University of
Applied Sciences
St. Pölten

Course Design for Teaching and Learning in Higher Education

Lisa David, USTP Service unit LEARN

Hochschule für Angewandte Wissenschaften St. Pölten GmbH, Campus-Platz 1, 3100 St. Pölten, +43 2742 313 228-200, csc@ustp.at, ustp.at
Registered in the company register of St. Pölten provincial court under FN 146616m, VAT ID: ATU 53208201

EUDRES²

Table of Contents

In order to plan a course step by step, it is not sufficient to think about content and topics alone as the success of any course is directly related to diverse framework conditions and circumstances. The purpose of the following checklist is to help lecturers consider the framework conditions for their own teaching context:

- Course type (e.g., seminar, exercise, workshop, etc.)
- Specific characteristics in the curriculum or module
- Input from the Academic Director, existing course material and documents
- Availability of rooms, material, and teaching resources
- Frequency of sessions and number of units per session
- ECTS credits – scope of the entire workload for the course
- Number of students and position in the study programme
- Learning outcomes (subject-related, methodological competencies and further educational goals)
- Contents and topics
- Examination modalities

A lot of information about these points can be found in the respective curriculum and in the module description. The concrete details of one's own course are then added in the course description. This is where the concrete learning activities (methods), specific contents, and examination modalities are described in more detail.

Correct Formulation of Learning Outcomes

The **rough objective(s)** are already discussed during the explanation of the assignment. For example, one of the questions that initiate a target formulation is: "What exactly is supposed to be different after the course from before?"

As the term already suggests, the **detailed objectives** are small, detail-oriented (interim) goals. These are also referred to as learning outcomes as they describe an expected learning experience in the fine design.

By definition, an objective is “something towards which effort is directed: an aim, goal of end of action” (https://www.merriam-webster.com/dictionary/objective).

More specifically, an objective consists of a desired future condition that is clearly defined in terms of content, time, and scope.

SMART Formula

Accordingly, the SMART Formula can help with the review of a formulation of objective:

S Specific
M Measurable
A Agreed upon
R Realistic
T Time bound

This formula can be applied to both personal and professional objectives, and it can also assist in the formulation of a learning objective for teachers and learners alike (see Andler 2010, p. 121).

Such a learning objective in planning the fine design could be, for example: “The participants remember how to draw up a design procedure and design it on their own”. Whether the SMART requirements are met or not depends on the method, the scheduled time, etc.

When formulating a learning objective, it is important to avoid anything that is vague or unclear. Conjunctives should not be used, either: would, could, should.

Levels of Learning Objectives

In 1965, Benjamin BLOOM found out through comprehensive studies that learning objectives or outcomes can be divided into three domains:

- **Cognitive Learning Objectives**
  Knowledge, thinking, intellectual capabilities
- **Affective Learning Objectives**
  Interests, emotions, attitudes, values
- **Psychomotor Learning Objectives**
  Dexterity, movement coordination, capacity to act (Bloom 1972)

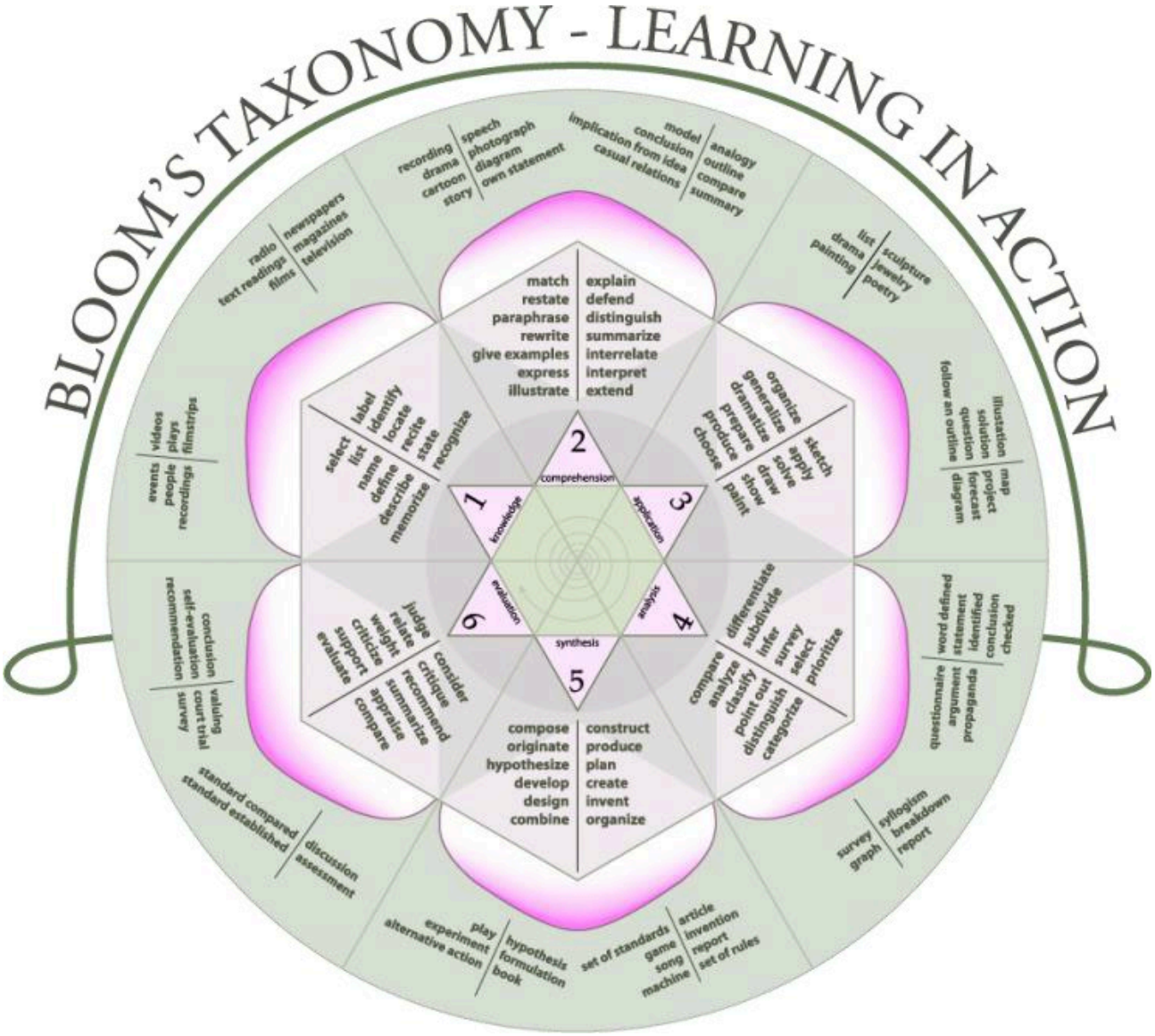
When preparing a course, it is important to plan learning objectives on all three levels in order to support students in their holistic learning process.

Terms Used to Formulate Learning Outcomes (Anderson/Krathwohl 2001)



Cognitive (brain)	Affective (heart)	Psychomotor (hand)
Add	Accept	Carry out
Appraise	Develop values	Craft
Argue	Empathise	Cut out
Assess	Engage	Demonstrate
Characterise	Estimate	Design
Clarify	Experience	Develop
Classify	Feel	Model
Create	Identify	Observe
Deal with	Inspire (be inspired)	Perform
Deduce	Learn	Present
Derive	Position oneself	Produce
Designate	Show understanding	Put together
Determine	Tolerate	Reference actions
Differentiate	Touch	Represent
Discuss	Understand opinions	Serve
Evaluate		Sketch
Explain		Stick on
Formulate		Test
Hypothesise		Write down
Identify		
Label		
Learn by heart		
List		
Look up		
Measure		
Name		
Prove		
Reason		
Represent		
Reproduce		
weight		

Another complex representation is offered by the following graphic:



(Traverso 2008)

Possible learning outcomes of courses in higher education (according to Behrendt)

Objective	Method	Measurement of learning success
Knowledge: Having completed the course, the students are able to …		
… repeat the basic terms from memory.	Lecture, reading assignments, etc.	Multiple choice; correct use of terms in essays or discussions
… describe the principles (concepts) of this subject area.	Lectures, reading assignments, demonstrations, etc.	Direct reference to principles in arguments and/or essays
… list some applications areas of this subject area.	Contact with research, industry, or representatives of the profession; experiments or projects	(informal) assessment of project descriptions
… identify principles and application areas of related subject areas.	General studies, background literature	Synthesis of data from various sources
Competence: The students demonstrate the ability to …		
… present something in writing in a clear, readable, and argumentative manner.	Essays, lab reports	(Informal) assessment
… express themselves in a clear and conclusive manner.	Presentation of project results, arguments in discussions, tutorials, etc.	Feedback from students or tutors
… pass independent judgement.	Discussion of contradictions; opposite views; use if discussion for setting out the student's hypotheses and presumptions	"Compare and differentiate" – questions in exams, assessment of arguments
… obtain, select and effectively structure information.	Use of libraries, abstracts, etc.; preparation for presentation and projects	Informal comment on the accomplishment of tasks; review and literature use
… demonstrate creative and imaginative thinking.	Projects, processing of unsolved problems, use if scientific concepts in argumentations, in discussion, etc.	Quality of writing, assessment of methods of problem assessment; positive assessment of originality

… effectively collaborate with others in a team.	Projects, role play, group discussion, etc.	Assessment of student behaviour by tutors and other students
Attitude: The students increasingly exhibit …		
… enthusiasm	Voluntary reading, meetings outside the course (learning groups)	Extent of activities outside the course, asking new questions for independent working
… an interest in scientific diligence	Contact with lecturers and researchers, continuous examination of own results	Grades for scientific diligence
… concern for moral, social, economic, political, and scientific problems with reference to the topic area	Interdisciplinary studies, projects, discussion about values	Overall impression of students' written papers and discussions

Planning Scheme for Course Schedule Planning

Rough objective of the course:

Interdisciplinary objectives of the course:

Type of exam:

Date Time	Contents	Learning outcomes of the course unit	Learning outcomes / contents betwen course units

Here it becomes quite clear that there is a difference between the learning outcomes and contents for the attendance time and tasks and contents of the self-study phases. In digital teaching/learning settings, we distinguish between synchronous and asynchronous phases.

Special attention should be given to a logical content order:

- *Logical order – example*: Individual elements are processed first, then the connections between them.
- *Process-oriented order – example*: The teaching/learning process follows the operating sequence: customer request, offer, production, delivery, invoicing, and maintenance.
- *Didactic/logical order – example*: First, known building materials are discussed; then, new technologies are introduced (principle: “from the known to the unknown”).
- *Dramaturgical order – example*: An arc of tension is built up: experiment – question – technical reflection – solution (see Lehner 2009).

Detailed planning and objectives in individual units/blocks:

- → Balanced events contain all three levels of learning outcomes.
- → A new line is filled in for every new method (lecture, discussion, assignment, etc.).

Time	Contents	Methods (teching / learning forms)	Learning outcomes & measurement of learning success	Notes on material and media

Selection of Contents and Didactic Reduction

5 Steps for Selecting Content

The following steps are helpful for designing a teaching/learning scenario. This course of action is a combination of several other techniques and pursues the target of approaching a new topic and selecting the relevant information.

1. **Step:** Select all terms, words, ideas, thoughts, images, numbers, forms, etc. on the topic that is to be addressed in the course (similar to a **brainstorming**). Write everything down, even if it does not fit the topic precisely. Brainstorming is about admitting all ideas without criticising any concepts, setting priorities, or deleting anything. This will be done in the next step.
2. **Step:** Reflect on who exactly is the **target group**, how much **time** you have in the course, and which **objectives** you want to achieve within the framework of the course. Take down notes, come up with concrete formulations, and – if necessary – ask the person that has set the task which exact objective is to be achieved.
3. **Step:** Just like in the **check of priorities**, mark the terms from Step 1 that are particularly relevant and delete anything that has no meaning for this course.
4. **Step:** Use the **substance check** to find out whether there are enough contents and learning outcomes left now. Take care not to form any categories but to name concrete learning outcomes for the topics.
5. **Step:** Try to completely outline the topic in as few sentences as possible. Pay attention to a concrete and result-oriented formulation.

Now you can

- think about the order in which the contents are to be explained, presented, and processed together with the students,
- select methods for the attainment of learning outcomes,
- select visualisation forms that are suitable for the topic,
- and select suitable course formats.

Didactic Reduction: Content Analyses

An important step in the planning of a course is the selection of contents to focus on. This is where the principle of Didactic Reduction comes in handy (see also the link auf wb-web).

Didactic analysis:

- *Present:* What role does this teaching content already play in the students' lives?
- *Future:* What will be its future meaning?
- *Material structure:* What is the overarching context of this content? Where is it embedded?
- *Accessibility:* Which concrete cases and phenomena make this content interesting, comprehensible, and vivid?
- *Exemplary significance:* Which general circumstances and problems are explained by this content?

Specialist scientific perspective:

- Which specialist technical basics are significant for the subject of learning?
- Which bigger technical picture needs to be taken into account?
- What is the historical background, and which specialist characteristics need to be considered?

Content selection:

- *Situational context:* Learning contents are geared towards concrete present and/or future situations.
- *Orientation towards action:* Learning contents offer assistance and orientation for concrete actions.
- *Scientific orientation:* Learning contents are (also) oriented towards the state of knowledge as well as the contents and methods of the respective specialist discipline.
- *Exemplarism:* Learning contents are selected in such a way that the wealth of knowledge can be reflected in a small number of typical cases (that are representative of similar situations).
- *Structure:* Learning contents (also) transport structural knowledge such as basic terms, theoretical elements, models, explanation patterns, etc. (see Lehner 2009).

Further course of action for reduction:

Horst Siebert proposes four approaches to reduction:

- **Elementarisation:** Limitation to fundamental structures, basic principles, and terms
- **Key terms:** Limitation to certain topic areas
- **Application situations:** Limitation to the most important situations of application
- **Exemplary selection:** Content processing based on cases and examples
  (Source: Wüst, 2015, p. 19)

With these aspects, it is possible to design one's own learning scenario. The above-mentioned methods form the basis for further reduction methods that are described in the following chapter.

"Fachlandkarte" (specialist map)

As a special form of mind map, the "Fachlandkarte" can offer support in the planning of a course as the relevant pieces of information on a topic are visualised and related to each other. The map can also be used as a visualisation option for students or the communication and dialogue with them.

This is an example of a course on "Programming Basics" from the second semester of a bachelor degree programme in Business Informatics. Just like in the selection of contents, we start out by collecting all important terms and contents. At the same time, however, we systematise them: All terms that go together are written down in the same spot. Then we collect the headings and check whether we have all contents for this heading. If not, we add them. We draw lines to connect terms that have a relationship in terms of content.

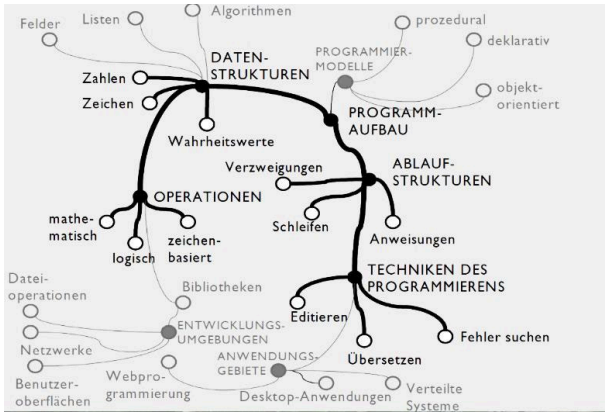


Abbildung 1: Abbildung 2: Fachlandkarte, aus Lehner, 2001

Determining the “How”: Methods

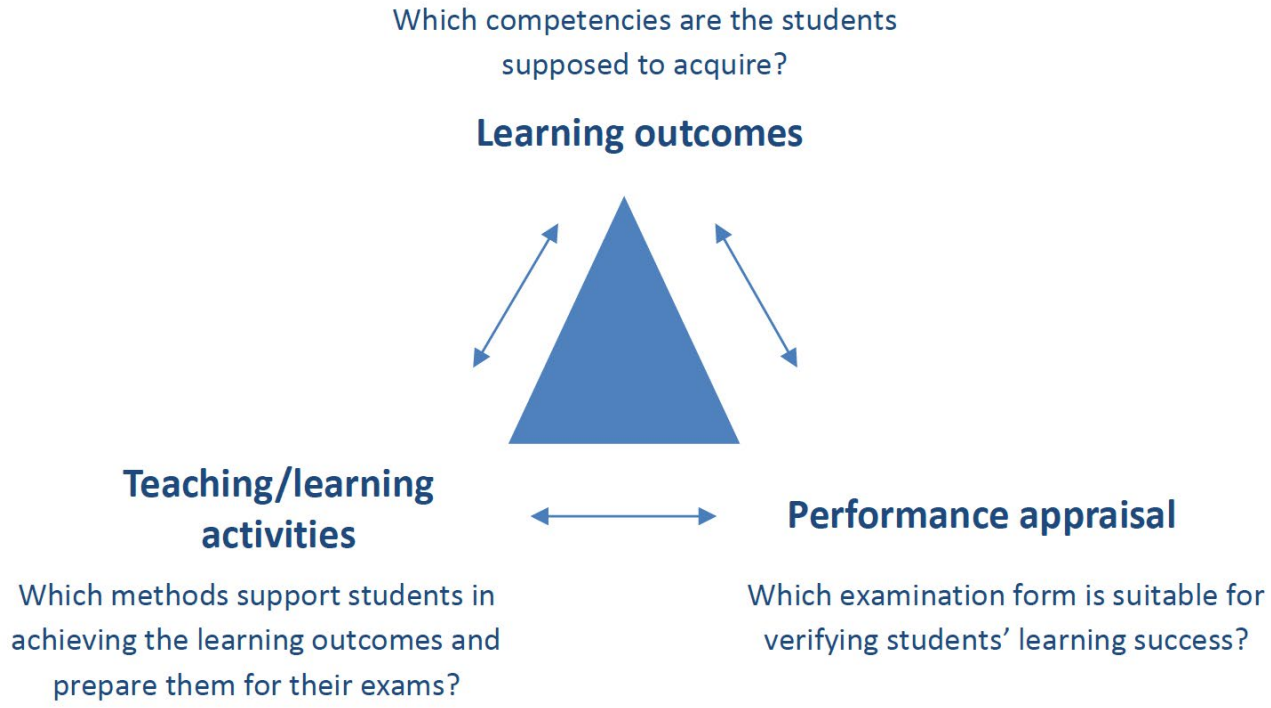
The chosen method(s) describe(s) the way in which certain contents can be taught or acquired, and they are part of any teaching/learning event’s structure. The methods always depend on the formulated learning outcomes. An important element in the choice of methods is the determination of a particular social form (plenary / all students, small groups, teams of two, individual work). The most important factor is the distribution of roles among lecturers and students. A method used in plenary can be either teacher-centred (lecture) or learner-centred (discussion, group work, etc.). Since the rise of online teaching, we have also been referring to learning activities. This means that the focus is on the learner and the activity that is supposed to result in learning.

Method cluster	Content
Activation – Learning transfer	Activating design of on-side teaching phases: Socratic conversation, retrieval practice methods, peer instruction, etc.
Presentation formats	Various ways of holding presentations: marketplace, poster session, idea sheet, impulse presentation, group puzzle, elevator pitch
Self-study tasks	Forms of preparation and assignments between units; these can be, e.g., collected and in the form of a portfolio and then handed it.
Discussion	Various forms of discussion such as fishbowl, debate, 6 hats, etc.
Feedback	Diverse possibilities of obtaining feedback
Relaxation	Relaxation exercises for in between
Other ideas	

All these methods can also be prepared, instructed, moderated, documented, etc. by students – see the document on “Student Engagement”.

Rounding off the Design: Constructive Alignment

The model of Constructive Alignment according to Biggs (2014) offers orientation for the cohesion between focused learning outcomes or competence objectives, learning activities, and examination forms.



The purpose of an exam is to review the students' learning outcomes. In this context, competence-oriented examinations assess not only the state of students' knowledge but also their methodological confidence and value-based capacity to act (see Wissenschaftsrat 2022). Accordingly, the learning outcomes need to be clearly defined so that the appropriate exam form can be derived. In order to facilitate competence-oriented examining, learning outcomes must also be formulated as competencies (see chapter on the review of learning outcomes). In didactic terms, the students' concrete teaching/learning activities (methods) are planned in such a way that they promote the attainment of competence objectives and make it possible to measure these in an exam.

At the USTP – University of Applied Sciences St. Pölten, the detailed content description, methodological approach, examination modalities, literature, etc. are to be entered in the

Literature Tips

Arnold, Rolf (2013): Wie man lehrt, ohne zu belehren. Heidelberg: Carl Auer Verlag.

Macke, Gert (2008): Hochschuldidaktik. Die Methodensammlung. Weinheim/Basel: Beltz Verlag.

Meueler, Erhard (2001): Lob des Scheiterns. Methoden- und Geschichtenbuch zur Erwachsenenbildung an der Universität. Baltmannsweiler: Schneider Verlag Hohengehren.

Meueler, Erhard (2009): Die Türen des Käfigs. Hohengehren: Schneider Verlag.

Schneider, Michael; Mustafic Maida (2015): Gute Hochschullehre: Eine evidenzbasierte Orientierungshilfe. Wie man Vorlesungen, Seminare und Projekte effektiv gestaltet. Berlin/Heidelberg: Springer Verlag.

Ulrich, Immanuel (2016): Gute Lehre in der Hochschule Praxistipps zur Planung und Gestaltung

von Lehrveranstaltungen. Wiesbaden: Springer Verlag.

Wörner, Alexandra (2006): Lehren an der Hochschule. Wiesbaden: Springer Verlag

Bibliography

Berendt, Barbara (2006): Gut geplant ist halb gewonnen… Teilnehmerzentrierte Struktur- und Verlaufsplanung von Lehrveranstaltungen. In: Berendt, B. (Hrsg.): Neues Handbuch Hochschullehre: Lehren und Lernen effizient gestalten. Bonn: Raabe Verlag.

Biggs, John (2014) Constructive Alignment in university teaching. HERSDA Review of Higher Education, Vol I, p. 5-22.

URL: https://www.herdsa.org.au/system/files/ HERDSARHE2014v01p05_0.pdf Zugriff am 10.06.2022

Bloom, Benjamin (1972), Taxonomie von Lernzielen im Kognitiven Bereich. 5. Auflage, Weinheim: Beltz.

Hartmann, Manuela (2008): Präsentieren. Präsentation zielgerichtet und adressatenorientiert. Beltz Verlag, Weinheim und Basel.

Illeris, Knud (2006): Das „Lerndreieck“. Rahmenkonzept für ein übergreifendes Verständnis vom menschlichen Lernen. In: Nuissl, E. (Hrsg.): Vom Lernen zum Lehren. Lern- und Lehrforschung für die Weiterbildung. Bielefeld: Bertelsmann Verlag.

Pfäffli, Brigitta (2005): Lehren an Hochschulen. Eine Hochschuldidaktik für den Aufbau von Wissen und Kompetenzen. Zürich: Haupt Verlag.

Traverso, John M.K. Traverso (2008): Blooms_rose. CC BY-SA 3.0, via Wikimedia Commons

Wildt, Johannes et al. (2003): Professionalisierung der Hochschuldidaktik. Bielefeld: Bertelsmann Verlag.