

EUR-ACE Going Global

Assuring and certifying quality of engineering education programmes worldwide

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Expected Evidences for Achievement of Programme Outcomes: a MÜDEK perspective

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Presentation Outline

- Programme outcomes and their components
- Levels of learning and programme outcomes
- Learning levels and their relations to the type of evidences on outcome achievement

Programme Outcomes and Their Components

- Programme outcome statements may be comprised of multiple components.
- A programme provider has to demonstrate that **each and every component** of each programme outcome **has been achieved** by each graduating student.

Example (EUR-ACE Programme Outcomes for Bachelor Degree Programmes - Engineering Analysis):

*The learning process should enable **Bachelor Degree graduates to demonstrate:***

- *ability **to analyse** complex engineering products, processes and systems in their field of study; **to select and apply** relevant methods from established analytical, computational and experimental methods; **to correctly interpret** the outcomes of such analyses;*

Evidences on achievement of each of these 3 components are required.

Levels of Learning and Programme Outcome Statements

- Levels of learning used in EUR-ACE programme outcomes:
 - **Ability**
 - **Knowledge**
 - **Understanding**
 - **Awareness**
- Levels of learning used in MÜDEK outcomes:
 - **Ability (= competence)**
 - **Knowledge**
 - **Awareness**
- Each learning level requires appropriate methods for
 - teaching
 - assessing and
 - **providing evidence that the subject outcome (component) has been achieved.**

Evidence for Demonstrating «Ability»

Evidence for demonstrating that students have acquired the **ABILITY** to perform a certain function (e.g. design) :

- Student course work showing that all students can perform the subject function
- Such course work may be an exam paper, a homework, a report, a project, etc., or a part of it .
- The subject course work is expected to be assessed and graded by the instructor to indicate the level of achievement of the required **ability** by using rubrics.

Evidence for Demonstrating «Ability» An Example

MÜDEK Programme Outcome (v):

Ability to **design** and **conduct** experiments, **gather data**, **analyze** and **interpret** results for investigating complex engineering problems or discipline specific research questions.

- **Assessment:** The level of achievement for all (5) components in the above outcome statement have to be assessed based on the actual course work related to each of these components.
- **Evidences expected:** Examples of **graded** course work (exam papers, homeworks, reports, projects, etc.) performed in courses and/or laboratory sessions where students **demonstrate** that they have acquired these **abilities** at the required level.

Evidence for Demonstrating «Knowledge»

Evidence for demonstrating that students have acquired the **KNOWLEDGE** on a certain subject:

- Student course work showing that all students have acquired the expected level of knowledge on the subject.
- This course work can be an exam paper, a homework, a report, a project, etc., or a part of it.
- The subject course work is expected to be assessed and graded by the instructor to indicate the level of **knowledge** that has been acquired by using rubrics.

Evidence for Demonstrating «Knowledge» An Example

MÜDEK Programme Outcome (xi):

Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.

- **Assessment:** The level of knowledge for the components in the marked part of the outcome statement has to be assessed based on actual student work.
- **Evidences expected:** Examples of graded exam papers, homeworks, reports, projects, etc., or a part of them where students **demonstrate** that they have acquired expected level of **knowledge** on the subject matter.

Evidence for Demonstrating «Awareness»

Evidence for demonstrating that students have acquired the **AWARENESS** on a certain subject:

- Evidence that all students have attended those courses and/or seminars that aim to provide an **awareness** on the subject.
- The level of awareness may be assessed but not necessarily be graded by the instructor.

Evidence for Demonstrating «Awareness» An Example

MÜDEK Outcome (xi):

Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; **awareness** of the legal consequences of engineering solutions.

- **Assessment:** Ensuring that all students have attended courses where the subject matter (in this case, "legal consequences of engineering solutions") has been covered. Additional assessment via a quiz or an awareness survey may be desirable.
- **Evidences:** Evidence showing that all students have attended the learning sessions where the subject matter was covered, and assessment results, if available.

Questions?

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