

Cooperative and Work Integrated Higher Education

15 Years Building Bridges between



Dipl.-Ing. Johannes Haas, Director of Sustainable Food Management

Contact Details: email: johannes.haas@fh-joanneum.at

Challenges in European Higher Education and the role of Dual Study Programmes

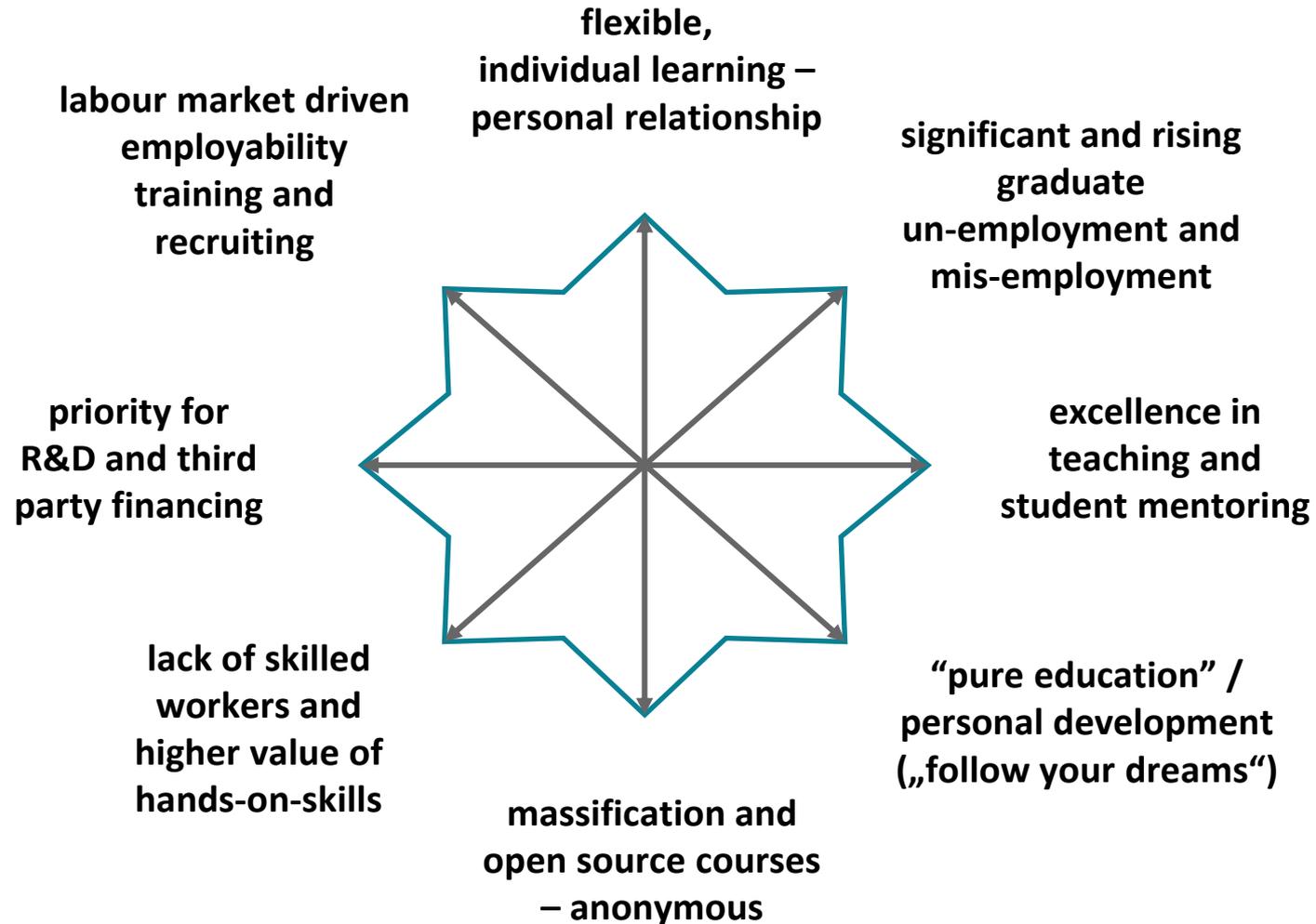
Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

Higher Education struggles with its position in society



ESG 2015 (1) – Relevance for Dual / Cooperative Education

(Standards and Guidelines for Quality Assurance in the European Higher Education Area)

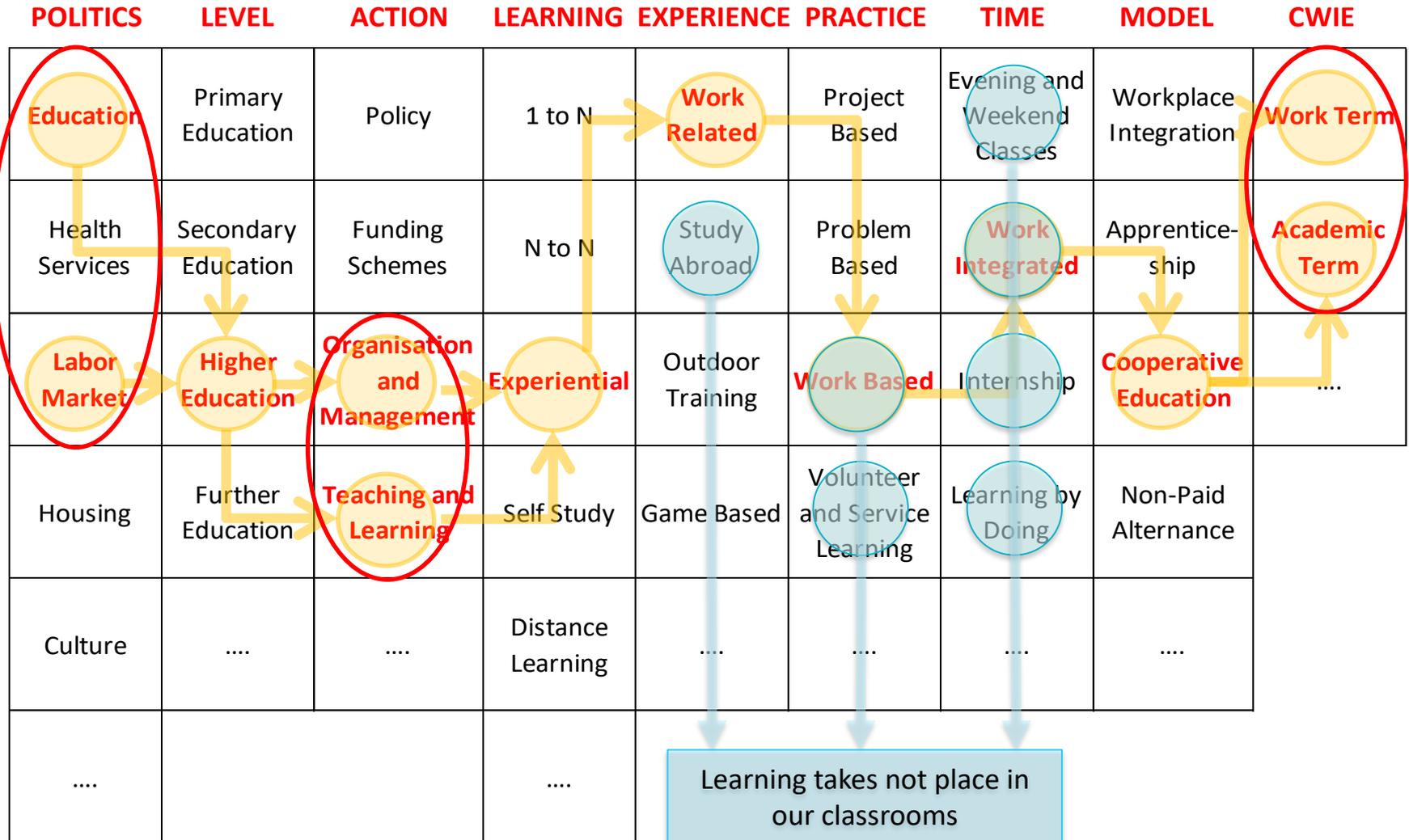
- **Context:** [...] Responding to diversity and growing expectations for higher education requires a fundamental shift in its provision; **it requires a more student-centered approach to learning and teaching, embracing flexible learning paths** and recognising competences gained outside formal curricula. Higher education institutions themselves also become more diverse in their missions, mode of educational provision and cooperation, [...]
- **Goals:** [...] preparing students for active citizenship, for their **future careers** (e.g. contributing to their **employability**), supporting their **personal development**, creating a broad **advanced knowledge base** and stimulating research and **innovation**. [...]
- **Quality:** [...] whilst not easy to define, is mainly a result of the interaction between teachers, students and the institutional learning environment. Quality assurance should **ensure a learning environment** in which the content of programmes, learning **opportunities and facilities** are fit for purpose. [...]
- **Four Principles of Quality Assurance:**
 - QA lies in the primary **responsibility of higher education institutions**.
 - QA responds to the **diversity of higher education** systems, institutions, programmes and students.
 - QA supports the development of a **quality culture**.
 - QA takes into account the needs and expectations of students, all **other stakeholders** and Society.

ESG 2015 (2) – Relevance for Dual / Cooperative Education

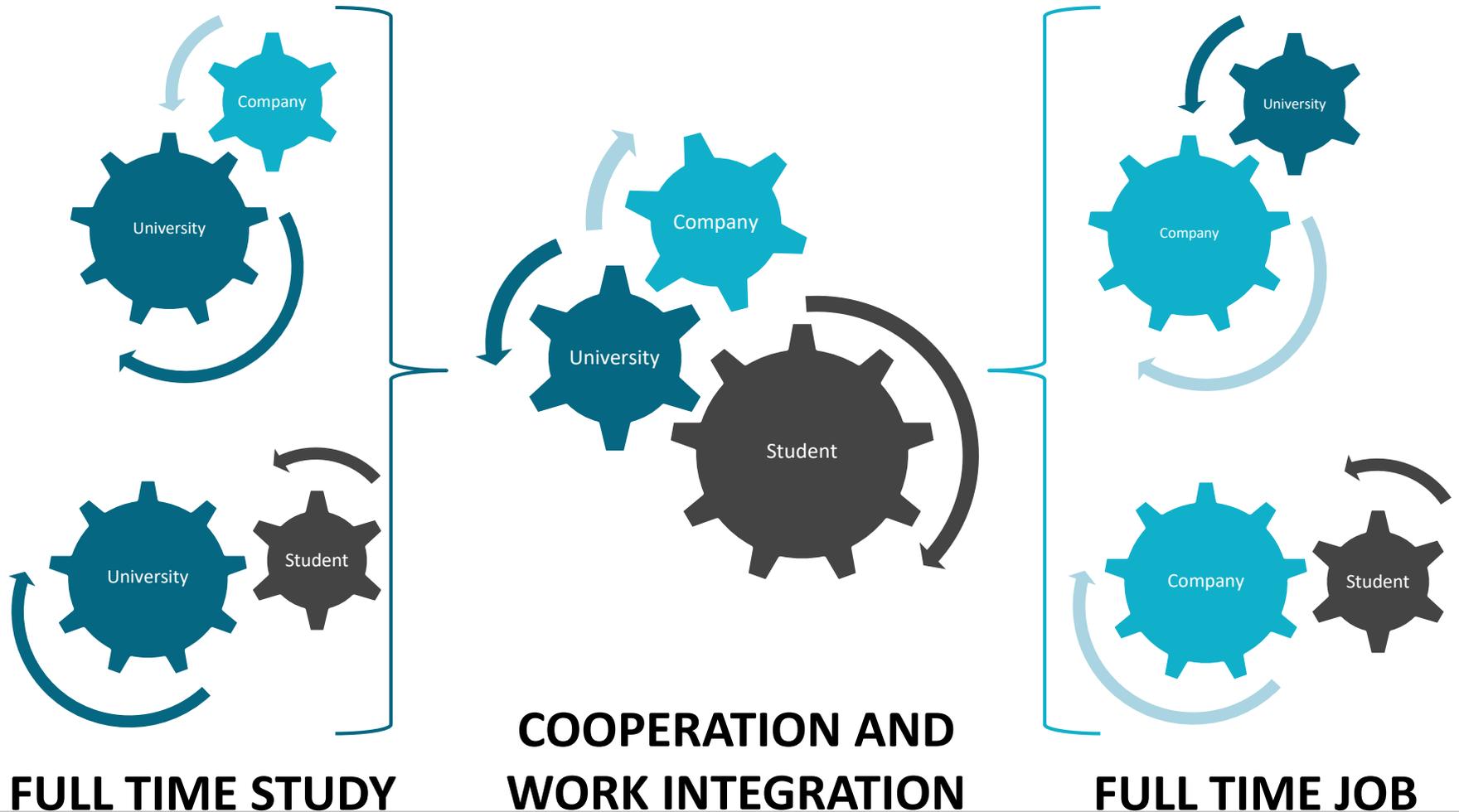
(Standards and Guidelines for Quality Assurance in the European Higher Education Area)

- **Design and approval of programmes**
 - [...] Programmes are designed by **involving students and other stakeholders** in the work.
 - Programmes **benefit from external experience** and reference points.
 - Programmes are designed so they enable **smooth student progression**.
 - Programmes define the expected student workload, e.g. in **ECTS**.
 - Programmes include **well-structured placement opportunities** where appropriate. [...]
- **Student-centered learning, teaching and assessment**
 - [...] Respects and attends to the diversity of students and their needs, enabling **flexible learning paths**.
 - Considers and uses **different modes** of delivery, where appropriate.
 - **Flexibly** uses a **variety of pedagogical methods**.
 - Regularly **evaluates and adjusts the modes of delivery and pedagogical methods**.
 - Encourages a **sense of autonomy in the learner**, while ensuring **adequate guidance and support** from the teacher. [...]
- **Information Management**
 - [...] Effective processes to collect and analyze information **about study programme and other activities** feed into the internal quality assurance system.
 - Information on: Key **performance** indicators, student **progression** and drop-out rates, students' **satisfaction**, learning **resources** and **support**, **career paths** of graduates.

Basic Framework of Cooperative and Work Integrated Education



The REAL Challenges of Cooperation



„Dual“ Higher Education

FH JOANNEUM University of Applied Sciences
Graz, Austria

Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

Contents of presentation

1. Introduction to FH JOANNEUM
2. Introduction to basic pedagogy and organizational structure
3. History of the dual programmes at FH JOANNEUM
4. Status quo in 2016/2017
5. Thematic questions from the PLA organizers

FH JOANNEUM University of Applied Sciences

28 Bachelor and 26 Master Degree Programs

Six Departments on three locations in Graz, Kapfenberg, Bad Gleichenberg

- Applied Computer Sciences
- Building, Energy & Society
- Engineering
- Health Studies
- Management
- Media & Design
- > 4.000 Students

4.500 Students

www.fh-joanneum.at/en

Selected Highlights (personal opinion)

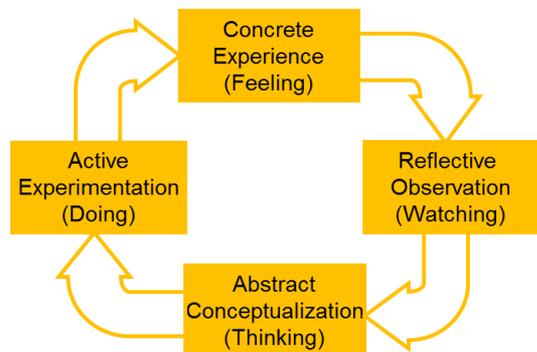
- Programme diversity with high transdisciplinary potential
- Successful Formula Student Team „Joanneum Racing“
- Graz = attractive city for companies and students
- Most experienced University in Austria concerning dual higher education

Basic pedagogy and organizational structure

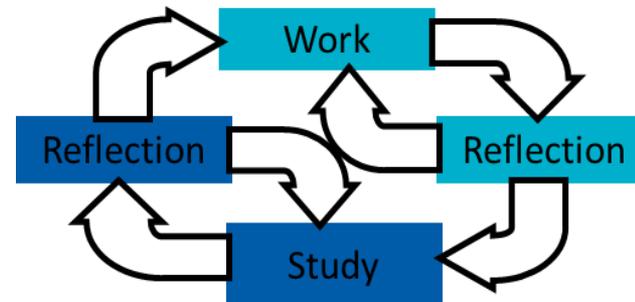
„DUAL“ Education = Cooperative and Work Integrated Education (CWIE)

The core elements of CWIE are **close and continuous cooperation between higher education and enterprises** and their representatives, a wide range of **specific elements to integrate academic curricular and professional tasks** and **temporary employment** to form a unique and individual educational system for each participating student.

Experiential Education and Learning Cycle



David
Kolb,
1974



..... translated into a work – study rotation

Fundamental differences for programme management

1. Industry / companies are (should be?) stakeholders AND educators.
2. We create many and very diverse interfaces / transfer points in a degree programme.
3. Respective strengths, weaknesses, opportunities and threads of the joint effort become immediately visible.
4. **Students are (should be?) process owners of a 100 % individual path to graduation.**

QUALITY = COOPERATION + INTEGRATION + REFLECTION

Characteristic differences between dual programmes

(A) Role of companies

STRONG („dual“ / Germany): Companies select and send students to university / academy

WEAK („coop“ / USA, Canada): Companies offer jobs for coop (usually four months) – students select and apply, work is integrated only into one course module

INTERMEDIATE (France, FH JOANNEUM): Companies select among available first year students

(B) Type of Rotation

Three to six months: f.e. USA, Canada, DHBW, FH JOANNEUM

Two to three days per week: IMH Elgoibar, Spain; Free University Bolzano, Italy

Wide variety of rotation systems: German „Duale Studiengänge“, French „Apprentissage par Alternance“

(C) Salary and legal issues

Distinct option for national apprenticeship system (France, Italy)

Apprenticeship parallel bachelor (several German universities)

Contract for one work term at a time or regular part time employee (f.e. 50 % position) for the duration of the programme

Retention provisions and additional contracts (f.e. university / company)

Evolution of a successful model

Origin: Roots in the successful European model of **apprenticeship education**.

1906 „**The Cincinnati Plan**“: Rotation of two weeks, two students with each employer, five year bachelor.

1920 „**The MIT Co-Op Model**“: Five year bachelor, the last three years divided in quarters, alternately spent at the MIT and with General Electric.

After World War II: A **rotation of three to six months** proves to be the best compromise for meeting university and company expectations. Co-Op starts **after the first year at university**. Each placement can be done with a different company.

1975 Start of the **University of Cooperative Education in Stuttgart**: Three year bachelor, all placements with one company (50 % continuous employment). Now about 1000 programmes in Germany with a wide variety of organizational models.

2002: Start of the four year diploma programme of **Production Technology and Organization in Graz** following the German model.

2011: Change to a three year bachelor with the first year full time at the university followed by a two year contract + a two year master (**Engineering and Production Management**) with a two year contracts. First master graduates in 2016.

Programme characteristic concerning cooperative elements

Production Technology and Organization (2002)

- 180 ECTS, „Full-Time-Dual“, Bachelor of Science in Engineering
- 25 Students per year, each of them with one company.
- Two year contract, salary € 700,- per month (14 per year)
- Importance of peer learning, mentoring and supervision.
- **Core competence = typical „trainee“ – knowledge of company.**

Sustainable Food Management (2012)

- 180 ECTS, „Full-Time-Coop“, Bachelor of Science in Engineering
- 25 Students per year, work terms along value chain in different companies. Flexible choice of employers.
- Employer networks in three fields (agriculture, processing, marketing and trade).
- **Core competence = range of experience along the value chain.**

Engineering and Production Management (2014)

- 120 ECTS, „Part-Time-Dual“, Master of Science in Engineering
- 25 Students per year, company and contract from the start.
- Responsible „knowledge brokers“ for „their“ company.
- Differences in salaries („trainee“ – employed academic)
- **Core competence = responsible R&D and innovation transfer.**

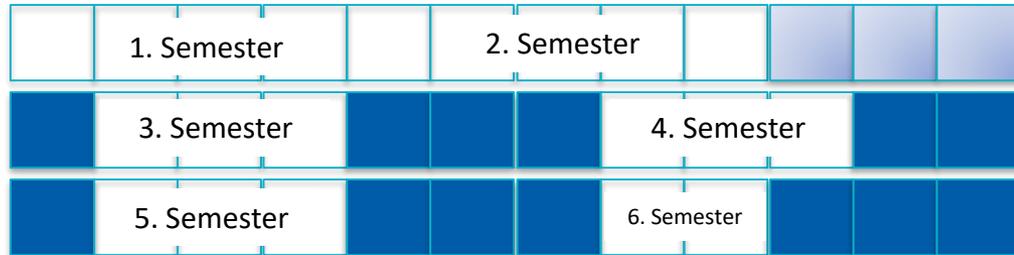
Food Product and Process Development (Start 2017)

Selected employers within Austrian producing industry

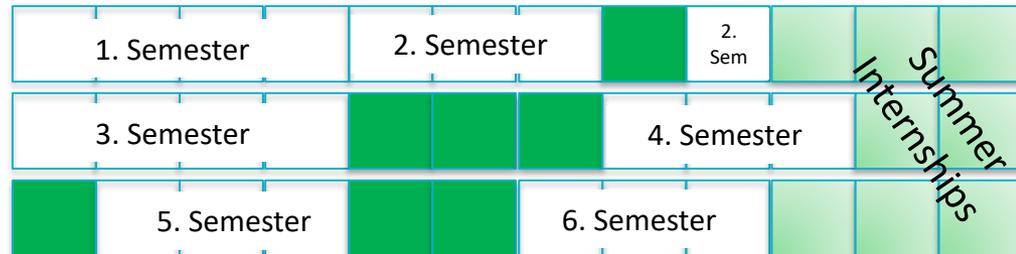


Rotation of Theory and Practice in the Degree Programmes of the Institute of Applied Production Sciences

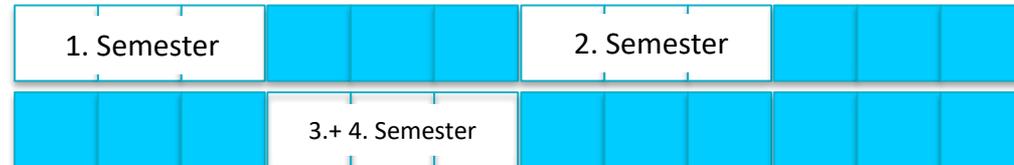
Production Technology and Organisation



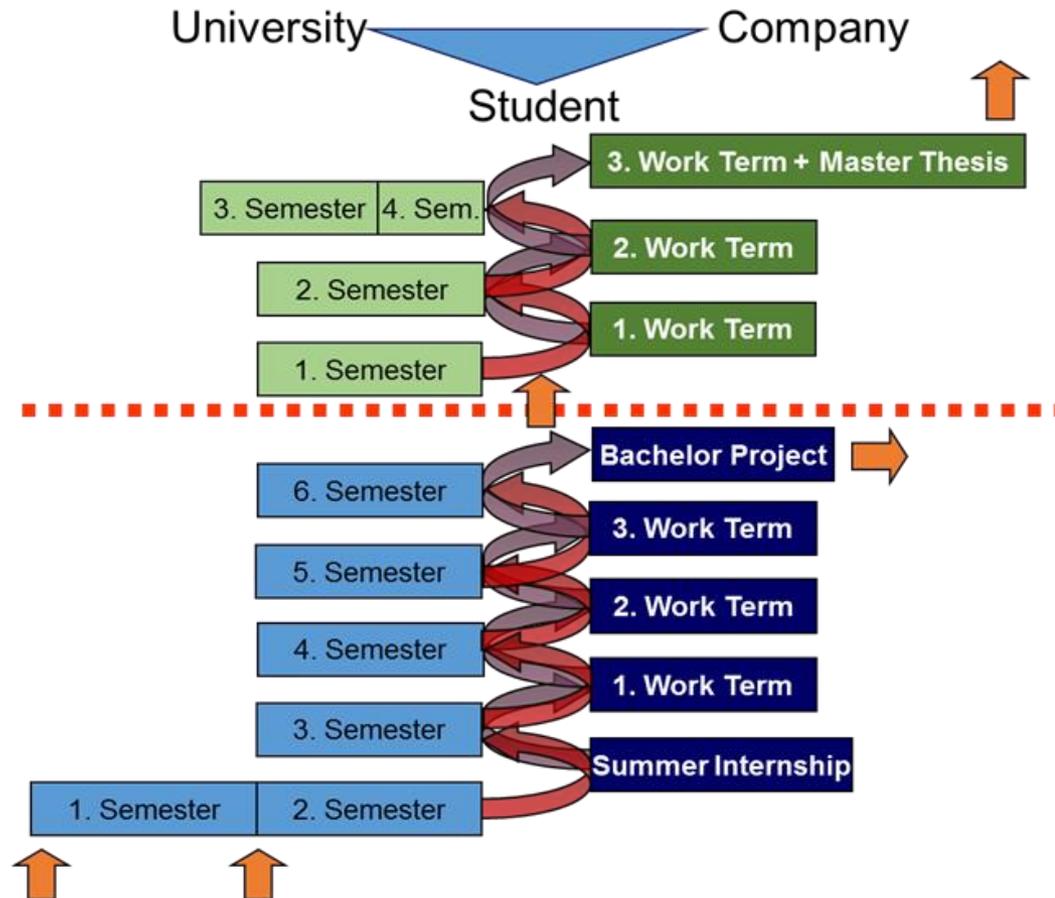
Sustainable Food Management



Engineering and Production Management



Succession of dual bachelor and master programmes



Thematic questions from the PLA organizers

- *Challenges behind the decision on developing and introducing dual training programme(s)*
- *Process of programme development (who did what with whom?); how have partners and stakeholders been involved?*
- *Structure of the programme developed; share of tasks and responsibilities during programme delivery*
- *Main methods of program delivery: where and how can students acquire knowledge, skills and competences?*
- *Some quality issues: how are students' learning outcomes assessed in work placement? how are company partners selected, and how are instructors/mentors are prepared?*
- *Main outcomes of the programme(s) in terms of employability, transversal skills, coherence of competences acquired by the students; satisfaction of graduates, company partners and the HEI*
- *Main challenges to be met yet*

TOPIC 1

Planning of learning process at the company to harmonise it with the institutional curriculum

Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

(A) Defining learning/practice outcomes of practical training (1)

(B) Curriculum harmonisation – synchronisation of theory and practice

- Rough outline of learning objectives of successive work terms in **accreditation document**.
- Definition of 10 core modules of each programme for which direct practical training or project work has to be documented for a minimum of 40 hours each, worth 1 ECTS. The complete „**Module Report**“ has to be signed off by all responsible faculty members and turned in before the end of the programme.
- Work content and expected outcomes are elements of **negotiations between university and company** (Why do you want to participate? What do you expect of the student?) and of the **hiring procedure** between students and companies (Including: Are we hiring you for a specific job? What are your career expectations? What skill do you bring with you – what skills do you need to develop?)
- Written **individual preliminary plan** for the entire programme before the start – support through company visit offered.
- Outlook on next work term in **reflection** of work term report of students.

(A) Defining learning/practice outcomes of practical training

(B) Curriculum harmonisation – synchronisation of theory and practice (2)

- **Site visit** in every work term by faculty.
- **Individual planning meeting** to define tasks for next work term advised to students during academic semester.
- Setting of **personal learning goals** (individual and peer group) for every work term, inclusion of outcome evaluation into the work term report.
- **Continuous improvement process** over the first years of a programme with corrections of allocation of courses to various semesters, sizing of courses according to possibility of moving competence development into companies or from companies to university.
- Option of **exchange of up to five days per semester university time for company time** upon application by the company (proof of at least equivalent learning opportunity – example: participation at quality audit, customer visit abroad, soft skills training, kick off meeting of key project).

(C) Share of skill development tasks between the company and the HEI

- **Harmonization has to go both ways:** Companies are partners in **programme design**, take part in **admission interviews at the university**, are included in **feedback discussions** once a year.
- A dual programme enables the **concentration of each partner on topics that he is better at delivering** (example: mathematics – manufacturing technology – production planning).
- **Soft skills** are ideally introduced at university and practiced in the company (examples: project management, English).
- Companies can **send students abroad** within projects or for an internship at a facility belonging to the same corporation. University can offer a student exchange with other dual programmes.
- The **bachelor and master thesis** play essential roles in the competence development of the students and the cooperation between university and company.
- There must be enough time at the company for **work not related to the studies** and content at university not essential for the company.

Learning Process

Thematic questions from the PLA organizers

- *Who should be involved in designing skills and knowledge and competences a student should acquire at the end of the programme?*
- *How can learning outcomes as well as responsibilities for supporting students to acquire LOs be shared between HEI and company partner(s)? What are the main challenges?*
- *Who should define learning outcomes of practical training period(s)/works placement? What are the good experiences of defining LOs at/with companies?*
- *What is the best way to harmonise curriculum units and teaching methods distributed to different partners?*
- *What are the most important challenges and good cases, experiences concerning HEI – company cooperation in planning the learning process?*

TOPIC 2

Mentor training

Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

(A) Choosing the right persons (motivation, skills)

- Most important are initial **high profile promoters** at the university and in respected companies.
- **Top management of companies and at university** have to be actively interested and make a written commitment.
- Needed are skilled „**work term supervisors**“ (can change according to task, should have either highest possible practical skills or equivalent university degree) and engaged „**mentors**“ (care for career development, HR or general management).
- Examples for an integrated strategy:
 - **Leadership training and assessment** for junior management staff through responsibility for a student.
 - **Know-how transfer from experts** before retirement through mentoring and supervision.
 - Student as **assistant to CEO** to work on projects left behind because of lack of time.
- **A rotation through various departments** can facilitate selection of best matches by students and future supervisors themselves.

(B) Skill development and methodology training for mentors

- **Faculty members are functioning as mentors** for company supervisors and consultants for technical, organizational and personal issues (importance of regular site visits).
- **Students are supporting the skills development of supervisors** and are coached to do so at the university (this is part of their essential „process ownership“ in a dual study).
- Supervisors and mentors are learning from each other in **regular meetings to exchange experience** (preferably always in one of the companies). Bilateral cooperation is facilitated through these meetings.
- **Experienced company representatives** offer advice in specific questions (f.e. contract issues).
- Joint **supervision of thesis** work acts as the best occasion for mentoring skills development.
- Partner companies get a **refund on seminars and courses** offered by the university (f.e. „Summer Business School“ at FH JOANNEUM).
- University can offer **specific training** free of charge.

Mentor Training

Thematic questions from the PLA organizers

- *Can be a profile of a good mentor identified? What are the most important features of a mentor (motivation, knowledge, skills, soft skills etc.)? Who can/should define them? And who can/should validate them?*
- *How can a CEO/HR manager find/select and motivate the right person (employee) for mentoring?*
- *What are the good cases of training a mentor? Who can/should do the training?*
- *Do methods of instruction and assessment of students as well as knowledge on students' learning; form an important part of a mentor's competences?*
- *Should mentor know well the whole curriculum?*
- *How often should a mentor be further trained?*

TOPIC 3

Practical training methods

Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

(A) Methodology used to provide professional practical training to students

Company:

- Company **makes decisions** and uses faculty as advisors.
- Overall **work** time in a two year programme = about 1800 hrs. About 30 ECTS = 750 hrs (50 % integrated in selected academic modules, 50 % open according to company plan) + bachelor (about 10 ECTS = 250 hrs) or master thesis (about 20 ECTS = 500 hrs). That leaves enough „free“ work time.
- „**Fast track career**“: Start on the „shop floor“, move through project work to actual responsibility.
- Design of **projects with duration less than work term**. Length and difficulty, independence and responsibility of students are increasing with time.
- Clear **assignment to a supervisor** who also acts as a back up in case of problems. Preferable is a rotation through important departments.
- **Standardized evaluation** procedure at the end of the work term (questionnaire + feed back conversation).
- **Thesis work** as capstone project, skills assessment and door opener for future position.

(A) Methodology used to provide professional practical training to students

University:

- Selection of **faculty with industry experience**.
- **Excursions and projects** with partner companies as integral parts of key courses.
- **Guest lectures** from partner companies and programme graduates.
- Facilitate the **sharing of experience among students** returning from practice.
- „**Learning and teaching factory**“ to practice novel process design and management skills and work with new technology („Industry 4.0“).
- Inclusion of valuable **official industry certificates** in curriculum (PTO: „Quality Manager“, „Work Safety Expert“).
- „**Students' Conference**“: Annual conference of last year students with successful industry projects (everybody has to present, companies and faculty are invited and give feedback).
- Participate in **international competitions** (Formula Student, Robotics, Business Plan Development, Product Innovation, Brewing).

(B) Methodology used to provide soft and transversal skills training to students

- Facilitate full **experiential learning cycle** for entire competence build up: experience – reflection – conceptualization – experimenting.
- Most important soft skill = **reflection of own learning from experience** and transformation into transferable skills.
- **Introductory courses** (f.e. project management) at university – **practical training** predominately in the company (main element of **evaluation by supervisor**).
- The **company environment** offers a wide variety of opportunities (example: preparation and facilitation of meetings, project management).
- Soft skills through **high rate of interaction at company**: University teaching: 1 Professor – 30 Students / Company training: 1 Student – 30 Instructors
- Motivating students to engage in the **student board** and take part in the management and strategy development of the programme and the university.
- **Send students abroad** in any possible situation (company or academic semester).
- **Cooperative projects with other programmes** (example: production technology + physiotherapy to solve problems of people with handicaps).

Practical Training Methods

Thematic questions from the PLA organizers

- *What are the most important/efficient methods to provide professional practical knowledge and skills to students at workplace?*
- *What are the most important/efficient methods to provide soft and transversal skills to students in workplace?*
- *Who can plan students' learning process at/with the company?*
- *What are the good cases of planning, and appropriate tools of supporting, students' learning process at companies?*
- *What specific assessment methods are to be applied in case of work placement?*
- *What feedback students should be given on their achievements?*
- *How often should mentors and HEI academic staff communicate on students' achievements? What are the good cases for that?*

TOPIC 4

Quality Assurance

Johannes Haas

PLA on Dual Education

Budapest

29.-30.09.2016

Assessment of students' skills, development and achievements, in advance, during training and at finish

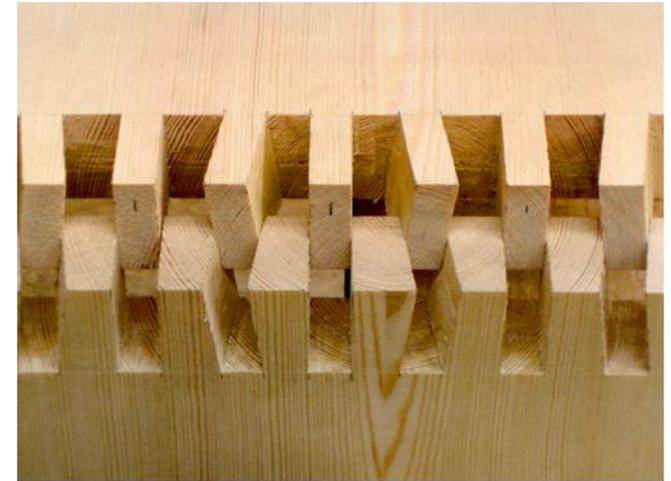
- There has to be a **selection process** for students to meet expectations of companies and university.
- Dual studies are attractive for students with company experience. Assessment of and credits for **prior learning** has to be clearly defined.
- Students should meet all requirements of **regular students** at the university and those of **regular employees** in the companies.
- Faculty has to be responsible for the assessment of **academic credits** achieved through work in the company (course integrated or thesis).
- Company supervisors concentrate on the **assessment of soft skills** development.
- **Achievements of students** (f.e. successful optimization projects) have to be assessed and documented to clarify benefits for the companies.
- A challenging and well designed **thesis** proves to be the single most important assessment of integrated student development.

Evaluation of training methods and mentor's work

- Students evaluate mentors preferably by **direct and personal feedback** (important item of competence).
- Students reflect on personal experience in their **diaries and work term reports**.
- Supervision by technical experts is easier to evaluate than mentoring, mostly by mentors (human resources development) or management.
- Mentoring and supervision as elements of **management career development** measures including evaluation of effectiveness.
- University should not interfere with mentoring and supervision but communicate feedback of students in case of obvious problems (mediation competence needed).

HIGH QUALITY LEARNING by INTEGRATING WORK and EDUCATION

**„Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.“**
(Konfuzius, 500 BC – Brain Science, 21. Jhdt)



Quality of Contact and Bonding

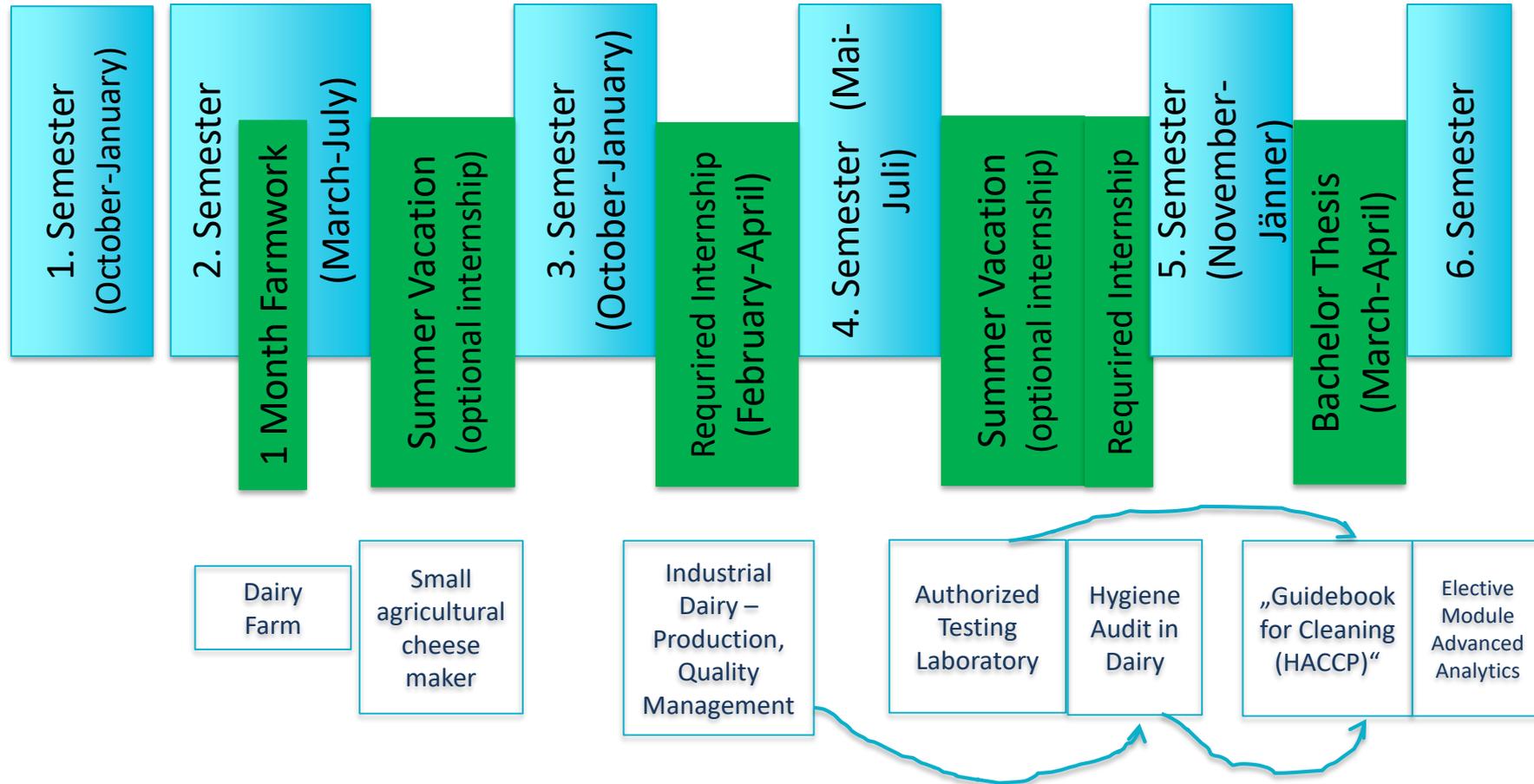


Quality of Balance



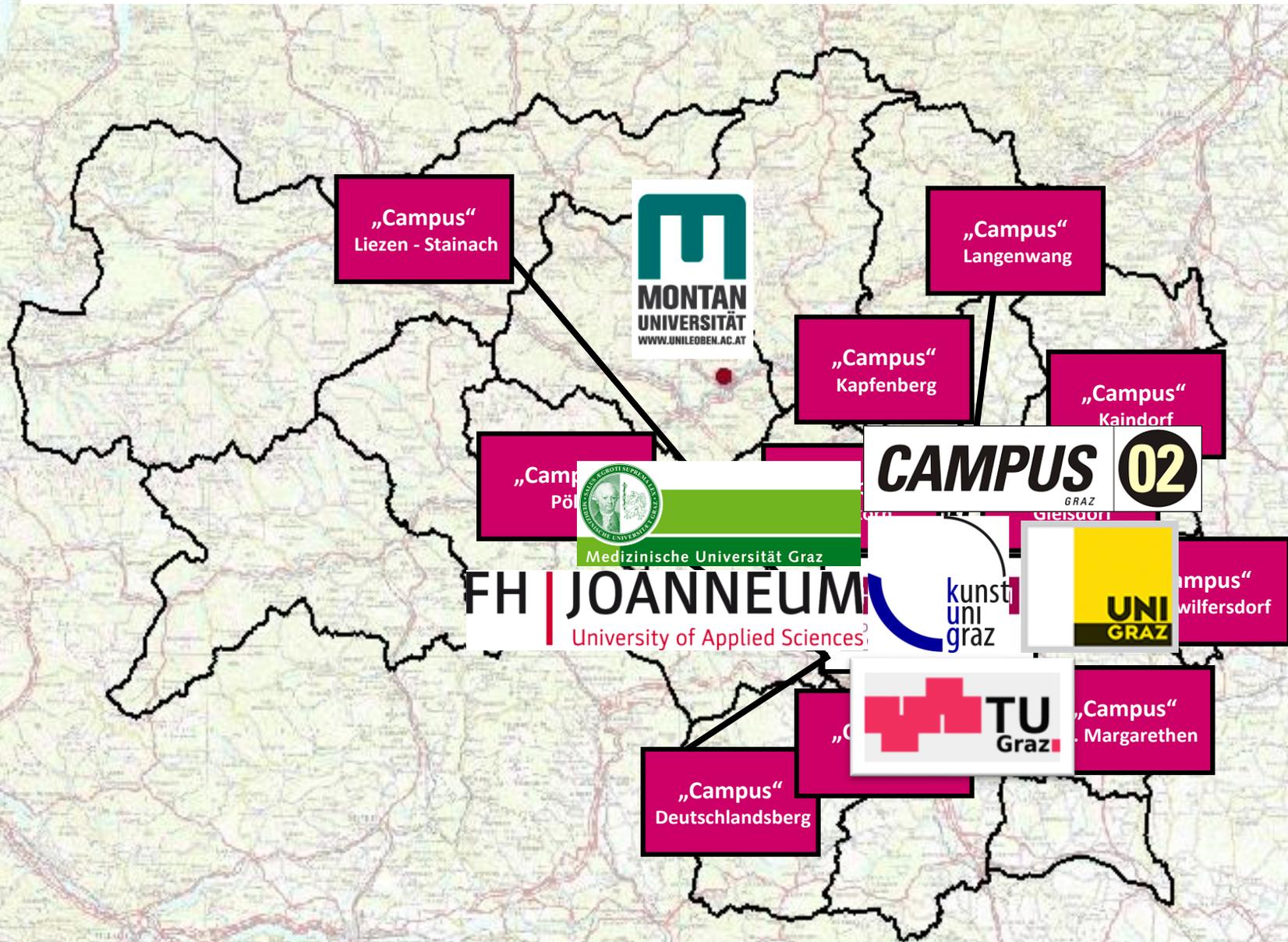
Quality of Cooperation and Coordination

Individual career development through choice of internships

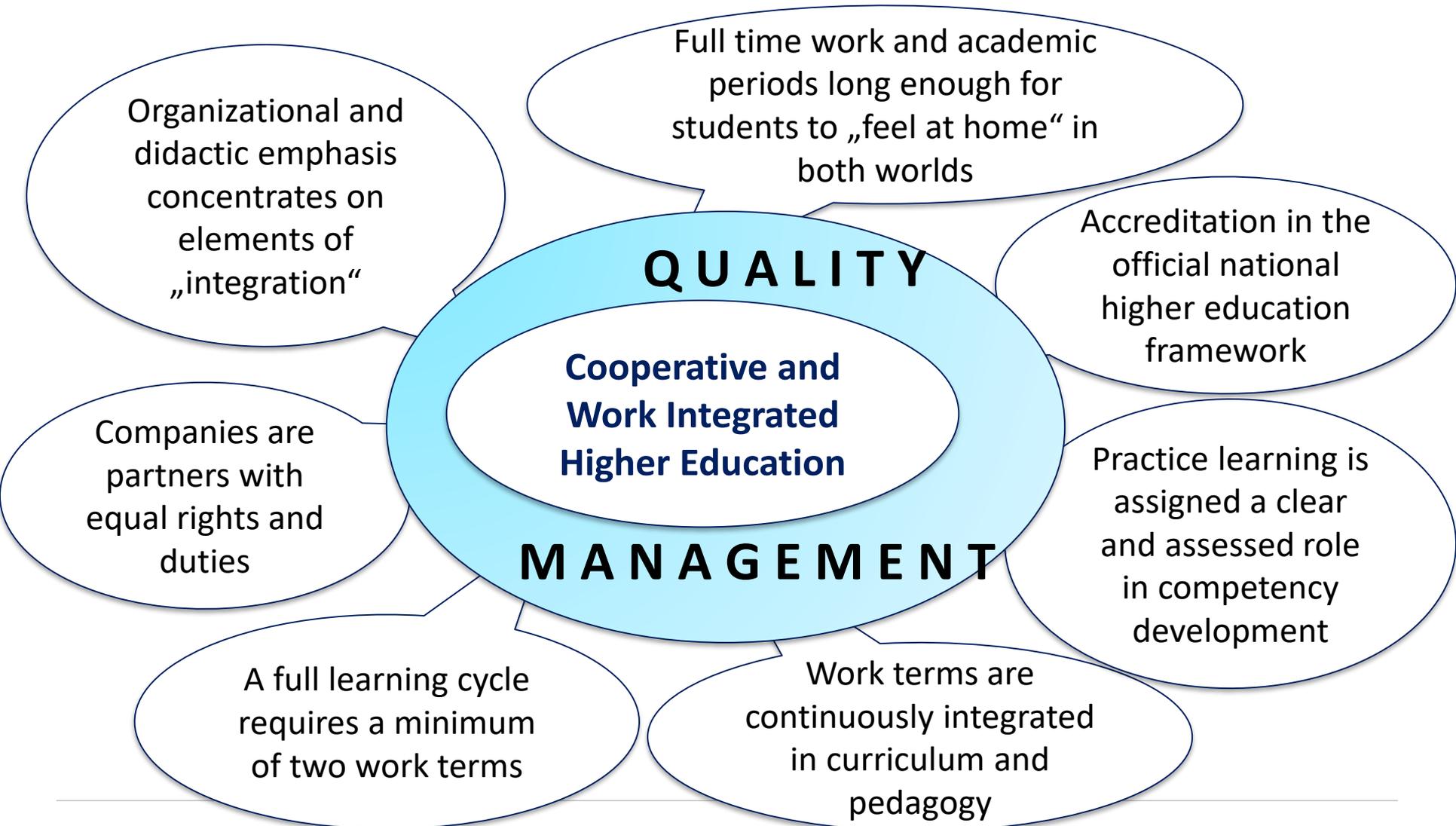


Example Sustainable Food Management: Hygiene management in large dairy

„Campus“ locations of higher education institutions in Styria



Recommendation from FH JOANNEUM experience



Summary of overall issues in quality assurance

1. There are many reasons for a **strong partnership between industry and universities** to deliver high quality and attractive work integrated education and a **large number of successful examples** exist worldwide.
2. **Higher education institutions** have to go through a transformation because programmes typically do not comply with all existing procedures and faculty members are not prepared for their additional role.
3. **Enterprises** have to go through a transformation to become effective learning environments and active academic partners.
4. **Students** must take responsibility for truly unique and individual learning experiences and learn to reflect on their progression.
5. **Part-time jobs** are created with direct influence of the labor market and dual programmes show potential to enhance **innovation** by cooperation with SME and start-ups.
6. By including employers directly into the design, organization and delivery of a degree programme **quality issues become more complex**.
7. Quality assurance is in the **responsibility of the higher education institution** and is at present neither well defined nor included in external and internal evaluation procedures.
8. Quality standards are necessary to allow for **smooth transition between dual programmes and traditional higher education**, especially between bachelor and master.

Quality Assurance

Thematic questions from the PLA organizers

- *Should a HEI develop and apply specific QA measures for evaluating company partners? What are the main challenges and good experiences concerning this issue?*
- *What persons and entities can be identified as important subject of assessment or evaluation in a developed quality assurance system of dual programmes (student, mentor, teaching staff; units of the curriculum, company, HEI; methods applied, outcomes achieved, pay-offs, etc.)?*
- *What are the main challenges and good experiences concerning the assessment of mentors' work?*
- *Who should evaluate methods of instruction and assessment applied at the company (peers? partner companies? HEI? external body? etc.)? How often should they be evaluated?*
- *Should a complex system of tracking students' skills development and achievements (that is in advance, during the training, and at the end of it) be developed and maintained? Where are the limits of costs and returns?*