Introduction to advanced didactic design

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Outlook

Introduction to advanced didactic design

- Bologna Process: from teacher oriented to student centred teaching.
- Dublin descriptors: learning outcomes according to Bloom's taxonomy.
- Matrix of Tuning: the university teacher as a member of a co-educational community.

Tools for teaching, training and learning on different levels of education

- Selection of didactical experiences (lectures, practical exercise, etc)
- Soft skills
- Development of different typologies of exams and test and related evaluation

Practical activities with the involvement of attendants

- The future EDICULA Joint Course and EDICULA toolkits
- Technical skills for didactic purpose: voice use lab

The Bologna Process

The Bologna Process started in 1999 is a series of ministerial meetings and agreements between European countries to ensure comparability in the standards and quality of higher-education qualifications.

The process has created the **European Higher Education Area** under the Lisbon Recognition Convention; the main actions of the EHEA:

Student mobility and mutual recognition of diplomas

- ECTS credit system
- 3 main cycles (Bachelor's, Master's, Doctorate degree)

*Each cycle is defined by the **number of credits** required and the description of the **learning outcomes and skills** expected for each graduate*

Quality assurance

- Internal and External quality assurance
- Quality assurance of accreditation agencies

European programs

- **Erasmus** and **Erasmus Mundus** programs
- "European Universities" initiative

Didactic design

The European area **does not aim to standardize national higher education systems**, but to make them more readable and to build mutual trust between higher education institutions.
The mutual recognition of training courses, acquired credits and diplomas is based, not on the comparison of the content of the programs, but on the definition and validation of the targeted **learning outcomes**.

This process has necessarily led to resorting on a phase of design completely innovative compared to the partial spontaneism of the past; the **didactic design** process is essentially based on the following elements:

Learning outcomes

- Types
- Taxonomies

Design-programming cycle

Alignment of objectives-teaching methods-evaluation

Dublin Descriptors

The Dublin Descriptors are adopted as the **cycle descriptors** for the framework for qualifications of the European Higher Education Area.
The Dublin Descriptors are **general statements of the typical achievements** of students who have obtained a degree after successfully completing a Bologna cycle of study; they therefore define what **learning outcomes are common** to all graduates in a course of study.

They are neither meant to be prescriptive rules, nor they represent benchmarks or minimal requirements, since they are not comprehensive. The descriptors are **conceived to describe the overall nature of the qualification**. Furthermore, they are not to be considered disciplines and they are not limited to specific academic or professional areas.

	First cycle	Second cycle	Third cycle
Knowledge and understanding	…	…	…
Applying knowledge and understanding	…	…	…
Making judgements	…	…	…
Communication skills	…	…	…
Learning skills	…	…	…

What are Learning Outcomes?

Learning outcome

- A **specific expected result** of the training process.

When you begin designing a course, it is a good idea to first establish your course goals. If you start with the end in mind, you will have a clear path to follow!
To ensure your stated goals are appropriate and achievable, you should create both **course level** and **lesson level learning outcomes**.

When you take the time to write out your outcomes, it is easier to develop assessments to measure student outcomes.

Types of Learning outcomes

- **Cognitive** involving mental processes such as memory recall and analysis
- **Affective** involving interest, attitudes, and values
- **Psychomotor** involving motor skills

Taxonomies

- **Bloom's Taxonomy** (revised by Anderson in 2000) – hierarchical
- **Fink's Taxonomy of Significant Learning** – not hierarchical

Student-centred learning

Student-centred learning, also known as learner-centred education, broadly encompasses methods of teaching that shift the **focus of instruction from the teacher to the student**.

Student-centred instruction focuses on **skills** and **practices** that enable lifelong learning and independent problem-solving.

Student-centred learning theory and practice are based on the **constructivist learning theory** that emphasizes the learner's critical role in constructing meaning from new information and prior experience.

In student-centred learning approach the learning outcomes represent the set of knowledge and skill that characterize the cultural and professional profile to the achievement of which the course of study is aimed; they are identified by:

- a verb of **action**

- a **condition**
- a **verifiability criterion**

Formulating objectives

Learning outcomes should be SMART (Specific, Measurable, Attainable, Relevant and Time- framed) and stated in **student-centred** terms.

They should focus on what the student will be able to do rather than what you will have taught them.

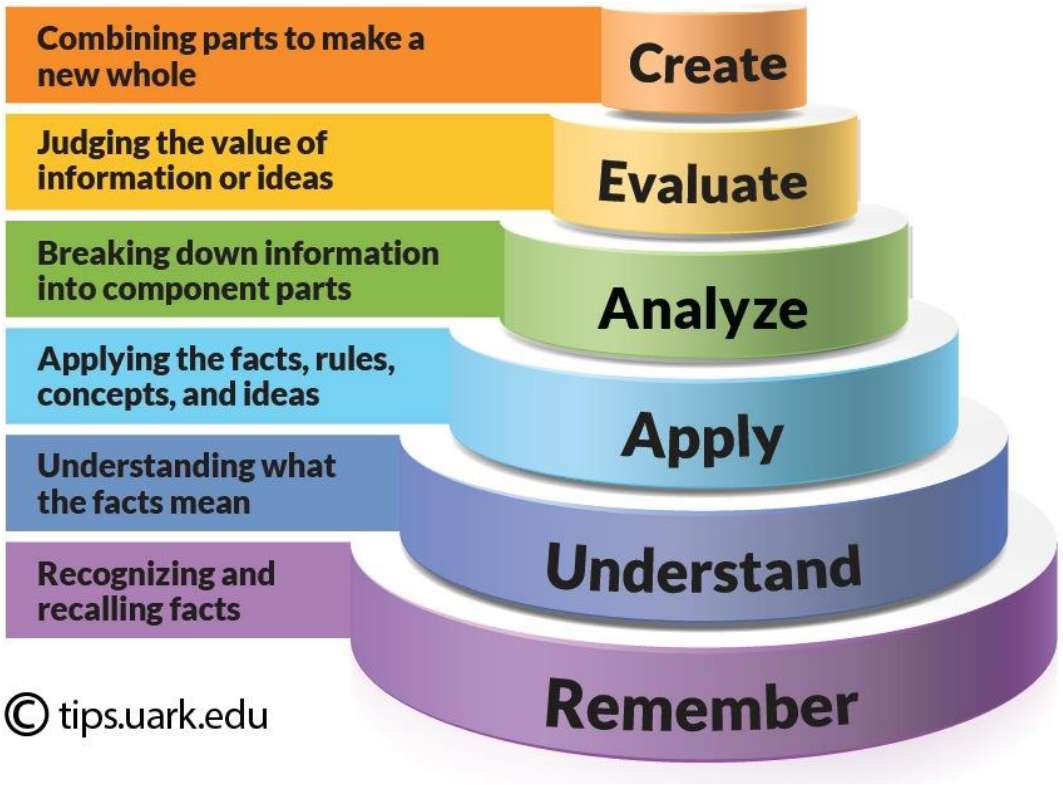
S pecific	each outcome clearly states one **skill** or **competency**
M easurable	they describe student **performance in observable terms**
A ttainable	they target an **appropriate level** of learning, within the scope of the course
R elevant	assessments align with lesson level outcomes, which align with course level outcomes
T argeted	written from the students' perspective in terms they can grasp

What is Bloom's Taxonomy

Bloom's Taxonomy is a **classification** of the different **outcomes and skills** that educators set for their students (**learning outcomes**). The taxonomy was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. The terminology has been then updated to include the following six levels of learning.

These **6 levels can be used to structure the learning outcomes**, lessons, and assessments of a course.

Bloom's is hierarchical: learning at the higher levels is dependent on having attained prerequisite knowledge and skills at lower levels



How Bloom's can aid in course design

Bloom's taxonomy is a powerful tool to help develop learning outcomes because it **explains the process of learning**:

1. Before you can understand a concept, you must **remember** it.
2. To apply a concept you must first **understand** it.
3. In order to evaluate a process, you must have **analyzed** it.
4. To create an accurate conclusion, you must have completed a thorough **evaluation**.

However, we don't always start with lower order skills and step all the way through the entire taxonomy for each concept you present in your course. Start by **considering the level of learners** in your course:

- **Freshman/Junior students**: target the lower order Bloom's skills, because your students are building foundational knowledge, getting too far up in the taxonomy could create frustration and unachievable goals.

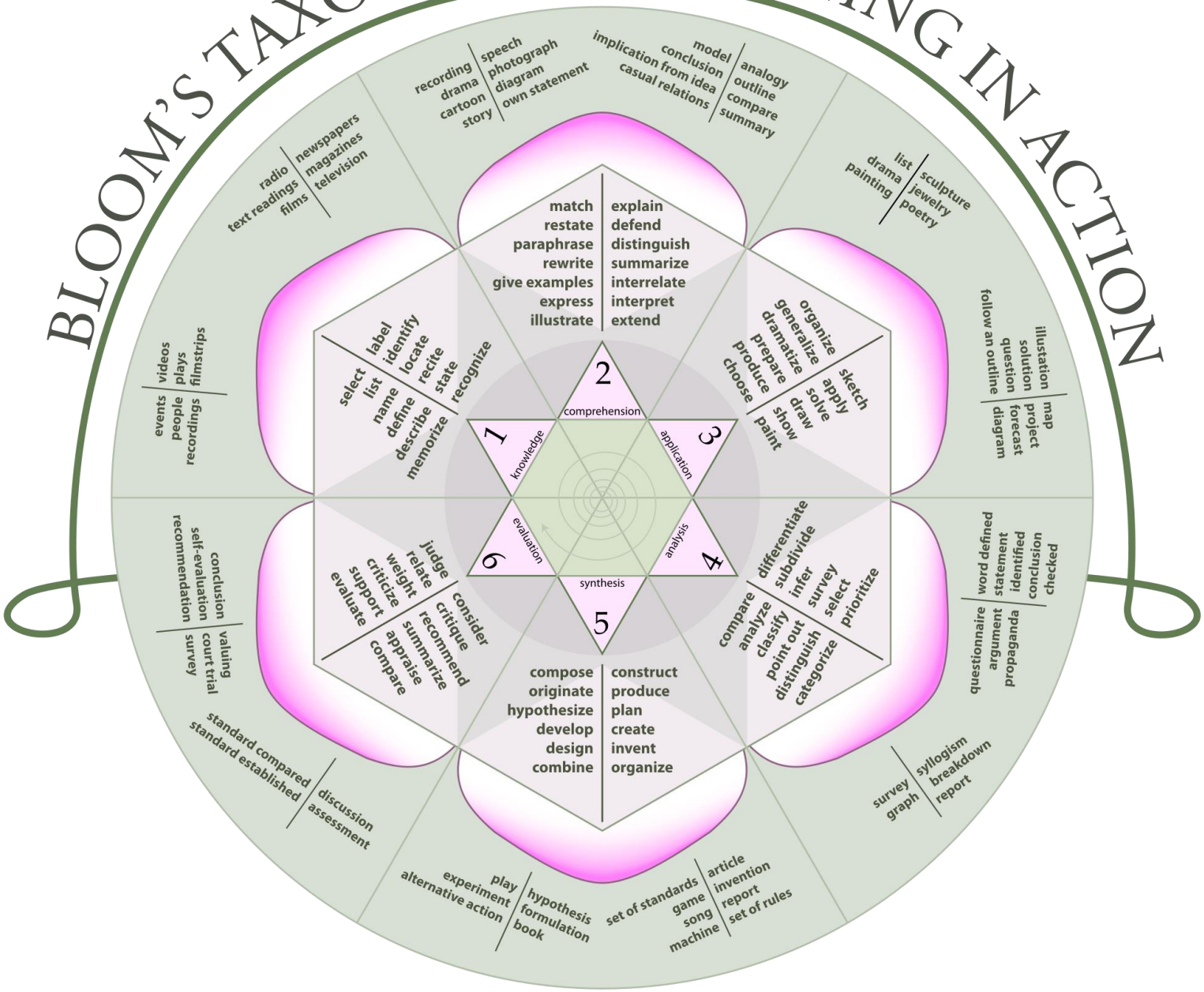
- **Graduate students/seniors**: advanced students should be able to master higher-order learning objectives, too many lower level outcomes might cause boredom or apathy.

How Bloom's works with learning outcomes

There are "verb tables" to help identify which action verbs align with each level in Bloom's Taxonomy.

Bloom's Level	Key Verbs (keywords)	Example Learning Outcome
Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop.	*By the end of this lesson, the student will be able to* design an original homework problem dealing with the principle of conservation of energy.
Evaluate	choose, support, relate, determine, defend, judge, grade, compare, contrast, argue, justify, support, convince, select, evaluate.	*By the end of this lesson, the student will be able to* determine whether using conservation of energy or conservation of momentum would be more appropriate for solving a dynamics problem.
Analyze	classify, break down, categorize, analyze, diagram, illustrate, criticize, simplify, associate.	*By the end of this lesson, the student will be able to* differentiate between potential and kinetic energy.
Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, perform, present.	*By the end of this lesson, the student will be able to* calculate the kinetic energy of a projectile.
Understand	describe, explain, paraphrase, restate, give original examples of, summarize, contrast, interpret, discuss.	*By the end of this lesson, the student will be able to* describe Newton's three laws of motion to in her/his own words
Remember	list, recite, outline, define, name, match, quote, recall, identify, label, recognize.	*By the end of this lesson, the student will be able to* recite Newton's three laws of motion.

BLOOM'S TAXONOMY - LEARNING IN ACTION



Course level and lesson level outcomes

The biggest difference between **course and lesson level outcomes** is that **we don't directly assess course level outcomes**: course level outcomes are just too broad. Instead, we use several lesson level outcomes to demonstrate mastery of one course level outcome.

Either the lesson level outcomes and the course level outcomes need one verb: ensure that the verbs in the course level outcome are at least at the highest Bloom's Taxonomy as the highest lesson level outcomes that support it.

Strive to keep all your learning outcomes measurable, clear and concise.

How Bloom's can aid in multidisciplinary EDICULA-like course design?

EDICULA joint future course will be a Master Degree course, so in principle students should be of the second type, i.e. advanced and not of basic level.

However, the **multidisciplinary character** involves a concern: despite being advanced level students, their knowledge will be basic on some specific topics while it will be advanced on other aspects depending on the previous studies.

This raises a number of questions:

- How to resolve this **contradiction**?
- How to **recall and integrate**, if necessary, **basic concepts** on an audience of potentially varied students coming from different educational paths?
- How to **avoid losing the attention** of students who already have a high-level education on those specific areas?

Possible solutions

Course design phase

- **Shared definition of prerequisites and learning outcomes** at the level of the various courses
- Accurate didactic design through the **Tuning Matrix**
- **Ongoing course review** process

Didactic design phase

- **Assessment test** or self-assessment test of **incoming knowledge**
- **Flipped classroom**, students who are already trained on a discipline can expose some content to colleagues in order to further sediment those concepts and not lose attention

Course design phase - purpose

The purpose refers to the aims of programme, can include personal development of the students and their value to society at large.

In the case of a multidisciplinary EDICULA-like course design it is necessary to **share the purpose as much as possible**, taking into account the different origins of the students and **the need not to create overlapping profiles** with the courses already existing at the moment in the different partner locations. In sum, it is necessary **to combine multidisciplinarity with diversity and specificity**.

A	**Purpose**
	Please provide (in 2 sentences) **a general statement** about the degree programme, providing a short summary –a 'synthetic view'- of the overall **purpose of the programme.**

Once the purpose has been defined, the characteristics allow to decline in detail the **focus and orientation** of the programme.

Course design phase - characteristics

B	Characteristics	
1	Discipline(s) / Subject area(s)	Please indicate the main **discipline(s) / subject area(s)** of the degree programme. If the programme is multi- or interdisciplinary, please indicate the relative weight of the major components, if applicable (e.g. politics, law and economics (60:20:20).
2	General / Specialist focus	Please specify the **general and/or specialist** focus of the degree programme.
3	Orientation	Please outline the **orientation of the degree programme.** *For example whether the degree is primarily research, practically based, professional, applied, related to designated employment, etc.*
4	Distinctive features	Please indicate any **additional features that distinguish this degree programme from other similar degree programmes.** *For example: if the programme includes a compulsory international component, a work placement, a specific environment or is taught in a second language.*

Course design phase – key competences

In addition to defining in the design phase other fundamental aspects such as **employability**, opportunities for **further studies** and **education style** (teaching strategies, assessment methods, learning approaches etc.), in a course with a strong multidisciplinary character **key competencies** are of paramount importance.

They cover demonstrated knowledge, understanding, (subject specific and generic) skills, abilities, attitudes and (ethical) values covering the whole spectrum of capabilities from pure theoretical and methodological knowledge to vocational knowledge and from research to practical abilities.

	PROGRAMME COMPETENCES
1	GENERIC Please list here the generic programme competences.
2	SUBJECT SPECIFIC Please list here the subject specific programme competences.

While **the learning outcomes are formulated by academic staff** and are the measurable result of a learning experience, **competences** are developed during the process and therefor they **belong to the student involved**.

Competences: the Matrix of Tuning

Competences are described by **short statements** indicating an area of capability connected to a field of knowledge, a skill or related to another competence. Key competences are **developed in a progressive way** Implying that are built in different course units as visualised in the **Matrix of Tuning**:

Learning outcomes and competences in study programmes

Tuning
Educational Structures
in Europe

Example

Course unit/ learning outcome	Competence									
	A	B	C	D	E	F	G	H	I	J
Unit 1		X			X				X	
Unit 2	X			X		X	X		X	
Unit 3		X				X			X	
Unit 4	X		X							X

X = This competence is developed and assessed and is mentioned in the learning outcome of this unit

The university teacher as a member of a co-educational community

Generic and subject-specific competences

Generic competence

It is a competence which is transferable between subject areas, could be written from these starting points (see also Tuning list of generic competences):

- Research ability
- Teamwork
- Management ability
- Problem solving
- Creativity
- Communication skills
- Communication of information

Subject-specific competence

It is a competence that is performed in a specific subject area:

- Ability to demonstrate knowledge of and ability to use research techniques and technology
- Ability to interpret the degradation processes of artistic artifacts in the light of the properties of the constituent materials
- Ability to predict future conservation issues taking into account the influence of climate change on the environment and the fruition of cultural heritage

EDICULA Curricula reformation

EDICULA project aims to **reform the curricula of three post graduate programs** in the field of Cultural Heritage, to permit their graduates, despite their discipline, to commonly respond to the need to face grand challenges and risks in complex environments. The parallel and complementary approach to the reformation of specific courses in these Master Programs, promotes the need for harmonization for the **future creation of a Joint transdisciplinary Master Degree** in the field of Monument Rehabilitation and Conservation.

The second output O2 – EDICULA Curricula Reformation requires the participation of the three Post Graduate Master:

NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA) Post Graduate Program in "Protection of Monuments"

SAPIENZA UNIVERSITY OF ROME (UNIROMA1) Post Graduate Program in “Science and Technology for the Conservation of Cultural Heritage"

BEZALEL ACADEMY OF ARTS AND DESIGN (BEZ) Post Graduate Program in “Urban Design” together with the Conservation Unit in the Department of Architecture”

EDICULA Joint Master Degree – Matrix of Tuning

EDICULA Curriculum Reformation

Partners:

Sapienza University of Rome
National Technical University of Athens
Bezalel Academy of Art and Design

Profile:

Purpose	
Characteristics	
Employability & further education	
Education style	
Programme competences	Quality, ability, capacity or skill that is developed by and belongs to the student
List of Programme Learning Outcomes	Measurable result of a learning experience which allow to ascertain to which extent a competence has been formed (not properties unique to each student)

Matrix of Tuning:

DESCRIPTORS	ACTIVITIES																	
	Sapienza						NTUA						Bezalel*					
	PLANT BIOLOGY FOR CULTURAL HERITAGE	CONSERVATION FOR CULTURAL HERITAGE	APPLIED GEOSCIENCES	BIOCONSERVATION LABORATORY	CLIMATE RISK ASSESSMENT OF CULTURAL HERITAGE	INTRODUCTION TO THESIS AND PRACTICAL SEMINARS							INTRODUCTION TO URBAN HERITAGE From theory to practice in heritage preservation (ASW)	CRITICAL HERITAGE STUDIES	STUDIO	INDIVIDUAL PROJECT	LEARNING FROM JERUSALEM	CONSERVATION THEORIES
A - Knowledge & understanding	**Acquisition of theoretical and operational knowledge with reference to:**																	
Knowledge and familiarization of theory and standard setting documents in the field of urban heritage													x	x				
Understand the attributes of heritage													x	x				
Knowledge and understanding of evaluation methods and techniques													x	x				
Classify and compare case-studies													x	x				
Define and describe role of stakeholders													x					
Knowledge and understanding of the steps of scientific writing																		
B - Practice: application skills	**Acquisition of multidisciplinary applicative skills for diagnostic and conservation, of methodological and instrumental type with reference to:**																	
Apply multidisciplinary approach														x				
Apply methodological procedures													x	x				
Apply international regulations																		
C - Autonomy of judgment	**Acquisition of conscious autonomy of judgment with reference to:**																	
Interpret data																		
Apply a scientific approach to conservation																		
Apply a critical approach to conservation													x	x				
Evaluate and choose the intervention																		
Prioritise climate-induced conservation risks																		
Transfer scientific outcomes to the application of international regulations																		
Reading scientific literature													x	x				
D - Communication skills	**Acquisition of adequate skills and tools for communication with reference to:**																	
Process data and presentation													x					
Work in a team													x	x				
Display computer skills																		
transmission and dissemination of scientific topics by papers and social media														x				
E – Autonomy & ability to learn	**Acquisition of adequate skills for the development and deepening of further skills with reference to:**																	
Consult bibliographic material													x	x				
Consult databases and information on the web													x	x				
Combine cognitive tools for continuous updating																		
Write scientific papers, congress contributions, outreach manuscripts, grant proposals																		

* The exact titles of Bezalel courses will be detailed later in accordance to the final curriculum of 2022-23

Analysis of indicators:

- Unique indicator for Bezalel Curriculum
- Adaptation of Sapienza indicator to Bezalel
- Identical indicator to the indicator of Sapienza

A three levels scale (suggested):

- Direct X
- In-direct x
- Non -

…and thank you for your attention!