



Labour Efficiency of Tertiary Adult Education at universities

Patterns of Co-operation between Higher Education & the World of Work in Germany Context and Cases

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1. Introduction

For adaptation of learning programmes offered by universities, provision of adult education has crucial relevance. In its resolution of 2007 on modernising universities for Europe's competitiveness in a global economy, the Council claims *“to improve the identification of training needs, increase the labour market relevance of education and training, facilitate individuals' access to lifelong learning opportunities and guidance, and ensure smooth transitions between the worlds of education, training and employment.”* The Councils recognised the need to increase lifelong learning opportunities widening access to higher education boosting employability and upgrading the skills of population. This requires a closer cooperation between public services, education and training providers and employers at all levels.

One of the key elements of this modernising strategy is encouraging higher education (HE) institutions to open up to non-traditional learners and adult students and further develop their role in lifelong learning increasing, when appropriate, the diversity of the tertiary education system.

This is confirmed in the new strategy framed in the new master plan <Europe 2020>. In the strategy paper of the year 2011 “Supporting growth and jobs – an agenda for the modernisation of Europe's higher education systems” one of the key policy issues is to encourage a greater variety of study modes (e.g. part-time, distance and modular learning, continuing education for adult returners and others already in the labour market).

However, each policy and their concrete measures must be submitted to an evaluation measuring their efficiency. In so far it is important to develop tools to evaluate the strategies of the universities to provide labour market relevant skills and competences. This affects specifically their programmes of adult education, which are mainly resp. partly private funded, by students themselves or by enterprises. Both are expecting adequate return of investment. An evaluation of labour market efficiency of the programmes will be a valuable support to adapt constantly the programmes to labour market needs and to avoid miss investments or matches.

The project describes cases of <apparent good practices> in the participating countries Germany, Scotland, Finland, Turkey, Spain, and Czech Republic; analysing potentials and barriers for their linkage to the labour market, establishing a dialogue between institutional responsible stakeholders about ways to increment the labour market efficiency of the programmes and to provide tools to measure the labour market efficiency.

This project will promote the labour market linkage of tertiary adult education facilitated by universities in relation to industrial sectors. In so far, orientation to this specific, but still broad sector, will contribute to mitigate and cope this qualification gap. In the following, we expose

the results of a study about university-enterprise cooperation in the field of tertiary lifelong learning (TLL) or university adult education or using the old fashion term continuous training at university. We analysed per country three cases of university-enterprise programs for adults, who started working and who want to participate in education and training measures offered by universities to improve their labour market position. These case studies are complemented by desk research about the institutional context of university higher education.

Core questions to be addressed are the regulation of the TLL systems within the national qualification systems, but overall the integration of labour market actors in the design of the programmes.

National strategies towards TLL depend strongly on the resp. educational systems: for this purpose chapter “2. Institutional Context” offers a comprehensive insight into the educational system of Germany. One of main features is its deep rootedness on two main pillars, middle-school (Realschule, Hauptschule) degrees, followed by Initial Education and Training (IVET) and with future career paths within a strong and nation-wide recognised Continuous Education and Training (CVET) system; on the other hand the classical university career with university entrance diploma (Abitur), followed by HE. In Germany, co-operation of the “world of work” with educational systems takes rather place in General Education (GE) resp. IVET, so chapter 2 focuses on these pre-HE structures.

Poor traditions in TLL in Germany, strong CVET system, high relevance of programmes that combine IVET with HE (dual studies) and private universities, working exclusively for a (or a row of) company/-ies, where we tend to speak rather from addiction than co-operation; all excluded from LETAE-approach – these preconditions made choice of cases for in-depth analyses quite complicated.

But we found three interesting grass root cases, covering different approaches of cooperation between HE and the world of work. After a short introduction, why we have chosen the approach of case studies, chapter “3. Case studies on university – enterprise cooperation” will document outcomes of field research in detail:

Chapter “3.1. First Case” analyses an example of open universities; a programme designed for students without university entrance diploma, being fully employed.

Chapter “3.2. Second Case” analyses an example of upgrading skills of white collar workers, planning their next career steps.

Chapter “3.3. Third Case” describes a HE-propedeutic measure, offering a low-threshold insight into the world of studies.

Report is closed by chapter “4. ”, consisting of a short summary and an outlook on next steps resp. starting points for policy learning.

2. Institutional Context

2.1. Short overview of the educational system and educational structure

Following table shows the structure of the German Educational System. At the end of Secondary I education (10th year of school) Secondary II stage starts and from here on a variety of VET or HE forms appear (s. Tab. 1).

Basic Structure of the Educational System in the Federal Republic of Germany		GLOSSARY
Further Education	CONTINUING EDUCATION (various forms of continuing general, vocational and academic education) Doctorate (Promotion) Degree or examination after a course of study which provides qualification for a profession (Bachelor, Master, staatl./Nachtl. Prüfung, Diplom ⁽¹⁶⁾) UNIVERSITÄT ⁽¹⁵⁾ TECHNISCHE UNIVERSITÄT/ TECHNISCHE HOCHSCHULE ⁽¹⁵⁾ PÄDAGOGISCHE HOCHSCHULE ⁽¹⁵⁾ KUNSTHOCHSCHULE ⁽¹⁵⁾ MUSIKHOCHSCHULE ⁽¹⁵⁾ FACHHOCHSCHULE ⁽¹⁵⁾ VERWALTUNGSFACHHOCHSCHULE ⁽¹⁵⁾ Fachhochschulbildung Qualification of vocational further education Allgemeine Hochschulreife	OLDSCHOOL Old-school education Description of the so-called Zweier Bildungsgang at which adults can attend evening classes to obtain the general higher education entrance qualification. Since 2011, the majority of Länder the "alteingesamte" municipalities can be obtained after the successful completion of 12 consecutive school years (eight years at the gymnasium).
		ALTEingesamte Type of school at lower secondary level providing a basic general education. Compulsory schools, which have a different level of secondary school, usually comprising grades 5-10.
Tertiary Education	Fachschule ⁽¹⁷⁾ ABENDGYMNASIUM/ KOLLEG Fachgebundene Hochschulreife Allgemeine Hochschulreife Fachhochschulbildung Berufsqualifizierender Abschluss ⁽¹⁷⁾ Fachhochschulreife Fachhochschule ⁽¹⁷⁾ Fachhochschulbildung Berufsaufbauschule ⁽¹⁷⁾ Fachhochschulbildung Fachhochschulbildung	Alteingesamte The factors degree as a first higher education degree provides qualification for a profession. It can be obtained after a certain period of study (Bachelordiplom) of six, seven or eight semesters at universities and equivalent institutions or higher education, at colleges of art and music, and at Fachhochschulen. Together with the "alteingesamte" degree, the Bachelor's degree is part of a graduate system of university degrees which has replaced the traditional system of higher education qualifications (degrees and diplomas). Bachelor's qualifications provide the same rights as degrees (Qualifikation) (degrees and diplomas). Bachelor's degrees may also be obtained as a tertiary education qualification providing qualification for a profession or for a university.
		Berufsaufbauschule Type of school at upper secondary level offering a three-year course of education which includes both the general education subjects taught at upper - (Gymnasium) level - (Gymnasium Oberstufe) and vocational subjects, such as business and technology, but which also leads to the general higher education entrance qualification.
Secondary II level	Fachschule ⁽¹⁷⁾ ABENDGYMNASIUM/ KOLLEG Fachgebundene Hochschulreife Allgemeine Hochschulreife Fachhochschulbildung Berufsqualifizierender Abschluss ⁽¹⁷⁾ Fachhochschulreife Fachhochschule ⁽¹⁷⁾ Fachhochschulbildung Berufsaufbauschule ⁽¹⁷⁾ Fachhochschulbildung Fachhochschulbildung	Berufsaufbauschule Vocational school at upper secondary level generally providing daytime instruction in general and vocational subjects to trainee-receiving vocational education and training within the dual system.
		Fachhochschulbildung University of applied sciences. Type of higher education institution established in the 1970s, which has the particular function of providing application-oriented teaching and research, primarily in engineering, business, administration, social sciences and design.
Secondary I level	Fachschule ⁽¹⁷⁾ ABENDGYMNASIUM/ KOLLEG Fachgebundene Hochschulreife Allgemeine Hochschulreife Fachhochschulbildung Berufsqualifizierender Abschluss ⁽¹⁷⁾ Fachhochschulreife Fachhochschule ⁽¹⁷⁾ Fachhochschulbildung Berufsaufbauschule ⁽¹⁷⁾ Fachhochschulbildung Fachhochschulbildung	Abendgymnasium Vocational school at upper secondary level generally providing daytime instruction in general and vocational subjects to trainee-receiving vocational education and training within the dual system.
		Berufsaufbauschule University of applied sciences. Type of higher education institution established in the 1970s, which has the particular function of providing application-oriented teaching and research, primarily in engineering, business, administration, social sciences and design.
Primary Education	Fachschule ⁽¹⁷⁾ ABENDGYMNASIUM/ KOLLEG Fachgebundene Hochschulreife Allgemeine Hochschulreife Fachhochschulbildung Berufsqualifizierender Abschluss ⁽¹⁷⁾ Fachhochschulreife Fachhochschule ⁽¹⁷⁾ Fachhochschulbildung Berufsaufbauschule ⁽¹⁷⁾ Fachhochschulbildung Fachhochschulbildung	Abendgymnasium Vocational school at upper secondary level generally providing daytime instruction in general and vocational subjects to trainee-receiving vocational education and training within the dual system.
		Berufsaufbauschule University of applied sciences. Type of higher education institution established in the 1970s, which has the particular function of providing application-oriented teaching and research, primarily in engineering, business, administration, social sciences and design.
Kindergarten	Fachschule ⁽¹⁷⁾ ABENDGYMNASIUM/ KOLLEG Fachgebundene Hochschulreife Allgemeine Hochschulreife Fachhochschulbildung Berufsqualifizierender Abschluss ⁽¹⁷⁾ Fachhochschulreife Fachhochschule ⁽¹⁷⁾ Fachhochschulbildung Berufsaufbauschule ⁽¹⁷⁾ Fachhochschulbildung Fachhochschulbildung	Abendgymnasium Vocational school at upper secondary level generally providing daytime instruction in general and vocational subjects to trainee-receiving vocational education and training within the dual system.
		Berufsaufbauschule University of applied sciences. Type of higher education institution established in the 1970s, which has the particular function of providing application-oriented teaching and research, primarily in engineering, business, administration, social sciences and design.

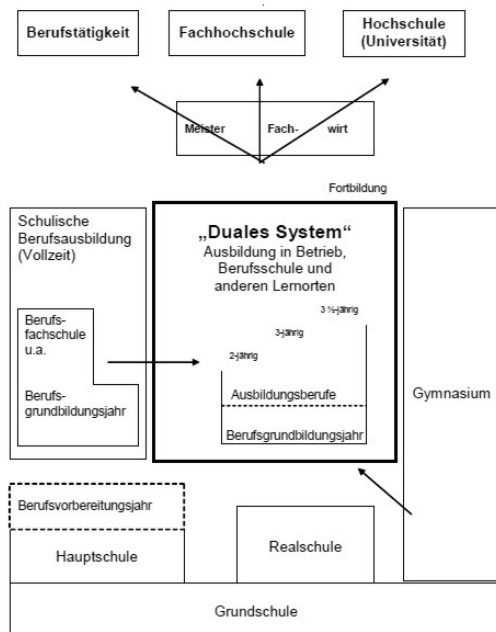
Tab. 1: Basic structure of educational system with a glossary in English

Compared to this sharp frontier (sec. 1 => 2) or threshold the difference between General and Higher Education (GE and HE) is not that sharp. The German Gymnasium covers the middle and upper parts of GE. As the upper stage is performing like a college, which can be part of the university studies in other countries, the assignment of Gymnasiale Oberstufe either to GE or to HE is not a trivial thing. For this report we count Secondary II part of Gymnasium to HE, because that helps to understand the rather long way German reforms passed after they started in the mid of the 60ies.

To illustrate it by a simple fact of these never ending reforms: The attempts to bring HE and work related learning together started with the latter! The ordinary career of a German young adult led from compulsory school to an apprenticeship; then to CVET – ways leading to HE have been excluded for the mass of the school leavers; HE used to be an exclusive field for a

small privileged amount of population (~10%): Any bridge between HE and work related learning had to be built from VET-side.

This section wants to help understanding the way Germany has passed to come to what we have to face now in a more or less European defined situation. To characterise this situation from the general German perspective as the latter is bound to the facts set by the recent reforms we have to underpin that by the pure existence of an elaborated VET regime the leading questions of our project needs a different interpretation. In Germany (as well as in Austria, Switzerland, Luxemburg, South Tyrol, Liechtenstein and a small part of Belgium) the need to open HE to workplace or work related learning cannot be the way to include the latter into the Educational System — as there already is a broad offer of vocational learning fixed in institutional structures its a question of opening workplace and work related learning to HE. In Germany the last step to terminate reforms aiming the so called parity of esteem now seems to come: Replacing the traditional VET regime by HE in the will import all the problems other countries have to include workplace and work related learning into HE. It sounds ridiculous and in fact it is ridiculous.



Tab. 2: The relevant part of the structure shown in Tab. 1 with the apprenticeship system as its centre

Tab. 2 illustrates the way decisions now can be made. Meanwhile it is no exception to come from VET to university anymore. But it was a long way to enable this.

Since the 1960's, Germany has three different school types: Volksschule/Hauptschule (encompassing eight or nine years of schooling), Realschule (encompassing 10 years) and Gymnasium (encompassing thirteen years, nowadays 12). Upon having reached the age of six, all children were required to attend the Volksschule. Four years later the selection process was

already underway, i.e. it was decided whether these students could then attend the Gymnasium or the Realschule or whether they had no alternative but to stay at the Volksschule (nowadays: Hauptschule). This, naturally, meant that a student's future was already decided upon at a time when he or she was just ten years old, in other words whether the student would upon completion of his education attend a vocational college or be able to pursue university studies (having switched to the Gymnasium). Within the recent year less and less students visit Hauptschule; the German system of GE can be seen as being reduced to two tracks.

These 2 mighty pillars in general resp. vocational education (Abitur resp. Realschule followed by IVET) find their prolongation afterwards: HE on university (or university of applied sciences) level was only available for applicants with Abitur; standard career paths for others – after finalising IVET- were CVET-courses.

Aiming at increasing options for university studies for students without Abitur, German Ministry of Education and Research recently started a pilot initiative “open universities”; supporting 47 pilot projects allowing people without Abitur to study, to:

- assure sustainable supply of skilled workforce,
- increase permeability between VET and HE,
- assure fast transfer of knowledge to practice,
- and to allow universities to develop a profile within the area of LLL.

(oh_2015)

Case study 1 was chosen as an example of opening HE for students without university entrance diploma.

2.2. *Systems and structures of work based/work related learning in HE*

Work based or work related learning as a truly integrated element in Education and Training was part of the Berufsausbildung mit Abitur (BmA = VET certificate in combination with the Abitur) in the former GDR.

Due to its political structure based on socialist principles (rooted in the philosophy of German Marxism), the GDR rejected the “bourgeois” notion of education — particularly the notion held by some that education should necessarily be non-utilitarian, i.e. non-job-related. The very name of the GDR's general school type at the lower secondary level, “Higher Polytechnical School” Polytechnische Oberschule, POS), indicates that this type of school took the combination of general education and vocational education very seriously. The concept of this school type resembles those polytechnical educational institutions in France that go back to the days of the Napoleonic reforms. At these types of schools, higher education is not defined by the way it differentiates itself from the learning that goes on in the world of work; in the

contrary, higher education is intended to be acquired explicitly within the context of a specific occupational field, such, as for instance, technology or economics.

After reunification of Germany, BmA was disbanded of, and no adequate replacement for this school type was provided. Whereas Eastern Germans voiced no strong objections to the fact that West German school structures were enforced on them, completely eradicating 40 years of East German educational structuring, they did regard (and object to) the abolition of the BmA as a great loss.

Keeping this situation in mind, it becomes clear that education policy makers in the new states (who wanted to save a double-qualifying educational path) had only one political alternative left: Instead of offering university access together with a vocational training, they had no other choice than to turn to the idea of combining vocational training with access to the “Fachhochschule” (University of applied sciences, FHS; FHR= Certificate of FH entrance), i.e. an institute of higher education (tertiary stage; a kind of Polytechnical School) that combines academic studies with work experience. In this, the Fachhochschule differs from a “Hochschule” (university), an exclusively academic institution, which requires a university entrance certificate awarded by the Gymnasium or Berufsoberschule (BOS). Fachhochschulreife (certification to pursue studies at the Fachhochschule, FHS) is based on a KMK agreement and can relatively easily be combined with vocational training, given a degree of effort directed at resolving certain organizational and curricular problems.

In principle the construction of Fachhochschulreife can be seen as Germany's best practice in bringing HE and work related learning together:

Term “FHR” is somewhat confusing since it is sometimes misunderstood as awarding access to the study of once specific subject (“Fach”) only. But actually, the FHR is an FHS entrance certificate that permits a student to pursue any course of study offered at a FHS. For example, a student who has attended the technological set of courses at a Fachoberschule (cf. Tab. 1) can, of course, study electrical engineering, but could just as well study sociology. Studying at a FHS is not less academic than studying at a university. The only main difference between these two institutions of higher education is that there are no post-graduate courses offered at FHS; research is generally not an FHS focus. Another difference was (prae-Bologna) the shorter duration of study at FHS.

Universities of applied sciences (FHS) are a special feature of the German university system. Distinctive features of those universities are their emphasis on practical relevance, their small group size and exams which are integrated into the studies, as well as study programs which are highly structured, planned and job-related. Universities of applied sciences offer application-oriented study courses mainly in Engineering, Economics, Social Work, Public and Legal Administration and Health and Therapy – so they are closer to “the world of work” than

traditional universities; e.g. they include more internships in their curricula, either voluntarily or due to national or transnational regulations, as in the case of “ship management” (cp. Picture 1: modules of “ship management”) offered by Bremen University of applied sciences.

Semester	Module 1	Module 2	Module 3	Module 4	Module 5
1 30 Credits	<i>Internship I</i>				
2 30 Credits	Mathematics I	Maritime Communication I	Maritime Economics	Maritime Human Resources I	Engineering I
3 30 Credits	Mathematics II	Maritime Communication II	Maritime Law I	Ship's Theory I	Engineering II
4 30 Credits	Ship's Command I	Maritime Meteorology	Navigation I	Ship's Theory II	Cargo Handling I
5 30 Credits	Ship's Command II	Maritime Communication III	Navigation II	Ship Technology	Ship's Command III
6 30 Credits	<i>Internship II</i>				
7 30 Credits	Emergency Management	Cargo Handling II	Maritime IT-Systems	Elective I	Elective II
8 30 Credits	Maritime Law II	Maritime Human Resources II	Ship's Command IV	Bachelor Thesis	Bachelor Thesis

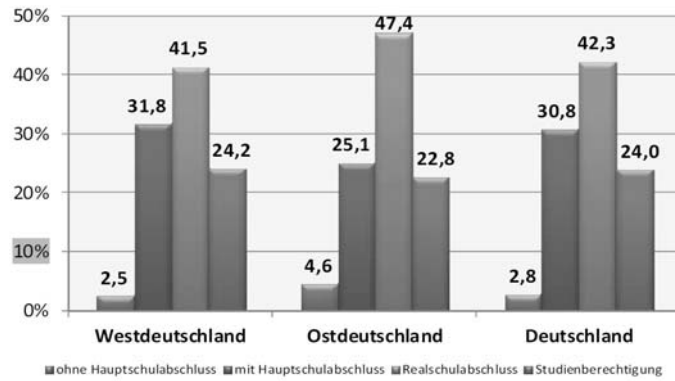
Picture 1: modules of “ship management” (HSB 2013)

Internships are mandatory part of licences on operational level of International Maritime Organisation IMO’s International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).

Case study 3 was chosen due the rich experience of FHS HAW in co-operating with the “world of work” – although most of experience is related to IVET Dual studies, see below).

2.3. Ratios of school-leavers and funding

The percentage of school leavers who enter VET instead of starting university studies is about 50% of a cohort. The most complicating fact is that there are a lot of school leavers who first start an apprenticeship and then chose the university track after having finished it. They are counted twice. And, of course, we also have to face the other way round, that young people first finish (or drop out from) higher education and then start an apprenticeship. That differs as well in regions of the North, the West, the South and the East.



Tab. 3 Quotes of Secondary I resp. II exams of apprentices starting VET (left Germany, middle former GDR, right Germany + former GDR) [»ohne Hauptschulabschluß«: without any certificate; »mit Hauptschulabschluß«: lower certificate of GE; »Realschulabschluß«: higher certificate of GE; »Studienberechtigung«: Abitur or Fachhochschulreife [[gives access to Universities of Applied Sciences]]]

But never the less, one of the most important characteristics of the German education system still is the sharp distinction between general and vocational training. For more than 10 years the number of students with "Abitur" has been increasing. Some of those students, however, do not go to university; they leave school and start a vocational training. There are fundamental changes in deciding about the course of education. These changes are "traverse" to the structure of the German education system described above. The sociological explanation of this behaviour is very simple: the differentiation between education and vocational training is associated with the access to higher positions, i.e. higher income (at least in public discourse). "Abitur" and university degree furthermore offer the access to much more interesting and attractive jobs.

The development in direction of more students with access to university has two contradicting sides:

The choice of the course of education is based on the structure of the German education system described above. This system demands a decision about vocational training *or* university at a very early stage. For this reason the decision for Gymnasium seems to be reasonable.

On the other hand the structure of the education system is already supplemented by several possibilities to gain access to university through vocational training. Gymnasium with Abitur still is the quantitatively most important way to a higher education level, but it is not at all the only possibility to gain access to university or to vocational success. On this basis the early decision for education at Gymnasium is not all cogent and for this reason not as reasonable as it seems to be when viewing the structure of the education system.

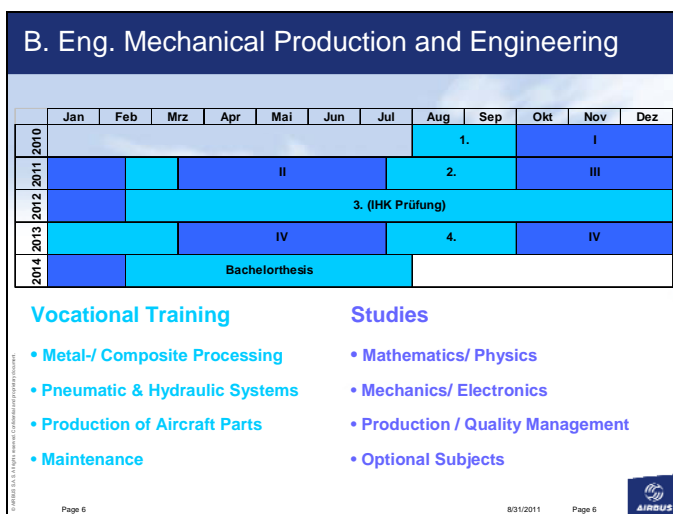
A lot of reform projects tried an approach towards the parity of esteem in a more practical way, for example by increasing the above mentioned »permeability« between general education and

vocational training. Among these projects there are reform projects in Bavaria and North Rhine-Westphalia where young people gain a double qualification: they receive a complete vocational training and gain access to Fachhochschulen. In fact, these double qualifications intend to create additional possibilities to gain a qualified general education. Thus the separation between vocational training and general education remains untouched. These projects only create new possibilities to change from one way to the other. In this respect they add further »mixtures« to the structure of the German education system, the system itself remains unchanged.

As explained above, now the most relevant programme is to combine an apprenticeship with an university's degree. It's called dual studies. It responds to the fact that more and more Secondary I students continue GE and leave the Gymnasium with the Abitur (cp. Tab. 3). Just not to loose them for VET they are offered to study parallel to their VET qualification. Again we have to face that this means opening VET to HE and not HE to VET.

The model was developed in the federal state Baden-Württemberg in the early 1970ies (DHWB 2014). Starting as a pilot project with 160 participants in 1974, nowadays the “Duale Hochschule BW” has 34.000 students – and the model was spread all over Germany, with more than 95.000 participants in 2014 (Weg_ds 2014). In relation to the overall amount of 2.616.881 university students in 2013 (destatis 2013) in Germany still a quite small, but rapidly increasing amount. Additionally must be considered that the number of subjects that might be studied dual is rather low, mainly engineering and economics. In 2014 almost 1500 dual courses of studies were offered (mainly by universities of applied science and academies); cooperating with more than 40.000 enterprises (Weg_ds 2014).

The structure itself is quite simple; a combination of the lectures of an university of applied science or an academy and an internship resp. apprenticeship, an example is give in Picture 2: Sketch of the dual study programme @Airbus Bremen: (roman number: semesters, arabic numbers: worked-based learning (WBL)).



Picture 2: Sketch of the dual study programme @Airbus Bremen

There is one important differentiating factor within the usual study programmes: Some are really double-qualifying with a journeyman’s certificate and a bachelor degree, both awarded by the ordinary assessments as for “normal” apprentices respective students. Approx. half of courses mentioned above are double qualifying (model A); the others lead only to the university degree, the internship is rather engineering propaedeutic (model B).

These models match the tradition of modernisation of VET. This does not only mean to move the centre of vocational training from the tools to the activities, because otherwise it will not be possible to cope with the change of work. The quality of professional work itself speaks in favour of putting »mental« and »personal« characteristics of the working person into the centre of vocational training. These are typical aims of GE and HE. Modern vocational training may not only include technical aspects of labour, it must as well include the context of labour (its organisation) at definite working places. In doing so, this kind of vocational training comes closer to the aims of traditional general education. A worker who develops his capabilities in relation to the modification of his profession as a whole, disposes of capabilities to learn. These capabilities connect the tasks of professional »modernisation« with the worker's person. It is the task of the vocational training system to convey this capability, to develop the person within the frame of his or her capabilities and possibilities.

Modern work organisation in industry, trade and service allows to include competencies which before have been privilege of GE and HE. New VET profiles choose modern working techniques as the subject of vocational training. What ever they learn is connected to working activity under real working conditions; so specific knowledge and skills are completed by general competencies.

Of course, one real advantage is that such models of combining VET profiles and study programmes are still for free. As apprentices not only don't have to pay for their training but earn money while they are learning most of the enterprises which offer study options contribute to the costs of studying. Studying itself is free in Germany. As Tab. 4: wages shows the monthly remuneration of an apprentice can be rather high. Considering that only big enterprises offer dual studies those VET profiles which show a higher remuneration we can expect that their apprentices have more than average available. In most of the cases this income may sufficient for studying.

MIN	MAX	AV
456,00 €	1.030,00 €	816,54 €

Tab. 4: wages

Another aspect of funding is the structural under-financing of German universities; many of them have to search for programmes that are financed by third parties. For sure is this a rather

negative reason; but the willingness of individuals or companies to pay for a HE course (traditionally free in Germany) might be seen as a descriptor of quality.

So case study 2 was chosen due to its relative high amount of fees (18000€) – indicating that participants resp. their companies expect real added value for their money.

2.4. Reference to Bologna and other European initiatives

In Germany Bologna process has a huge impact on the universities. More than the new degrees as bachelor and master the old tendency called academic drift rules the reality of VET and GE on the one hand and the labour market on the other. Traditionally German HE programmes were lasting 5 years (diploma, magister), at universities of applied sciences sometimes only 4 years. Now almost all bachelor programmes last 3 years, almost all (consecutive) master programmes additional 2 years. Short cycle higher education (SCHE) like foundation degrees does not exist.

With references to the European Qualification Framework (EQF) especially the bachelor degrees aren't seen as vocationally relevant as a proper VET exam. A lot of representatives of industry and trade unions want the VET certificates (now: EQF level 4) on the same level as a bachelor degree (EQF: level 6). Actually traditional master (handy craft) degrees are on level 6. The formal, but rather strong rationale is the duration of a VET and of a bachelor degree: 3 years. Additionally effects from the labour market are mentioned: A HE leaver with a bachelor degree applies in some sectors for the same vacancies as somebody who successfully finished IVET.

German HE applies European Credit Transfer System (ECTS), based on learning hours (input). European Credit System for Vocational Education and Training (ECVET) is not introduced in Germany and most stakeholders refuse it due to established holistic assessment procedures – being not compatible to the respective approach of ECVET-recommendation (assessment of single units).

To sum the German situation after 50 years of reforming GE, HE and VET up: Normal school careers tend to this model: GE finished on Secondary II level with an Abitur, then entrance to university, finished with a bachelor degree. This model doesn't know any practical experience. That means never before this many young people in Germany have been separated this far from workplace learning and work experience – so there is really the need of policy learning from other countries with more elaborated approaches.

2.5. Statistics

OECD-statistics on the percentage of younger adults with tertiary education offer an impression of the role of HE in the LETAE partner countries; Tab. 5 Percentage of younger adults (25-34 years old) with tertiary education shows the development from 2000 to 2013:

Country	2000	2013
OECD mean	27%	41%
Czech Republic	11%	30%
Germany	23%	28%
Spain	34%	42%
Finland	38%	41%
UK	29%	49%
Turkey	9%	23%

Tab. 5 Percentage of younger adults (25-34 years old) with tertiary education (OECD 2015)

Although this kind of macro-data always includes a lot of uncertainties (different understanding of HE, politically corrected statistics, different quality of HE-institutions or -programmes...); it offers at least a clear separation between the LETAE partner countries: Finland, Spain and the UK are above (or on the) mean, Turkey, Czech Republic and Germany below mean – OECD-reports for these countries are combined with recommendations to increase the amount of adults with tertiary education. Whereas these recommendations are reasonable for Czech Republic and Turkey due to the really low enrolment in 2000 and the special historic circumstances (post-socialist resp. low-industrialised); for the case of Germany this recommendation ignores an important aspect of German educational system resp. labour market: Many demanding positions that are filled by HE-qualified persons in other countries, are covered by CVET-qualified persons in Germany, with comparable wages, image and sometimes even higher concrete skills for the position.

Comparable conclusions can be drawn when analysing statistics on participation rate in education and training by adults in LETAE countries (cp. Tab. 6: Participation rate in education and training (last 4 weeks), Age from 25 to 64): A lot of hidden variables (quality of programmes, understanding of informal learning, intention of programmes (e.g. real added value vs. programmes only to have less numbers in the unemployment statistics), beneficiaries, etc.) and the same trend as in table Tab. 5 Percentage of younger adults (25-34 years old) with tertiary education (OECD 2015): Spain, UK and Finland are above or close to the mean, Czech Republic, Germany and Turkey below.

Country	2013	2014
EU 28 mean	10.5%	10.7%
Czech Republic	9.7%	9.3%
Germany	7.8%	7.9%
Spain	11.1%	9.8%
Finland	24.9%	25.1%
UK	16.1%	15.8%
Turkey	4.0%	5.0%

Tab. 6: Participation rate in education and training (last 4 weeks), Age from 25 to 64

And, as before, a naïve interpretation (the higher, the better) must be questioned: For sure a certain ratio of population must be re- or further qualified during their working life due to changing economies, new technologies, or other reasons – but a high ratio might also be seen as an indication of poor initial (whether VET or HE) education; for example if initial programme is too far away from labour market and work life starts with an internship or if modularised IVET approaches offer only a training to a certain workplace – and further education is necessary if the person changes to another workplace; even if it is in the same company and within the same vocation.

3. Case studies on university – enterprise cooperation

Case studies are based on series of interviews made with persons responsible for the programme from side of the university and enterprise, lecturers and students of different programme cohorts. The interviews are made using interview protocols, which have been jointly elaborated by the European partners of the project to assure a common standard of information. However, we are talking about semi-structured interviews, given place to ask specific questions about issues emerging in the course of the case study and the interviews. The interviews have been complemented by the analysis of documents available about the programme.

In so far, study is not representative, but exploratory (rather than purely descriptive or fully interpretative) in nature, answering the following leading research questions:

- a) Which are the conditions to foster university-enterprise cooperation in the field of university adult education so that it becomes one viable instrument for social effective university adult education?
- b) Are the cases examples to foster university-enterprise cooperation in university adult education, but also in the formal higher education and if so, under which conditions?

3.1. First Case

3.1.1: Introduction to Case

In Germany a wide and controversial debate on a possible general lack of skilled workforce in engineering disciplines (cp. wiwo 2014) arose in the last years; but there is broad evidence that this lack already exists in chosen fields, beside others aren't there enough VET-teachers in technical domains (cp. handwerk 2013).

Another recent trend is the opening of German universities for non-traditional students (cp. oh_Bremen 2009) in the last decade; especially for applicants with a Continuous Vocational Education and Training (CVET) degree (master craftsmen (Meister), technicians). Open universities are not very successful in terms of numbers of students without traditional university entrance degrees (2% of all new students in 2010, (Che 2012)); due to a bundle of reasons: Time schedules, financing, academic snobbishness, academic teaching and learning etc.

Referring to these two trends Institute for Technology and Education (ITB) from Bremen University together with CVET adult education provider "Handwerk Bremen" (run by the chamber of handicraft) and supported (or at least tolerated) by the employers of the students started in 2012 the 3 years open study programme "TRIAL". Successful students receive a double qualification, a Bologna bachelor degree in engineering and a CVET-certificate as a vocational pedagogue, both on EQF-level 6. Programme combines and recognises the learning

outcomes of three learning venues: university, CVET-courses and workplace. When successfully finalising this programme two career pathways are foreseen: Students could either work as a skilled trainer in a company or start a master programme to become a VET-teacher. Programme analysed is designed for around 30 students each year; offering many lessons outside regular work hours.

At the university the non-traditional students visit the same seminars as “normal” students; as both sub-groups are aiming at acquiring the same qualification. Seminars of university and of CVET-provider are synchronised in terms of time and content, employers try to support the programme by being flexible with the working times and offering project work that might be used for term papers.

3.1.2: Collaboration or partnership

Programme started with a feasible study in 2010 in four German regions (Bremen/Oldenburg, Trier, Rostock, Schwäbisch Gmünd). One of the main outcomes -beside the need for such programmes- was that for a smooth implementation a “conceptual, didactic and organisational integration of the three learning venues (University, CVET-provider, and company) is necessary”. For this purpose a binding co-operation declaration between university and CVET-provider was signed. As students participating work for different companies, comparable declarations with companies are not foreseen; co-operation works rather informal via motivating companies to be flexible with working times or helping to find work-processes that might be creditable within the programme.

Previous work-based learning or work experience is creditable with up to 60 ECTS points (one year of regular studies); modules, which foresee project or practical work, might be processed in the company.

In general education and training are playing an important role in German companies due to the dual VET-system; especially large companies run own training departments (for apprentices). Consequently the engagement or commitment of companies related to the issue of lifelong learning (LLL) is rather high, although there is only poor experience in co-operating with universities, usually companies co-operate with VET-schools or CVET-providers only.

3.1.3: The case study programme, based on interview matrix

3.1.3.1. Interviewees:

For this case study 4 persons were interviewed, all of them male.

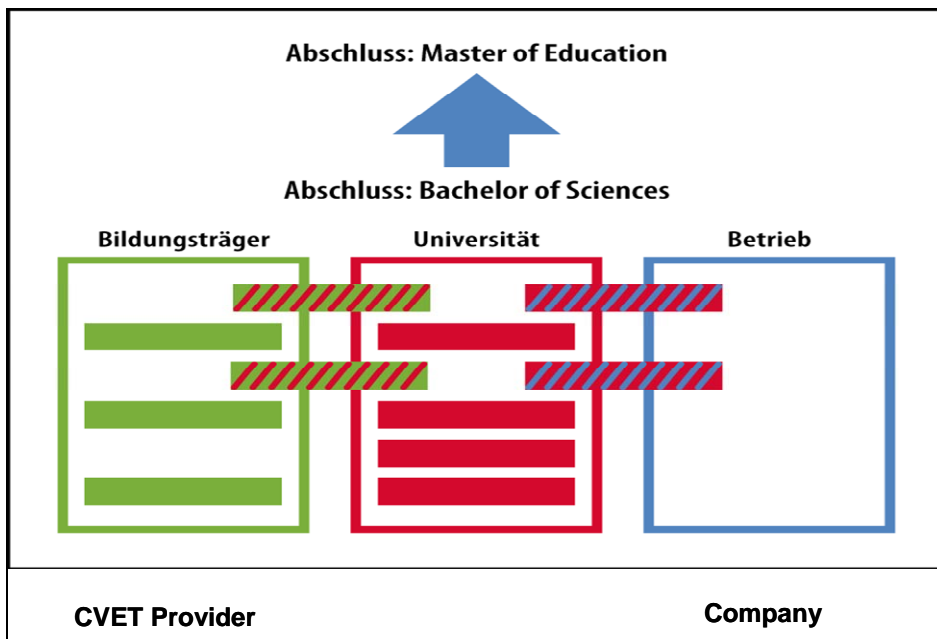
- The project coordinator, aged 62 years, working at the university full-time for the programme with a PhD in sociology. As a side job he is a teacher in an adult

education centre, but his main involvement is research in the field of vocational education.

- A pedagogical colleague from CVET-provider, aged 43 years, teaching pneumatics, additionally responsible for projects run by the provider and development of curricula; within the TRIAL-programme he's in charge of marketing, mentoring and recognising of former LO, spending 10% of his working-time for the project. He started his career with an apprenticeship as an industrial tool mechanical, followed by a master craftsman (Meister) and studied sociology afterwards; awarded with a Diploma.
- Two students, both stable employed full-time, aged 31 resp. 47 and part of the "first generation students", starting in 10/2012. Both without "Abitur" (general university entrance diploma), leaving general school after 9 resp. 10 years. Starting their working life with an apprenticeship (fitter resp. industry mechanic), after some years of work experience (minimum: 5 years) they awarded the CVET "state certified technician"-qualification, one of them full-time (2 years) the other one extra-occupational. One of them works in special purpose machinery manufacturing, the other one as a technician at the university.

3.1.3.2. Decision making process

After the positive resonance of feasible study the main challenge was to assure funding of the programme, as additional tasks -compared to traditional study programmes- arose; esp. promoting of programme to new target group, advising of students, organising new curricula and scheduling, and evaluation of programme. A proposal was successfully submitted to the German ministry (BMBF) and programme was funded from 03.12 till 02.15; a prolongation of another year till 02.16 was negotiated by the end of 2014. Stakeholders from university and CVET-provider jointly developed the curriculum; general structure of programme is sketched in Picture 3: The tripartite model. It was accredited by the competent body as a full, Bologna-compatible bachelor programme; the additional CVET-degree "VET-pedagogue" was already accredited by the regional chamber. Lecturing staffs are a mix of university and non-university staff. University lecturers are selected exclusively by the university. Non-university lecturers at CVET-provider are in-house professionals.



Picture 3: The tripartite model

Programme combines 5 core areas: Vocational- and workplace-pedagogies, vocational sciences of vocational discipline, core modules of vocational discipline, engineering basics, and engineering within the vocational discipline.

Students interviewed told us that the main driving factors to enter the programme were own motivation, acquiring a HE degree, linked with the perspective of a better (paid) job. They have chosen this programme because it is the only one of this kind in Bremen, designed for master craftsmen (Meister) and technicians from the sectors of metalworking and electricity with recognition of work-related LO, due to the prestige of the provider and the relationship to current employment.

3.1.3.3. General programme information

A regular bachelor programme (180 CP), with the option of combining it with a CVET-degree. Lessons with redesigned curriculum started in winter 2012/13 with 30 students, 19 of them “traditional” the other 11 without university entrance diploma but with a CVET degree. It combines 3 learning venues; university, company and CVET-provider (optional). LO from the other 2 learning venues are (partially) accredited by university; prior LO from working or CVET experiences might be accredited with up to 60 CP, partially (22 for a technician) by general (blank) recognition, the rest by an individual portfolio, but no candidate reached full 60 CP. Beneficiaries have to apply as ordinarily students, too; as always in Germany the first undergraduate degree is free of charge; additionally the standard fees of CVET-provider (~5000€) are covered for students in the pilot phase by the programme. Regarding schedules of lessons a mixed model was established: Whilst “regular” engineering lectures are during daytime, seminars and didactic lessons are in the evening or as bloc-seminars on the weekend.

Successful students award a bachelor of science, including the option of studying a master of education programme (2 years fulltime) afterwards.

Target group are vocationally qualified students, who are working full- or half-time from sectors of metalworking and electricians, who haven't a university entrance diploma. Generally programme would be suited for jobless technicians, too; but German welfare regime states that jobless people must by job-seeking full-time and that they are not allowed to study - if so, they lose their right for dole.

Programme is accompanied by an independent advisory board with stakeholders from all relevant institutions (other universities, ministry, employers, CVET-providers, trade unions). Advisory board meets each year to guide and support programme, and to increase visibility via public announcement.

3.1.3.4. Programme evaluation

University of Bremen generally supports policies of lifelong learning (LLL) issued by competent bodies; besides other approaches by supporting developing programmes for VET-qualified students (Open University). In TRIAL-programme special emphasis is given to guidance for students, starting with a pre-study, consultancy of potential students, individual recognition of prior learning outcomes, and a formative assessment of programmes' performance during the first 3 years. The main demands programme is responding to are up-skilling of competencies, improvement of labour market opportunities, personal development and development of new (academic) skills. To assure involvement of all relevant stakeholders, an advisory board was founded, with delegates from ministry, social partners, university, CVET-providers etc. to guide advancement of programme.

Mean age of the target group is around 40, most of students (~80%) are male and all of them are employed. To match the programme to the learning needs of the target group schedule of lessons was adapted to their needs (mainly: evening/weekend), special bridging lessons (math, mechanics) were offered and additional lectures were hired; but most (around 20) of lecturers are normal university staff.

Besides recognition of prior learning some of the lessons of programme allow integration of working life of students, projects might be performed in company and bachelor theses can be written on topics of company, for example on improving apprenticeship schemes. Although a standard way through the lessons is foreseen, students are free to develop their individual learning paths, for example to concentrate a whole semester on challenging topics like mathematics. The standard length of bachelor programmes (3 years) is quite ambitious for working students, no punishments are foreseen if students need longer; the only constrain are

fees that all long-term students have to pay (500€each semester if standard duration+ 2 years is overspent).

Programme is evaluated twice, on one hand by the standard procedures used for all lectures (written feedback by students on the lecture at the end of course), on other hand by an additional formative evaluation process, consisting of more detailed questionnaires, and individual and group interviews.

Students interviewed for this case study were seriously challenged by family obligations and schedules; they developed their own evaluation scheme: First semester was seen as a personal feasible study; whether programme and university teaching and learning fit for them or not. Both decided 'yes' and identified mathematics as the hardest topic for them; so they reserved the whole 3rd semester for mathematics, again with the option to leave if they fail - but both succeeded.

„Mathematics-obstacle is very high; it costs time, nerves, courage, and energy for studying other topics.“

(„Die Mathematik-Hürde ist sehr hoch, es raubt Zeit, Nerven, Mut und Kraft für das Studieren der anderen Fächer.“)

Quality of lessons is seen differentiated: Students have the impression, that some of lecturers, esp. the pedagogic ones, really try to meet their needs in terms of scheduling, topics (close to working live), and teaching methods - whilst others, esp. from engineering faculty, suggest that they are not interested to teach VET-qualified students. In general learning programme was as expected, partly even better, e.g. the cooperation with traditional students or the rather low attendance requirements.

Due to the innovative approach of offering a common programme for traditionally and VET-qualified students a row of specific challenges occurred:

- Different interests in scheduling: Traditional students prefer lessons from Monday to Friday between 08:00 and 18:00, whilst VET-qualified & working students usually cannot reach the university before 17:00 and are willing to offer their weekends.
- Different learning attitudes: VET-qualified students are challenged by ambiguous tasks without perfect solutions and their concept of learning is often rather directed by others, if they don't receive straight orders they are unsure on how to proceed.
- Self-dependence regarding learning, presenting in front of a broader audience and the ability to write scientifically must be developed during the programme.

„Problem is; that rethinking to universities' learning- and working methods is approachable only under pain. The amount of

private obstacles that must be overcome. I heard from other students too, that families are revolting; that families don't understand why students would do that to themselves at the age of 40."

(„Das Problem ist, dass ein Umdenken auf den universitären Lern- und Arbeitsmodus nur unter Schmerzen möglich ist. Was man für private Hindernisse überschreiten muss. Ich habe es auch von anderen Kommilitonen gehört, wo die Familie schon rebelliert, weil die das nicht nachvollziehen kann, dass man sich das mit 40 noch einmal antut.“)

- Challenging topics: Some topics, especially mathematics, are built on learning outcomes of upper secondary school. If students never heard anything on those topics before, comprehensive additional teaching is needed.

3.1.3.5. Impact

As no student has already finished programme is it too early to judge evidence-based on the impact. Preliminary impressions reveal that the amount of drop-outs of vocationally qualified students is lower than the ratio of traditionally qualified students, in summer 2014 (after 2 years of programme) 7 (from 11) VET-students were still matriculated, whilst the amount of traditional students decreased from 19 to 7.

Programme can be considered as a success story from the learners' resp. companies' perspective; students reported from work-tasks with higher responsibility, a more confident work-attitude, application of methods learnt at the university and the expectation of higher wages when finalising the programme.

From universities' perspective programme is successful in a narrow meaning, in terms of increasing the amount of students in ITB's bachelor programme. But from a wider perspective, the shortage of VET-teachers in technical subjects in the region; it is not very successful; only few of the VET-qualified students are planning to continue with the -for VET-teachers mandatory- master programme. This is caused by a bundle of reasons; main factors are:

- Relative satisfaction with the actual company; no aspiration to change employer.
- Master-programme is not offered parallel to work; all lessons are on Mondays to Fridays from 8:00 to 18:00.
- Workload in the 3 years of the bachelor programme (parallel to work) was this high, that additional 2 years would be too challenging.

From a very wide perspective another risk occurs; due to the principle of subsidiarity between the German regions (Länder) every region is free to accept teachers, who went to university in another region, or not. Till now this risk was of relevance only for teachers in general schools;

in Germany each teacher has to study two topics (e.g. physics and politics); and some combinations of these topics are accepted only in some of the regions.

Regarding TVET-teachers, two traditions of referencing to scientific topics exist in Germany:

- Most universities in south Germany refer mainly to the corresponding engineering discipline (e.g. mechanical engineering).
- North-German universities refer mainly to the corresponding vocational sciences (e.g. group of metal vocations).

If curricula of north-German universities are adapted more and more to the needs and potentials of vocationally qualified students (e.g. by lowering the standards of mathematics or mechanics), the risk that degrees are not accepted by VET-schools in south Germany is increasing.

3.1.4: Case summary

At a glimpse, main strengths, weaknesses, opportunities, and threats can be summarised as following:

Strength and opportunities:

- Study programme alongside the job
- Practice oriented and work process related studies
- Modularised curricula with certification of modules
- Flexible options for entry and exit

Weaknesses and threats:

- Timeframe 3 years (as for ordinary bachelor programmes): often *NOT* realistic
- Recognition and accreditation of vocational learning outcomes often less than expected
- Some lecturers are not willing to respect the need of evening sessions
- Some lessons are too hard (mathematics)

Interviewees saw the following potentials or needs for further development of programme:

- (Better) integration of vocational qualified students from the automotive sector
- Better permeability from HE to VET, in terms of recognising LO from university for IVET resp. CVET programmes, mainly focussing on traditional students who drop out from university
- Co-operation of traditional and non-traditional students should be increased by organisational measures
- CVET-degree ‘vocational pedagogue’ should be recognised as a trainer (in-company) certificate (this certificate is mandatory for in-company trainers & part of ‘master craftsmen (Meister)’-CVET-programmes)

- Lessons in mathematics that refer to the needs and potentials of students in a VET-teacher programme.

Most crucial aspects for implementing such a programme in other institutions resp. countries are funding and scheduling; programme needs financial support by third parties at least for the phase of developing and implementing it; additionally must be taken into account that not all employers are able or willing to offer flexible working schedules.

Type	Payment	Award	Entry requirements
1	Free	Qualification	open
2	Free	Qualification	traditional
3	Free	Certificate	open
4	Free	Certificate	traditional
5	extra fees	Qualification	open
6	extra fees	Qualification	traditional
7	extra fees	Certificate	open
8	extra fees	Certificate	traditional

Tab. 7: Typology of LETAE-cases

Referring to **Tab. 7: Typology of LETAE-cases** the programme TRIAL is *type 1*; no additional fees for students or companies have to be paid, the awarded degree is a Bologna-compatible Bachelor-degree and it is open for non-traditional (VET-qualified) students.

3.2. Second Case

3.2.1: Introduction to Case

In Germany it is quite common, that engineers advance to higher management positions in companies in technological sectors; e.g. the CEO`s at Siemens were mainly engineers. On the other hand most traditional German study programmes focus on one topic only, for example mechanical engineering or one natural science.

Engineers, planning their advancing into management or from middle management to higher management, consequently partially lack of systemic, leadership, self-estimation, and organisational competencies resp. methods.

Study programme *Master of Engineering "Industrial Engineering" (MIE)* was developed to bridge this gap between competencies from first (technical) studies and the expectations of management positions. It focuses on imparting knowledge, skills and competencies to enable students,

- ...to develop visions and aims within occupational context,
- ...to improve communication and leadership competencies,
- ...to develop abilities for sustainable problem-solving and decision-making and for straight implementation,
- ...to arrange tasks, processes, projects and structures according to the needs,
- ...and to optimise processes and structures from a holistic perspective.

Programme is designed parallel to work and equals 120 Credit Points (CP) as almost all German Master programmes. These 120 CP correspond to 2 years of full-time studies; as the target group of programme is employed and from all over Germany, regular period of studies was extended within this programme to 3 years.

Programme is aiming at 10-15 students per year only - to enable efficient group work, so applicants have to provide evidence on their working experience, to pass an entry examination; and to pay 18.000€ for the whole programme.

Programme is accredited as being Bologna-compatible by competent authorities; successful students could apply for a PhD position.

3.2.2: Collaboration or partnership

Programme was developed by Bremen Institute for Work Science (aib), being part of the University of Bremen, department of Industrial Engineering - Mechanical Engineering and Process Engineering. aibs' main focus is on design of human work and on human action in work and organisational contexts.

Research and experiences from co-operating with different companies by the head of institute aib lead to the development of MIE programme; supported by academy for continuing education, a spin-off of Bremen University, and the faculty of mechanical engineering.

Students participating in the programme work for different companies, declarations with companies on co-operation are not foreseen; co-operation works rather informal via motivating companies to be flexible with working times, helping to find work-processes that might be creditable within the programme, or financial support of the students by covering (parts of) fees by companies.

Previous work-based learning or work experience is not creditable within programme, but certain certified training seminars from competent providers are creditable, for example certified seminar project management offered by the German society for project management; modules, which foresee project or practical work, might and should be processed in the company.

In general education and training are playing an important role in German companies due to the dual VET-system; especially large companies run own training departments (for apprentices). Consequently the engagement or commitment of companies related to lifelong learning (LLL) is rather high, although there is only poor experience in co-operating with universities, usually companies co-operate with Vocational Education and Training (VET)-schools or Continuous Vocational Education and Training (CVET)-providers only. Large companies offer many seminars of continuous education, interestingly positively correlated to the level of education of staff (cp. AG Bildungsbericht 2012); but most of these seminars are lasting some days or weeks only and do not have an holistic approach as the programme analysed for this case study.

3.2.3: The case study programme, based on interview matrix

3.2.3.1. Interviewees:

For this case study 2 persons were interviewed, both male.

- The project coordinator, aged 64 years, working full-time as a professor at the university. He is the head of Bremen Institute for Work Science (aib) and developed programme 10 years ago, designed the curriculum and is involved in lecturing in the programme.
- A former student of programme, being now chief executive officer of a midsize equipment technology company, covering both, the learners' and the companies' perspective, as he now sends his staff to the programme. He is aged 40, left general schooling with general university entrance diploma; but started his professional career with an apprenticeship (industrial electronics technician), followed by a university diploma in industrial engineering and management. He studied in the programme analysed whilst working for a company in automotive sector.

3.2.3.2. Decision making process

The founder of programme worked for years with companies for further development of their management, organisational and controlling procedures. He recognised a systemic lack in these fields and developed a first version of programme with 90 CP. Later programme was increased to 120 CP to cover the workload of German Master programmes. Actually programme consists of 4 fields of study:

1. field: Basics
 - Systematic of systemic working (9 CP)

- Compulsory optional subject: General Studies: Economics and social sciences (6CP)
- Project thesis (15 CP)
- 2. field: Advanced studies
 - Industrial engineering 1 + 2 (12 CP)
 - Leadership and organisation (6CP)
 - Modelling of socio-technical systems (6CP)
- 3. field: Supplementation
 - Leadership, communication and cooperation (6CP)
 - Simulation of operational performance-developing processes (3CP)
 - Methods of working engineer-appropriate (3CP)
 - Cost- and performance-calculation and controlling (3 CP)
 - Industrial planning- and controlling mechanisms (6CP)
 - Further education on methods (15 CP)
- 4. Master thesis
 - Master thesis and colloquium (30CP)

Programme is promoted via webpage of aib and recommendations of former students; broader communication by advertisements in newspapers didn't increase the amount of applicants.

Former student interviewed said that the main driving factors to enter the programme were own motivation, the focus of programme, enhancing of generic competencies and skills, and quality of programme - linked with future career plans. The flexible scheduling with only few lessons with attendance requirements (details: see below) and block seminars facilitated the decision - as he is not living in the region of Bremen.

3.2.3.3. General programme information

Case is an accredited regular master programme (120 CP); with only 67 days of mandatory attendance, mainly from Thursday to Sunday. Each CP equals a workload of 30 hours. Most modules listed above combine some days of lectures /seminars (3-15 days) or "mobile lecture-units" (without attendance requirements) with preparation and analyses of the subjects of seminar and preparation of module assessment. Most modules include "transfer-tasks"; the application of methods learnt within concrete work- and business-processes. Project thesis and Master thesis should be written on tasks of the actual position in company, if this is impossible other solutions are feasible, too.

University of Bremen tries to increase the amount of students without university entrance diploma, so programme is open for master craftsmen (Meister) and state certified technicians, too - if they have worked for at least five years, among those two years in positions that usually are staffed by an HE absolvent. In fact almost all students of programme have already an HE degree; some of them even a PhD. Successful students award a master of engineering, including the option of applying for a PhD position.

Target groups are:

- Specialists and managers from product-, process- or project-management, being responsible for organisational and strategic tasks in industry or service sectors
- Specialists and managers from operative management from all sectors

- Consultants from company-, organisations- and recruitment consultancies

3.2.3.4. Programme evaluation

Mean age of the target group is around 40, most (~80%) of optimal 10-15 new students per year are male and all of them are employed. 80% have a technological background (engineers), the others come from logistics and consultancy. They work in lower or middle management or are interested in proceeding to management. To match programme to learning needs of target group schedule of lessons was adapted to their interests (only few mandatory block courses), and innovative forms of teaching like phases for reflection, role-playing, or integrated lessons (combing subjects and methods from work sciences, psychology, and mechanical engineering) were developed.

„Most impressing were methods of teaching; phases for reflection, group discussions, methodical skills! - structured working methods for daily life in company.“

(„Am meisten beeindruckt hat mich die Art und Weise der Stoffvermittlung; Reflexionsphasen, Gruppendiskussionen - Methodenkompetenz! - strukturierte Arbeitsweisen für den Alltag im Unternehmen.“)

The four lecturers are acknowledged experts for their subjects, in their first job professors at University; employed as a second job for teaching within programme; in some cases leading to time conflicts. Lessons of programme allow integration of working processes of students, projects resp. home-work might partially be performed in company (transfer-tasks) and master theses should be written on topics of company, for example on improving production flows.

Although the standard length of master programmes (2 years) was already prolonged to 3 years is programme scheduling still quite ambitious for working students, but no punishments are foreseen if students need longer; the only constraints are fees that all long-term students have to pay (500€ each semester if standard duration+ 2 years is overspent). Only mandatory time condition is being present in block seminars, for example 3 days for module “methods of working engineer-appropriate (3 CP)”, corresponding to a workload of 24 hours; the other 66 hours of module are flexible; to be spend afterwards at home or in company.

Fees of programme were covered fifty/fifty between former student and his company; additional costs like travelling and accommodation had to be covered by former student. In the impressions of interviewees’ this sharing was quite representative for other students, too.

Presence times in Bremen of former student interviewed were partly supported by company; for example (30 presence days a year) by unpaid exemption for 20 days and 10 days of holidays. This also was estimated as being quite representative for other students.

Programme is evaluated by the standard procedures used for all lectures (written feedback by students on the lecture at the end of course); no special guidance services are foreseen but due to small groups and close co-operation with lecturers informal support is available if needed.

Former student interviewed for this case study was challenged by family obligations and schedules; additionally he reported that some of his colleagues with a pure technological background were challenged by business studies. Quality of lessons is seen rather positive: Student has the impression, that lecturers really try to meet students’ needs in terms of

scheduling, topics (close to working live), and teaching methods. His expectations on all other issues like content, practical orientation, attendance requirements, student/teachers relationship were met or even outperformed; best aspect was seen in the interdisciplinary approach:

„Setting of tasks was in a manner that dissimilar themes were combined.”

(„Die Aufgabenstellungen waren so angelegt, dass artfremde Themenstellungen verknüpft wurden.”)

To put it different, programme can be considered as being close to interests and working situations of students, satisfying by innovative teaching methods, opening new career opportunities, and really delivering know-how applicable in work processes.

3.2.3.5. Impact

Both persons interviewed estimate that programme has a high impact on future careers of former students; they reported from low drop-out ratios, positive feedback, and gained knowledge with real added value. Recruitment of new students via recommendations of former students is another indication for high impact; best example is the former student interviewed - who sends his staff now to programme. So programme can be considered as a success story from the learners' resp. companies' perspective; graduates work in positions with higher responsibility, have a more confident work-attitude, apply methods learnt at university, and receive often higher wages after finalising the programme.

In general programmes like the one analysed or dual study programmes (combining a bachelor-degree with in-company part of an apprenticeship) bear for companies the risk of investing in staff that might change employer after successfully finalising programme; binding obligations to work for a given period for the old employer often are not in a manner that will stand up in court.

From universities' perspective programme is successful in a narrow meaning, in terms of increasing the amount of students who contribute to universities' budget and increasing linkage to companies; opening new accesses to the field of work sciences. This positive estimation is questioned by the missing long-term strategies:

University of Bremen generally supports policies of lifelong learning (LLL); besides other approaches by its spin-off “academy of continuing education”; being partner in the programme. Although programme is seen as a success story by all parties involved and generates by fees additional revenues for university it will be closed after retirement of founder; university cuts many activities that are not part of its core business due to financial situation in Bremen. This leaves the question whether all policies on lifelong learning and innovative approaches (open universities to society) are more than lip services.

3.2.4: Case summary

At a glimpse, main strengths, weaknesses, opportunities, and threats can be summarised as following:

Strength and opportunities:

- Offering career opportunities for the middle management

- Accreditation of work-process oriented LO
- Respecting the opportunities of the target group
- Meeting the needs of participants
- Innovative teaching methods

Weaknesses and threats:

- Closely related to the engagement of the founder – no sustainability after his retirement (next year)
- Lessons are on-top (for the lecturers), partly problems with time & motivation
- Expensive
- Economics lessons partly hard for engineers
- Timeframe not realistic (First student finished his studies after 3.5 years)

Additionally, the following potentials or needs for further development of programme were mentioned:

- Further improvement of e-learning facilities
- Increased flexibility to assure smooth work/study/family balance

Most crucial aspects for implementing such a programme in other institutions resp. countries are funding and scheduling; programme needs financial support by third parties *and* by university; additionally must be taken into account that not all employers are able or willing to offer flexible working schedules.

Type	Payment	Award	Entry requirements
1	Free	Qualification	open
2	Free	Qualification	traditional
3	Free	Certificate	open
4	Free	Certificate	traditional
5	extra fees	Qualification	open
6	extra fees	Qualification	traditional
7	extra fees	Certificate	open
8	extra fees	Certificate	traditional

Tab. 8: Typology of LETAE-cases

Referring to Tab. 8: Typology of LETAE-cases the programme MIE is *type 6*; extra fees are charged, awarded degree is a Bologna-compatible Master-degree and most participating students have already finished a first study programme (or have at least an university entrance diploma), although this is not mandatory.

3.3. Third Case

3.3.1: Introduction to Case

German educational system -after mandatory general school- traditionally is based on two separate pillars: Apprenticeship-structured Vocational Education and Training (VET) and Higher Education (HE). Permeability between these two tracks is rather low, beside other reasons due to an established and nationwide recognised Continuous Vocational Education and Training (CVET) system.

On the other hand a wide and controversial debate on a possible general lack of skilled workforce in engineering disciplines (cp. wiwo 2014) arose in the last years; and in many companies an increasing gap between skills of blue and white collar workforce must be considered. To reduce this gap and to increase the amount of successful engineering students a row of measures were implemented or reinforced during the last years, for example:

- Dual studies, combing in-company part of an apprenticeship with an university Bachelor programme (cp. ds 2015)
- Opening of German universities for non-traditional students (without university entrance diploma, cp. German case study I)
- Propaedeutic measures

Case analysed is a propaedeutic measure of one semester, offering a low-threshold insight into engineering studies at Hamburg University of applied sciences (HAW) alongside work. Programme was originally developed to increase the amount of female students in engineering disciplines (Pro Technische); around 15 young women participate, funded by city council of Hamburg. But there was space for more students, Airbus Hamburg decided to join programme and to send 5 apprentices in their last (third) year of apprenticeship to programme.

3.3.2: Collaboration or partnership

HCATPro is a joint programme of Hamburg University of applied sciences, State Vocational College for Manufacturing and Aircraft Engineering (G15), and Airbus Hamburg; aiming at demonstrating manifoldness of engineering studies and increasing operational competencies of participants. Originally city council of Hamburg initiated and funded curriculum design, but they are no formal partner in HCATPro. Partners are an established network, organising together (and with other partners like Lufthansa) Hamburg Centre of Aviation Training (HCAT):

“HCAT offers a combined range of vocational and academic education and training. Key areas of the learning venue are avionics / electronics, cabin / cabin systems and modern manufacturing processes / new materials (CFK). Vocational college, university and industrial companies are sharing the laboratories and workshops of HCAT and exchange their know-how in teaching, research and practice.” (HCAT 2015)

Airbus Hamburg committed itself to send 5 students resp. up to 5% of apprentices each year to programme for piloting; future of programme is unsure as it is closely linked to programme Pro Technische of original initiator (City council of Hamburg).

Airbus, as a leading aircraft manufacturer in general is very engaged in vocational education and training and in adult education; for example by improving its apprenticeship schemes through pilot projects, offering many dual studies programmes, or supporting its workforce to visit CVET-courses.

Hamburg University of applied sciences (HAW) is a practise-oriented university, cooperating closely with dozens of companies and offering more than 50 dual study programmes.

State Vocational College for Manufacturing and Aircraft Engineering (G15) is the only VET-school in Hamburg for technical aircraft vocations; most of their apprentices are from Lufthansa or Airbus.

3.3.3: The case study programme, based on interview matrix

3.3.3.1. Interviewees:

For this case study 3 persons were interviewed, all of them male.

- Project coordinator, aged 52 years, working at the university full-time as a professor in the department automotive and aviation engineering. He is teaching mathematics, aerodynamics, and fluid mechanics. He developed programme together with colleagues from G15 VET-school. He is selecting the applicants, teaching within programme, and supervising collaboration.
- Project manager vocational training of Airbus Hamburg, aged 55. He is industrial master craftsmen in metal and trainer for welding and aircraft structure. Vocational training department in Hamburg is quite large (>100 new apprentices each year), so he is responsible for all additional activities like HCATPro. Together with his trainer-colleagues is he choosing among the apprentices who could resp. should apply for programme, but final decision is made by university.
- A former apprentice and former student of programme analysed, aged 27, being now a regular student in aircraft engineering. After general school he started to study teaching; but realised after 3 semesters that this is too theoretical for him. So he changed to Airbus' apprenticeship programme and was proposed to be part of the first cohort (2013/14) from HCATPro. After successfully finishing both, apprenticeship and HCATPro, he received a working-contract at Airbus but is unpaid exempted from work for up to 3 years (regular duration of his actual study programme (Bachelor)).

3.3.3.2. Decision making process

Programme was developed by HAW to increase the amount of female students in engineering disciplines via this propaedeutic measure. As it was not fully booked by young woman, the coordinator asked the project manager from VET department at Airbus whether they are interested in joining the programme. Project manager prepared Tab. 9: Decision making at Airbus (own translation) to convince heads of his department - and they agreed.

PRO	PRO
Initiierung eines nachhaltigen Talentförderprogramms, das sich nahtlos in das Konzept der PoA einbinden lässt	Initiating of a sustainable support programme for talents; in-line with the PoA (work-process oriented apprenticeship) concept.
Nutzung vorhandener HCAT Kapazitäten	Using existing HCAT facilities
Übergreifende Kooperation Hochschule, Berufsschule und Unternehmen	Cooperation between HE, VET-school and company
Die Azubis gehen für mehrere Jahre in ein Studium und stehen dem Unternehmen zur Verfügung, wenn wieder Bedarf an Ingenieuren besteht	If successful, participants study for several years and return to company if there are (as expected) additional needs for engineers
CONTRA	CONTRA
Kosten ca. 2000€pro Student	Expenses ca. 2000€per student

Tab. 9: Decision making at Airbus

Afterwards Airbus developed a commitment between management and workers council, consisting of 6 paragraphs, main entries are:

1. Background and aims

Special support of chosen apprentices, especially by “Airbus graduate support” if apprentice decides to start a regular study programme afterwards, will be provided.

2. Scope

All apprentices at Airbus Hamburg might be beneficiaries.

3. HCAT-Pro

...is aiming at increasing permeability between VET and HE, focussing on operational competences.

4. Participation and process of selection

Airbus Hamburg offers participation in programme to at least 5 apprentices resp. up to 5% of the yearly cohort:

4.1.: Common criteria:

Grades, both from school and company, must be better than 2.5 (scale from 1 to 5) - same criteria as for apprentices, who want to shorten apprenticeship from 3.5 to 3 years. Additionally key competencies and motivation are considered.

4.2: Nominating

...is carried out by the responsible trainers in cooperation with head of VET-department and workers council.

4.3: Final decision and criteria:

Final decision is made by HAW Hamburg. Criteria are grades from school-leaving certificate (university entry diploma; should be better than numerous clausus of possible studies afterwards) and a study interview at university.

5. **Exemption**

Participating apprentices receive a paid exemption of 1.5 hours every day with lectures.

6. **Final regulation**

Commitment is valid after signature and might be cancelled according to juridical regulations.

Suited apprentices with university entrance diploma in their third year were asked, whether they are interested in joining the programme; former student interviewed was convinced due to support of company and low-threshold approach:

“Studying as such is great - but I was unsure due to my experiences when studying teaching.”

“Ein Studium als solches ist toll, ich war aber unsicher wegen meiner Erfahrungen im Lehramt.”

The potential decision not to study but to start “only” a career as a skilled worker after programme wouldn’t be seen as a failure - as programme would be finished successfully with a certificate, wouldn’t count as premature termination of a regular programme, and no time would be lost. Other influential factors to enter programme were the enhancing of specific professional competences and skills and creating new labour market opportunities (engineering).

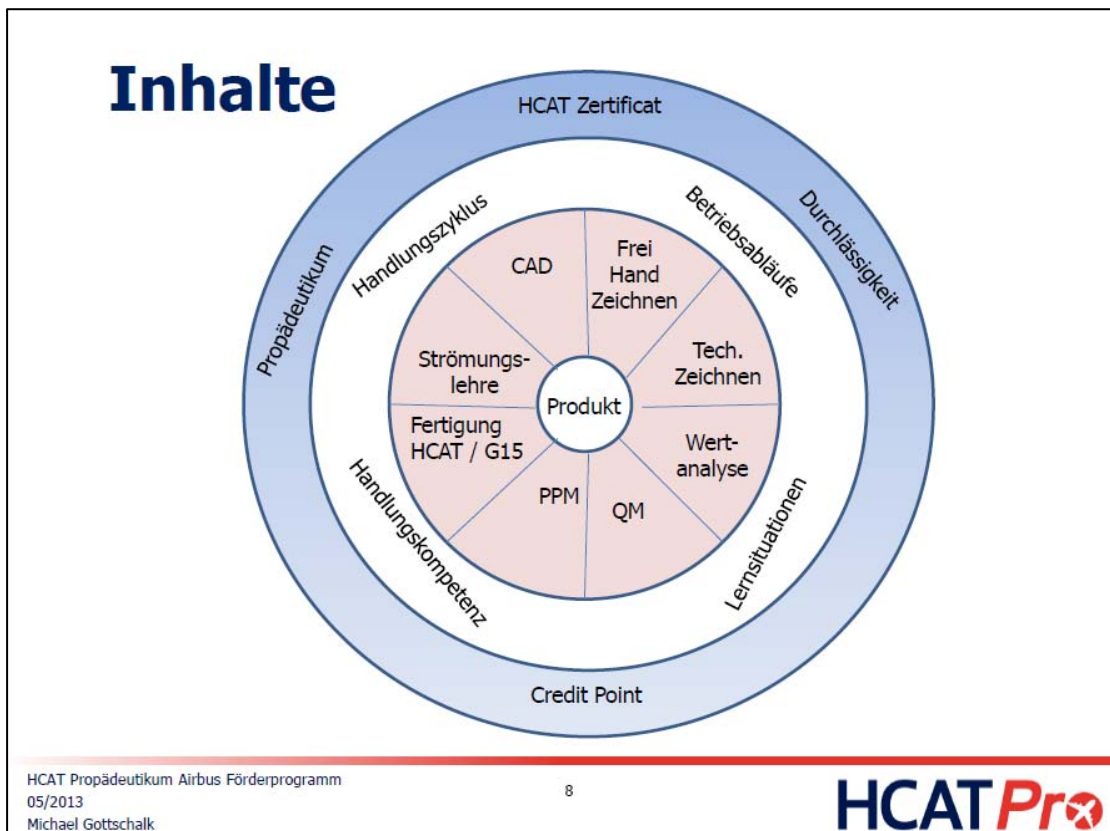
3.3.3.3. General programme information

Programme combines 6 core areas: CAD-basics, freehand-drawing, construction, fluid mechanics, business studies, and technical communication. Programme foresees 252 hours compulsory-attendance lectures plus ~258 hours individual learning (study groups advised). Lessons are 3 hours a day within 6 month in the afternoon; but no lectures during VET-school periods. Exemption from work-based learning was seen as not being crucial due to the fact that apprentices have learnt already all aspects of their vocation and are “only” becoming professional in a chosen department in this last phase of apprenticeship.

It was agreed that achieved Learning Outcomes (LO) resp. Credit Points (CP) will be recognised and accredited by HE (HAW) and CVET-providers. A successful student, who passes all examinations receives 21 CP, equalling lectures from different semesters (not only 1st semester.)

Programme combines 3 learning venues; university, company (for a project) and VET-school. LO from the other 2 learning venues are (partially) accredited by university. Lecturing staffs are a mix of university and non-university (vocational school) staff: University lecturers are

selected exclusively by the university, non-university lecturers at IVET-provider are in-house professional VET-teachers. Picture 4: Holistic approach of programme sketches pedagogical frame:



Picture 4: Holistic approach of programme

Core is the product; surrounded by main courses like computer-aided design (CAD) or fluid mechanics; pedagogically embedded within operational competencies, acting cycles, in-company work- and business processes, and learning situations; aiming at a propaedeutic insight, credit points, a certificate by HCAT, and increased permeability between the worlds of VET and HE.

3.3.3.4. Programme evaluation

According to interviewees main demands programme is responding to are the increasing of motivation and ability to study, and to deliver a comprehensive insight into various aspects of engineering studies. Participants still have apprentice-status (incl. wages of ~900€), and are supported by flexible apprenticeship-schemes (e.g. by adapting time schedules of training to lessons at university). Lecturers are from university (3 colleagues), VET-school (4 colleagues) and Airbus (to supervise project "shell skin" or "cone"). Cycles of lectures and examinations are as usual (presence/home work resp. written tests); once accepted for programme no special guidance services are foreseen. From former students' perspective programme was quite stressful, especially during final phase:

"January is full of very important courses [at Airbus], and company-specific final VET examination (BA) is pending - simultaneously HCATPro-phase ends up."

„Der Januar ist voller VIP-Lehrgänge und der BA steht an - gleichzeitig endet die HCATPro-Phase.“

Former student interviewed emphasised that student/teacher relations, co-operation with other students, and quality of lectures were very positive, due to the small amount of students were lecturers' doors open all day. He summarised that he received a comprehensive insight into engineering *studies* - but missed more information on *working* as an engineer, to learn about potential fields of application. After studying a first regular semester he resumed:

“I became interested in studying aviation mechanics, recognition [CP] wasn't very important for me - but I missed bridging lectures in mathematics.”

„Ich habe Lust auf den Studiengang bekommen, die Anerkennung der Kurse war mir nicht so wichtig - aber ein Mathe-Brückenkurs sollte dabei sein.“

Last argument was seen similar by the other interviewees; curriculum of HCATPro will be supplemented by mathematics. Mathematics is one of the most challenging courses for all engineering students; students who worked for several years or were apprentices are even more challenged - last lessons in mathematics in general schools were years ago. Project manager from Airbus saw the issue of recognising HCATPro modules by other universities more critical; if successful participants start to study at another university partly less modules are recognised than expected; only HAW accepts all CP. This is not a special problem of HCATPro but a collateral damage of Bologna reforms: Amount of possible studies arose to more than 3000; each university developed its own programmes with unique modules.

3.3.3.5. Impact

After a first piloting phase it is much to early to judge about impact seriously, but a very short résumé can be drawn:

The 5 students from the first cohort (all of them male, aged between 22 and 30) decided to start regular studies at different universities of applied sciences after successfully finishing programme; so programme can be considered as a success story for participants; opening new career pathways. For university it is of added value, too: An increasing amount of motivated students with a low risk of dropping out. From companies' perspective it is on the one hand a loss of skilled workforce - with the option of re-recruiting participants after successfully finishing their study programme.

In general programmes like the one analysed or dual study programmes (combining a bachelor-degree with in-company part of an apprenticeship) bear for companies the risk of investing in staff that might change employer after successfully finalising programme; binding obligations to work afterwards for a given period for the old employer often are not in a manner that will stand up in court.

3.3.4: Case summary

At a glimpse, main strengths, weaknesses, opportunities, and threats can be summarised as following:

Strength and opportunities:

- Studying without obligations, low-threshold programme
- Accreditation of work-process oriented LO
- Modularised curricula with certification of modules
- Lectures with other participants in this propaedeutic measure
- If participant decides to start to study: He keeps his working contract (without payment)

Weaknesses and threats:

- Other universities often do not recognise vocational learning outcomes *AND* LO from HCAT Pro
- Some lessons of follow-up programmes are quite hard (mathematics) => Need for additional (bridging) lectures
- If participants decide to start a full study programme: They have to interrupt their assured career as a skilled worker for the opportunity of being hired again as an engineer in some years

Most crucial aspects for implementing such a programme in other institutions resp. countries is funding; programme needs financial support by third parties (city council of Hamburg/Airbus).

Type	Payment	Award	Entry requirements
1	Free	Qualification	open
2	Free	Qualification	traditional
3	Free	Certificate	open
4	Free	Certificate	traditional
5	extra fees	Qualification	open
6	extra fees	Qualification	traditional
7	extra fees	Certificate	open
8	extra fees	Certificate	traditional

Tab. 10: Typology of LETAE-cases

Referring to Tab. 10: Typology of LETAE-cases the programme HCATPro is *type 8*; additional fees by company have to be paid, the awarded certificate is no full Bologna-compatible degree and it is not open for non-traditional (VET-qualified) students.

4. Summary & Outlook

Field research confirmed that co-operation of HE and the world of work, as defined within LETAE-project, has rather low relevance in Germany. Reasons mentioned by the interviewees and other stakeholders were mainly:

- An established and nation-wide recognised CVET-system, offering degrees on EQF level 6 (partly even on level 7)
- Many companies co-operating with HE prefer model of dual studies, combining a Bachelor degree with an IVET-qualification. Alternatively they prefer to hire students from very practical oriented programmes from universities of applied sciences.
- Some big companies collaborate with private universities (or faculties); these private universities are fully depending on sponsorship – these universities are addicted; not cooperating.

Consequently there is a relative low level of experience with co-operation of HE and the world of work in Germany, opening space for policy learning – and low relevance in past times doesn't mean that it should stay at it is.

Case studies and other cases found (but not analysed) revealed many pilots without long traditions but with engaged stakeholders working on different aspects of the field and covering a broad range of types from typology developed:

1. Programmes aiming at increasing amount of students without traditional university entrance diploma; exemplarily analysed in 1st case study.
2. Programmes aiming at enhancing skills of workforce of middle management; correlated with collecting reasonable funding for universities; might be called Continuous Higher Education (CHE?) – 2nd case is exemplarily.
3. Programmes aiming at decreasing the amount of drop-outs; in engineering faculties up to 50% of students. One of the main reasons for this high ratio is the fact that sometimes the wrong students start studying; they realise after some months or years that their decision was wrong – whilst others don't dare to start studying. Low threshold programmes for the latter might reduce this mismatch; 3rd case is an example of this kind of cooperation.

Following characteristics of all programmes analysed in detail were common:

- Above-average engagement of coordinators, lecturers and students; none of programmes would have been developed with a “work to rule” mentality.

- Funding as a very crucial element; although all programmes are successful future is unsure due to cuttings or pilot character.
- Programmes are challenged by finding their places in competition to traditional career paths; amount of applicants isn't overwhelming.

Impact of programmes is high in terms of participants and companies expectations resp. experiences, but low in terms of numbers; representative statistical data is hardly available, but surroundings of cases deliver some indicators:

- Case 1: Although an enormous amount of policies on open universities was published, less than 2% of German students study via this path.
- Case 2: Only accredited engineering programme alongside work at all engineering faculties at University of Bremen.
- Case 3: HAW Hamburg runs more than 50 dual study programmes – but only one propedeutic measure, the case analysed.

From university perspective, impact is twofold: On the one hand programmes like the ones analysed tear down traditional barriers between worlds of VET & HE, recruit new cohorts of students, and open up new access to field (companies) for research and development. On the other hand is the freedom of research and teaching at least potentially on the line, including the risk of lowering standards to keep VET-qualified students onboard; and funding by pilots is only a substitute for precarious financial support of many universities.

Another open question arose: German HE was originally founded on 5-year programmes (diploma) – divided into 3 years of Bachelor + 2 years of Master after Bologna. Case studies revealed, not very surprisingly, that these time-frames are not very realistic for students working full-time; they need an average span of 4 or even 5 years – honest communication of these long time spans decreases the interest of workers to go to university additionally. A way out might be an implementation of “Short Cycle Higher Education” (SHE) like foundation degrees; as official degrees (and not only certificates) have high relevance within German mentality and for labour market. From traditionalists' perspective SCHE is foreign matter in German HE system – but no open or broad discussion even started on this issue.

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