Knowledge and experience have to be anchored. If individuals use their experiences as reflective practitioners (Schön, 1983) they gain new insights by enlarging their knowledge and integrating conclusions in this knowledge. By dealing with particular situations, teachers are forced to differentiate and specify their knowledge, and adapt knowledge to the requirements of the situation. As a result, professional knowledge grows. Using both sources of knowledge, student teachers change their concepts of teaching and learning, developing a more professional practice by solving problems in their daily work.

Linking different types of knowledge (see figure 1), so that student teachers become capable of handling situations in a professional way, is the central goal of the teacher education program. During pre-service teacher education, student teachers gain propositional theory-based knowledge as 'knowledge about school' and knowledge acquired by experience as 'knowledge from school'. By reflection, metacognition and cross-linked learning these two approaches are condensed to professional knowledge as 'knowledge for school'. The acquisition of only tacit knowledge should be avoided. This cross-linking should lead to fluid and adaptive competencies, necessary for mastering all demands as beginning teachers. Student teachers have to get competent to deal with the demands of real teacher's live, to get ready for the career entry phase and to go on with learning on the job.

But what does competence mean? Competence is the ability of an individual to handle special demands according to his job or task. Chomsky (1981) describes competence as the necessary prerequisite for a specific activity, which ranges from knowledge about how to act to the ability to master new situations using what has been learned so far. Competence as a potential for coping with demands is visible in a concrete situation but must be distinguished from performance as visible behaviour. Competence as a disposition implies more than performance.

Competence development, according to Chomsky (1981), does not only result from building up content knowledge, pedagogical content knowledge and pedagogical knowledge (Shulman, 1989); propositional knowledge has to be integrated in individual thinking to be relevant to professional performance (Neuweg 2011) and for in complex, high-demand scenarios, as Bloom (1956) and Anderson and Krathwohl (2001) explain. Competencies, motives, goals, beliefs and self-regulation have an impact on the perception of requirements (Baumert & Kunter, 2011). By mastering requirements and reflecting on the experience, beliefs can also change (Keller-Schneider, 2013b), which can lead to altered concepts, changed beliefs and increased knowledge.

Following the stress and resources oriented theoretical approaches of Lazarus and Folkman (1984) and of Hobfoll (1989), demands must be taken as challenges to accelerate the development of competence. Individual resources are significant for mastering requirements (Hobfoll, 1989). Studies by Blömeke (2008) point out that beliefs that align with the goals of a course are better preconditions and lead to higher learning outcomes and than ill-fitting beliefs.

**Perception of demands and learning opportunity**

To illustrate the process of the perception of demands, the model in figure 2 is provided (Keller-Schneider, 2011). The perception of requirements differs by individual, depending on the individual resources like motives, competencies, beliefs and self-regulation. Following the transactional stress theory of Lazarus (Lazarus & Folkman, 1984), requirements are evaluated in a primary appraisal according to their significance for the individual and in a secondary appraisal according to their coping resources. Individual resources as the extent of competence, the shaping of motives, goals, beliefs and self-regulation influence this appraisal. Social and instrumental resources can be called in, if the individual wants to activate them. Depending on the results of this assessment process and available resources, the requirements can be challenging. Working on solutions to cope with this demand leads to greater experience. In dealing with this experience, the individual gains new insights. These cognitions enlarge knowledge and competence to cope with new demands.

If requirements can be handled with routine, no insights will emerge. If coping with the arising demands exceeds the available resources, the individual can reject or avoid this demand or control the situation by selecting new goals (Heckhausen & Schultz, 1995). In both cases, no development will take place. Demands have to fit the individual self-concept of achievement. If they are accepted as a challenge, they lead to experience and new findings – dealing with demands is necessary to progress in one's professional development. Coping with challenging demands is a stressing process that leads to new solutions. Findings must be integrated into existing resources. This process aids in the restructuring of the previous knowledge (Dreyfus & Dreyfus, 1986; Berliner, 2001; Neuweg, 2004). This new framework (marked in figure 2 as an ellipse in grey) makes it possible to see the upcoming requirements in a changed perspective with new accentuations and connections. This claiming process is essential for professional development (Keller-Schneider, 2010, 115).

If demands are perceived as challenges, an intensive processing of requirements results and promotes the development of competencies (Keller-Schneider, 2010). Without getting stressed and strained, learning as a chance of concepts and competences does not take place. But too much stress and strain lead to avoidance rather than a learning process. Demands have to fit the resources of students in order for them to get involved in learning processes (Lazarus & Folkman, 1984; Heckhausen & Schulz, 1995; Deci & Ryan, 2000). Students must feel to be capable of meeting the demands (Jerusalem & Klein Hessling, 2009). Learning situations have to be used in a active claiming way (Lazarus & Folkman, 1984) to accelerate knowledge-acquisition and performance (Fend, 2002; Helmke, 2003).

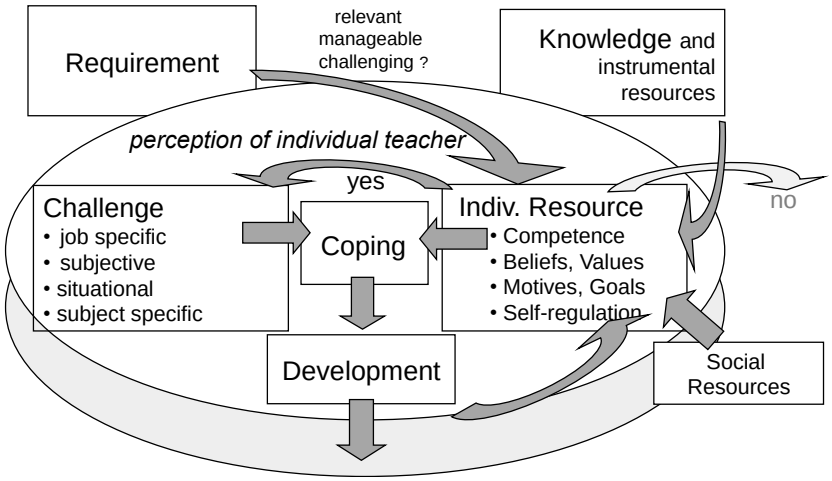


**Figure 2**: Process of the perception of demands of professional development (Keller-Schneider, 2011).

This means that student teachers have to be empowered to cope with demands and to go on in their professional development, solving developmental tasks (Keller-Schneider & Hericks, 2014 in press) of their specific phase of development (Dreyfus & Dreyfus, 1986; Berliner, 2001). They must get involved in their learning to transform their knowledge and beliefs. Development of competencies is a claiming process that leads to a changed framework for the perception of subsequent requirements. Learning effects result from learning situations if they fit with the individual resources to cope with these situations – getting involved in one's own learning process is another precondition for a good learning outcome. The individual shaped process of perception of requirements as challenging tasks is crucial for the learning outcome of the learners (see figure 2). Individual resources are significant for the interpretation of a learning situation. Individual resources shape the interpretation of learning situations during teacher education.

The following model (figure 3) shows a combination of the teaching-related model of the 'opportunity uses model' of Fend (1998) and Helmke (2003) and the model of the 'significance of the individual perception of requirements for professionalization' of Keller-Schneider (2010) (see figure 2). To reach the goals they should, student teachers must make use of the learning opportunities that the professors provide. Student teachers take advantage of their individual resources, meeting the requirements of the tasks that the professors and the learning settings provide. According to the perception-process model at the centre of figure 3, it is crucial that students take up the offer as a challenge and work on the tasks with high commitment and learning-oriented motivation (Pintrich, 2000). In so doing, they are ready and able to deal with the requirements in a way that changes them and develops their knowledge (Keller-Schneider, 2013a).

To foster student teachers in their professional development, it is important to create learning activities that fit their capacity and self-concept, demanding to work on these tasks in a elaborated way. In addition to a high quality of courses, it seems to be important that students show learning-oriented motives and use appropriate learning strategies to reach the relevant goals of the specific course.

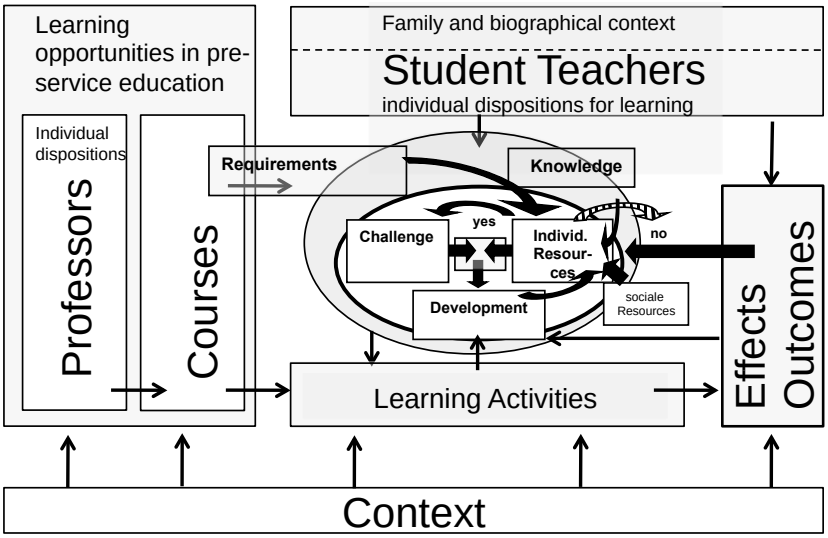


**Figure 3:** Process model of the impact of the learning situation, context, students' resources and the process of perception of demands as a challenge on student learning (Keller-Schneider 2013b, 185).

**The specific learning setting of the course evaluated in this study**

To meet the demands of career entry phase it is important, to use the individual resources. As we derived above not only knowledge and competences are significant for dealing with requirements (Shulman, 1986; Bromme, 1992; Neuweg, 2004; Krauss, 2011). Beliefs (Blömeke et al. 2008), motives (Spinath et al., 2002; Pintrich, 2000), self-efficacy (Jerusalem & Klein Hessling, 2009) and self-regulation (Lazarus & Folkman 1984; Hobfoll, 1989; Schaarscmidt & Fischer, 2003) are significant as well. To challenge student teachers in their professionalization and to foster them to develop their self-regulation and self-monitoring competencies specific courses in teacher education pre-service program were developed. Student teachers have to organise their learning process in groups to acquire basic knowledge and deal with the problem-based tasks. To reach the goals of this specific course, student teachers have to link their propositional and situated knowledge to foster their professional knowledge (see figure 1). In the specific course evaluated by this study, they should acquire the following competencies, according to different levels of goals in the taxonomy of Bloom (1956), revised by Anderson and Krathwohl (2001).

**Competences to be acquired in this course**: Student teachers …

- know specific *learning strategies* and categories of learning strategies
- recognise learning strategies in the learning activities of students
- are ready to get themselves involved in the thinking and learning of students according to their age and phase of development.
- apply their acquired knowledge about learning strategies and processes of students on *monitoring and fostering* them during their learning activities
- know well-fitting *methods* of teaching to foster their students in the development of skills to learn and use learning strategies
- create problem-based learning situations for students, which make it necessary to apply a wide range of learning strategies
- analyse and evaluate their actions as teachers, referring to the learning process and needs of their students

Core topics in the cognitive approach are learning and learning strategies. Concerning skills the student teachers should foster their ability in monitoring students and utilising methods to foster their

development of competencies; the third topic in this course focuses on the readiness of the student teachers to be involved in a fluid and adaptive interaction with students of a certain age.

In order to reach these goals, factual, conceptual, procedural and metacognitive knowledge have to be acquired in deductive and inductive approaches. Student teachers have to deal with theories and book-related knowledge and link it with examples from their experiences. In a second part, student teachers must analyse the actions of teachers monitoring students in their learning activities. They evaluate the effects of teachers acting on the learning behaviour of their students. In the third part, student teachers are asked to create a lesson in which they apply their findings on monitoring children during their learning activities. Finally, they must analyse the teacher – student interactions and evaluate the adequacy of teacher action on student needs.

**Research questions**

The study this article is based on evaluates the learning outcomes of the student teachers during this specific course, presented above. Courses of high quality are important preconditions for high learning outcomes (Hattie, 2009), but they cannot guarantee them (Helmke, 2003). The individual resources of the learners, like motives and goals are crucial as well. Student teachers have to get involved in their learning, perceive tasks as challenges and maintain the commitment to work on them, reflect their findings and restructure their professional knowledge, integrating knowledge, experience and findings. Derived from this theoretical framework, we assume that not only *courses with high quality* lead to high learning outcomes but also that the intensity of *learning activities* of student teachers, their effective use of *learning strategies* and *specific individual resources* have an impact on the extent of the learning outcomes.

According to the theoretical framework, composed in the theory base of the study, this evaluation study focuses on the impact of the quality of the course (1), the investigation and learning commitment of the student teachers (2) and their individual resources to deal with problem-based tasks (3) on their learning outcomes, evaluated by the achievement of the objectives of this course.

The following research questions will be examined (see the corresponding marks in figure 4). They focus on the impact of different factors on the learning outcomes concerning the development of competencies of the student teachers, fostered by this course. According to the relevance of individual resources for the perception of demands and dealing with requirements (see figure 2), the extent of the goal-related learning outcomes of student teachers (see figure 3) are self-assessed. The numbers of the following research questions correspond to the marks in figure 4.

1. What impact has the extent of the assessed quality of this course as a learning opportunity - assessed by the student teachers - on their learning outcomes?
2. What impact does have the use of learning situations and learning strategies of the student teachers on their learning outcomes?
3. What impacts do specific student teachers' individual resources of have on their learning outcomes?

## METHOD

**Design and data collection**

The evaluation was arranged in a pre-post design. This longitudinal study included the period of the second semester for student teachers at the Zurich University of Teacher Education. At the beginning and the end of the spring semester 2012, students were asked in an electronic survey to assess individual characteristics, like specific knowledge (concerning the content of the course), beliefs about learning and teaching, self-efficacy, commitment and resilience. In the post-test, additional evaluation questions were asked to estimate the teaching quality, the learning outcomes, the use of the learning opportunities and learning strategies (evaluation of the course).

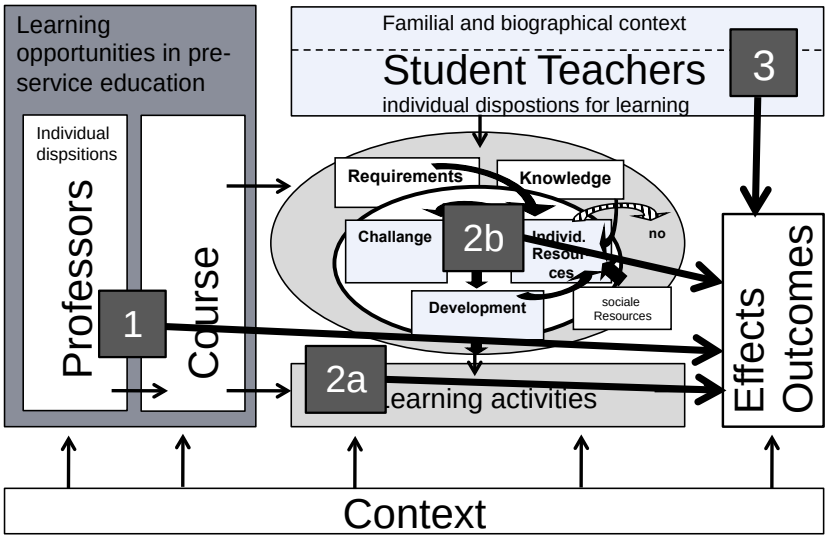


**Figure 4:** Research questions embedded in the theoretical framework of the study.

**Participants/Sample**

All 320 students taking part in the course 'Learning strategies and monitoring students in their learning activities' in their second semester of teacher education were asked to participate in the survey. The response rate of 74.375% led to a sample of 238 students, of which 197 were female, and 41 male. The average age was 22.66 years.

**Instruments**

Several instruments were developed for this study (see more in Keller-Schneider, 2012). Table 1 gives an overview of the instruments.

The *learning outcomes* (as dependent variables to measure the impact of the interacting factors, see 1, 2a, 2b and 3 in figure 4) are measured by ratings of achievement of the seven goals of the course (see above in part 'Competences to be acquired in this course'). The central goals were assed on a rating scale from 1 to 6 (one means very low, six means very high, captured by self-evaluation). These items were introduced by the following question: How well have you reached the goals of this course?

To measure the *quality of the course* as a learning occasion (see 1 in figure 4), several questions were developed concerning the structure of the course, the learning material and the inputs of lecturers in plenary and coaching sessions.

The intensity of *using the different learning settings* of the course, like group work, self-study, plenary sessions and coaching (see 2a in figure 4), was measured on scales from 1 (very little) to 6 (very much). To evaluate the use of *learning strategies* during the process of dealing with the requirements (see 2b in figure 4), an instrument was developed based on the LIST by Wild and Schiefele (1994), adapted to learning strategies suitable for learning conditions at a teacher university, focusing on competencies to be acquired (according to different levels of the taxonomy of Anderson and Krathwohl, 2001). This instrument contains 72 learning activities, corresponding to the learning strategies pointed out in the course. For this analysis, seven scales (with 40 items in total) were utilised.

Individual characteristics as resources for learning (see 3 in figure 4) were collected on various scales: Orientation of student teachers' motivation to learn by SELLMO-Stud of Spinath and Schöne (2002), self-efficacy with the LSW of Schmitz and Schwarzer (2000) and commitment and resilience by a reduced version of the AVEM of Schaarschmidt and Fischer (2003). To get the dimensions of

commitment and resilience (composed of 4 subscales each) the highest loading item of each subscale was included in the questionnaire (four items per dimension).

Table 1 shows the instruments used in this study to analyse the introduced research questions, along with an example item, the inner consistency of the scale (represented by Cronbachs' alpha) and the number of items included. The last column shows the first results: the mean and standard deviation of each scale; see the section "Results" for further commentary.

**Procedure**

To proceed the data the statistic package SPSS is used. *Descriptive analyses* (Frequencies) will explain the mean (m) and standard deviations (sd) of the specific scales. To prove the *reliability* of the scales the inner consistence is tested by Cronbachs' alpha. Results of descriptive statistics will be reported in the order of the ranks of the means. By *regression analysis*, the impact of the following predictors on the learning outcomes will be examined: (1) estimations of the quality of the course, (2) usage of the learning opportunities and learning strategies, (3) individual pre-conditions.

**Table 1:** Instruments used in this study: Scales, Items as example, Conbachs' alpha and number of items, mean (M) and standard deviation (SD).

| | Example of Items | Cronbachs' alpha (Items) | M (SD) |
|---|---|---|---|
| **Learning outcomes**[1] goal-oriented | How well have you reached the goals of this course?<br>You recognise the learning strategies in the actions of students. | .84 (7) | 4.81 (.64) |
| **Quality of the course** [1] | How do you evaluate the quality of the course in serving you to reach your goals? | .85 (4) | 4.44 (.97) |
| **Intensity of use**[2] | | | |
| - Self-study | How much have you contributed to your learning success? | .76 (4) | 4.41 (.75) |
| - Group work | How great was your engagement in pair or group work? | .65 (2)[4] | 4.87 (.73) |
| - Coaching by lecturer | How intensively did you use the counselling by the lecturers? | .68 (2)[4] | 4.10 (.87) |
| **Learning strategies** [2] | | | |
| - Elaboration | I try to find concrete examples of specific learning content. | .81 (6) | 4.20 (.79) |
| - Organisational | I write brief summaries of the most important content. | .84 (6) | 4.28 (1.00) |
| - Rehearsal | I learn rules, terms or formulas by heart. | .81 (6) | 4.08 (.99) |
| - Metacognition | I examine critically whether I'm doing things in a right way. | .86 (6) | 3.41 (.96) |
| - Emotion. Motivate. | If a task is not interesting, I can motivate myself to do it | .90 (6) | 4.35 (.78) |
| - Time managing | nevertheless. | .84 (4) | 3.50 (1.13) |
| - Social Resources | During learning, I keep to a specific schedule.<br>I compare my notes with those of my colleagues. | .85 (6) | 3.88 (.91) |
| **Motivation** [3] | | | |
| - Learning oriented | I'm involved in class because I want to learn new things. | .65 (4) | 4.32 (.45) |
| - Performance oriented | I participate in class to show others what I'm able to do. | .82 (4) | 1.81 (.77) |
| - Avoidance oriented | I want to keep the workload low. | .58 (3) | 1.99 (.65) |
| **Self-oriented belief** [2] | | | |
| - Self-efficacy | I can always solve difficult problems when I try. | .78 (5) | 4.5 (.61) |
| **Self-regulation** [2] | | | |
| - Commitment | Regarding my professional development, I consider myself ambitious. | .73 (4) | 4.50 (.72) |
| - Resilience | After work I can relax easily. | .61 (4) | 4.19 (.70) |

[1] 1=very low … 6=very high; [2] 1=very little … 6=very much; [3] 1=very little… 5=very much; [4] this scale with only two items does not fulfil the requirements of a reliable scale

# RESULTS

## Results of descriptive analysis

As shown in Table 1, student teachers estimate their *learning outcomes* from this course as quite high, with a mean of 4.8 and a standard deviation of .64. Their average estimations, including standard deviation, are in the upper part of the scale. This means that more than 2/3 of all students believe that they have learned quite a lot in this course.

Student teachers estimated the *quality of the course* at 4.4 (m) on a Likert scale from 1 to 6. This is quite high, but the rather large standard deviation (sd) of .97 indicates dissent. Nevertheless, at least two parts of the rating are on the upper part of the scale, showing satisfaction with the quality of the course. As a result, the quality of this course can be judged to be quite high.

The values concerning the intensity of the *use of the different learning settings* shows that the intensity in group work shows the highest mean (m/sd=4.87/.73). The mean of intensity of using self-learning settings follows at second rank (m/sd=4.41/.75), while the mean on the third rank (m/sd=4.1/.87) is taken by the learning setting conducted by the lecturer. The standard deviations show inter-individual differences in preference.

The frequencies of the use of specific *learning strategies* are quite different. The most frequently used strategy is the emotional strategy of self-motivation (m/sd=4.35/.78), followed by organisational (m/sd=4.28/1.00), elaboration (m/sd=4.20/.79) and rehearsal strategies (m/sd=4.08/.91). Using social resources (m/sd=3.88/.91), time-management (mean 3.50, SD 1.13) and metacognition (m/sd=3.41/.96) follow on the last ranks. The large standard deviations show that there are differences between the students' learning habits. On the whole, strategies for time management, metacognition and social resources are used less often than strategies of elaboration, organisation and rehearsal. The high mark of using self-motivation shows that students are able to regulate their working process even when they have to force themselves to do so. Furthermore, even when they have to motivate themselves to deal with the tasks of the course with a low use of social resources, they prefer to collaborate in groups.

Results about *learning motivation* as an individual resource show that student teachers in pre-service education are learning-oriented (m/sd=4.35/.45); learning-orientation shows the highest mean. Performance-orientation (m/sd=1.81/.77) and avoidance-orientation (m/sd=1.99/.65) are much less pronounced. It can be concluded that students deal with requirements in a way that fosters their understanding of the topic to reach the goals of the course. Learning in the way of a deep understanding seems to be the leading orientation of the student teachers – a helpful precondition for becoming professional.

The average value of the *self-efficacy* of these student teachers is quite high (m/sd=4.5/.61), but it corresponds to the same values from the group of students, joining the course one year prior (Keller-Schneider, 2012: m/sd=4.57/.61). Also, the values of *commitment* (m/sd=4.50/.72) and *resilience* (m/sd=4.19/.70) are quite high, but the rather large standard deviations show that less favourable combinations of individual resources can occur.

*Summary*: On average, student teachers in this course estimate their learning outcomes and the quality of the course as quite high. They use different learning settings quite intensively – the large standard deviations show differing individual preferences. The frequencies of use of specific learning strategies show large differences – it seems that the repertoire of learning strategies and competencies varies among the student teachers. Self-efficacy, commitment and resilience seem to be helpful preconditions to meet the requirements of this course, as evaluated by this study.

**Effect on learning outcomes**

Following the theoretical framework (figure 4), the impact of the estimations of the quality of the course on the learning outcomes will be examined in the first model (M1). The impact of the intensity of the use of learning settings and the frequency of learning strategies will be tested in the second model (M2). Model 3 (M3) shows the impact of individual factors on learning outcomes. In Model 4 (M4), all components together will be inserted in the regression analysis to examine their impact (see Table 2).

The quality of the course in *Model 1*, rated by the student teachers, shows a standardised Beta-effect of .24, but it explains only 5.5% of the variance of the learning outcomes. The quality of the course was estimated to be quite high with rather little standard deviation.

The intensity of the use of different learning settings and learning strategies (*Model 2*) explains 38% of the variance. How student teachers deal with learning settings and learning strategies seems to be more important than the quality of the course, under the precondition that the course is considered to be good. Using available coaching from the lecturer has a significant impact on the learning outcomes. Student teachers who took advantage of this opportunity showed better outcomes than other students.

Strategies of elaboration, organisation and self-motivation have a positive impact on the learning outcomes; strategies of time management show a negative impact. Students who use strategies of elaboration, organisation and self-motivation frequently show higher values for reaching the goals of

**Table 2:** Effects of factors of learning on the learning outcomes (standardised Beta-coefficients, declared variance and F-Value of each regression model, method enter).

| Model | **M1** | **M2** | **M3** | **M4** |
|---|---|---|---|---|
| **Quality of the course** | .24* | | | .09 |
| **Intensity of use different settings** | | | | |
| - Self-study | | .11 | | .08 |
| - Group work | | .07 | | .04 |
| - Coaching by lecturer | | .29*** | | .22** |
| **Learning strategies** (frequency of use) | | | | |
| - Elaboration | | .21** | | .18* |
| - Organisational | | .15* | | .18** |
| - Rehearsal | | -.03 | | -.01 |
| - Metacognition | | .02 | | -.03 |
| - Emotion. Motivation | | .19** | | .08 |
| - Time management | | -.20** | | -.17** |
| - Social Resources | | .07 | | .05 |
| **Motivation** | | | | |
| - Learning oriented | | | .23*** | .14* |
| - Performance oriented | | | .01 | .01 |
| - Avoidance oriented | | | -.13 | -.05 |
| **Self-oriented belief** | | | | |
| - Self-efficacy | | | .23** | .09 |
| **Self-regulation** | | | | |
| - Commitment | | | .12 | -.01 |
| - Resilience | | | .16* | .13* |
| $\mathbf{r^2}$(explained variance) | 5.5% | 38% | 24% | 46% |
| **F-value** | 13.91*** | 11.08*** | 11.15*** | 8.18*** |

the course. Time management, in the sense of limitation of the time to spend on a task, leads to lower values concerning outcomes. To reach the highly complex goals required in this course, it seems to be crucial that students take time to elaborate and understand the material and to get themselves involved by analysing and evaluating the experience, applying knowledge and reflecting findings.

All characteristics of individual resources examined in this study contribute to the explained variance of 24% (*Model 3*). Learning orientation and self-efficacy impact the learning outcomes most, followed by resilience. Student teachers are obliged to perceive their tasks as demands, get involved and restructure their knowledge, competencies and beliefs.

If all predictors are inserted together (see *Model 4*), the variance of 46% for the learning outcomes can be explained. The intensity of the use of lecturer coaching, meeting the requirements of the tasks and applying the learning strategies of elaboration and organisation show significant effects. In addition, the use of time-management has a negative impact on learning outcomes. It seems to be crucial to work on tasks until a deep understanding is reached. Individual resources, like learning orientation and resilience, contribute significantly to the degree of realisation of the learning outcomes. The effect of the high quality of the course and high self-efficacy can be explained by learning orientation and useful learning strategies, such as elaboration and organisation, and the lack of time-management.

## DISCUSSION

Following the research questions the results will be discussed.

1) The extent of the assessed quality of the course has an impact on the self-assessed learning outcomes of the students. According to the findings of Hattie (2009) and the opportunity-use-model of Helmke (2003) the quality of the course has an impact on the learning outcomes of the students. But a high-qualified learning opportunity can't guarantee the learning outcomes. The effect identified in this study is only a little one. 5.5% of the variance of the self-estimated learning outcomes is explained by the quality of the learning setting of the course, assessed by the extend of goal reaching by self-evaluation. Other predictors are important as well.

2) The use of learning strategies and the intensity of the use of different learning settings show higher effects. They explain nearly 40% of the variance of the self-estimated learning outcomes. The intensity of the usage of the different learning-settings and the way to deal with demands have an impact on the learning outcomes. The use of learning possibilities has an influence on the extent of the learning outcomes, as Helmke (2003) proclaimed.

3) Individual resources, specially learning-oriented motives, self-efficacy and resilience are decisive for the self-estimated learning outcomes. Learning-orientation corresponds to the aims of the course – according to Blömeke et al. (2008) a helpful precondition for dealing with the demands – and shows effects on self-estimated learning outcomes (Pintrich, 2000). High self-efficacy is a helpful resource to meet requirements (Jerusalem & Klein-Hessling, 2009; Deci & Ryan, 2000). Resilience is an important individual resource to deal with demands (Lazarus & Folkman, 1984; Hobfoll, 1989).

All factors together – the quality of the learning situation, the intensity of dealing with demands and individual preconditions – explain a variance of 46% of the self-estimated learning outcomes. Learning opportunities, their usage and individual characteristics as learning-orientation and resilience contribute to a high learning outcome in learning situations, demanding high self-regulation and a high commitment to reach the goals. These results confirm the theoretical model of the significance of the use of learning situations by individually shaped characteristics, focusing on dealing with the demands in a serious way.

## CONCLUSION

The *high quality of courses* in teacher education is an important precondition for learning, but it is not sufficient to guarantee the learning outcomes of the student teachers. Reasonable and demanding

tasks requiring an intensive process, as well as specific *learning behaviour* and learning-oriented *motivation*, contribute to the learning outcomes. Individual factors contribute to a higher extent to the explained variance of the learning outcomes.

In learning settings requiring self-regulation competencies, the *intensity* of the use of learning opportunities is significant. *Frequently* used learning strategies of elaboration, organisation and self-motivation are essential to reach goals on higher levels of complexity like analysing and evaluating situations and taking into account the acquired knowledge. It is also important that requirements are perceived as challenges, and that high learning-oriented motivation and strong resilience are present. Strategies of time-management are not helpful to reach goals on a complex level (see the taxonomy of Bloom, 1956, or Anderson & Krathwohl 2001); these strategies are contra-indicant.

The results show a very weak effect from the quality of the specific course. The intensity of using learning settings and frequently used learning strategies, as well as learning-oriented motivation and resilience to overcome obstacles are crucial for learning outcomes, measured by goals of high complexity. This result shows the effectiveness of the student is largely what makes a learning opportunity profitable. In teacher education learning outcomes are not only dependent on the quality of a course but also on the intensity of its use by the student teachers.

**Limitations**

In this study, the findings of effects on learning outcomes are only valid when the quality of the course is estimated to be quite high by a significant number of the participants (narrow standard deviation of the estimations). In further studies, the effect of a low-qualified course – or a course with debated quality – on learning outcomes ought to be examined.

**Further research**

The large standard-deviation for the use of different learning settings and learning strategies raises the question: Can different types of learning settings and strategies to foster personal competence development be identified? In addition, it would be interesting to examine whether these types differ in their learning behaviour and strategies and whether individual resources have different impacts. Favourable factors and combinations of factors could be identified and lead to findings relevant for monitoring student teachers in their learning activities.

This evaluation study focused on a learning setting with complex goals. Students are seen as active learners, with the ability to understand the learning material and apply the acquired knowledge to analyse, evaluate and create learning scenarios. Further studies on the effect of courses, based on instruction-oriented learning, could give a differentiated view on the significance of the quality of learning settings.

## REFERENCES

Anderson, L.W. & Krathwohl, D.R. (eds.) (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

Baumert, J. & Kunter, M. (2011). Das Kompetenzmodell von COACTIV. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss & M. Neubrand (Hrsg.). Professionelle Kompetenz von Lehrkräften. Ergebnisse des Forschungsprogramms COACTIV (p. 29 – 54). Münster: Waxmann.

Berliner, D.C. (2001). Learning about und Learning from Expert Teachers. International Journal of Education Research, 34, 463 - 482.

Blömeke, S., Kaiser, G. & Lehmann, R. (2008). Professionelle Kompetenz angehender Lehrerinnen und Lehrer. Münster: Waxmann.

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H. & Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York: David McKay Company.

Bromme, R. (1992). Der Lehrer als Experte. Zur Psychologie des professionellen Wissens. Bern: Huber.

Chomsky, N. (1980). Rules and Representations. Columbia University Press.

Deci, E.L. & Ryan, R.M. (2000). The "what" and "why" of goal pursuits: Human needs and self determination perspective. Psychological Inquiry, 11, 227-268.

Dreyfus, H. & Dreyfus, S. (1986). Mind over machine. The Power of Human Intuition an d Expertise in the Era of the Computer. New York: The Free press.

Fend, H. (1998). Qualität im Bildungswesen. Schulforschung zu Systembedingungen, Schulprofilen und Lehrerleistung. Weinheim: Juventa.

Fend, H. (2002): Mikro- und Makrofaktoren eines Angebots-Nutzungsmodells von Schulleistungen. Zum Stellenwert der Pädagogischen Psychologie bei der Erklärung von Schulleistungsunterschieden verschiedener Länder. In Zeitschrift für Pädagogische Psychologie, 16 (3/4), 141-149.

Heckhausen, J. & Schulz, R. (1995). A Life-Span Theory of Control. Psychological Review 1995, Vol. 102, No 2, 284-304.

Helmke, A. (2003). Unterrichtsqualität erfassen, bewerten, verbessern. Seelze: Kallmeyersche Verlagsbuchhandlung.

Hattie, J. (2009). Visible learning. A synthesis of over 800 meta-analysises relating to achievement. Oxon: Routledge.

Jerusalem, M. & Klein Hessling, J. (2009). Mental health promotion in schools by strengthen-ing self-efficacy. Health Education 109 (4), 329-341.

Lazarus, R.S. & Folkman, S. (1984). Stress, Apprailsal and coping. New York: Springer.

Hobfoll, S.E. (1989). Conservation of ressources. A new attempt at conceptualizing stress. American Psychologist, 44, 513-524.

Keller-Schneider, M. (2010). Entwicklungsaufgaben im Berufseinstieg von Lehrpersonen. Beanspruchung durch berufliche Herausforderungen im Zusammenhang mit Kontext- und Persönlichkeitsmerkmalen. Münster: Waxmann.

Keller-Schneider, M. (2011). Die Bedeutung von Berufswahlmotiven von Lehrpersonen in der Bewältigung beruflicher Anforderungen in der Berufseingangsphase. Lehrerbildung auf dem Prüfstand, 4 (2), 157-185.

Keller-Schneider, M. (2012). Lernstrategien lehren lernen. Lernertrag im Studium und mitwirkende Faktoren – eine Begleitstudie zum Lernfeld «Lernstrategien und Lernprozessbegleitung». Zürich: Pädagogische Hochschule. http://www.phzh.ch/personen/m.keller-schneider

Keller-Schneider, M. (2013a). Selbstgesteuertes Lernen an der Hochschule – Kompetenzentwicklung und die Bedeutung von individuellen Merkmalen der Studierenden. In A. Gehrmann, B. Kranz, S. Pelzmann und A. Reinartz (Hrsg.). Formation und Transformation der Lehrerbildung. Entwicklungstrends und Forschungsbefunde (p. 189-205). Klinkhardt.

Keller-Schneider, M. (2013b). Schülerbezogene Überzeugungen von Studierenden der Lehrerbildung und deren Veränderung im Rahmen einer Lehrveranstaltung. Lehrerbildung auf dem Prüfstand, 6 (2), 178-213.

Keller-Schneider, M. & Hericks, U. (2014 in press). Forschungen zum Berufseinstieg. Übergang von der Ausbildung in den Beruf. In: E. Terhart, H. Bennewitz & M. Rothland. Handbuch der Forschung zum Lehrerberuf, Münster: Waxmann.

Krauss, S. (2011). Das Experten-Paradigma in der Forschung zum Lehrerberuf. In: E.Terhart, H. Bennewitz & M. Rothland (Hrsg.). Handbuch der Foschung zum Lehrerberuf, p. 171-191. Münster: Waxmann.

Neuweg, G.H. (2004). Könnerschaft und implizites Wissen. Zur lehr- und lerntheoretischen Bedeutung der Erkenntnis- und Wissenstheorie Michael Polanyis. Münster/New York/München/Berlin: Waxmann.

Neuweg, G.H. (2011). Das Wissen der Wissensvermittler. In E. Terhart, H. Bennewitz & M. Rothland. Handbuch der Forschung zum Lehrerberuf (p. 451-477). Münster: Waxmann.

Pintrich , P. R. (2000). Multiple goal, multiple pathways: The role of goal orientation in learning and achievement. Journal of Educational Psychology, 92, 544-555.

Schön, D.A. (1983). The reflective practitioner. How professionals think in action. New York: Basic Books.

Schaarschmidt, U. & Fischer, A. (2003). Arbeitsbezogenes Verhaltens- und Erlebensmuster (AVEM). 2. überarbeitete und erweiterte Auflage. Frankfurt a.M.: Swets Test Services.

Schmitz, G.& Schwarzer, R. (2000). Selbstwirksamkeitserwartung von Lehrern (LSW): Längsschnittbefunde mit einem neuen Instrument. In Pädagogische Psychologie 14 (1), 12-25.

Shulman, L.S. (1986). Those who understand: Knowledge grows in teaching. In Educational Researcher, Vol. 15, No. 2, 4-14.

Spinath, B., Stiensmeier-Pelster, J., Schöne, C. & Dickhäuser, O. (2002): Die Skalen zur Erfassung von Lern- und Leistungsmotivation (SELLMO). Göttingen: Hogrefe.

Wild, K.-P. & Schiefele, U. (1994). Lernstrategien im Studium. Ergebnisse zur Faktorenstruktur und Reliabilität eines neuen Fragebogens. Zeitschrift für Differentielle und Diagnostische Psychologie, 15, 185-200.

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