PACKALL

PackAlliance:
European alliance for innovation training
& collaboration towards future packaging

R3.1 – Guidelines on learning module structure and training methodology.

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1. Glossary of terms, abbreviations and acronyms

Abbreviation / Acronym / Term	Description
CE	Circular Economy
CHAINs	CHAllenges INnovation teams. Collaborative teams of students of the PackAlliance postgraduate programme to work on a specific industry challenge
EACEA	Education, Audiovisual and Culture Executive Agency
HEI	Higher Education Institution
PackAlliance Hubs	Physical places where the academia-industry collaboration within the project will take place
WP	Work Package

Partner shortname	
P1-Campus Iberus	Partner 1 - Campus Iberus (Spain)
P2-Ecoembes	Partner 2 - Ecoembes (Spain)
P3-AGH	Partner 3 - AGH University of Science and Technology (Poland)
P4-Synthos	Partner 4 - Synthos Group (Poland)
P5-TAMK	Partner 5 - TAMK Tampere University of Applied Sciences (Finland)
P6-Pyroll	Partner 6 - Pyroll Group (Finland)
P7-Proplast	Partner 7 - Consorzio per la promozione della cultura plastica - Proplast (Italy)
P8-UNISA	Partner 8 - Università degli Studi di Salerno (Italy)

2. Introduction

As part of the Programme PackAlliance Task 3.2. is devoted to establishment of the training program methodology. The issues in this section are related to the unified principles of teaching methodology. In the beginning, after analyzing the different teaching approaches, the student-centered approach is the most appropriate teaching approach.

In the document also were analyzed the steps of preparing the lecture, practical work, seminary, workshop and laboratory included in the Programme. Learning objectives based on three areas of learning: knowledge, skills and competences for different types of activity were also defined. Other stages of the preparation of the activities are presented in depth, inter alia: preparing materials for students, selection of appropriate teaching tools, CHAINs methods and tools and assessment of the students' work.

The detailed elaboration of methodology elements introduced in Task 3.2. is presented in the following annexes:

- In Annex 1 the description of objectives and practices of the tools for the module were shown;
- In Annex 2 the description of objectives and practices of the tools for CHAINs were shown.

3. Approach – an overview of the different approaches to learning

One of six dimensions of the Ambitious European Education Area by 2025 is the green and digital transformation. The circular economy and sustainability transition required new social, economic, and environmental approaches and focused on news skills and knowledge. The implementation of the among others: The Strategy of European Green Deal, Just Transition, aims to raise the acquaintance of the transversal and entrepreneurial skills. The transformation requires creating the new jobs related to: *"master green technologies, including digital, develop green products, services and business models, create innovative nature-based solutions and help minimize the environmental footprint of activities."*[1]

Project Partners analyzed different teaching approaches in this part of work. Among other, teaching & learning approaches and specific activities and their durations are defined. After analyses of the mentioned concepts, the most proper is student-centered learning (SCL). Nowadays the SCL is more appropriate, using digital teaching techniques. "*Innovation in SCL and teaching and more flexible and modular learning is a key in career pathways*"[2]. Student centered approach is also important due to, among others: Long Life Learning Strategy, promoted by the EU. The strategy recommends self-initiated education that is focused on personal development and the useful digital teaching tools can make access to education possible for different groups of people of all ages.

SCL will help students develop the competences using high tech, innovative teaching methods in a supportive and inspiring working and learning environment. Student centered approach can be combined with other approaches that will make learning more effective.

After analyzing the different approaches to learning used in various higher education institutions, it can be concluded that there are the recommended ones that are most relevant

[1] Communication from the Commission to the European Parliament, the Council, the European economic and social committee and the committee of the regions, European Skills Agenda for sustainable competitiveness, social fairness and resilience, COM(2020) 274 final.
[2] Communication from the Commission to the European Parliament, the council, the European economic and social committee and the committee of the regions on achieving the European Education Area by 2025, COM/2020/625 final.

to the student learning process. Among the most popular and popularized approaches by the academic teachers, there is a deep approach along with an achieving approach. It is important to follow these approaches by limitation of the surface approach. The surface approach is easier to students and that is why is often chosen by them. Deeper and experience-oriented teaching brings better results and helps students acquire skills.

Definitions and more information about deep, surface and achieving approaches you can find on the following websites:

- Surface approach is mainly perceived by the student as learning the most important topics by heart. The student's aim is to pass the course and does not think about using the knowledge in a practical way. This approach is now less popular, new learning strategies place student in the center and the achievement of learning goals are far more complex. Therefore, we should use approaches that focus more on the student (due to student centered approach) more useful knowledge and stimulate his creativity in solving problems using the possessed knowledge[3].
- Deep approach is an approach that stimulates the student's motivation and interests in the knowledge being learned. A student learns with understanding and is aware of the possessed knowledge. It is crucial, that he/she is able to use it, can ask questions, look for answers, can search analogies and choose the right solutions. Learning in this approach is more conscious than in the surface approach, where rote learning was essential. Thanks to deep approach student's learning is on the cognitive level than learning by heart[4].
- Achieving approach is an approach aimed at accomplish specific goals, for example particular grade. This approach helps with organizing learning space and planning work. It may be useful in peer matching. For the teacher this approach is useful in

[3] More information about surface approach: Houghton, Warren. (2019). Engineering Subject Centre Guide: Learning and Teaching Theory for Engineering Academics". figshare. https://hdl.handle.net/2134/9413 p. 9-11., Donnison, S., & Penn-Edwards, S. (2012). Focusing on first year assessment: Surface or deep approaches to learning? The International Journal of the First Year in Higher Education, 3(2). 9-20. doi: 10.5204/intjfyhe.v3i2.127.

[4] More information about deep approach: Jackson M. (2012) Deep Approaches to Learning in Higher Education. In: Seel N.M. (eds) Encyclopedia of the Sciences of Learning. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_1843, Entwistle, N. (2003). Promoting deep learning through teaching and assessment: conceptual frameworks and educational contexts, https://www.semanticscholar.org/paper/Promoting-deep-learning-through-teaching-and-and-Entwistle/b1a899a384f52e0159a4faf748115a622aef2ff5, (access: 20.03.2021).

identifying the estimated learning effort and required to achieve grade. It also can motivate students or makes groups of students compete with each other[5].

3.1. Student-centred learning

Two approaches might be distinguished in the learning and teaching approach: student-centred learning and teacher-centred learning (TCL). In conventional TCL, students are treated like passive recipients of knowledge, where almost all of the attention is focused on the teacher's knowledge and competencies. In the modern approach, the SCL focuses on students' experience and co-ownership of the study pathways. In the SCL approach, students lie at the center of the education process[6].

Manja Klemenčič has distinguished the elements of ecosystem ("*learning support, teaching support, active learning spaces and learning technology infrastructure, community learning conceptions, teaching and learning data analytics, flexible learning pathways*"[7]) and concept ("*active learning activities, collaborative learning activities, experiential learning activities, self-regulated learning activities*"[8]) which should be accomplished during designing of the methodology which is in line with SCL concept. Therefore, during designing of the curricula of the PackAlliance Programme, the elements as follows were distinguished:

- **Focus on the practical work and activities provided by the students.** The teacher will help the students in achieving learning goals, nevertheless, the main responsibility for the whole education process will belong to the students. The Project Partners during provision of all the learning activities, will use the student-centred classroom activities, which will engage the participants of the course in learning activities.

[5] More information about achieving approach: Entwistle N.J. (2012) Approaches to Learning and Studying. In: Seel N.M. (eds) Encyclopedia of the Sciences of Learning. Springer, Boston, MA. https://doi.org/10.1007/978-1-4419-1428-6_652.
[6] More information can be found: Klemenčič, M., Pupinis, M., Kirdulytė, G. (2020). 'Mapping and analysis of student-centred learning and teaching practices: usable knowledge to support more inclusive, high-quality higher education', NESET report, Luxembourg: Publications Office of the European Union. doi: 10.2766/67668.
[7] Klemencic, M. (2019). Successful Design of Student-Centered Learning and Instruction (SCLI) Ecosystems in the European Higher Education Area. A Keynote at the XX Anniversary of the Bologna Process. Accessed September, 19, 2019, 2-3.
[8] Ibdeim, 2-3.

Therefore, during the curricula' design, 10-30% of the learning activities are defined as "front teaching" and 70%-90% focuses on the practical work of the students.

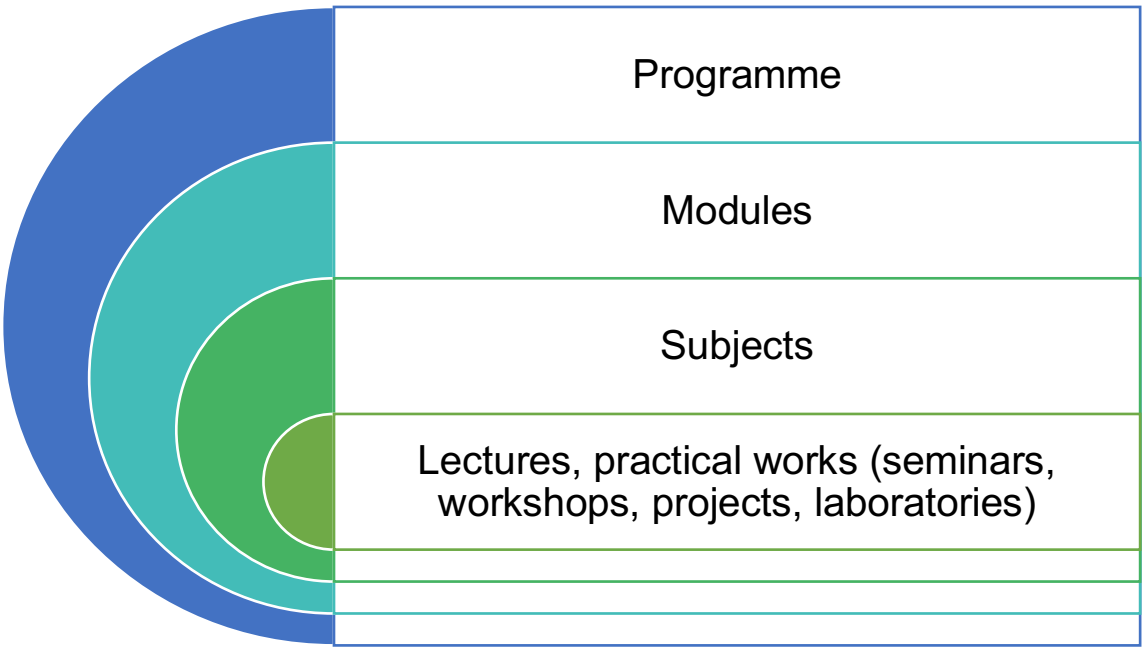
- **Access to the education and flexibility of the students' work**. During the discussion about picking the right project methodology, the autonomy of the teachers was underlined. Therefore, it was decided to establish the regulations, stating that 70% of the content will run asynchronously and 30% will be synchronous. However, this is a contractual rule as each module deals with different content and it is also part of the teaching autonomy to establish some other differences. Some features of the theoretical recording will have the open access status to increase the knowledge, skills, and competence in the circular economy area in plastic packaging.
- **Collaborative learning** process during the course, students will work in pairs and groups to exchange knowledge, idea, and concepts in order to increase social competencies among the course participants.
- **Community learning conception.** During the development of PackAlliance Programme the universities and companies from four EU courtiers were engaged. The design of the programme leads to the creation of the common platform for discussing different local, national, and international perspectives. Additionally, the Partners of the Programme will include locally-oriented webinars and online masterclasses at consortium level to connect with other implementing programmes.
- **Engagement students in the curricula is a part of the designing the content**. During the Pilot of the PackAlliance Programme Partners will assess each module and ask the students for the verification of the content of the learning activities in this way the student might be engaged in the next step of the verification of the content.
- **Learning platform and innovative learning tools.** The course will be provided on the Moodle platform with the use of the active learning tools and approaches.
- **Quality Assurance Assessment** of the course in each step of creating the course, the Quality Assurance Committee provides the review and crosscheck of the prepared materials for achieving the high-quality outcomes.

4. Content of the Programme of PackAlliance Programme

Each module should have from 10 – 30 % of teaching hours as front teaching (front teaching is based on presenting students theoretical and practical knowledge with the use of various digital teaching techniques suitable for each module).

The rest from 70 – 90 % of teaching hours should be as student's active learning (Active learning "*consists of a broad range of pedagogical processes that emphasizes the importance of student ownership and activation. It harnesses the benefits of curiosity-driven methods, research-based/problem-based learning and diverse assessment practices, thus stimulating the learner's critical thinking skills. It is defined by a student centered approach to learning and teaching, in which teachers are seen as facilitators of learning"*[9])
On Fig. 1 is presented the structure of the theoretical part of the PackAlliance Programme.

Fig. 1 Theoretical part of the PackAlliance Programme



Source: own work

[9] EUA, (2019), Learning & Teaching paper #5 Promoting active learning in universities Thematic Peer Group Report, 3, https://eua.eu/downloads/publications/eua%20tpg%20report%205-%20promoting%20active%20lear ning%20in%20universities.pdf (access: 25.01.2020).

The PackAlliance program consists of 4 modules and CHAINs.

The modules consist of the following areas:

1. New materials and biomaterials,
2. Eco-design & novel manufacturing processing,
3. Citizen and consumer engagement,
4. Residue management and valorisation.

Each module contains subjects that are detailed in the syllabuses included in Task 3.1

The terms and their definitions important for the program are presented below.

On the Fig.2 and Fig.3, there are presented the steps for preparing the modules and subject

The program for modules is defined as "*a sequenced set of courses or modules representing a student's total study requirement and usually leading to an award on successful completion"*[10]

Modules are "*components of education and training programmes*"[11]

Module – is a part of the PackAlliance Programme by means of:

1. New materials and biomaterials,
2. Eco-design & novel manufacturing processing,
3. Citizen and consumer engagement,
4. Residue management and valorization.

Each of the modules represents 5 ECTS points.

Subject "*one unit of study which is enrolled in as part of the module"*[12] *based on syllabus.*

Lecture is a theoretical part of the subject that focuses on students' individual work by using the student's center approach by means of students' involvement discussion and interaction. *"Student centered learning requires more collaborative*

[10] Quality Assessment for E-learning: a Benchmarking Approach Second edition, 137, https://e-xcellencelabel.eadtu.eu/images/documents/Excellence_manual_full.pdf (access: 22.01.21).

[11] CEDEFOP,(2015), The role of modularisation and unitisation in vocational education and training, Luxembourg: Publications Office of the European Union, 7, https://www.cedefop.europa.eu/files/6126_en.pdf (access :22.01.21).

[12] Course and subject definition https://ask.unimelb.edu.au/app/answers/detail/a_id/3028/~/course-and-subject-definition (access: 26.01.21).

processes in which participate teachers and students. During this process tools, services and support structure are essential"[13].

Practical work includes practical activities which should be cooperation between students and the teacher and students between students. The classes will take place on the moodle platform, with different options of using tools suitable for the module. The examples of interactive tools offered by moodle platform is shown below.

The partners can choose various types of practical work taking into account the specification of the module, which includes:

- Seminars - "*meeting of a group of people with a teacher or expert for training, discussion, or study on a particular subject*"[14]. Seminars focus on a specialized subject area. Students are expected to participate in this kind of classes with activity. The teacher can provide a wide range of interactive tools.
- Workshops – "*meeting a planned occasion when people come together, either in person or online (= using the internet), to discuss something*"[15], it is the practical form of classes which engaged students with discussion, interaction, presentation or debate on a given topic.
- Projects – "*task or problem engaged in usually by a group of students to supplement and apply classroom*"[16]. Students have a period of time to solve a problem they working on. By the end of the classes, they are obligated to finish it, sometimes presenting the results of their work in the specific form.
- Laboratories – "*common in science courses, laboratory classes allow students to explore material allied to what they are learning in their theory classes but with a focus placed on the practical nature of the material being studied. Laboratory classes allow emphasis to be placed on the experimental nature of science and in particular it*

[13] Learning and Teaching in the European Higher Education Area, Trends 2018, 85, https://eua.eu/downloads/publications/trends-2018-learning-and-teaching-in-the-european-higher-education-area.pdf (access:22.01.21).
[14] https://dictionary.cambridge.org/dictionary/english/seminar (access: 22.01.2020).
[15] https://dictionary.cambridge.org/dictionary/english/workshop, (access: 22.01.2020).
[16] https://www.merriam-webster.com/dictionary/project (access: 22.01.2020).

provides an opportunity to explore the basis of the scientific method and it serves to guide students as they can seek deeper understanding of the material in question".[17]

This type of activities are designed to allow students to practice and develop a wide range of discipline-based techniques and personal skills.

- "*Depending on the discipline and the topic, specific purposes will vary but they may include;*
- *Providing an opportunity to apply and investigate theoretical and conceptual knowledge;*
- *Developing a range of experimental techniques and approaches;*
- *Improving skills in collecting, analysing, interpreting and presenting findings and data*
- *Practicing a wide range of personal and transferable skills such as problem solving, team working, observing and following protocols;*
- *Learning how to manage resources (including time);*
- *Working more effectively and safely in a laboratory or in the field*".[18]

During the creation of the PackAlliance Programme, the people responsible for management of the process should:

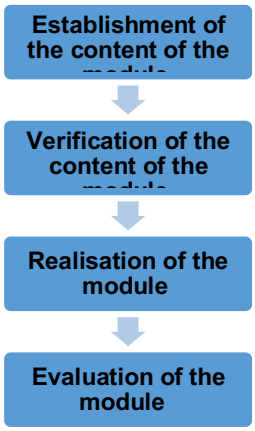
- Ensure that the audience acknowledges the learning outcomes of the course;
- Present the framework of the learning activities;
- Describe the roles and expectations between teacher and learners;
- Present the base level of the knowledge, and necessary skills and competencies which participants should be equipped with at the start of the learning activities;
- Provide the materials and sources of information (literature, website, project), which will be used within the learning activates;
- Set the communication between the audience and participants of the Programme;
- Provide information about the assessment of students' work;
- Encourage the students to contact their instructor in case of any problems;

[17] The University of Adeline, https://student.ask.adelaide.edu.au/app/answers/detail/a_id/1193/~/what-are-the-different-types-of-classes%3F (access: 22.01.2020).
[18] https://www.nottingham.ac.uk/studyingeffectively/teaching/practicals/index.aspx (access: 22.01.2020).

- Provide information on how the achievements of the participants of the course will be monitored;
- Highlight the key elements which are necessary to achieve during the learning activity.

The Programme consist of four modules, where the steps which should be fulfilled are presented on the Fig.2.

Figure 2. The steps for preparing the module of the PackAlliance Programme



Source: own work

Establishment of the content of the module

Based on previous work on the project, Partners will develop the module's content by preparing the subjects' syllabus and materials for online learning.
At the start of the preparing of the syllabus, the teacher should follow the checklist below:

- Ensure that the Knowledge, skills and competencies acquired over the course will fit the target audience expectations
- Define the intended learning outcomes which should be acquired by learners at the end of the subject;
- Choose the literature which will fit the subject;
- Define how the learning outcomes will be assessed;
- Define the methods which will be provided during the subject (problem- based learning, content-based learning, peer learning, challenge-based learning etc.);

- Define the tools which will be used during the subject.

At the start of the preparing of the materials, the teacher should follow the checklist below:

- Ensure that the learning materials will be understandable by the students;
- Ensure that the learning materials will be in line with the content included in the syllabus;
- Define who will have access for the learning materials;
- Define what will be the format of the materials (audio, textbooks etc.).

Verification of the content of the module

Each of the PackAlliance Project Partner prepares a syllabus and materials for the topic for which they are responsible. Due to the possible overlap of thematic issues in the modules, partners have to verify the given topic.
The procedure will be developed by Quality Committee of PackAlliance Project.

Realization of the module

The PackAlliance Programme consists of 4 modules; each of the modules is covered by the subject.
The steps which should be taken while designing the subject are presented on Fig 3..

Evaluation of the module

To improve and enhance the quality of learning and teaching and programme development, the well-conducted evaluation process is a must.
The steps to think of while designing the evaluation process:

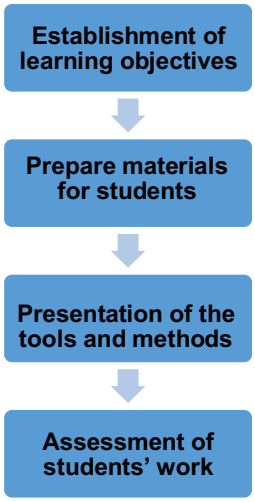
1. Defining the purpose of the evaluation;
2. Choosing the method of the evaluation.

The purpose of the evaluation:

- To improve the quality of the subject;
- To improve the performance of the teacher;
- To increase the experience of the learners.

The evaluation form will be designed as a survey for the end of each of the modules. The preliminary questions were developed in the first stage of the work of methodology. The next step of development of the survey will be done by Quality Committee.

Figure 3. The steps of preparing the subject



Source: own work

4.1. Learning objectives

Learning objectives are the effects connected with obtaining knowledge and skills by students after the course, lectures, practical work or another learning activities.

The examples of learning objectives in a universal approach are:

- "*Knowledge/Remembering: define, list, recognize;*
- *Comprehension/Understanding: characterize, describe, explain, identify, locate, recognize, sort;*
- *Application/Applying: choose, demonstrate, implement, perform;*
- *Analysis/Analyzing: analyze, categorize, compare, differentiate*"[19].

[19]https://www.erasmusnet.org/single-post/2018/01/22/7-EXAMPLES-OF-LEARNING-OUTCOMES-HOW-TO-WRITE-THEM (access date 22.11.20).

To make easier to specify learning objectives we can use the Bloom's Taxonomy[20]. This is a kind of classification of learning goals in education. The goals were categorised and introduced by Benjamin Bloom in the publication *Taxonomy of Educational Objectives (1956).* In 2001 it was revised and more extended in the publication titled: *A Taxonomy for Teaching, Learning, and Assessment.* In the new perspective appeared "action words" which describe the cognitive processes. There were performed exact six cognitive processes and also new separate taxonomy of the types of knowledge used in cognition. The six main categories of the revised taxonomy include:

- remember,
- understand,
- apply,
- analyse,
- evaluate,
- create.

Due to European Qualification Framework 5 what the student will know, understand, and be able to do after completing the learning module based on:[21]

- *"Knowledge: Comprehensive, specialized, factual and theoretical knowledge within a field of work or study, and an awareness of the boundaries of that knowledge;*
- *Skills: A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems;*
- *Responsibility and autonomy: Exercise management and supervision in contexts of work or study activities where there is unpredictable change. Review and develop performance of self and others".*

[20] For more information please visit the website: Armstrong, P. (2010). Bloom's Taxonomy. Vanderbilt University Center for Teaching. Retrieved from https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/. (access: 20.03.2020).
[21] https://europa.eu/europass/en/description-eight-eqf-levels (access 15.01.2020).

4.2. Preparing materials before subjects

Building and transferring of knowledge are crucial for the course. Therefore, the resources which will be provided to the students shall enable them to succeed. The performance of the students also depends on the quality of the learning materials which teachers provide them.

Types of learning materials:[22]

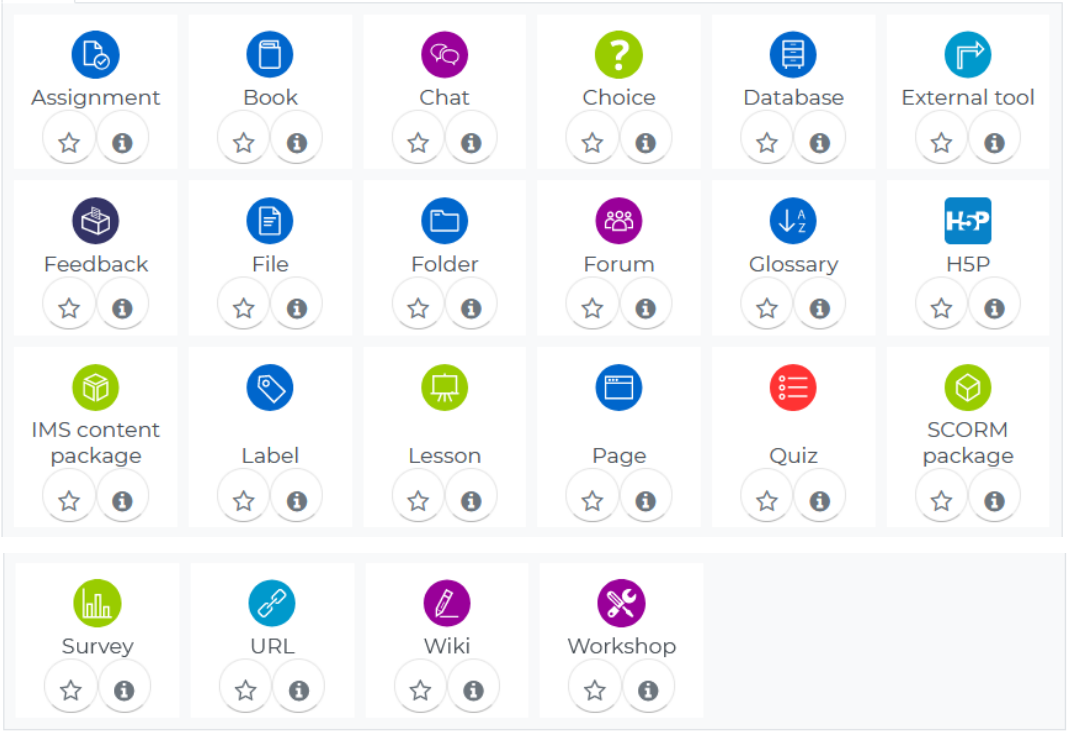
- "*Textbooks;*
- *Software;*
- *Relevant reading materials;*
- *Videos;*
- *Recordings;*
- *Other online materials*".

Each module should have from 10-30 % of students teaching hours. The materials should be prepared in the forms of presentation which will be recorded by the teacher. The front teaching can be led as: single presentation, panel discussion or masterclass. The general rules and templates will be developed as a technical part before the beginning of the preparation of the materials.
The 70- 90 % of teaching hours should be as a student's active learning by means of using various tools.

The examples of interactive tools offered by moodle platform is shown below.

[22] Carnegie Mellon University https://www.cmu.edu/teaching/designteach/syllabus/checklist/learningresources.html,(access 22.11.2020).

Fig. 4 Interactive tools offered by moodle platform



Source: https://learn.moodle.org/

4.3. How the student will be engaged into the learning activities (methods and tools)

The selection of tools has been presented taking into account the specificity of learning activities and internet learning solutions.

SCL could be easier achieved providing this type of practical work. Especially seminaries or case studies could be the best forms of the approach of learning by doing. Practical works should correspond and complete lectures.

- At the beginning of the learning activities, the teacher should refer to the front teaching and/or theoretical part of the subject and recall the most important terms, definitions and issues discussed during the different forms of meetings with students.
- The teacher should also check the student's knowledge and preparation for learning activities.

- The description of the purpose of the practice and the tools which will be used should be shown.
- Student should have an explanation of the tools used during learning activities the online tools possible in moodle platform
- Work in small discussion groups can be very useful during practical works, so students should be integrated by encouraging them to work in small project groups

Active learning includes techniques for large lecture courses in auditoriums with fixed seating, as well as for small classes with students seated in seminar-style rooms. The examples of useful tools will be shown below.

Examples of useful on-line tools (lecture/workshops/seminaries/laboratory/project) are in the Annex 1.

Table 1 Examples of tools approaches

	Lectures	Seminars	Workshops	Laboratories	Projects
Interactive Lecture – lesson (moodle)	v				
Active Review Sessions		v	v		
Quiz (moodle)	v	v	v	v	v
Forum (moodle)		v	v	v	v
Chat (moodle)	v	v	v	v	V
Building a database		v	v	v	v
Problem based learning	v	v	v	v	v
Content based learning	v	v	v	v	v
Short students' presentation		v	v	v	v
Small group discussion		v	v		v

Think- pair-share				v	v
Peer review		v	V	v	v
Error identification		v	V	v	v
Case studies		v	V		v
Concept map		v	V	v	v

Source: own work based on Annex 1

Examples of Tools and Approaches can be found:

- Yale University Centre for Teaching and Learning[23];
- University of Michigen[24];
- University of Columbia[25].

4.4. Blended learning by the inclusion of local webinars and online masterclasses at consortium level to connect with other implementing programmes

The masterclasses aim is to engage the highly specialized professionals into the curricula of the Programme, which can share the practical skills and knowledge in the area of plastic packaging in the circular economy sector. These experts have insight and practical techniques which can help students to achieve learning goals within the project. The PackAlliance Project reached a lot of associated partners who can help to develop the masterclasses.

Associated Partners of the project:

- Plastics Europe
- The Finnish Packaging Association
- Unionplast S.r.l.
- Ferrero Group

[23] https://poorvucenter.yale.edu/ActiveLearning (access: 18.11.20).
[24] https://crlt.umich.edu/sites/default/files/resource_files/Active%20Learning%20Continuum.pdf (access: 18.11.20).
[25] https://ctl.columbia.edu/resources-and-technology/resources/case-method/ (access: 18.11.20).

- Waste Management and Recycling Cluster
- Collaborating Centre on Sustainable Consumption and Production gGmbH
- Agencia de Calidad y Prospectiva Universitaria de Aragón
- Consorzio Nazionale per la Raccolta
- AMUEBLA
- Government of Aragón
- Government of Navarra
- Eco Fellows
- Confindustria Udine
- Zinnae Cluster
- The Highway to Technology and Innovation Institute

Additionally, project partners utilize already implemented local webinars and initiatives, which can be used as resources for development of the curricula offered within the project.

Objectives of the Masterclasses:

- Develop specific skills and knowledge in the area within the project;
- Provide opportunity to develop practical skills;
- Discover new techniques, methods and tools in the field of plastic packaging within the circular economy.

Experts

Project partners will cooperate with associated partners to create the masterclasses. Within the masterclass, the academic and professional experts will be invited, who shall have experience in the field of plastic packaging in a circular economy.

4.5. CHAINs methods and tools

The practical part of the programme focused on the CHAINs which is stimulation of innovation, co-creation and entrepreneurial skills. This specific mechanism will focus on equipping students with transversal skills (particularly those related to creativity, innovation and digital skills) by establishing working teams at the PackAlliance Hubs for searching

innovative solutions to address proposed challenges upon the base of co-creation processes from an entrepreneurial discovery approach.

In these activities, academic and industry experts from the project consortium supported by associated organizations (academics and industry practitioners) will work together to deliver a value training programme from both perspectives educational and industrial/sectorial, this way ensuring the high-quality study focused on specific competences required by the labor market. The CHAINs will take place on the PackAlliance Hub where academic and company mentors will be interacted with the students during 2 months.

In the annex 2 there are detailed information about CHAINs programme.

5. Assessment of students' work

Assessment of students' work is part of the curriculum design. The main goal of the student assessment is to check if the knowledge, skills and competence was achieved during the course. Assessment of the learners enables to determine their progress through the feedback, and it determines if the student fulfilled the learning outcomes.

Subject learning outcomes include

- knowledge
- skills
- competence.

Each of the module the description of the proposal of the students' assessment is presented Table 3.

Each module has its own structure and thematic scope, therefore the possibility of the assessment of students' work can be different. The theoretical part of the Programme will be providing in the form of MOOCs, therefore the way of assessment will be different than in the traditional learning process. Therefore, the online activity of the students such as: chat activity, Q&A. The example of the useful tools for the assessment of students' work was described on Table 2.

Table 2 Examples of tools and methods for assessment of students' work

Types of activity	Types of students' assessment	Description of the students' assessment
Lecture	Essay	Objectives: Essay is a piece of writing on the given topic connected with the subject included in the module. The aim of the essay is to show the opinion and understanding the problem and checking the knowledge obtain during the lecture. Practices: Student will write an essay of 500-600 words on a particular topic connected with the subject matter.

Lecture	Test	Objectives: Test is intended to measure and check the students' knowledge obtained during the lecture on the subject included in the subject. Practices: Test of 20-25 closed questions with multiple choice answers.
Seminars	Case studies	Objectives: A case study is a detailed study of a specific subject, problem connected with the topic of seminar. The examples of the tools and methods used based on the Practices: Written and oral report of case studies. The report is prepared by the small group of 3-4 persons working together. The final report of case studies should have about 500 words.
	Pecha Kucha presentation	Objectives: Based on the short-written report on the specific subject, group of student aim to prepare the presentation on Practices: The group of 3-4 students prepared: 20 slides, which automatically advance every 20 seconds, on the chosen topic within the collaboration between teacher and student
	Short written report	Objective: The aim of a *short report* is a *brief written* communication about a specific topic. Practices: The short report is prepared by the small group of 3-4 students. The text volume should be about 200 words. It should define the purpose, description of used data, used methods, results, findings, conclusion and references.
Laborataories	Lab report	Objective: Lab Report is the written and described experiment. The aim of this kind of exercise is to explore a scientific concept.

		Practices: It is written work in the form of description of the hypothesis of the experiment. It should be a detailed description of including textual observations. The work should be prepared in a group of 3-4 persons.
Project	Work-based problem	Objectives: The aim of written work - based problem is the practical form of checking students' skills on particular topic. Practices: Written report on a particular problem on the topic. The report is prepared by the small group of 3 persons working together. The final report of work-based problem should have 500 words. It should define the purpose, description of used data, used methods, results, findings, conclusion and references.
	Discussion/debate/role play	Objective: The aim of the debate is to present different point of view for the problem included on the written work. The participants will be divided into 3 types of actors: producer, distributer, consumer. The aim of this work type of assessment is to development soft skills of the participants of the PackAlliance Programme. Practice: The group will be form from 3 people which will have to recorded debate for 10 minutes about 3 perspectives of the solutions for work-based problem.
Workshops	Error identification	Objectives: The exercise focuses on the critical and creative thinking of the students. Students have to solve the challenge based on given exercises prepared by the teacher. This

		type of exercises support the transversal skills of the students. Practice: Teacher prepare the exercises with the mistakes; Students have to individually find the mistakes and improve it for the right one answers

Source: own work

Examples of the Assessment methods can be found:

- University of Reading An A–Z of Assessment Methods[26],
- University of Sheffield [27],
- Vanderbilt University[28],
- Queen's University[29],
- UCD Teaching and Learning[30].

[26] https://www.reading.ac.uk/web/files/eia/A-Z_of_Assessment_Methods_FINAL_table.pdf, (access: 20.11.2020).
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[28] https://cft.vanderbilt.edu/student-assessment-in-teaching-and-learning/ (access: 25.11.2020).
[29] https://www.queensu.ca/teachingandlearning/modules/assessments/19_s2_11_sample_assessment_methods.html, (access: 25.11.2020).
[30] https://www.ucd.ie/t4cms/moddesignfyassess.pdf, (access: 25.11.2020).

Annexes

Annex I The description of the use of the tools for module

Annex II The description of the used of tools for CHAINs

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