



HCATPro

Hamburg Centre of Aviation Training Propaedeutic course

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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.

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: The case study programme, based on interview matrix

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)).

3.2. 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. 1: 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. 1: 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 numerus 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.”

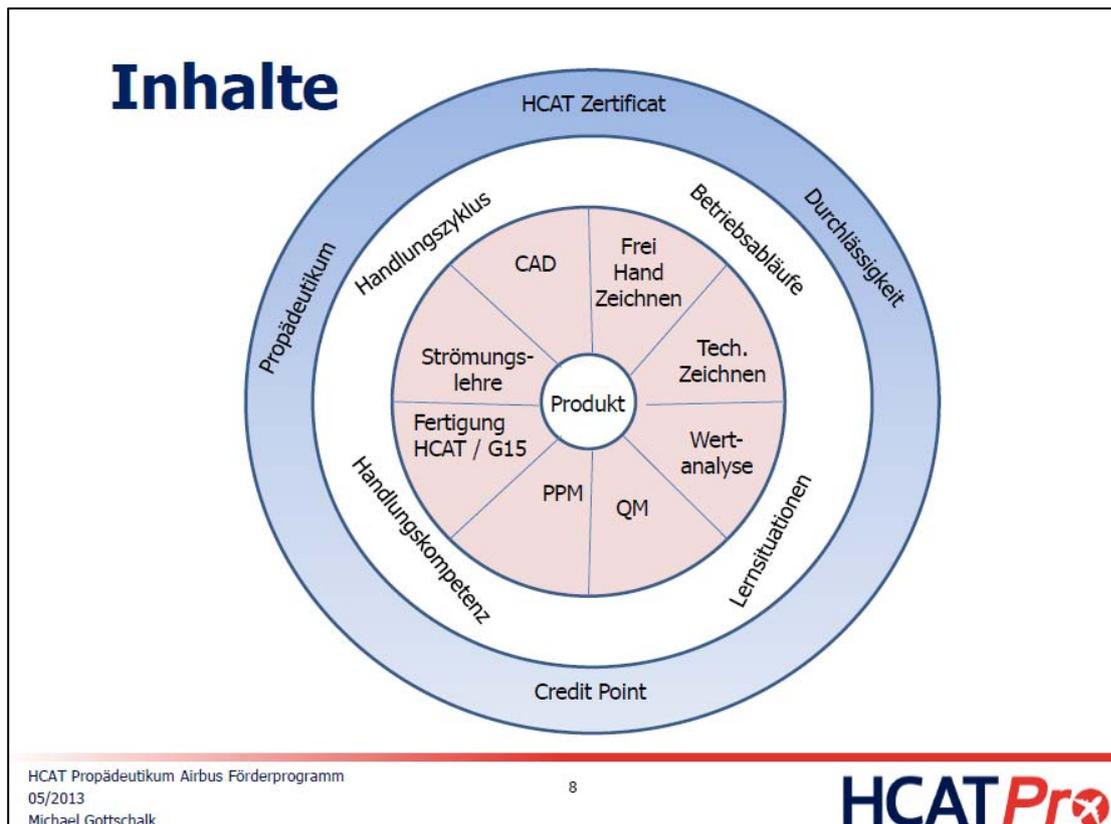
The potential decision not to study but to start “only” a career as a skilled worker after programme wouldn’t be seen as a failure - as programme would be finished successfully with a certificate, wouldn’t count as premature termination of a regular programme, and no time would be lost. Other influential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

3.3. 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 1: Holistic approach of programme sketches pedagogical frame:



Picture 1: 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.

3.4. 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 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.

3.5. Impact

After a first piloting phase it is much too 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.

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. 2: Typology of LETAE-cases

Referring to Tab. 2: 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.

References:

Project description: <http://www.haw-hamburg.de/ti-ff/aktuell/nachwuchsgewinnung/hcat-pro.html>

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