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DEVELOPMENT OF SYSTEMS FOR VOCATIONAL TEACHER QUALIFICATION IMPROVEMENT

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Teacher training for vocational schools in Germany

– Structures, Problems, Perspectives –

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1 Preface

To assess the current situation and the developmental perspectives of teacher training, it seems appropriate to briefly review its history. We can draw conclusions on the macro-level and, to a limited extent, on the meso-level; on the basis of empirical studies, partial conclusions about the present situation can also be drawn.

Because the educational system in Germany has traditionally been the domain of the federal states, different training models have developed that cannot be described here individually. Instead, in section 2 we will sketch out the overarching structures that are commonly found in all federal states. Because of this only the macro and meso level will be considered. The training at the University of Stuttgart, for which relatively complete evaluation studies are available, will be explored in more detail in section 3; here the focus will be on the meso and micro level. Section 4 will shortly present problems of teacher training for vocational schools in Germany and will conclude with an outlook on future needs related to the tutors' training.

2 Vocational teacher education in Germany

2.1. Historical development (macro level)

The institutionalisation of teacher training for vocational schools¹ is closely connected with the institutionalisation of the vocational schools themselves. The first training programmes developed specifically for vocational schools appeared in the mid-19th century. The institutional responsibility changed hands relatively often in the 19th and 20th centuries, between the universities and lower-ranked training facilities. The causes of this 30-year cycle were: (1) problems satisfying the demand for teaching staff; (2) the assumption, on the one hand, that lower-ranked training facilities could provide more “practical” training, versus the conviction, on the other hand, that also these teaching staff required an academic education; (3) the efforts of teacher staff at vocational schools to be treated equally with grammar school² teachers, and; (4) financial considerations.

¹ E.g. in Karlsruhe

² Teachers who work at schools which qualify for a study at the university.

While the teachers for commercial vocational schools were trained at universities or equally-ranked colleges/academies from the 1920's (see Sommer 1992), the training of industrial-technical teaching staff continued to be subjected to the institutional merry-go-round. This area was also assigned to the universities in the 1920's, but by the mid-30's the Nazi-ideology led to a renewed de-ranking, in the form of a seminar-based, strongly practice-oriented education.

In the 1960's and 1970's, with teacher training plagued by a dearth of teaching staff and the advancing process of industries becoming more scientific, teacher education was shifted back to the universities. The universities, however, saw their role primarily in teaching specialist (academic) knowledge, which led to the establishment of a practical education subsequent to the university education; the so-called second training stage. This basic structure has remained to this day, and has not been put into question, though the change-over to the Bachelor/Master system brings with it a greater emphasis on subject-specific didactics at the universities. The first training stage takes place at the universities. The 9-semester course provides the academic background in at least two subjects and is complemented by studies of vocational and economic education. The following training stage, *Vorbereitungsdienst* (preparatory service), is located at so-called *Studienseminaren* (the institutions responsible for the second stage), takes 1.5-2 years and concludes with a state examination. The first training stage also ends in a state exam, sometimes in parallel with a diploma. Despite this fundamental structure, the federal states have developed in part distinctly different educational models. These differ primarily in regards to the importance placed on pedagogical-didactical education, and a more or less school-specific subject-specific education. As part of the change-over to the Bachelor and Master courses, which is expected to be completed by 2009/10, all signs point to even greater heterogeneity.

2.2. Current standard models of teacher training for vocational schools (meso level)

Conditional structure

As already mentioned, German vocational teacher education in its basic form is divided into two stages. The first training stage, which takes place at the universities, is structured into three parts. It consists of a major subject (e.g. electrical

engineering, mechanical engineering, civil engineering, computer science, business science), a compulsory optional subject (e.g. German, English Studies, politics, sport, physics, chemistry, mathematics, religion) and vocational education. Subject-specific didactical studies, varying in scope depending on the region, as well as work placements at schools and businesses round off the 9-semester course. The 18 to 24 months of the second stage, the so-called *Vorbereitungsdienst* (preparatory service), takes place at the aforementioned *Studienseminaren* where theory and practical application are combined in order to advance the teaching competencies of the future teachers. Seminars, as well as individual guidance and training, support them in acquiring the skills necessary to teach independently at the high level required.

Lateral entry to the preparatory service for the teaching profession is possible in subjects with a teacher shortage. It enables engineers, for example, to start working directly as regular teachers, whilst being pedagogically trained in parallel by the *Studienseminar* for about two years. Universities normally do not participate in this model.

Some federal states, such as Baden-Württemberg and North Rhine-Westphalia, have re-established vocational teacher education with the participation of the *Fachhochschulen* (universities of applied sciences). However, that education model is not common, for which reason the following concentrates on the education at the universities.

Ideally, one can separate the standard models into two classes: the “Teacher Model” and the “Engineer Model” (see Nickolaus 1996). The Teacher Model, developed, for example, in Hamburg in the 1960’s, is characterised by having:

- relatively comprehensive course offerings with specialised knowledge oriented at specific teaching positions
- a relatively large range of pedagogical and didactical studies.

The central characteristics of the Engineer Model, which is used in, for example, Baden-Württemberg – and therewith also Stuttgart – are, on the other hand:

- specialised knowledge shared with the engineering faculty and other related disciplines
- a smaller range of pedagogical and didactical studies.

In reality, *mixed models* can also be identified, which offer – for example – a small range of specialised courses tailored to the content requirements of a particular teaching position.

There have been no empirical studies suitable to identify the effects of the different variants on the competencies of the teaching students. A study on the effect of different forms of education on the didactical competence of mathematics teachers, however, did show that a thorough infusion of specialist knowledge promotes the acquisition of didactical skills. Thus university-educated teaching students who complete their mathematical studies together with the mathematicians studying for a diploma perform better, both in terms of specialist knowledge and didactical skills, than teaching students who complete their specialist courses in a teaching-student-specific form (Baumert et al. 2007). Where the specialist knowledge is the same, however, the advantage of didactic studies can be seen.

Also the range of school placements and work placements during a course varies between the federal states, depending on the model used (Engineer or Teacher Model), sometimes significantly so. In Baden-Württemberg (Engineer Model), and therefore also here in Stuttgart, the students complete a two-week-long school placement during their basic studies. This has the primary function of familiarisation with the future working environment and reflection of the students' own study choices. This work placement is accompanied by preparatory and follow-up sessions, intended to foster a systematic, theory-based investigation of and reflection about the experience. In the main study period, a second two-week-long school placement occurs under university supervision, allowing the students to gather first-hand teaching experience. For this placement, too, there are preparatory and follow-up sessions. As a general rule, the students will have taken the didactic classes before the second placement. Since the shortening of the second training period from 2 to 1.5 years, which occurred in some of the federal states in 1998, the school placements in the main study period have been extended by 6 weeks. These are overseen by the *Studienseminar*. Typical for both basic models (Engineer or

Teacher Model) is that teaching qualifications are earned in two areas (e.g. electrical engineering and German, or mechanical engineering and mathematics, etc.). The potential fields of activity (see Figure 1) are very broad, and range from job preparation for youths with special coaching needs, to teaching at vocational schools, which are visited 8-12 hours a week next to the on-the-job training in the dual education system, through to teaching at schools training technicians or master craftsmen.

Figure 1: The fields of activity of teachers at vocational schools (selection)

School Type	Specific Teacher Requirements
Prevocational training year	Helping weaker students; educational tasks
Vocational School (so-called <i>Berufsschule</i>)	Teaching professional skills (e.g. electrical engineering) and general academic content (e.g. German, Politics)
Vocational School (so-called <i>Berufskolleg</i>)	Teaching professional skills and general academic content at an advanced level
Vocational Grammar School	Preparation for academic studies, including a professional area (e.g. electrical engineering)
<i>Techniker-/ Meisterschule</i> (school training technicians or master craftsmen)	Further technical education for professionals

Curricular components

The orientation of the course with a teaching-position-specific competence model will only occur as part of the transition to the Bachelor/Master system. For the vocational education teachers' degree, however, a basic curriculum was decided upon by the Vocational and Business Pedagogy sections of the Germany Society for Educational Sciences in 2003, which found broad acceptance and serves as a guideline in many locations (see Figure 2). The concept behind this basic curriculum is a model that is multifaceted, and, alongside the preparation for teaching, gives students the skills

needed to work in the areas of corporate education, further education, etc. The main focuses are:

No.	Major focus with topics	Study phase	Weekly hours
1.	Fundamentals of vocational and business pedagogy		6
1.1	Introduction to vocational and business pedagogy	BP ³	2
1.2	Theoretical basics and mainstreams of vocational and business pedagogy	AP ⁴	2
1.3	The history of vocational education.	AP	2
2.	The didactics of vocational education and further education⁵		8
2.1	The fundamentals and fundamental problems of didactics	BP	2
2.2	Learning and teaching goals in vocational education	AP	2
2.3	Didactical conception of vocational education and further education	AP	2
2.4	Job-oriented teacher-student arrangements as an integration of didactical, methodical, and medial decisions.	AP	2
3.	Conditions and structures of vocational learning		8
3.1	Theories of vocational teaching and learning	BP/AP	2
3.2	Diagnostics and evaluation of vocational educational processes and learning results	AP	2
3.3	Socialisation through work and career	AP	2
3.4	Institutions and institutional development of vocational education nationally and internationally	BP/AP	2
4.	Approaches and methods of quantitative and qualitative vocational education research		4
4.1	Vocational teaching-learning research methods	BP	2
4.2	Research programmes and strategies in vocational education research	BP/AP	2
5.	Studies of teaching and instructional practices		4
5.1	Analysis of decision-making and responsibility in vocational practice, preparation of a work placement as a theory-based investigation of teaching and/or instructional practices	BP	2
5.2	Complexity analysis of the practice of vocational teaching and learning, work placement follow-up	AP	2
Total weekly hours			30

Figure 2: Basic curriculum structure (see Sektion Berufs- und Wirtschaftspädagogik der Deutschen Gesellschaft für Erziehungswissenschaft (DGfE) (2003), p. 9)

³ Basic program

⁴ Advanced Program

⁵ The classes on the didactics of vocational education and further education are supplemented by subject-specific didactics classes, oriented after the field of study or occupation, taking vocational pedagogic problems into consideration.

No basic curricula exist for the compulsory and compulsory optional subjects. Systematic comparative studies of the content layout of course offerings at the individual universities do not exist.

3 The Stuttgart example for the training of teachers for vocational schools

Two diploma courses are currently available in Stuttgart to train teachers for vocational schools:

- a) An undergraduate course, containing high school graduates of whom about 50 % have a traineeship.
- b) A postgraduate course for graduates of engineering degrees at universities and technical colleges.

Following the analytical framework laid out by Abele, the following will only look at the undergraduate course, whereby we restrict ourselves to the meso- and micro-levels.

3.1. Conditional Structures (meso level)

As mentioned above, Stuttgart currently still has Diploma degrees, which will be replaced by Bachelor/Master degrees in 2009/2010. Figure 3 gives an overview of the current course's basic structure:

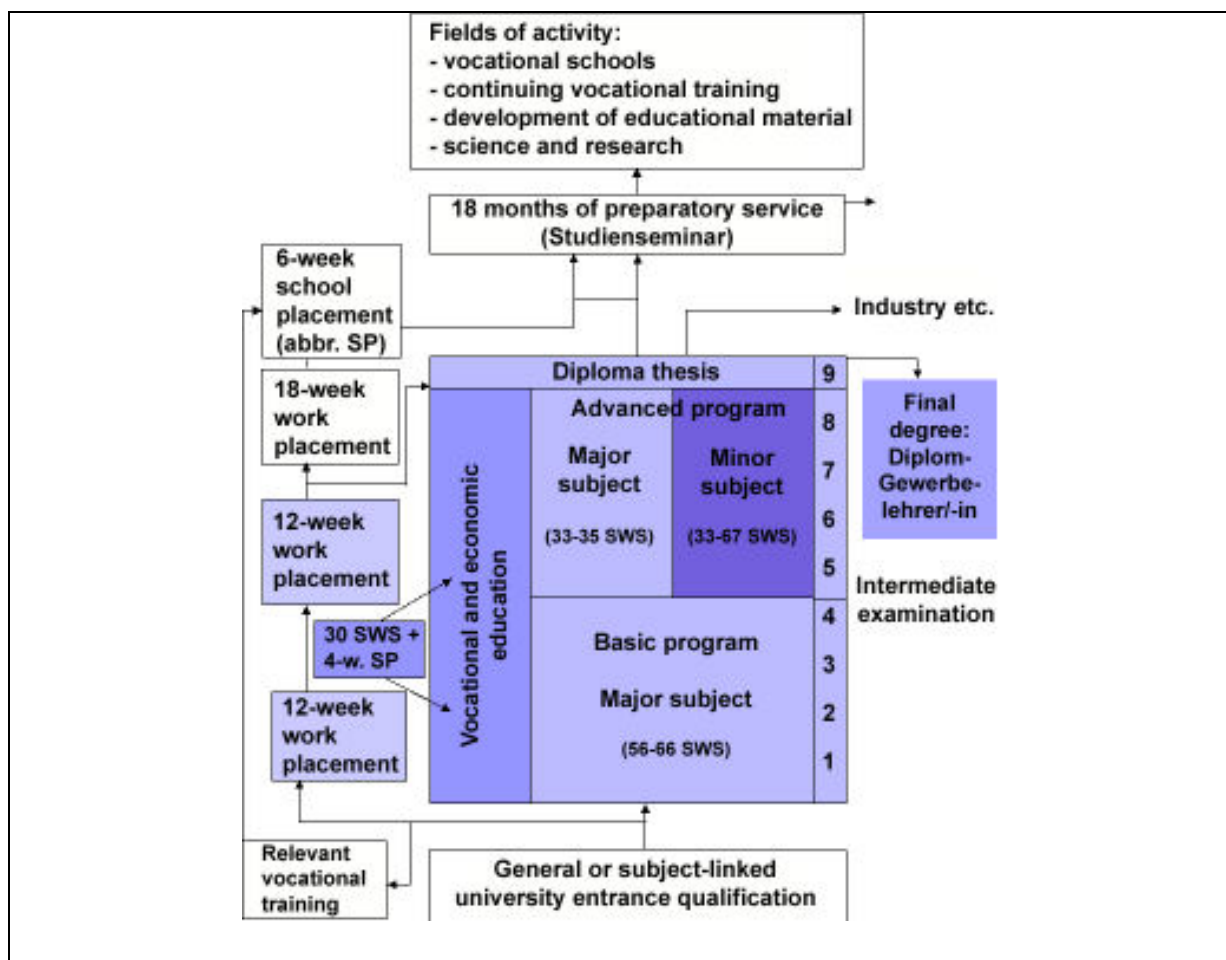


Figure 3: Basic structure of the current educational path for vocational school teachers

As already mentioned, the first training stage at the universities is structured into three parts. Theoretical courses in the major subject, the compulsory optional subject and vocational education are taught by professors, lecturers and assistant professors. Subject-specific didactics is taught by teachers delegated from vocational schools who also provide some guidance for the students in their specific subject area. **Additionally, they support the students concerning the organization of their study.** According to their profile they can be considered to be tutors as defined in PROPETO. For reasons of differentiation we will refer to this kind of teacher as *Tutor A*.

As can be seen, the education includes preparatory service and practical experience – in the form of vocational schools and firms – alongside the University. The systematic introduction to practical teaching occurs only after the university education is completed. The 4-week school placements integrated into the university course are supervised at the university by the delegated teachers (*Tutor A*), who

can, however, only prepare and debrief the students about the placement. On-site supervision by these teaching representatives is not possible, but occurs organisationally through a teacher at the school, through alternate teachers during the class, who aren't specifically trained for this role.

It is a peculiarity of Germany that the education occurs in two phases, and that the confrontation with teaching in practice occurs – leaving aside the relatively short 4-week school placement – without university supervision. This supervisory role is instead performed by the *Studienseminare*, whose personnel as a rule do not have a doctor's degree, and are recruited from academic practice. These so-called *Ausbilder* ("instructors") are responsible for **courses in educational science, educational psychology or subject-specific didactics** and resemble a tutor within the PROPETO definition; we refer to them as *Tutor B*.

3.2. Curricular Content (meso level)

The curricular content is closely related to the reference courses of the particular science. Next to the compulsory subjects, there is also a more or less diverse choice of electives.

The only course we will depict with any detail is the vocational education course, which must be taken by all students, and into which the accompanying classes to the school placements are integrated.

Table 2: Overview of the current curriculum for Vocational Education (compulsory subjects) in Stuttgart

Introduction to Vocational Education (Lecture+Tutorial)	6 ECTS
Organisation of Vocational Education in Germany (Lecture+Tutorial)	6 ECTS
Pedagogical Psychology (Lecture or Seminar)	3 ECTS
Research Methods (Lecture+Seminar)	6 ECTS
Didactics and Methods of Vocational Education (2 Lectures+Seminar)	9 ECTS
Technical didactics (Seminar)	3 ECTS
Diagnostics (Seminar)	3 ECTS
History of Vocational Education (Lecture)	3 ECTS
Proseminar (Topic chooseable)	3 ECTS
Advanced Seminar (Topic chooseable)	6 ECTS
Preparatory and follow-up exercises to school placement 1	3 ECTS
Preparatory and follow-up exercises to school placement 2	3 ECTS

Total	54 ECTS
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In the framework of the transition to the BA/MA structure, the number of classes in vocational education and didactics will be expanded, so that for vocational education a total of 60 (instead of currently 54) ECTS will be available. Didactics will have 12 ECTS. Practical school courses will also be expanded (18 ECTS in future).

While the lectures primarily serve to give an overview of the current standard of knowledge in the respective areas, the seminars promote an independent and discursive examination of the topics. In Research Methods, at least one part of the course occurs in project form, in order to give students their first experience in research. The first teaching experiences occur during the school placements and during technical didactics. In the advanced seminar, problem areas must be independently structured and academically explored. The Diploma thesis can, but does not have to be written in vocational education. Where the thesis is written in the area of vocational education, it mostly takes the form of a small empirical study.

3.3. Standards and competence models in teacher education (meso level)

The education of teachers for vocational schools in Stuttgart is currently not systematically competence-based. While the change-over process to the Bachelor/Master system is being used to force the module descriptions to list the expected competencies to be gained, the module generation is more based on the established lecture models. This does not rule out the new “competence-based” education course from being a good fit with comprehensive competence models. In reality, however, the educational content remains dominant.

We lean towards following the professional decision-making model developed by Baumert (et al.), which operates from the assumption that professional decision-making capacity is constituted by the interplay of:

- specific declarative and procedural knowledge,
- professional values, beliefs, subjective theories, normative preferences and goals,

- motivational alignment, and
- meta-cognitive capabilities and professional self-regulation, as is indicated in the following diagram.

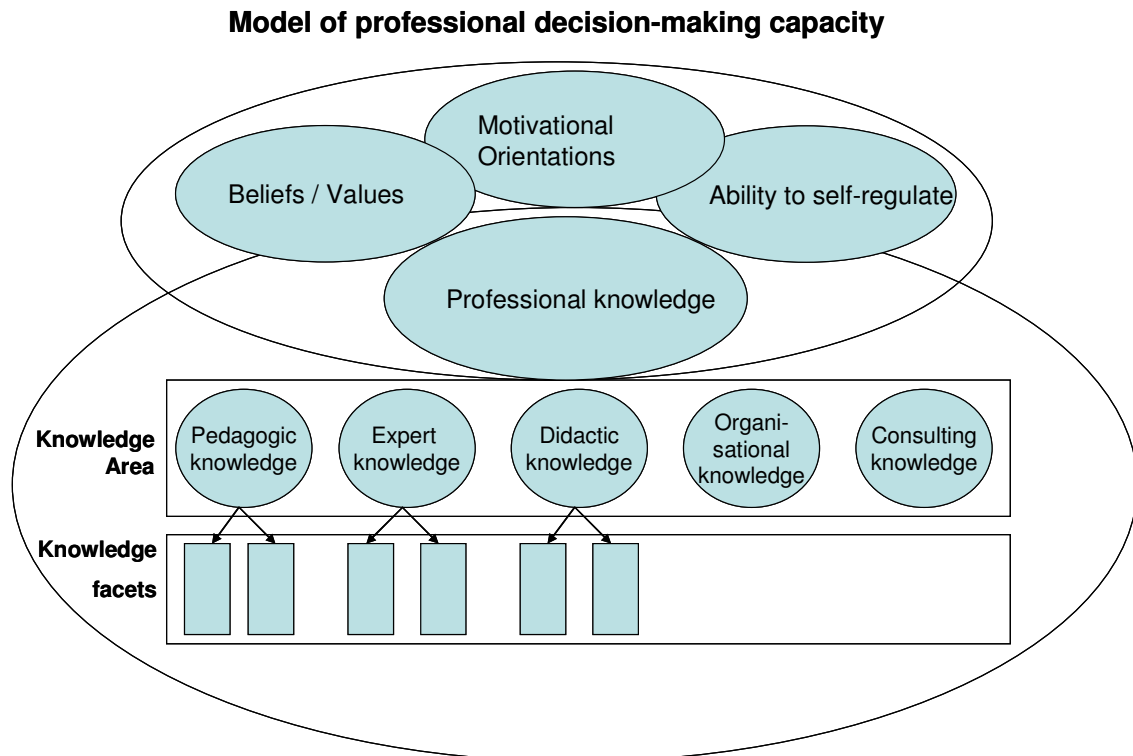


Figure 1: Model of professional decision-making capacity (Baumert et al. 2007)

To some extent the individual competence areas have also been further differentiated, for example by Seppo Hedakorpi. His ideas have not yet been empirically verified, however. As a form of quality assurance, all classes at the University of Stuttgart are evaluated on the basis of student feedback. Whether this has a positive effect on the quality of the classes is a question that has not been addressed.

The design of the exams is the purview of the lecturers and is subject-based. Central, standardised exams are not customary in Germany.

3.4. Educational processes and their evaluation (micro level)

The University of Stuttgart has several differently designed classes, as discussed above. Quantitatively speaking, the lectures, seminars and tutorials are the most

important. The facilities and equipment are, as a rule, satisfactory. Problems occur rather in the area of personnel, where numbers are often too small to realise project-based classes etc in the desired scope. Significant deficits exist especially in the area of subject-specific didactics personnel. The student evaluations of the university class offerings and examinations of the developing interests of students definitely give reasons for reform.

University teaching in the compulsory subjects and in pedagogy, in particular, receives critical evaluations. The compulsory optional subjects remain widely spared, as the students choose to attend them (see Nickolaus/Ziegler/Kenner 1998; Ziegler 2004).

Older evaluation studies related to the second training stage also find a considerable need for reform (see in overview Nickolaus 1996). A new survey by Ziegler suggests that, even in the second training phase, the students' search for confident decision-making is and perhaps cannot be successful.

Evaluations of university teaching show (see Nickolaus/Ziegler/Kenner 2004; Ziegler 2004 in particular) that course offerings in pedagogy are rated well above all when the "practical relevance" can be seen (or is hard to miss). This is particularly true for practical school studies. Pedagogic theories are seen, in part, as having little relation to practice, as they yield little in the way of instructions on how to act in specific situations. The expectations of a degree in pedagogy are already humble to start with, and they sink even lower during the course of the degree. In this light, we are currently conducting a panel study on the development of student interests in pedagogy, and the compulsory and compulsory optional subjects. This study is being done in the context of PROPETO, in cooperation with the universities of Hamburg, Hannover, Karlsruhe and Munich. It is noteworthy that scepticism of the guiding qualities of pedagogy is not a feeling confined to the vocational teachers, but is already well-developed at the start of the degree. Since the evaluation of course offerings is strongly correlated with expectations (see Nickolaus/Ziegler 1999), one can assume that those with sceptical expectations will see those expectations reinforced in the course itself, and will cling to their subjective antecedent theories. According to the studies of Hascher (2007) on the effects of the school placement, which is generally rated quite positively by the students, the practical experiences

serve more often to reinforce existing competencies and orientations than to prompt the acquisition of new ones (see Hascher 2007, p. 138). Hascher's study also clearly shows a broad willingness on the part of the students to assume the approaches and practices of their school placement teachers as a model for their own actions. In the light of this it seems particularly problematic when some work placement supervisors explicitly distance themselves from the theoretical education, and expect the same of the placement students, as this undermines the reflexive learning potential of work placements (see Hascher 2007, p. 19f).

4 Challenges for the future

4.1. Fundamental problems with teacher training for vocational schools in Germany

If one reviews the debates about teacher training for vocational schools in Germany over the past decades (see Nickolaus 1996; Ziegler 2004 for a summary), the following areas stand out as being problematic:

- 1) Recurring recruiting problems, which lead to the situation in which teachers are recruited from a pool of not only those who have undergone the intended educational process, but also of those who have studied as Engineers, Economists, etc., who then take part in specially designed further education courses. These recruiting problems were, in the past, frequent triggers for the institutional relocation of the education to different educational institutions.
- 2) Educational courses for teachers at vocational schools exist, as a rule, only for professions which are quantitatively important, and for which the universities have corresponding differentiated departments, for example Electrical Engineering, Business Studies, etc. No undergraduate educational courses exist for teachers, who teach professions such as Bakers, Butchers, etc.
- 3) In all evaluation studies and debates in Germany, the so-called Theory/Practice Problem plays a central role. There are two perspectives between which must be differentiated here:

- a) The question of which practice should serve as the central reference: the concrete teaching experience of the teacher, or the (future) vocational practice of the students the teachers will be teaching.
- b) Which practical benefits of educational theories are visible to the students, and how far a university education can fulfil the students' expectations of receiving proven instructions for their future job.
- 4) Insufficiently developed subject-specific didactics leads to didactics being taught primarily by practitioners. Systematic, empirical research in this area is still in its infancy. As a consequence, Professorships for Didactics at universities can often only be filled sub-optimally.
- 5) The cooperation between the first and second training stages tends to be limited. This, in part, leads to the same material being taught during the theoretical part of the second training stage as at the university, or – in extreme cases – to the recommendation that the student teachers forget everything they learnt at University: the really important things came now (see Hascher 2007, p. 139).
- 6) So few students are enrolled into vocational teaching degrees at University that no separate lectures can be run for them. This is not helped by a relatively large number of study locations. This leads to, in practice, significant organisational problems while studying, as timetable clashes between compulsory classes become unavoidable.
- 7) The teachers at vocational schools are active in wide range of different areas. The accompanying qualification requirements vary considerably. Thus teachers with the same (formal) qualifications will teach, for example, both during the prevocational training year, during which the daily tasks are primarily educational and aiding weaker students, and in technical colleges / master schools, in which experienced professionals receive further education and where primarily specialised knowledge is expected of the teachers. This was previously accepted in order to keep employment opportunities wide and flexible, even though the goal of being competent in all areas is probably unattainable.

- 8) A subject of hefty discussion in Germany is the so-called “vocational field concept”, which a section of our colleagues believe should govern the education of teachers for vocational schools. The basis of this concept is the assumption that teachers would be better prepared for their field of activity if, instead of being taught engineering or business sciences, specific vocational field sciences were developed. These would contain the specialists’ occupational practices in all their facets, and not “just” electrical engineering, mechanical engineering, etc (see Nickolaus 2001 for a discussion).

4.2. Needs for the Tutors’ training

As mentioned before, there are two different types of tutors in Stuttgart. *Tutor A* works at the university and is among other things responsible for the courses in subject-specific didactics, whereas *Tutor B* is in charge of courses in educational sciences, educational psychology or subject-specific didactics at the *Studienseminar*. Courses in subject-specific didactics at the university and at the *Studienseminar* are held by teaching staff that is rather familiar with practical work than with current scientific insights. Their work mainly consists of instructing future VET teachers and students at a vocational school and does not explicitly focus on broadening and actualizing the relevant expert knowledge. Hence, their teaching very often lacks an orientation to current theoretical findings. This means that tutors’ training has especially to deal with questions of how to combine theoretical and practical aspects. Therefore, we suggest including the following topics in the tutors’ training:

- theory of teaching-learning-processes
- approaches of how to support students in combining theory and practice
- didactical approaches to the imparting of occupational related contents

In view of the upcoming training session in November we propose that further steps than those mentioned above are taken. Considering the fact that teachers, as a rule, rather take their own teaching methods as a basis for further development than adopting those of others we consider it helpful to conduct an evaluation of the tutors’ current practice. Within this evaluation it might be also appropriate to focus on the tutors’ subjective theories concerning teaching-learning processes.

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