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21st Teach skills

Project Title

TEACHER TRAINING WITH SPECIALIZATION ON LIFE AND INFORMATION TECHNOLOGY SKILLS

Project Acronym

21st TeachSkills

WP2 2.1: Outline and methodology of the Syllabus for course

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THEORETICAL AND METHODOLOGICAL BASES OF SYLLABUS FOR COURSE

According the project description, the focus of syllabus will be in the acquisition of 21st century skills for teaching. This must be integrated in all aspects of the training: learning environment, teaching and learning methods, collaboration and networking as well as assessment.

The course will cover the following areas (all mandatory):

- **Module 1** (10ECTS): **Teaching critical thinking and collaborative problem-solving skills**. Leader: SCES
- **Module 2** (10ECTS): **Education Technology skills (based on the Technological Pedagogical Content Knowledge).** Leader: SWU.
- **Module 3** (10ECTS): **Authentic learning tasks: practical implementation of the skills in the classroom.** Leader: SZPT.
- **Module 4** (10ECTS). **Optimizing Assessment for 21st century skills**. Leader: RUPP.

The outline of the syllabus of course is composed of: title of module; credits and hours; course content; learning objectives, target group; topics of module; characteristics of class meetings; learning activities; teaching methods; equipment; assessment methods; course schedule (Appendix 1).

Education in the 21st century highlights globalization and internationalization. Any advancement of technology presents theoretical constructs and realistic insights in the development and enhancement of knowledge, skills, and attitudes among students and teachers (Abao, Dayagbil, & Boholano, 2015). Since education standards and the purposes of education are changing, curriculum frameworks, instructional methods, and assessment strategies must also change. Those changes in curriculum, instruction, and assessment have many important human capital implications, including those related to teacher training, professional development, career mobility, and general cultural standing of the teaching profession. This work will be demanding and complicated, and it will require from educators and policy makers at all levels precisely the sorts of skills that we deem critical for the next

generation. However, if we believe 21st century skills are the key to solving economic, civic, and global challenges and to engaging effectively in those spheres, then we must act upon the belief that using those skills to overhaul our education systems is possible (Saavedra, Opfer, 2012).

Course content

When constructing the course content, it is important to take into account the name of the module, its logical components. The form and content of a syllabus vary widely by discipline, department, course and teacher. However, there are common components that most successful syllabi contain. These components communicate to your students an accurate description of the course including the topics that will be cover, assignments and assessments students will be responsible for, as well as a clear source for policies and expectations.

It is important to note that the content of the course would include basic knowledge, its interpretation in the aspect of various sciences (especially pedagogy and psychology). It is equally important that the content is constructed to meet the educational situation of the 21st century, the specifics and needs of a particular country. When constructing content, you need to ask questions: What is the basic content of the course and what makes it important or interesting? How does the course fit into the context of the discipline?

Drafting a course description is typically the first step an instructor takes to define the ideas a course will address and to articulate its scope. This paragraph to page-long description of the course may describe:

- the intellectual context of the class (with enough background about the discipline to explain the location of the class within that context);
- the ideas and questions that will drive discussion and inquiry in the class;
- the general course objectives (see below);
- the nature of the kind of work the instructor expects other students;
- the kind of relationship the instructor expects the students to have with other students, the instructor, and the class time;
- the location of this class in the student's curriculum (does this satisfy a requirement? does it have or satisfy a prerequisite?);
- the instructor's pedagogical philosophy;

- other key forces that define a course.

Target group

According the project description, the course will be adaptable to the needs of the principle target groups: pre-service and in-service teachers.

Thus, in preparing course material and filling in the module tables, the student experience must be an important moment for the facilitators. One group will have more and especially practical experience, others will have knowledge and skills of both theoretical and practical application.

Learning objectives

A learning objective should describe what students should know or be able to do at the end of the course that they couldn't do or didn't know before. The objectives must be clear to students. The objectives and outcomes must be differentiated for the individual student. All the learners should be able to see where they are and what they need to do to get to the next level. Learning objectives must have a criterion of success, that is, they must be achievable for a specific group of students and individually.

The course description normally includes the general course objectives, though these are often not expressed as explicitly as they should be. To make sure you have written down all of the general course objectives and there are mentioned:

- increase a student's knowledge base (through exposure to new ideas, leaning of facts, rules. dates and formulas. etc.).
- provoke a student's interest in a field (by cultivating a student's sense of inquiry and giving students opportunities to investigate the topic on their own).
- foster critical thinking and a host of related skills: comparative thinking, analytical thinking, the ability to evaluate and judge.
- establish a classroom environment that supports student learning and engages students in each other's progress (through group interactions and projects intended to stimulate trust and collaboration).

When setting learning objectives, it is important to ask questions: What should students be able to do by the end of the course? What purpose does this course and its material serve?

Are there discipline-specific objectives, larger metacognitive goals, or both? Objectives are most helpful when they are expressed in terms of knowledge and skills that can be readily identified and assessed. For example, the ability to recognize, differentiate, apply or produce is much more readily identifiable than the ability to appreciate or understand.

It is expedient to take taxonomies into account when anticipating the objectives of the subject, constructing the content of the subject and choosing teaching and assessment methods (Appendix 2).

Topics of module

Each module must be divided into logical components in such a way that the essence and logic encoded in the title of the module are explained, and students are provided with various information. The project provides these 4 modules:

- Teaching critical thinking and collaborative problem-solving skills.
- Education Technology skills (based on the Technological Pedagogical Content Knowledge).
- Authentic learning tasks: practical implementation of the skills in the classroom.
- Optimizing Assessment for 21st century skills.

The modules are different, but they are all linked by things like: they are all for current or future teachers, so the educational aspect of the topics is important; all subjects must have more or less theoretical knowledge; all subjects must be designed to help students acquire practical abilities and skills; all subjects must include modern educational technologies; the topics in all modules must focus on 21st century skills development.

The example of topics of the 1st module "Teaching critical thinking and collaborative problem-solving skills":

Topic 1: Critical Thinking Skills

- Critical Thinking Skill -Concept and Characteristics
- Elements of Critical Thinking
- Strategies to develop Critical Thinking Skills
- Methods and Tools to develop C. T. Skills
- Role of a Teacher to promote C. T. Skills
- Suggested Activities

- Assessing C. T. Skills

Topic 2: Collaborative Problem-Solving Skills

- Collaborative Problem-Solving Skills -Concept and Characteristics
- Elements of Collaborative Problem-Solving Skills Strategies to develop each
- Methods and Tools to develop Collaborative Problem-Solving Skills
- Role of a Teacher to promote Collaborative Problem Solving Skills
- Suggested Activities
- Assessing student's Problem Solving Skills

Characteristics of class meetings

The nature of the meetings with students must be foreseeable, depending on which students are current or future teachers; to the content to be conveyed, the aims of the subject; to the relationship between theory and practice in the module; to the available hardware, etc. The questions should be answered: What types of activities should students be prepared for? Discussion? Lecture? Small groups? Student presentations? How will we contact? How are course materials obtained? When and where does the class meet? It is important to decide what the nature of the training will be - face to face or distance learning, or mixed.

Learning activities; teaching methods

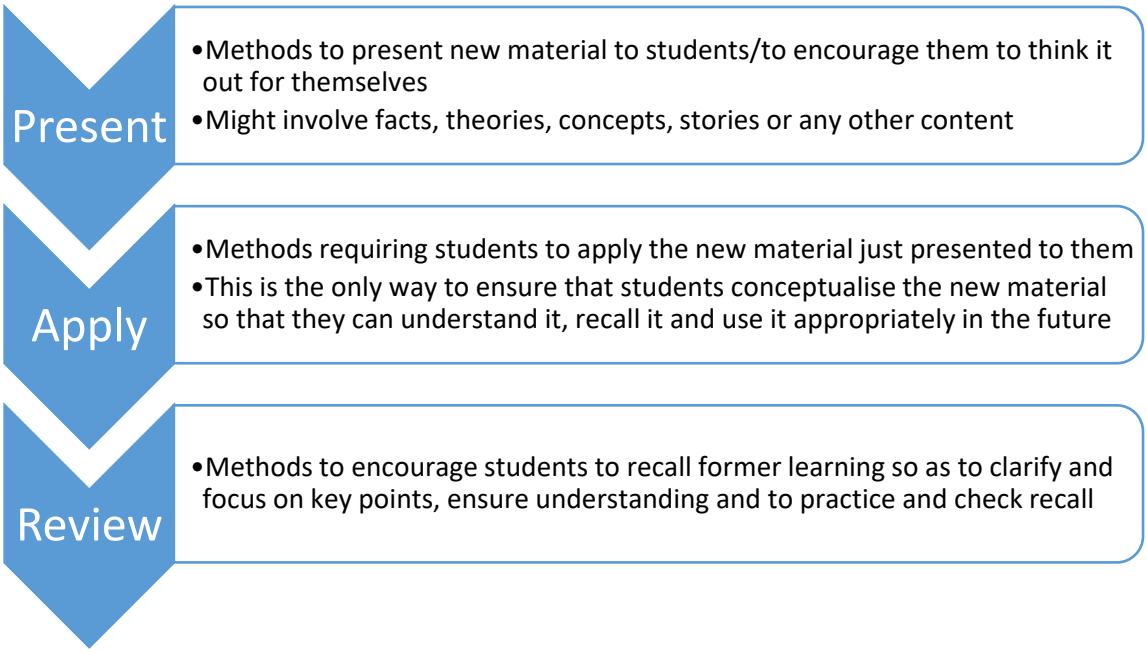
The term teaching method refers to the general principles, pedagogy and management strategies used for classroom instruction. Your choice of teaching method depends on what fits you — your educational philosophy, classroom demographic, subject area(s) and school mission statement. Teaching theories can be organized into four categories based on two major parameters: a teacher-centered approach versus a student-centered approach, and high-tech material use versus low-tech material use.

These mutually reinforcing core elements are inherent and mandatory, according M. Pupinis (2020), in 21st century education:

- Policies, rules and regulations enabling student-centered learning and teaching;
- Student-centered curriculum and pedagogy;
- Student-centered assessment;

- Flexible learning pathways;
- Learner support;
- Teaching support;
- Active learning spaces and academic libraries;
- Learning technologies infrastructure;
- Community learning connections and partnership;
- Quality assurance supporting student-centered learning and teaching.

Professional development service for teachers' points out, that teaching falls into three phases, each requiring appropriate methods:



It is also important to answer these questions when planning learning activities and anticipating teaching methods: What books, readings, and other course materials will be needed, and where can students acquire them? Are there other skills that students will need to be successful (for example, proficiency with specific software)? Will the course involve site visits or fieldwork outside of regular meeting times?

Based on the results of the surveys in WP1, the following teaching methods can be distinguished, which may be suitable for planning and carrying out the activities of the modules: case analysis, work in groups, discussion, team project, individual consultations,

individual project, interactive lecture, creative workshops, guest lecturer (practitioner) lecture, presentation of literature review, practical tasks, problem-based training, seminar, application of special software packages, blog, traditional lecture, reflection of activity, virtual teaching environment (Moodle, Google class, video conference, meeting room, etc.) and others.

Equipment

According the project description, development of a digital online education platform in order to obtain a shared vision on how ICT can help making lifelong learning a reality for all. The platform will provide opportunities of exchange of experiences among academics and educators, access to e-toolbox and virtual learning courses. Its objective is to help build professional learning communities that support teachers to learn, collaborate and innovate together. The platform will dedicate a space to personal learning communities, with no limit of borders, in order to develop better academics and educators' pedagogical skills, especially around integrating technology appropriately into practice.

All activities related to the teaching of modules will have to be penalized by the equipment provided in the project.

Assessment methods

Successful assessment strategies result in improved learner progress on a continual basis. The principal characteristic of Assessment for Learning is effective feedback provided by teachers to learners on their progress. The value of the feedback is dependent on two factors:

- the quality of the feedback
- how learners receive and ultimately use it.

According to M. Pupinis (2020), the assessment of the 21st century and student centered assessment must have these aspects:

- More frequent, in different forms, peer to peer, self-assessment, quizzes;
- Formative feedback rather than summative;
- Reflects progress in terms of Bloom’s taxonomy, connects to other fields;

- Reflects learning outcomes;
- Possibility to learn from mistakes, repeat.

When anticipating an evaluation strategy and principles, it is important to anticipate these issues: What will students be asked to do? How is the course grade determined, and what is the grading scale? Do you offer extra credit? How will students demonstrate their learning? Include learning goals, estimated scope or length, assessment criteria and dates. Teachers typically include a breakdown, in point values or percentages, of how much each assignment or test contributes to a student's final grade.

Based on the results of the surveys in WP1, the following assessment methods can be distinguished, which may be suitable for planning and carrying out the activities of the modules: report, case analysis, works' folder (portfolio), exam, essay, team project, individual work, project, colleagues' rating, colloquium, control work, course work, analysis of literature, report of internship, problem solving task, paper, self – evaluation, poster presentation, test, blog, reflection of activity and others.

Course schedule

In this part of the module planning it is important to provide specific dates for interim and final settlements, dates of meetings (face to face and / or virtual). It is necessary to consider such questions: What will students be asked to do for particular class sessions? When will quizzes and/or examinations be given? What are the due dates for the papers, projects, or other assessments? Is there a final exam, and if so, when? (Many institutions have a special calendar for final-exam week.).

References

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APPENDIX 1

- TEMPLATES FOR THE SYLLABUS FOR COURSE

Module 1: Critical Thinking Skill and Collaborative Problem-Solving Skills	
Leader: SCES	
Credits / hours	10ECTS (260 hours labor)
Course content	
Learning objectives	
Target group	
Topics	
Characteristics of class meetings	
Learning Activities	
Teaching methods	
Equipment	
Assessment methods	
Course schedule/calendar	

Module 2: Education Technology skills (based on the Technological Pedagogical Content Knowledge)	
Leader: SWU	
Credits / hours	10ECTS (260 hours labor)
Course content	
Learning objectives	
Target group	
Topics	
Characteristics of class meetings	
Learning Activities	
Teaching methods	
Equipment	
Assessment methods	
Course schedule/calendar	

Module 3: Authentic learning tasks: practical implementation of the skills in the classroom	
Leader: SZPT	
Credits / hours	10ECTS (260 hours labor)
Course content	
Learning objectives	
Target group	
Topics	

Characteristics of class meetings	
Learning Activities	
Teaching methods	
Equipment	
Assessment methods	
Course schedule/calendar	

Module 4: Optimizing Assessment for 21st century skills	
Leader: RUPP	
Credits / hours	10ECTS (260 hours labor)
Course content	
Learning objectives	
Target group	
Topics	
Characteristics of class meetings	
Learning Activities	
Teaching methods	
Equipment	
Assessment methods	
Course schedule/calendar	

APPENDIX 2

TAXONOMIES

The most commonly used are three taxonomies – **Bloom** (1956), ***SOLO*** (Structure of Observed Learning Outcomes) (Biggs, K. Collis, 1982) **and New Taxonomy of Marzano** (2001) (Designing a New Taxonomy of Educational Objectives).

B. Bloom and other (1956)
Taxonomy of educational objectives
(cognitive, emotional, psychomotor learning areas)

6. Assessment
5. Synthesis
4. Analysis
3. Applying
2. Understanding
1. Knowledge

Cognitive area
(Bloom et al, 156)

5. Adoption of values
4. Systematization
3. Values assignment
2. Reaction
1. Acceptance

Emotional area
(Krathwohl et al, 164)

7. Creation
6. Adaptation
5. Complex open reaction
4. Acting technique
3. Controlled reaction
2. Disposition (mindset)
1. Perception

Psychomotor area
(Simpson, 1972)

COGNITIVE AREA					
Knowledge	**Understanding**	**Applying**	**Analysis**	**Synthesis**	**Assessment**
The ability to reproduce and memorize facts without necessarily understanding them	The ability to understand and interpret information	The ability to use learned material in new situations, such as using ideas and concepts to solve problems at work	The ability to divide information into components, such as the search for interactions and ideas (understanding of organizational structure).	The ability to connect parts together into a whole	The ability to evaluate the value of a material for a given purpose.
VERBS:					
defines, lists, quotes, counts, repeats, tells.	explains, classifies, describes, recognizes, and calculates, reviews.	applies, adapts, modifies, demonstrates, finds, constructs.	analyzes, compares, singles out, groups, links, proves, and criticizes.	collects, plans, formulates, summarizes, and integrates, offers.	determines value, argues, gives reasons, suggests.

EMOTIONAL AREA[1,2,3] (from the interest shown to the adoption of values and attitudes)				
Acceptance and interest	**Reaction**	**Values assignment**	**Systematization**	**Adoption of values**
Acceptance and interest are related to a person's willingness to take an interest in a particular phenomenon or what is going on around them. The person consciously accepts the information, listens willingly and carefully. Indifferent to the environment - focuses on it, distributing it according to the importance of the received information to himself/herself.	It signifies a person's higher activity. A person is not only interested in the environment, but also willingly participates in activities, takes initiative, and is happy to be active. The person consciously responds to what is going on around him, expressing his interest in an appropriate way.	Value is assigned to a phenomenon, object, activity, and so on. A person is not only an active participant - he or she recognizes the values he or she promotes and gives meaning and significance to what he or she participates in. At this level, a person's attitudes change: a value is not only recognized but also committed to, and the behavior clearly shows that the value is acceptable to the person.	This level marks the creation of a system of values. A person sorts values in a certain order, links and reconciles them with each other, giving priorities that help him resolve internal value conflicts. A person compares different values, establishes connections between them, summarizes and combines them into a whole. New or newly emerging values are compared with the previous ones, they are given a corresponding priority in the system of personal values.	The behavior of the person who has reached it depends on the created value system, the values seem to control the person. When behavior is consistently and for a long time conditioned by the same values, a worldview based on the respective characteristics, a certain way of teaching and learning is formed. A person's behavior becomes implicit, characteristic, and constant in similar situations.
VERBS:				
interested, listens, asks, pays attention, notices	performs, responds, cooperates, participates, discusses	loyal, initiates, committed, expresses attitude	discovers balance, harmonizes, groups, classifies, binds	gives an example, defends, influences, modifies, supports

PSYCHOMOTOR AREA[4]						
Perception	**Disposition (mindset)**	**Controlled reaction**	**Acting technique**	**Complex open reaction**	**Adaptation**	**Creation**
Ability to use noticeable signs, hints as references	Readiness to take certain actions.	Trial-and-mistakes-based activities in the acquisition	Intermediate stage in the acquisition of a certain ability.	Actions using complex activity's models.	At this level, skills are well developed and a person can choose to modify actions and solve problematic	Skills are so well developed that creativity is used to deal

[1] Krathwohl D. R., Bloom B. S., Masia B. B. (1964). Taxonomy of educational objectives // Handbook II: Affective domain. New York: David McKay Co, 196 p. Ryan, 2006

[2] Hartel, R. W. and Foegeding E. A. (2004). Learning: Objectives, Competencies, or Outcomes // Journal of Food Science Education, (3), p. 69–70.

[3] Kennedy D., Hyland Á, Ryan N. (2006). Writing and Using Learning Outcomes: a Practical Guide.

[4] Simpson E. (1972). The classification of educational objectives in the psychomotor domain // The psychomotor domain, Vol. 3. Washington, DC: Gryphon House.

to activities.		of a certain ability.			situations or adapt to specific requirements.	with special situations.
VERBS:						
verbs are not usually associated with a particular level until the context in which the learning outcomes are sought is defined. In summary, the following verbs can be named to formulate learning outcomes in the psychomotor field: collect, correct, demonstrate, mix, record, measure, express in motion, etc.						

SOLO taxonomy (J. Biggs, K. Collis, 1982)
(Structure of Observed Learning Outcomes).

	Pre - structural level	Single structure level	Multi-structure level	Relational (systemic) level	Advanced Abstract level
Learning outcomes	Did not complete the task properly, did not answer the topic, did not understand the essence of the question at all and his / her answers show that the learning outcomes have not been achieved	See into only one particular aspect, fact, or idea, but it does not cover more related issues. This indicates a low level of his achievements	Focuses on several aspects, facts or ideas, but uses each of them individually or in several different ways and does not integrate them with each other.	Is able to link at least two separate aspects or ideas of information and combine them into a whole. This level indicates a proper understanding of a particular topic.	Demands that it not be limited to available information or ideas and involves the greater challenge of using ideas put together at the relational level to find new solutions, apply ideas to a new topic, and so on.
	Surface learning			Deep learning	

New Taxonomy of R. J. Marzano (2001)
(Designing a New Taxonomy of Educational Objectives).

The author did not classify the components of the taxonomy in a hierarchical order according to complexity. He relied on three systems of mental activity:

- ego;
- metacognitive;
- cognitive;
- plus - knowledge divided into three categories: information, mental and physical processes.