Can Indonesia Learn Something from the German Model of TVET Teacher Education?

Joachim Dittrich
Indonesia University of Education

ABSTRAK

Sistem pendidikan dan pelatihan teknik dan kejuruan Jerman dikenal sebagai sistem yang efektif, dan kadang-kadang penilaian ini diberikan kepada pendidikan guru teknik dan kejuruan Jerman. Namun demikian, pendidikan guru teknik dan kejuruan Jerman disesuaikan dengan sistem pendidikan dan pelatihan teknik dan kejuruan Jerman. Artikel ini membahas aspek-aspek pendidikan guru teknik dan kejuruan Jerman yang dapat dijadikanm titik acuan untuk pengembangan pendidikan guru teknik dan kejuruan di Indonesia. Untuk itu, berbagai kondisi yang berkaitan dengan pendidikan guru teknik dan kejuruan di Jerman akan diuraikan, khususnya yang berkaitan dengan kurikulum, model pembelajaran, pelaksanaan magang, serta keterkaitan antara program pembelajaran dan penelitian.

Kata Kunci: technical and vocational education and training (TVET), TVET teacher education, internship

The title's question must definitely be answered with "yes', since everybody, when openly analysing someone else's activities, will learn something. So the question just is, "what" can Indonesia learn from German teacher education for technical and vocational education and training (TVET), and what are the aspects which Indonesia should analyse carefully when considering to adopt certain elements.

Aspects to analyse are certainly students' entry qualification when they take up a TVET teacher study programme as well as the differences in the regulatory framework for TVET teacher education in Indonesia and Germany. But also the differences in the TVET systems themselves, different conditions in TVET providing institutions, and differences in labour market and economy should be considered.

In this article I will give some information on the German situation with respect to these aspects, however I will leave the comparison with the Indonesian situation largely to the reader. I am convinced that also culture makes a significant difference for the shaping of an education and training programme. Since this is an even more complex matter which also requires the development of the respective theoretical background I will leave this issue to a publication to come. Instead I will describe briefly the different models of initial TVET teacher education that can be found in Germany, and I will describe the one in more detail, which I, personally, consider as the most appropriate one for TVET teacher education in Germany.

Finally, I will select a limited number of aspects from this model in order to discuss them with respect to their appropriateness for the development of the quality of Indonesian TVET teacher education.

General remarks

When writing about education for a job, it would be wise to describe the respective job profile, at least in international communication. When talking with teacher educators – also with TVET teacher educators – about teacher education for technical and vocational education and training (TVET), it has turned out to be mandatory to point out the differences between general and vocational education as for both types of teachers the same identifier is used, namely "teacher" or "guru". I won't present such a job profile, which can be found for

example in SPÖTTL (2009) here, instead I want to name some of the differences, first for general and vocational education, and second with respect to Germany and Indonesia.

The work of TVET teachers is different to the work of general education teachers with respect to quite a number of aspects, here I just want to list three of them:

a) General education teachers prepare their students for their future career in the educational system, while TVET teachers have to prepare their students to be able to earn their living in the world of work.

b) General education teachers usually impart "school" knowledge and maybe also some generic competences, while TVET teachers have to impart professional knowledge and professional competences that are needed in a specific occupation when working in a job.

c) Almost everywhere in the world TVET students are considered not as bright as general school students, even though this is not the case in general; often they just are not so good in academic learning or cannot afford higher education.

In Germany TVET teachers have to be able to work in the framework of the cooperative system of vocational education and training (see the section on the German TVET system below), where companies and vocational schools share the responsibility for education and training of the young adults. The companies' share is much bigger than that of the schools, so the vocational school must be considered as a "junior partner" in this scheme. TVET teachers therefore are obliged to cooperate intensively with their counterparts – human resource development staff – in the companies.

In addition, student assessment for the final certificate is in the hands of the industry, trade, or craft associations depending on the respective occupational profile, so that performance in school does not really contribute to the final score. TVET teachers therefore have to rely on their individual, personal competence and authority when motivating students for learning.

Remarks on the German TVET system

The "German Dual System of Vocational Education and Training" for skilled workers, meanwhile sometimes also referred to as the "German System of Cooperative Vocational Education and Training" or "System of Dual Training", features approximately 70% learning in the company and 30% learning in vocational schools. The actual training takes place in companies while the vocational school provides theoretical and background knowledge as well as reflection of the learning experiences at the workplace.

Ideally, learning is organised directly in the work processes. In the case of big companies learning sometimes also takes place in special training departments which largely keeps apprentices out of the production process, while in the case of small companies, especially from the craft trades, part of learning takes place in so-called "intercompany VET centres". These intercompany VET centres are typically run by craft chambers and similar institutions and are intended to complement the learning offer of small, specialised companies in order to cover the whole range of technical issues defined in the training regulations. According to legal regulations, learning in the company is supervised by skilled workers with additional pedagogical and didactical training, or, in the case of craft trade companies, by Master Craftsmen whose training also includes pedagogical and didactical competences. For the responsible instructors in company training departments or intercompany VET centres the same legal rules apply.

There is also full-time school-based vocational education and training for a number of vocational training occupations, as well as in occupations normally belonging to the dual system in case there is a severe shortage of apprenticeship places in companies. Here teachers for vocational practice are employed beside university educated teachers. These teachers for vocational practice usually are state-examined technicians, certified masters (craftsmen or skilled workers), or specialised teachers without academic education (For more details see for example REFERNET 2009, pp. 53 ff.).

On 1st August 2009 there were 349 initial training occupations defined. These training occupations including the respective training regulations are developed by the social partners (employers and employees associations) supported by the German Federal Institute of Vocational Education and Training (Bundesinstitut für Berufsbildung, BIBB) and are enacted by the German Federal Ministry of

Economics and Technology in consultation with the Federal Ministry of Education and Research and therefore are binding for the whole country. Frame curricula for the vocational schools, however, are developed and enacted by the 16 German Federal States (Bundesländer) since in Germany the competence for educational matters lies with them. Therefore frame curricula can be different from state to state, even though for sake of compatibility and of economical use of resources the states try to coordinate their work via the "Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany" (in German: Kutusministerkonferenz – KMK).

In addition there are countless further training occupations (Weiterbildungsberufe) for which education and training, however, does not take place in the vocational schools of the public education system, and which are not referenced further in this contribution.

TVET teacher students

For being admitted to teacher education studies students need the "higher education entrance qualification" (Hochschulreife). This is usually acquired after attending school for 13 years (currently in the process of being reduced to 12 years) and passing the "Abitur" examination. The higher education entrance qualification can also be obtained in other ways, e.g. with completing vocational highschool (Fachoberschule / Fach¬gymnasium), technical vocational school (Berufsfachschule) after leaving general school at grade 9 or 10, or, in certain cases, following the successful completion of a non-university course of training in the tertiary sector, including in the dual system of vocational education and training.

TVET teacher students candidates have to prove 6 to 12 months practical experience in the vocational area which they intend to study. The length of required practical experience varies between the German federal states. This practical experience can be either acquired by internships with a company, via a training contract in the dual system, or by working, e.g. as an engineer in an area relevant to the study programme.

It is important to note that the majority of students entering TVET teacher education programmes have already completed a vocational education programme and several years of work experience in their occupational area after leaving general school either at grade 9 or 10 or after passing the Abitur. It might be interesting to know that there is quite a remarkable share of students with higher education entry certificate who opt for initially not going to university but to learn an occupation in the dual system or in other tertiary education institutions.

Therefore about 70% to 80% of TVET teacher students can already draw on comprehensive work experiences and on mastership of the subject matters of their future teaching area, which also influences the construction of curricula for teacher education.

The regulatory framework for TVET teacher education

The different modes of German TVET imply that there are three main types of education and training staff with different duties: university trained teachers in vocational schools, practice teachers in vocational schools who usually are master craftsmen or technicians with additional further training, and instructors and trainers in companies or within intercompany VET centres. The requirements with respect to formal qualifications of these types of vocational education and training professionals vary considerably. TVET teachers are required to have an academic university education while practice teachers and trainers are not.

In this paper I concentrate on university education of TVET teachers for initial vocational education and training. TVET teachers must have at least a Master degree in order to be employed as TVET teacher in a public TVET school. TVET Bachelor degree holders are supposed to work in other employment sectors, such as in companies as training expert, in non-public training centres, or in employers' or employees' associations.

However, the Master degree is not sufficient to be employed as a teacher at a public TVET school. Following the Master degree that usually is recognized as a so-called "first state examination", there is a compulsory one to two-year traineeship under supervision of a state-run teacher training institute, usually referred to as the "second phase" of TVET teacher education, which ends with a "second state examination" (see Figure 1). To be

employable at public schools all teachers including TVET teachers are required to pass this "second state examination". The state examinations are run by the competent authorities for teacher certification, the first one in cooperation with the university.

Such a traineeship is compulsory for all professions that perform duties that are considered vital for the state, e.g. higher civil servants, lawyers, etc. This internship has its roots in the intention of the state to develop commitment of his civil servants towards the state and the constitution, after universities were granted freedom in teaching and research beginning of the 19th century. Consequently the above mentioned teacher training institutes are still never located in or associated with a University.

For teachers in general and therefore also for TVET teachers this internship period nowadays is intended to provide practical knowledge and experiences under supervision in a real-world work environment, but retains the function of socialization in public service.

The traineeship is an education phase with "dual" organisation. Teacher candidates are part-time working at a vocational school with reduced teaching duties compared to regular teachers. In the school they are coached by an experienced teacher. That way they are introduced into the teachers' community of practice, are integrated in the social and organisational system "TVET school", and can assume step-by-step the tasks of a TVET teacher while enjoying counselling by experienced colleagues. Parallel to this teachers have to attend a state-run teacher training seminar, which is never connected to a university, where they learn how to plan and evaluate instruction, get additional practical knowledge on pedagogy and didactics, and have the opportunity, together with other candidate teachers and experienced teacher educators, to reflect on their concurrent experiences in school.

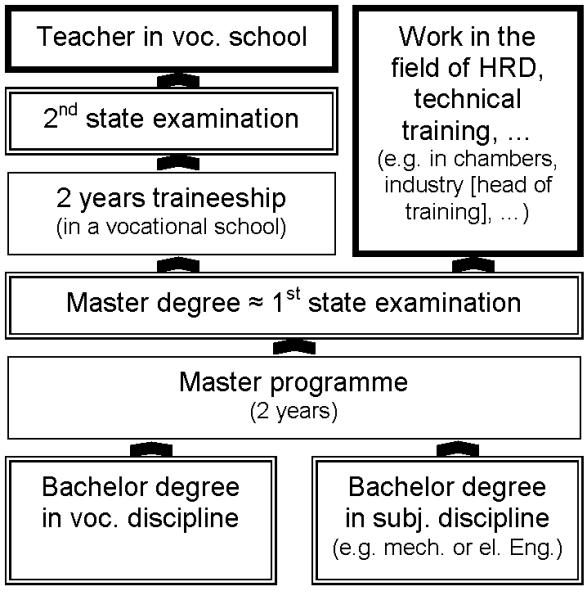


Figure 1: Structure of TVET teacher education in Germany

Teachers in German public schools are usually employed as civil servants. However, at times when the public coffers are empty or when there is a high offer of potential teachers on the market, public school administration, usually the competent state school ministry, also hires teachers based on regular employment contracts.

In times of high demands for TVET teachers without matching supply of university-educated teachers the school governing bodies tend to employ subject specialists like e.g. engineers or economists as TVET teachers in the framework of emergency measures. Often these teachers without teaching qualification receive some pedagogical and didactical training with varying length and intensity which, however, never is equivalent to university based teacher education.

TVET teacher study programmes

University-run teacher education programmes as the first phase of teacher education are intended to lay the scientific basis for the teacher profession, while the second phase, the above mentioned traineeship, is intended for developing the practical competences in teaching. With respect to TVET teacher education it should be noted, that the acquisition of practical, vocational skills does not have a place in the whole process of TVET teacher education. This may be considered as one of the reasons why only few students start a TVET teacher study programme directly after leaving general high school.

TVET teacher education programme structures vary from Federal State to Federal State of the Federal Republic of Germany even though there are some common cornerstone definitions. TVET teacher education programme content varies from university to university due to the so-called "freedom of teaching and research" in academic education, but is controlled by the competent state government bodies. In addition, major restructuring is taking place since about 7 years due to policies

of the European Union which aim at creating the so-called European Higher Education Area, and due to the results of the Program of International Students Assessment (PISA) surveys (OECD 1999), where German students could not be found on the top-most ranks OECD (2003). For more information see box: Background information.

Some background information

The curricula of the study programmes for TVET teachers in Germany have recently been reconfigured to Bachelor and Master structures in the framework of the so-called "Bologna-Process" (for more information on the Bologna Process and the EuropeanHigher Education Area see e.g. European University Association two years). Currently, the Bachelor/Master system, as it was implemented in Germany, again is under discussion because students as well as lecturers seem not to be happy with the outcome of the German study structure reform. Curricula are still different from federal state to federal state, and in some cases they even do not follow the structural agreements elaborated by the KMK (Kultusministerkonferenz 2007).

With the Bologna Process all study programmes have to pass an accreditation process of one of the German accreditation agencies that are accredited by the German Accreditation Council, which itself is a member of the "European Consortium for Accreditation in Higher Education" (ECA). The accreditation process, among others, has to assure that all the criteria set out by the KMK are met.

And there are discussions and measures with respect to the development of teacher education as a whole as a follow-up of the German's so-called "PISA-shock" - Germany's 15 years old students ranked unexpectedly low in the first international programme for international student assessment – which also affects teacher education for vocational education and training, even though vocational students are older than the ones assessed in PISA. Currently, due to a directive of the KMK (Kultusministerkonferenz 2008), teacher education standards are being developed for all subject areas of teacher education. Standards for vocational disciplines (= occupational areas of skilled work), however, are not yet developed.

Subject specialisation and second subject

TVET teachers are typically educated for vocational disciplines (in German: Berufliche Fachrichtungen). These vocational disciplines once were derived from fields of vocations (Berufsfelder) which were defined in the German vocational education act and which grouped vocational training occupations (Berufe) in order to implement a common first year of vocational education and training for all training occupations in a specific field of vocations. This does not hold any more since a core set of 16 vocational disciplines were defined by the KMK in 1995 (Kultusministerkonferenz 2007). Also the term "Berufsfelder" has changed its meaning after they were abolished with the new vocational education act from 2005. Federal states are allowed to implement additional vocational disciplines at their universities, which, as far as I know, has none of the states done so far.

In order to counterbalance too narrow specialisation and to make placement easier, all teachers in Germany, including TVET teachers, have to study at least two teaching subjects. In the case of vocational education there is also the opinion, that general subjects should be taught with reference to TVET. For TVET teachers the main subject always is a vocational discipline, the other one normally is a general subject like a natural science subject, German or foreign language, sports, etc. In some federal states it is also possible to study a second vocational discipline as the second subject, or even to get a specialisation in the vocational discipline recognised as a second subject. In some states the freedom of choice of the second subject is restricted, in others not. In most of the states vocational teachers are educated for certain groups of school types, and vocational schools, together with vocational high schools are in the same group as general education high schools. In these states TVET teachers can also teach in general high schools, and in any case they can teach in vocational high schools which cover all subjects of general high school education, but with modified intensity for certain subjects.

In addition to these two subject areas students also must study vocational education sciences / vocational pedagogy in order to acquire the necessary knowledge on pedagogy of vocational learning and at the same time a broader overview on educational issues.

Study volume

To earn a Master degree at least 300 Credits have to be earned, which usually requires 10 semesters, since one credit is equivalent to a students' workload of 25 to 30 hours, and one full-time study semester has 30 credits according to the definition of the European Credit Transfer and Accumulation System (ECTS). Bachelor is either 6 semesters (180 credits) or 8 semesters (240 credits). The corresponding Master courses have 2 semesters (60 credits) to 4 semesters (120 credits). Usually it is not possible to combine a 60 credit Master with a 180 credit Bachelor.

An example for the credit distribution between major and minor (first and second subject) at the University of Bremen in the year 2008 is shown in Figure 2. The distribution of the different study areas (first and second subject, vocational pedagogy) between Bachelor and Master varies slightly from university to university and in different programmes for different target groups, but the sum over Bachelor plus Master is fixed. According to KMK guidelines from 2007, for Bachelor plus Master these are 180 credits for first plus second subject, 90 credits for vocational pedagogy and 30 credits for Bachelor plus Master thesis, but this distribution is under discussion again. With respect to content there are close linkages between the vocational discipline and vocational pedagogy.

These directions pose problems with respect to Master study programmes for students with a non-TVET teacher bachelor degree. Such students would have to study the whole volume of vocational pedagogy and do a Master thesis. Arithmetic shows that there are not many credits left for studies in the vocational discipline or in the second subject.

Master program

Vocational discipline with specialisation *(30 credits)*	**Vocational education / pedagogy** *(30 credits)*	**Second subject** (incl. didactics and internship) *(60 credits)*

Bachelor program

Vocational discipline *(90 credits)*	**Vocational education / pedagogy** (incl. didactics and internship) *(45 credits)*	**Second subject** *(45 credits)*

Figure 2: Structure of Bachelor and Master Programmes (Example)

Selected elements of study programmes

In this section I will give a deeper insight into three of the elements of TVET teacher study programmes. The first element is the vocational discipline, because there are various different approaches to this study field at German universities. The second one is the area of students' practicals because it contributes significantly to students understanding the points of reference of their future work as a teacher. The third one is the topic of TVET research as part of the academic education of TVET teachers.

The vocational disciplines

There is a debate ongoing for several decades (Bannwitz and Rauner 1993, in German), what the contents of the vocational disciplines should be. The two extreme positions are:

1. TVET teachers need a profound theoretical knowledge of the science field corresponding to their vocational discipline. This would mean for example, that a TVET teacher for electrics and electronics needs to study electrical and electronic engineering like his fellow students who wants to become an engineer in research and development. Or a TVET teacher for nursing would have to study medical sciences like his fellow students who will become a medical doctor or a surgeon. With some additional knowledge in vocational pedagogy he is expected to be prepared for the job as a TVET teacher for the respective occupational profiles.
2. The knowledge and skills required for skilled work are largely different to the knowledge available in the corresponding science field because the job profiles of skilled workers and academic staff are disjoint due to the prevalent division of labour. As an example, a mechanical engineer will develop machinery whereas a mechanical worker will be responsible for installing, operating, and maintaining it. The different job profiles of a medical doctor and a nurse are known. Therefore the vocational disciplines have to be taught as "occupational sciences", which are quite different to the "corresponding" sciences. They must include a kind of sociological view on the historic development (social shaping) of technology, on the interrelation between the properties of technology and the type of work organisation,

and on the technology's tutorial qualities (for supporting competence development in the process of work). Occupational sciences must be closely interlinked (merged) with vocational pedagogy and didactics, because different occupational areas require different approaches to learning. Only that way a student will develop high competence, professionalism, and professional identity for his future profession as a TVET teacher and as an agent for innovation.

Very likely, most vocational educationalists will share the second position, however, it is very rarely implemented completely at German universities due to organisational and budget reasons. Usually there are only few professors and lecturers at one university, who could teach the vocational discipline that way and with that content. Consequently, due to teaching capacity, students have to be sent to courses together with their fellow students of the corresponding science discipline, which in the best case results in an intermediate model.

Very often, however, especially in the south of Germany, this lack of capacity results in the first model. There are professors and lecturers who teach vocational pedagogy, the study volume of the vocational discipline is taught by professors and lecturers of the corresponding science or engineering discipline for both groups, science and engineering students and TVET teacher students, at a time.

Table 1 is meant to give an impression of how the third model could look like, by showing module titles and the titles of the included courses, taken from the TVET teacher curricula of University of Bremen. Already the titles show, that the study elements deal with knowledge and experiences which are required for professional (skilled) work and the related didactical and pedagogical knowledge which a TVET teacher should have in order to develop and implement appropriate learning arrangements. The sociological view is included as a critical element in dealing with the topics.

Students' practicals

Experiences in TVET teacher education have shown that it is of utmost importance to expose students regularly, starting very early, to the reality of their future working environment and the related tasks. That way they have the opportunity to become aware during their studies, what the actual challenges of their future profession are, and why they are expected to learn certain things and acquire certain competences. With the first practical they also have the opportunity to decide early, whether it is their dedication to be a teacher, or whether they would prefer to take another career pathway.

At all German universities TVET teacher students have to do practicals which sum up to at least half a year (or one semester, often including semester breaks) in school and in companies. The objective is that students experience both main learning venues that are available in German vocational education and training. But it is also necessary for students having the opportunity to experience both, their own future working environment, as well as the future working environment of their future students. By means of the practicals students are confronted with the fact, that their future profession of a teacher will not only require to teach, but that it will also include tasks like e.g. participating in organisational school development, doing training needs analysis in companies, and providing counselling for small and medium sized companies with respect to human

Table 1: Module and course titles in a TVET teacher programme

Module:	Technical specifics in manufacturing systems and building equipment
Courses:	Professional work and technology in the area of manufacturing systems
	Professional work and technology in the area of building equipment
	Practical exercises in the areas of manufacturing systems and building equipment
Module:	Didactical specifics related to the fields of manufacturing systems and building equipment
Courses:	Didactical specifics related to the fields of manufacturing systems
	Didactical specifics related to the fields of building equipment
	Didactical internship in the field of manufacturing systems or in the field of building equipment

(Source: Curriculum of the TVET teacher study programme (Master) "Electrical engineering and information technology" (year 2007) of the University of Bremen, Germany)

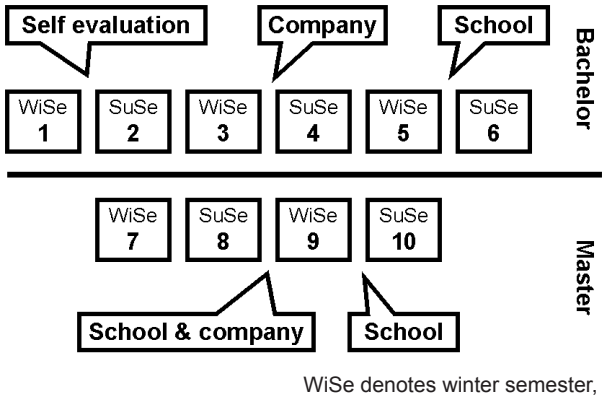
resource management, competence development and work organisation.

Figure 3 shows the 5 practicals that are mandatory for TVET teacher students at the University of Bremen. Practicals, except the fourth one, take place in the breaks between uneven and even semesters. This is possible because the spring school breaks are significantly shorter than university semester breaks, and companies usually do not have dedicated breaks in springtime.

All practicals are intensively prepared in a course during the semester before the practical, and are evaluated in a course during the following semester. During the practicals in schools the students are coached by an experienced teacher, during the practicals in companies they are supervised and advised by university staff in case the company cannot provide appropriate mentoring. The pre- and post-processing is very important to make the practicals valuable learning experiences for both, students and university lecturers. Students have to prepare a report on each practical, so that they learn how to systematically record and to evaluate things, and how to accomplish scientific writing.

The last practical is dedicated to the second study subject and governed by the respective non-vocational study regulations. In general it shows very similar structures to the third practical, but with a focus on the general schooling subject.

The first practical is a short one and includes the exploration of the microcosmos "vocational school". Students run interviews with school management, teachers and students, sit in on class



WiSe denotes winter semester,
SuSe denotes summer semester

Figure 3: Practicals in the TVET teacher study programmes at the University of Bremen (according to Ludger Deitmer, University of Bremen)

in theoretical and practical sessions, and collect background information on elements governing school procedures, e.g. on the TVET system, on occupational profiles, on legal regulations applicable to the work as a teacher, etc.

The second and third practicals are interchangeable with respect to time. In companies students assume tasks in vocational training or in other types of human resource development (HRD) under supervision and counselling either by experienced HRD expert or by lecturers from the university. In schools the students are integrated in teaching work, plan and conduct and evaluate one or more classes under supervision of experienced teachers, and that way make experiences in the role of a teacher.

The fourth practical is dedicated to the topic of cooperation between vocational schools and companies in vocational education and training. It can have quite different form and contents because the tasks to be assumed by the students are linked to problems or development needs that have been identified by companies, schools, and/or other actors in TVET. Just to give an example: An SME with 70 employees thinks it needs a HRD development scheme, but does not have an own HRD department. A vocational school offers to provide coaching and training for the companies employees, but the company does not know in detail, what is needed. A group of TVET teacher students runs a training needs analysis in the company and, based on the findings, develops a HRD plan, which then is implemented in cooperation between the company and the vocational school. One of the findings of the needs analysis was that there were problems with some work processes, which needed restructuring. A next batch of students then worked on this issue and developed proposals on how to best restructure the related workflows.

This pattern of the fourth practical actually developed with time after more and more companies experienced and heard, how much benefit such an internship teacher student can bring to the company.

Currently this fourth practical is more and more specified as a research and development practical, which in a number of cases also leads to the definition of the topic for the Master thesis. Students are happy that they can work on a Master thesis that is related to the reality of their future work, and companies are glad that their problems receive even closer attention.

Finally it must be mentioned, that not only the students take profit out of this scheme of practicals. Also the professors and lecturers draw advantages. They are in regular contact with schools and companies, can update their knowledge of the actual state of the art with respect to work processes, work organisation, and technology, and through the close contact always have ideas and partners at hand for implementing research and development projects. That way a constant regional cooperation between companies, vocational schools and university is organised.

Research orientation and social shaping approach

A central feature of the study programmes is the scientifically critical handling of study content and learning and practicing how to apply research methods. One example of such a research context was given above with the description of the fourth practical.

The research orientation, however, is integrated in all parts of the study programme and is intended to contribute to developing students' self-confidence and self-esteem, as well as to train them to apply scientific methods in their future work. This includes being always up-to-date with newest scientific findings in their area of specialisation, including TVET as such, being able to apply existing and to adapt or develop new research methods that are suitable to provide answers to their professional questions or to solve their professional problems, and, most important of all, to give the students the experience, that their own developments and engagement can change things and make them better. This is the core of the "social shaping paradigm" (Heidegger 1997), which can be seen as one of the central elements of German TVET (since 1992 all new or revised German training regulations contain as goal of VET to enable learners to co-shaping of the world of work and of society in social and ecological responsibility – in German: "…zur Mitgestaltung der Arbeitswelt und Gesellschaft in sozialer und ökologischer Verantwortung befähigen").

Both elements, research orientation and social shaping approach, are integrated in the study programmes via the mode of learning. Learning is student centred, often in seminar form in a way that students, in most of the cases in groups, prepare a certain topic and put it to discussion in the plenum of the class. In that case the lecturer's role is that of an advisor who points to where resources on the topic can be found, supports the group in organising the plenum session if necessary and participates in the discussions like any other student. If necessary he adds aspects to the issue discussed.

Such a scheme actually only works well if the lecturer accepts his students as adult persons who are working on similar problems like himself, and if the students dare to challenge the lecturer in intellectual terms. The role of the teacher is no longer the one of the Guru, who knows everything. Often the students will do some field research either in order to find out facts or to check, whether information found in literature is applicable to specific cases. That way the study programme is largely driven by students' activities while lecturers / professors are providing the overall topics, are giving support if necessary, and are adding complexity to the issues in case the students did not detect certain important aspects. That way the students grow into the teachers' role like they should fill it during their future employment. They learn how to elaborate topics by applying scientific methods alone or in cooperation with their fellow students, who later will be their colleagues. They will need to be able to do this later in their working live at a vocational school.

Proposals for TVET teacher education in Indonesia

In my eyes it is very clear, that the German system of TVET teacher education cannot be copied for implementation in Indonesia. This is already clear by considering the fact, that the major part of TVET in Germany takes place in the dual system of vocational education and training, while the Indonesian TVET system still is almost completely school-based. Some items however might be worth to be considered.

Practical experience with work and technology

There is no way to teach practical work experience and mastery of technology at the level of skilled work in a university programme. Therefore, nobody should expect a university educated TVET teacher to be able to provide sound skills training in a specific occupation. Skills training usually is much better done by persons, who have performed the respective tasks professionally over several years, and who have in addition acquired some didactical and pedagogical competences.

This does not mean that university educated TVET teachers do not need to be able to handle the relevant technology. They have, because some of their duties are to analyse competence requirements associated with the use of that technology as well as critically reflect, together with their vocational students, issues related to implementation of technology, the interaction between technology and work organisation, and between technology and environment.

Consequently, TVET teachers have to be trained in technical skills, but they should not be expected to provide skills training, except they have a lot of practical experience in the relevant field.

Making work and technology the core of the vocational disciplines

Students should learn in vocational schools all the things they need to know and be able to do later at their future workplaces. These knowledge and skills have to be provided by TVET teachers. Hence, TVET teacher education has to provide the respective competences. Since engineers at universities usually are not educated to do installation and maintenance work, and a Master of Business Administration (MBA) won't do bookkeeping in his future job, it is obvious that TVET teachers have to study other contents than their academic counterparts in non-TVET-teacher education programmes. A car mechanic will never have to design a new car, so why should a TVET teacher be trained to design a gearbox?

Subject contents for TVET teacher education in most cases cannot be easily derived from the content of the corresponding science field. Instead, TVET teacher education needs its own contents, which is closely related to the knowledge that is needed by a TVET-trained skilled worker, enhanced by the ability to critically reflect the interrelations in the triangle of work, technology, and competences.

Unfortunately this type of knowledge is not yet written down systematically, and even a complete list of work processes skilled workers of a certain occupation have to manage in Indonesia is not available, from which a set of required competences, knowledge and skills could be derived. Instead, there are partly occupational standards available, the SKKNI, from which we do not know for sure, whether they reflect the requirements existing at Indonesian workplaces.

Therefore the teacher education institutions at universities are requested to identify the work processes and the related competences, knowledge and skills, that make up the occupations of those people trained in vocational schools. This content then should be incorporated in the content of the vocational disciplines in TVET teacher education programmes. As long as such systematic knowledge is not available current teacher education curricula should be revised on the basis of sanity and reason to reflect as much as possible the requirements found in skilled work.

Defining HRD as a second career pathway for teacher students

In addition the faculties of TVET teacher education should think about the question, whether the competence of TVET teachers is not much more related to the competence of Human Resource Development (HRD) professionals in companies than, in the case of the technical subject, to the competences required in an engineering profession, in case they want to provide multiply career opportunities to their graduates.

Using practicals to enhance the relevance of TVET teacher education

Practicals are a statutory part of TVET teacher education, at least here at Universitas Pendidikan Indonesia. These practicals should systematically be used to enhance the relevance of the teacher education programmes with respect to the graduates' future work.

That requires that a sound concept for the practicals is developed, that the objectives for the different practicals are made clear, and that this is communicated effectively to the counterparts who provide the work places for the students. It is of great importance that the placements are embedded in classes for preparation and evaluation, and that they are closely monitored by university lecturers. When drafting the concepts the fact should be considered that schools and companies will be more open to accept teacher students, if they can draw benefit from the scheme.

For schools such benefits could be that the students bring new ideas with them with respect to improving instruction, enhancing school life with parents interaction, or intensifying cooperation with companies or other stakeholders.

For companies the benefit could lie in students providing services and knowledge to the

company, which it needs to solve its problems or to act more profitable. Especially small and medium sized companies usually do not have the staff with the knowledge and competences, TVET teacher students with support of their lecturers could provide.

In such a cooperation scheme also lies a big opportunity for a faculty of TVET teacher education. Lecturers have easy access to means for upgrading their knowledge, both, with respect to school and with respect to industry. Researchers are provided with a field to identify relevant research and development topics and have a better access to potential research partners.

Research, shaping orientation, and self-confidence

Student centred learning in group-work, project learning, experimental and research-based learning prepares students best for their future profession, and at the same time provides them the example, how they best could teach their own future students in vocational schools. Critical thinking with respect to the existing conditions and the existing teaching canon, combined with experiences which active and engaged teachers can contribute to develop the current situation, is the pre-condition for both, for the development of knowledge on TVET and for the development of the quality of TVET in vocational schools.

Summary

TVET teacher education in Germany is pretty much regulated and tailored to the conditions of the German vocational education and training system and to the entry qualifications of TVET teacher students. Both aspects are little compatible with the situation in Indonesia.

Nevertheless it might be worth to have a closer look at certain aspects of German TVET teacher training and to analyse, whether it would be worth to migrate components of them into Indonesian TVET teacher education.

It might be rewarding to have a closer look at the second phase of German TVET teacher education which was not discussed in this article. Maybe valuable insights could be found from the decades long experiences in Germany for the new Indonesian professionalization and certification courses, especially with respect to the combination of practical and theoretical learning, to coaching, and to the forms of assessment.

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