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Learning Outcomes' Assessment in Virtual Classrooms

Presa Universitară Clujeană

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FOREWORD

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Starting from the research question *How to assess the learning outcomes through the use of advanced technologies for representation, communication and collaboration across distance in virtual classrooms?* the book is dedicated to the use of teachers, instructors, trainers and researchers who are active in the current process of the digitalization of education, and connected with the higher education institutions and the global job market.

The *Learning Outcomes' Assessment in Virtual Classrooms* is an open educational resource (OER) consisting of a systematic literature review about the learning outcomes assessment practices, methods, and tools in virtual education environment. The book is based on more than 150 scientific articles and books, with a half being published in the last 5 years (2018-2022), presenting theories, reviews meta-analysis, empirical research results, recent developments and practical experiences of online assessment approaches in the learning process of virtual classrooms. The first chapter approaches the differences and similarities between HE learning settings with various degrees of virtually components; methods and practices of learning outcomes' assessment. The second chapter identifies innovative practices and methods from complementary perspectives of teachers, self-reflective and peer-reflective assessment of the development of transversal competencies. The third chapter follows the constructivist approach and presents models of authentic learning designs, the role and impact of the practical dimension of bringing real-life cases in the learning process of higher education students.

The *Learning Outcomes' Assessment in Virtual Classrooms* is available on the website www.VRclassrooms.uvt.ro and is disseminated through the events organized in the frame of the EEA 21-COP-0004 Bringing Real Life into Virtual Classrooms project, including the International Conference *Challenges and Benefits of Learning and Teaching in Virtual Classrooms*, at Timisoara, in June 2023. (VR-classrooms, 2022)

Acknowledgements

This book was elaborated under the EEA Financial Mechanism 2014–2021, project 21-COP-0004 Bringing Real Life into Virtual Classrooms, implemented by the West University of Timisoara, Romania, in partnership with the Norwegian University of Science and Technology, Norway.

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We are grateful to teachers, researchers and administrative staff at the Norwegian University of Science and Technology and at the West University of Timisoara.

After analysing the impact of new technology on education, Spector (2020) underlines the idea that the focus should be on learning, rather than on technology. The main conclusion is that the purpose of education has remained on *how we develop thinking* and technology is a tool we use in this process, which cannot replace human interaction, but can influence effectively the educational environment. Starting from these reflections of Spector, and analysing the educational research of recent years, we elaborated two books, offering possible answers to the question *How to increase the quality and relevance of education in an exclusive virtual environment?* Quality is a multi-faceted concept, complemented by the perspectives of different actors involved in education, namely students, teachers, employers, agencies, evaluators, national or international agencies and the list could go on (Harvey, L., Green, D., 1993). In the present studies, *quality* is closely related to the design, implementation and evaluation of instructional situations that produce student learning progress. The second term, that of *relevance*, is closely related to bringing real-life situations into the HEI's virtual classrooms.

The present volume, *Learning Outcomes' Assessment in Virtual Classrooms* is an analysis of existing practices regarding how could be assessed the learning outcomes in an online environment, how could be assessed the transversal competencies, and how could be developed an authentic learning process. The assessment is understood as a continuous process of providing feedback, underpinning the teaching and learning process. That is why, in the second volume, *Curricular Package Design for Transversal Competences Development in Virtual Classroom*, based on the conclusions offered by the literature review, we will try to offer teachers curricular and instructional benchmarks to develop subjects and contribute to the development of transversal competencies in an online learning environment. It could be used in two ways: to design an entire course on developing transversal competencies; or to integrate transferable skills into courses that are already developed.

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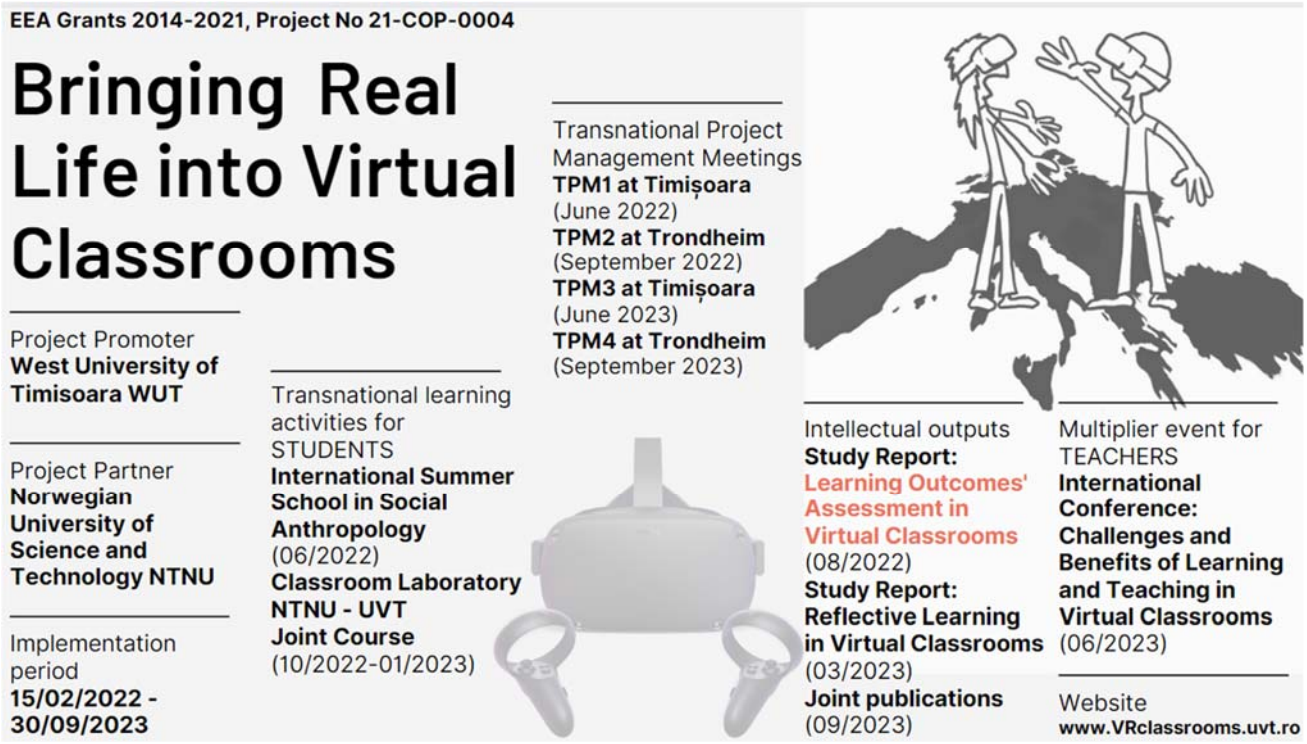
BRINGING REAL LIFE INTO VIRTUAL CLASSROOMS

The *Learning Outcomes' Assessment in Virtual Classrooms* is a documentary study report, elaborated in the frame of the EEA Grants 2014-2021 Bringing Real Life into Virtual Classrooms (VR-classrooms), Project No 21-COP-0004, presented in the Figure 1.

Figure 1. ***Description of the project Bringing Real Life into Virtual Classrooms***



Starting with the sustainable partnership between the West University of Timisoara (UVT) and the Norwegian University of Science and Technology (NTNU), the collaborative project Bringing Real Life into Virtual Classrooms (VR-classrooms, 2022) targets the challenges faced by the higher education institutions, with high level of complexity in Romania, where academic activities have been carried out online and at distance, continuously, for over two years (between March 2020 and May 2022), with students and teachers interacting in virtual classrooms without having the necessary level of knowledge, abilities, competencies and previous practice to use their digital skills for educational purposes. Thus, the project aims to develop innovative and practical solutions for learning in virtual classrooms.

Objective 1: Enhancing the quality of education in the digital era for HEIs

Objective 2: Strengthen the cooperation between education and the world of work

Objective 3: Increase the learning and teaching mobility between HEIs

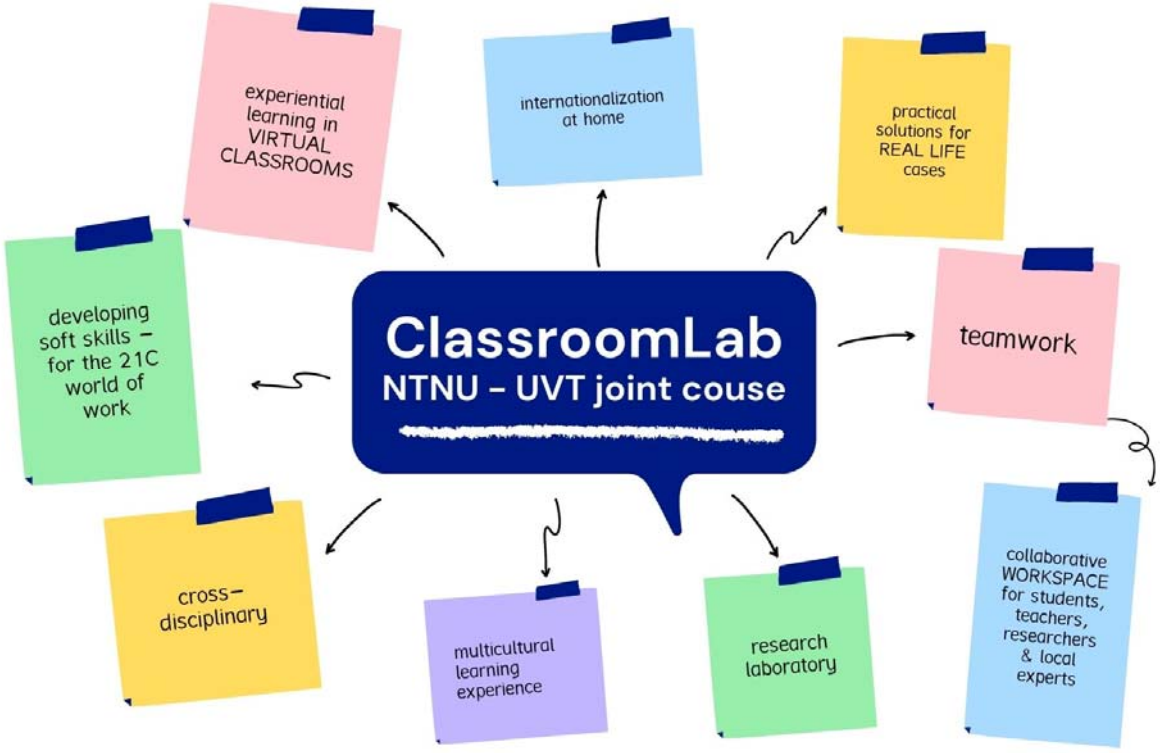
The target groups of the Bringing Real Life into Virtual Classrooms project are:

- Students
- Teachers
- Researchers
- World of work

The transnational learning activities planned in the frame of the VR-classrooms project have strong international, transversal, experiential, and cross-disciplinary dimensions. The students develop transversal competencies required on the labor market: digital skills, social skills, international experience, cross-disciplinary and cross-cultural teamwork, autonomy, professional integrity, community needs-oriented. The teachers and researchers of the project will use the transnational learning activities for developing innovative practices of learning and teaching based on the advanced technology of communication across distance.

The core activity of the project is the *Classroom Laboratory NTNU-UVT Joint Course*, an integrated transnational learning activity for students from partner universities (see Figure 2). The students learn in Romanian-Norwegian mixed study groups, forming project-based teams, share experiences, skills and professional competencies, and collaborate directly with Romanian and Norwegian teachers, researchers and the world of work representatives. The Classroom Laboratory NTNU-UVT Joint Course was piloted in the academic years 2020-2021 and 2021-2022, and gathered more than 65 participants each time: over 50 students, 4 lecturers engaged in co-teaching activities, researchers measuring the course impact on students, and local experts. The joint course description and examples of the projects developed by the Romanian-Norwegian students teams are presented on the project website: https://vrclassrooms.uvt.ro/HTML/jointCourse.html.

Figure 2. ***The characteristics of the Classroom Laboratory NTNU-UVT Joint Course***



Before the COVID-19 pandemic and its effects on the education systems all over the world, the Classroom Laboratory UVT - NTNU Joint Course was planned in 2019 to be organized Online, using digital platforms and VR technology for representation, communication and collaboration at distance. The course uses practices of co-teaching and co-learning, allowing Romanian and Norwegian students to meet and collaborate in real-time, dealing with real-cases of social inclusion and, in direct dialog with the world of work.

The VR-classrooms team was initiated four years ago (2018), by the professors from the Social Anthropology Department, from the Norwegian University of Science and Technology, in a preparatory visit at the West University of Timisoara. The Romanian-Norwegian team has consolidated during the previous EEA and Norway Grants project, 18-COP-0016, Classroom Laboratory, implemented in the period September 2019 – August 2021. We are really grateful and would like to mention the valuable contribution of each of the team members with their areas of expertise, the engaged and consistent involvement at the management and implementation of the project activities:

Trond Berge is Deputy Head of the Department of Social Anthropology, NTNU, and the Norwegian team leader of the previous EEA Grant 18-COP-0016 Classroom Laboratory project. He carried out extensive fieldwork research activities in Romania. His main focus is resilience and vulnerability related to industrial pollution and its social and cultural impact.

Melinda Dincă, is sociologist, Associate Professor at the Department of Sociology, UVT, and the team leader of the VR-classrooms project. Her research areas of interests are: social inclusion, social identity processes, group relations dynamics. She has experience in team-based learning and international teaching exchange.

Håkon Fyhn is social anthropologist, Associate Professor at the Department of Social Anthropology, NTNU, and the Norwegian team leader of the project. Competencies: cultural understanding, robotics, digitalization, anthropology of technology, writing across the curriculum, presence over distance, control rooms operators in space.

Anca Luștrea is Associate Professor at the Department of Educational Sciences, UVT. She is specialist in educational psychology, trainer in adults' education and principal supervisor in special education. Competencies: special didactics, educational inclusion, case management, research activities on teaching, counseling, and educational integration.

Martin Thomassen is Associate Professor at the Department of Social Anthropology, NTNU. He has research on globalization, social inequity, cultural heritage, and is responsible for the course "Cultural understanding and international working relations", providing practical solutions to challenges related to the internationalization of work.

Atalia Onitiu has a Ph.D. in history, is Assistant Professor with a teaching-training career of over 20 years at the Department of Sociology, UVT. Her areas of interests are in urban culture, sociology of religion, cultural heritage, quality of life, and social policies for children with disabilities. She has experience in managing training programs.

Jens Røyrvik is Associate Professor at the Department of Social Anthropology. He is heading the research area of Energy and Environment, innovation and energy efficiency.

He is the project manager of the H2020 project ECHOES and of the H2020 project SMARTEES. Jens Røyrvik is specialist in innovative digital forms of team-based learning.

Mariana Craşovan is Associate Professor at the Department of Educational Sciences, UVT. Her competencies are in teachers' training on curriculum development, instructional design, and classroom management. She developed several partnerships with schools, school-inspectorates, and education programs providers.

Malin Noem Ravn, Ph.D., is the Vice-Dean of the Faculty of Education and Social Sciences, NTNU, and has competencies in gender equality, the interface of science and community, societally relevant research development and innovation projects.

Florina Cionca is economist and the financial consultant of the project.

When planning the learning activities for the students, there have been used the competencies and resources of the project team composition:

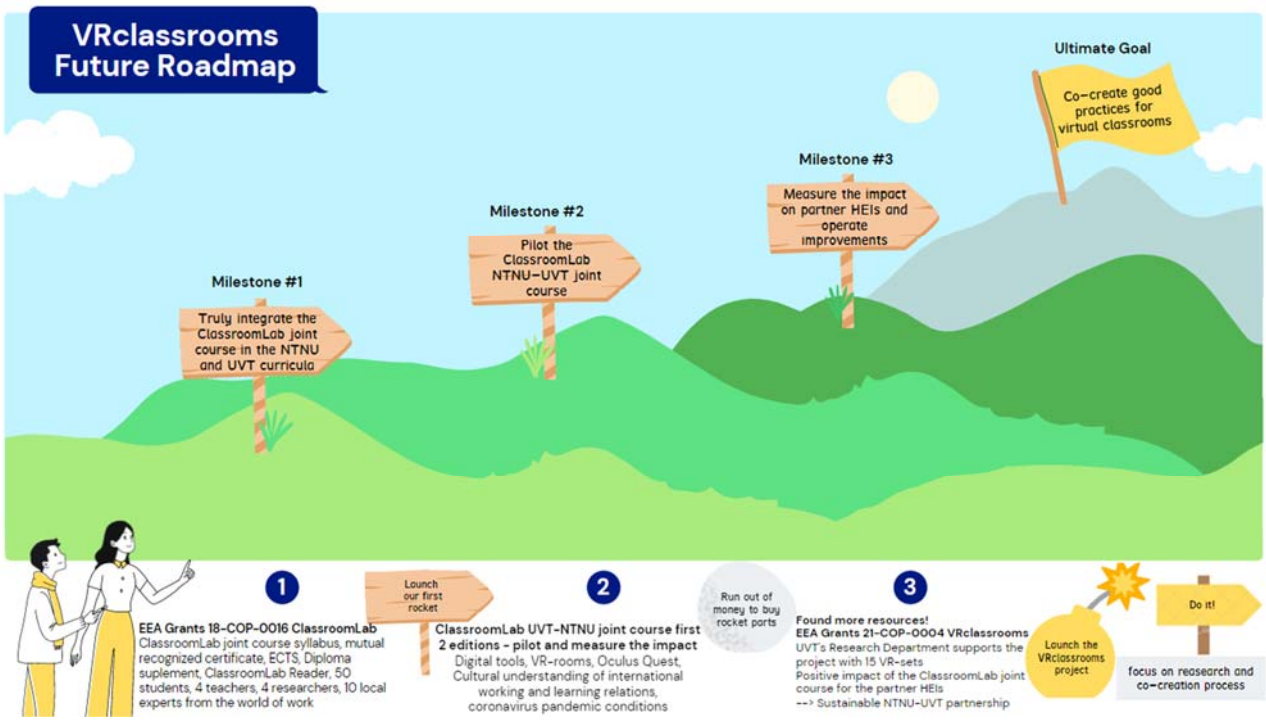
- Interdisciplinary, international teaching and learning experience,
- Community needs oriented,
- Focus on the technology-based learning approaches,
- The development of transversal competencies and future skills for students.

The VR-classrooms project candidature was elaborated considering the institutional priority needs of the beneficiary country and the West University of Timisoara, Romania:

- Ensuring a long term strategic partnership with the Norwegian University of Science and Technology,
- Responding to the growing interest in digitalization of education and the internationalization of higher education,
- Developing transversal competencies for students to increase their employability.

In this respect, the Bringing Real Life into Virtual Classrooms project roadmap has three milestones, presented in the Figure 3. The first and the second were achieved in the frame of the previous ClasroomLab collaborative project, when the project team managed to truly integrate the Classroom Laboratory NTNU-UVT Joint Course in the partner universities curricula and to pilot it. In the present, during the first year of the implementation period of the VR-classrooms project (2022), it is targeted the third milestone, aiming to measure the impact of the transnational co-learning and so-teaching experience in cross-disciplinary teams, and to operate the needed improvements. Further, the VR-classrooms co-creation process targets to share good practices, suitable for various forms and degrees of virtual classrooms, disseminate a curriculum design package for teachers and trainers in schools, universities, and human resources developers of regional and multinational companies.

Figure 3. *The roadmap of the Bringing Real Life into Virtual Classrooms project*



The project comprises multiple short-term mobility activities for students and staff (see Figure 4), such as the intensive study programme for HE students (see Figure 5), the transnational project management meetings (TPM1-TPM4), and the international conference problematizing the challenges and benefits for teachers and students learning in virtual classrooms during the COVID-19 pandemic period and beyond.

Figure 4. *Short-term mobility activities for students and staff*

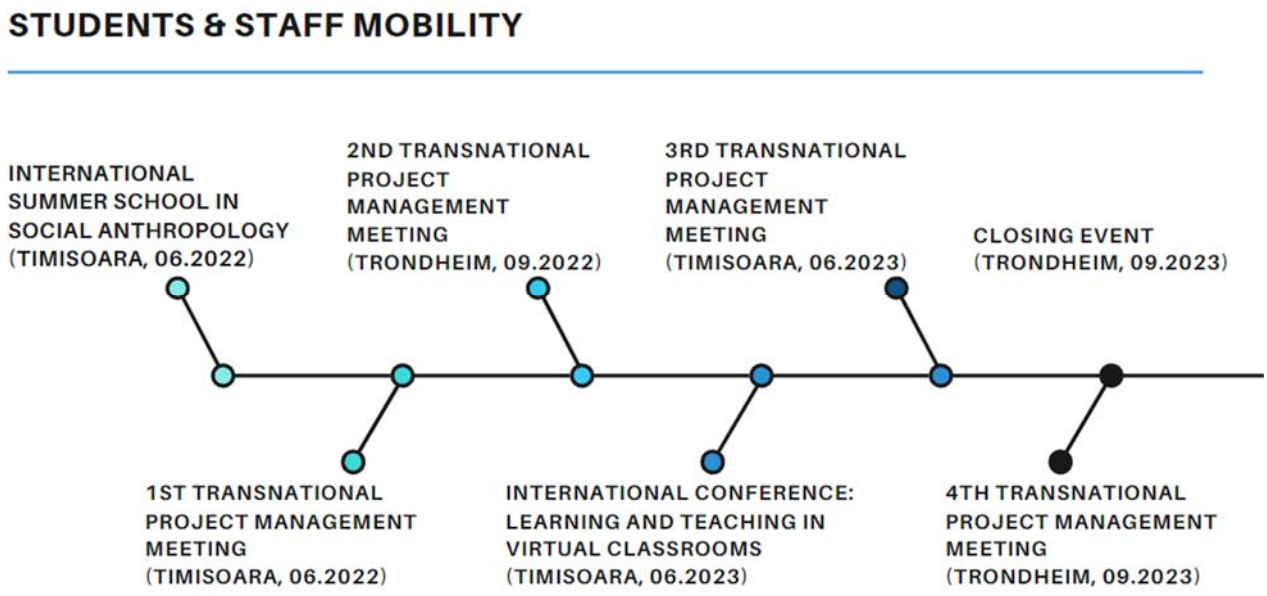


Figure 5. *International Summer School in Social Anthropology (ISSSA 2022)*

The VR-classrooms projects' transnational learning activities presented in the Table 1 integrates students, teachers, researchers and exponents of the world of work – local experts, employers, work mediation nongovernmental organizations, employment agencies -, as well as a Norwegian company developing technology solutions for the use of VR / AR in education.

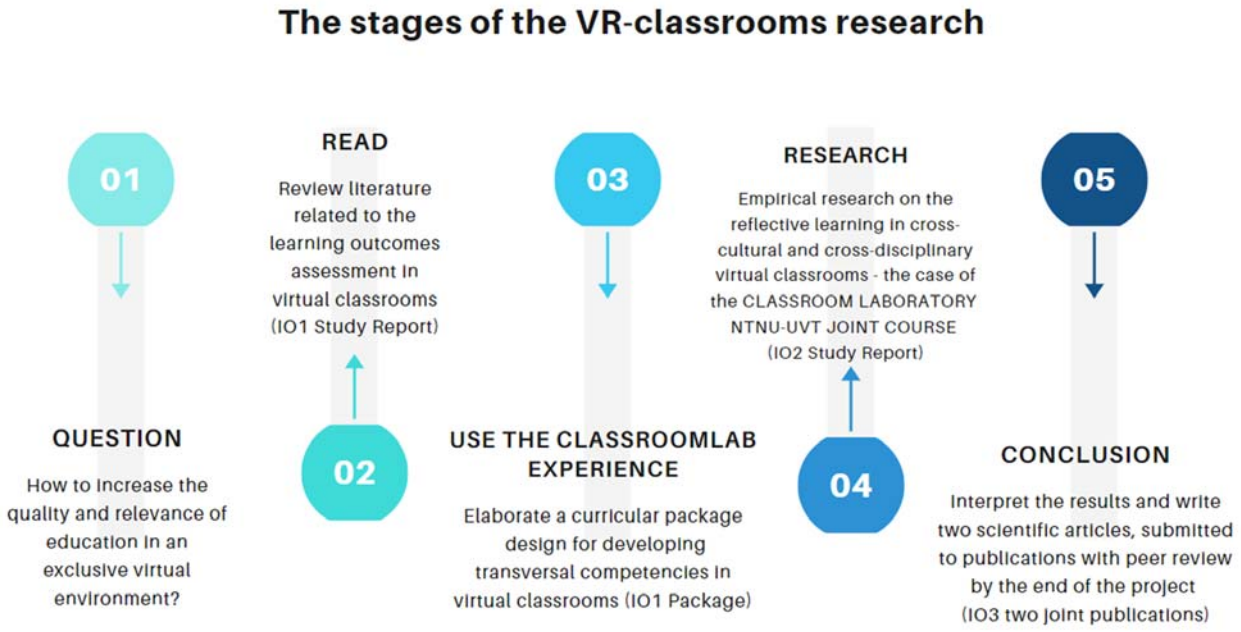
Table 1. *Transnational learning activities in the frame of the VR-classrooms project*

Participants	Number of participants	Activity description	Objective
Students from NTNU and UVT	62	Study in Norwegian-Romanian cross-disciplinary study groups, collaborate in real time, use VR technology, elaborate practical solutions for real life social problems	Develop transversal competencies Increase the learning mobility between partner HEIs
Teaching staff and researchers from NTNU and UVT	10	Collaborate directly, co-create curricular designs, co-teaching, reflecting together on the cultural differences and similarities of HE students and teachers in partner countries	Enhancing the quality of education in digital era Increase the teaching mobility between partner HEIs
The world of work	10	Direct collaboration with students, teachers and researchers from partner HEIs Direct involvement in the learning process, give feedback to the students work, participate at the learning process design	Strengthen the cooperation between education and the world of work Offer a real-life context of learning for students

The project has a consistent research dimension. The intellectual outputs are distributed along the implementation period of the project, as could be observed in the Figure 6.

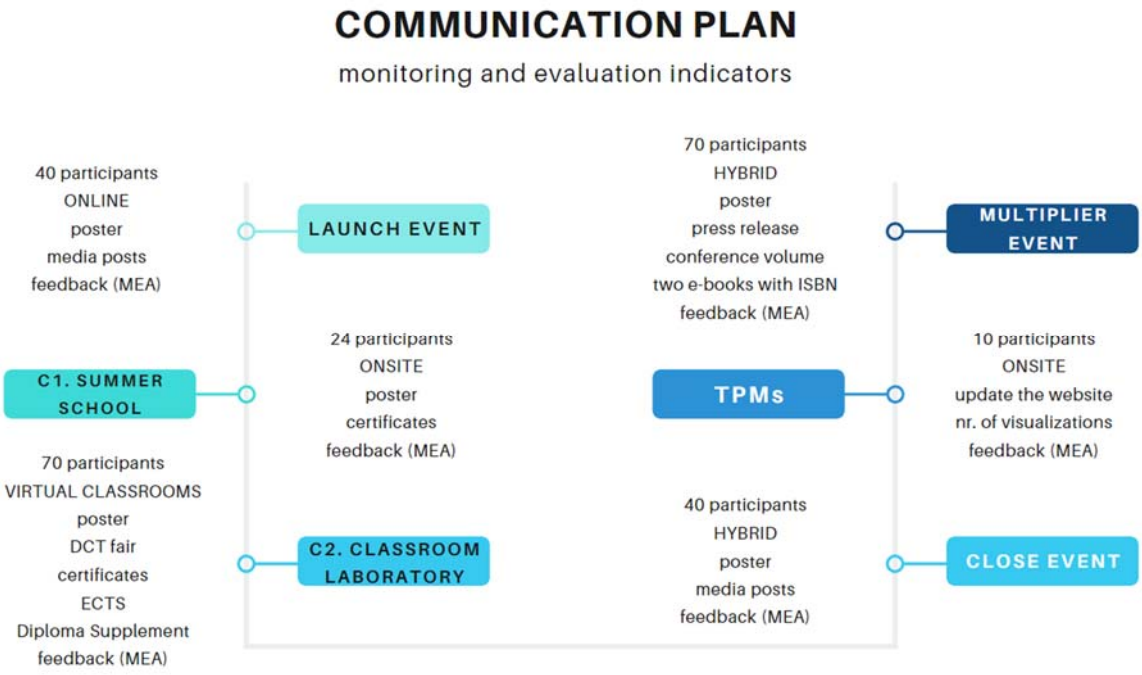
- During the first six months, the research team elaborated the present systematic literature review on the learning outcomes assessment in virtual classrooms, defining the state of art and theoretical frame of the research and completed a curricular package design for developing transversal competencies in virtual classrooms.
- The second stage of the research consists in conducting an empirical research on the reflective learning in multicultural and cross-disciplinary virtual classrooms, based in the case of the Classroom Laboratory NTNU-UVT Joint Course.
- The final stage will be focused on disseminating the research results to the scientific community, to the teachers, trainers, school mediators in the educational field, and to the large public.

Figure 6. ***The stages of the Bringing Real Life into Virtual Classrooms (VR-classrooms) project***



The objectives of the communication strategy and plan of the project (see Figure 7) will be accomplished based on the collaborative workspace created by the partner universities. At the end of each transnational learning activity and of each transnational project meeting, participants will complete a monitoring and evaluating assessment questionnaire in order to identify, evaluate the impact and consequently make corrections and other responsive planning actions. The good practices in the field of education in virtual environment, the orientation of education towards internalization will be included in the educational offer of the West University of Timisoara and the Norwegian University of Science and Technology and through the multiplier effect, will be able to be integrated in other educational institutions, beside the consortium.

Figure 7. ***The communication plan of the VR-classrooms project***



The main multiplier event of the project, the conference "Challenges and Benefits of Learning and Teaching in Virtual Classrooms", will be organized at the West University of Timisoara in June 2023. The conference will provide an excellent international forum for the dissemination of original research results and recent developments, and a debate arena for innovative approaches, new ideas and practical experiences of digitalized learning, teaching and assessment methods, which concentrate on practices of the teaching staff, researchers, and also VR industry professionals. The topic of interests of the conference includes:

- Digital skills for teachers
- Digital skills for learning in virtual classrooms
- Teaching methods and practices for virtual classrooms
- Evaluating learning outcomes using digital tools and e-learning platforms
- Different degrees of virtualization – Different curricular approaches
- Representation, communication and collaboration across distance
- Computer-based learning
- VR design for learning and training in adult education

The participants are encouraged to contribute to the conference through submissions of their research abstracts, papers and posters on unpublished results of theoretical, constructivist, empirical or experimental work in the area of digitalization of education. Submitted papers will have blind peer-review and peer-to-peer review. The high-quality papers will be published in a conference volume, with ISBN. An e-book of digital materials presenting best practices of learning, teaching and assessment in virtual classrooms will be published in a volume with ISBN and on the website of the project.

The conference Challenges and Benefits of Learning and Teaching in Virtual Classrooms will provide the context for disseminating the intellectual outputs of the project.

Chapter I. LEARNING OUTCOMES ASSESSMENT IN VIRTUAL CLASSROOMS

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I.1. GENERAL VIEW ON THE ASSESSMENT PROCESS IN VIRTUAL CLASSROOMS

Abstract: The purpose of the assessment is to provide accurate and authentic feedback about the student's level of knowledge, progress and learning needs. For this, students and teachers have to know and pursue clear, measurable, realistic learning goals. The assessment method should be integrated into the learning process, to use clear evaluation criteria compatible with the learning content and contextualized to the socio-educational system.

The evaluation process has been transformed over time by including alternative evaluation methods and techniques (e.g. feedback, portfolios, project-based); by making conventional evaluation methods more flexible, diversifying and digitizing (e.g. multiple-choice tests, short-answer timed-tests, quizzes); and through the importance given to the formative role of the evaluation in the learning process (formative assessment). The digitalization of education has accompanied and enhanced these transformations, providing schools, universities and adult education institutes with synchronous and asynchronous methods and techniques, applications, resources and digital tools that facilitate learning and assessment, both in the classroom and in the virtual educational environment.

During the COVID-19 disruptive crisis, innovative methods of evaluation have been tested and adopted in the virtual classrooms. Among the most successful and practical solutions are the formative assessment methods that are responsive to students' learning needs, are effective and viable, include feedback and reflective practices, stimulate participation and creates real-life learning contexts.

The learning outcomes' assessment is the process of transmitting a feedback from teachers to students, from students to their peers, from the students to their teachers. The assessment is relational, having an important role in the learning process. There are many factors that can influence the effectiveness and the results of the assessment, as could be observed in Table 2.

In the student-centered approach, the assessment process and results allows teacher to know what the students learned and how they have learned, and consequently plan the next learning activities based on the students' needs (Spanos et al. 2001, p. 319). From this perspective, the assessment is important because the methods and tools of evaluation directly influence the teaching strategy, the learning process and the students' achievements. The study of Schneider and Preckel (2017) shows that the most important function of the assessment is to offer both students and teachers a valuable feedback about the students' progress and development needs. The equity is also an important factor in

assessment process, since the evaluation methods, techniques and tools are considered faire if they are contextualized and appropriate for the students they are assessing (Suskie, 2000, p. 7).

Table 2. ***The process of assessment***

The LEARNING ASSESSMENT is the PROCESS of transmitting a FEEDBACK		
from teacher	→ → → → → → → → → → → → → →	received by the student
from student	*INFLUENCED by* *(facilitating and perturbing factors):* *validity, clear goals and standards* *fairness* *motivation for learning, learning style* *the students' own skills and experience* *tasks, resources and time management* *participation, commitment and engage* *flexibility and adaptability* *informal and spontaneous reactions* *self-confidence, self-regulation and trust* *sensitivity to the cultural background*	received by peers received by the same student (self-assessment) received by teacher

The most used assessment practices are the *traditional* standardized, summative, speed-based, recalling previously memorized knowledge, single-occasion, decontextualized assessment tests; and the *alternative* assessment forms, characterized by continuous, formative, authentic, performance-based, constructivist and contextualized tasks (see Table 3). All the assessment tools, traditional and alternative, can be successful applied in any learning setting, in conventional face-to-face on campus classrooms, blended learning activities, or learning at distance in virtual classrooms.

Table 3. ***Traditional vs. alternative assessment tools (adaptation after Dikli, 2003, pp. 1-4)***

Traditional assessment Single-occasion tests Summative Inauthentic Individual tests No feedback provided to learners Timed tests Decontextualized tasks Norm-referenced score interpretation Standardized	**True-false tests**	Unidimensional, timed test Easy to score, easy to administrate Succeeding by guessing up to 50% changes
	Multiple-choice tests	Fast and easy to administrate, and easy to score Recalling previously memorized knowledge Difficult to produce items that require higher order thinking skills (analyzing and synthesizing)
	Essays	Time consuming, difficult to score, risk of subjectivity Flexible and assess higher order learning skills
	Short-answer tests	Open-ended questions requiring a written answer, usually a statement of a brief written answer, timed test Might be difficult to produce clear, precisely formulated items

Alternative assessment Continuous, longitudinal Formative Authentic Performance-based Individual and Group projects Feedback provided to learners Untimed assessment Contextualized score interpretation Group or classroom-based assessment	**Portfolios**	Cumulative, time consuming, requires commitment and a lot of input, poses authenticity The collection included in the portfolio exhibits the students' effort, progress and achievement in the assessed learning unit
	Projects	Simulate real-life contexts, practicing authentic activities; focused on complex learning, requires commitment of the student time and effort Suitable for individual and group study/work Is problem-based when requires the use of problem solving skills
	Journals	Let the learners express their knowledge in their own way and apply his/her own skills to real life situation; requires commitment of the students' time and reflective effort Requires reflection on the learning process; learn how to learn skills

The learning components, such as the Massive Open Online Courses, e-learning platforms and learning management systems has been employed in universities (Mishra et al., 2020) and in adults' education and training beginning with late 1990s. A list of examples of online assessment platforms and tools is presented in Table 4.

Table 4. ***Examples of online assessment platforms and tools***

Online assessment platforms	**e-learning platforms**	Coursera, Udemy, Skillshare, MasterClass, Open EdX, Udacy, Pluralsight, Moodle, Future Learn, Ted-Ed, Classtime, Start.me, Classwize, Edmodo, Google Classroom, Bakpax, G Suite, Docebo, Future Leran, Lectora Inspire, Codeacademy, Lan School, Skillshare
Online assessment tools	**Discussions and debating**	Zoom, CiscoWebex, MS Teams, Google Meet
	Projects and presentations	Power Point, Canva, BlackBoard, Mentimeter
	Peer-assessment	Padlet, Jamboard, MS Teams, PeerScholar, Atlassian, ActiveCollab
	Reflective assessment	blogging platforms: Tumblr, Wordpress, Blogger
	Feedback	Google Forms, SurveyMonkey, QuestionPro, SurveySparrow, Mentimeter, Compare, Feedback Fruits etc
	Testing	Questionmark, Socrative, Google Forms, Quiz, PollEverywhere, QuestionMarkDesigner, WebTest, PsyCAL, RonSUB, BrainZone
	Game based assessment tools	kahoot, GlassLab, ACTNext, Imbellus
	Group work, Collaborative work, time and task management	Dropbox, OneDrive, Google Classroom, Drive, Docs, Hangouts, Calendar, MS Teams, Doodle, Slack, Zapier
	Anti-plagiarism	iThenticate, Turnitin
	Proctoring systems	ProctorU, Proctorio, Respondus, ExamSoft, Honorlock, Examity

Information and communications technology in higher education includes open courses, e-learning platforms, instructive stimulations, video and game-based tests, webinars, social media, text and open access data, intel tutoring systems:

- *A-synchronic* techniques use online resources such as email, online quizzes, recorded lectures and conferences, webinars posted on the Internet, discussion forums and newsletters.
- *Synchronic* techniques involve the active participation of students, facilitating students' actions such as projecting on the virtual classroom screen, developing and presenting their own work to the classmates, engaging in oral discussions in the chat rooms and all the real-time interactions with others in the virtual classroom environment (Spanos et al., 2001, p. 320).

Using an e-learning platform and digital assessment tools, the students can access in real-time the feedback from the teacher, their progress during the learning activities and the results of the summative exams.

The early studies about the impact of the development of information and communication technology on higher education, conclude there are no significant differences between the two educational environments. The common manuals, guidelines and reports about the online education are focusing on the similarities between the onsite classrooms and the online learning environment and are less centered on differences of teaching strategy and learning process particularities between the two mediums (Russell, 1999; Eaton, 2001 cited by Milam et al., 2004, p. 74). However, the initial research on the influence of technology on education recognize the complexity of the assessment in virtual classrooms, especially of the dynamics of the interaction between teachers and students when they do not share the same physical classroom. The lack of human direct interactions is affecting the assessment process in terms of how the feedback is transmitted and received, the inability to observe immediate informal and spontaneous reactions from the students, and the difficulty to ensure the validity and fairness of the assessment. In that respect, the early studies emphasize the benefits of introducing the ICT components in the traditional learning system, when students are learning in a face-to-face setting. And further, recognized the efficiency of blended learning, when online and onsite learning are combined.

Schneider & Prackel (2017) studied over 38 meta-analyses investigating 105 correlations between various variables influencing HE students' achievements. The results show that summative assessment is effective when is combined with formative assessment at the beginning and on duration of learning unit, and the biggest effect on students' achievement is self-assessment and peer-assessment between students. Their study presents the convergence between different meta-analysis reports that compare the grades with which students self-appreciate, the grades they received from their classmates and with which they received from the teachers, and finds that they are similar. This convergence suggests that higher education students' grades on average relatively objective and correct.

In order to ensure the learning achievements, clear learning objectives and clear evaluation criteria are needed. Teachers need clear objectives when planning the course syllabus and activities, for the designing the assessment tools and providing correct and complete feedback to the students. Students need clear objectives and clear assessment criteria to follow the important content of the courses and to plan and organize their individual learning activities and to prepare for the exams. In order to ensure the achievements, the sensitivity and concern of the teacher for the quality and fairness of the assessment is important, as well as for the content and frequency of the feedback they provide to the students. Allowing students to work with open books and open access learning materials, take notes during the exams, increases the similarity between exams and real-life situations. In conclusion, the assessment should include not only exams, but also clear goals, setting standards for defining success, and providing personalized feedback. The assessment and feedback practices determinates the students learning strategy, achievements, and motivation for learning (Schneider & Prackel, 2017).

A list of the necessary conditions for an effective assessment is presented in Table 5.

Table 5. ***Necessary conditions for an effective learning outcomes assessment***

To combine the summative with the formative assessment	Does not use solely the summative assessment, but coherently design and implement the initial assessment → on the duration of the learning unit → final summative assessment
To establish clear learning objectives	To engage students in the learning process from the begging, knowing what they will learn and having a clear achievement target
To define clear assessment criteria	To ensure the transparency and fairness of the assessment process; To formulate clear, measurable, objective criteria of assessment
To give multiple feedback during the learning process	To validate the students efforts, confirm to the students what are their learning progress, and helping students to overcome obstacles during the learning process
To use assessment forms which are similar with the real-life professional situations	Use portfolios; problem-based and team-based collaborative tasks; tests with open-books; activity reports; project-based assessment through monitoring, evaluating and correcting each project phase completion
To use self- and peer-assessment	Introduce learning journals; To assess group activities and self-assessment tests; To use the reflective activities outcomes to design future phase of the learning process

The quality of the online assessment is achieved when it comprises an initial assessment of competencies, skills and learning style, and is followed by quality teaching activities, which give the students the opportunities to integrate their own competencies into the online course (Milam et al., 2004, p. 82). In a study about the use of quizzes with multiple-choices in online assessment, Corral, Carpenter, Perkins and Gentile (2020) observe that in the case of summative assessment, students tend to learn for the exam only a week before the assessment. Students study style for the course was measured through an end—of-semester online survey: "When studying for exams, which of the following best describes when you do most of your studying? (Check only one).

a. Throughout the semester as I learn the information (8.1%)
b. More than a week before the exam (25.9%)
c. Less than a week before the exam (30.8%)
d. Within a few days of the exam (24.2%)
e. The day before the exam (9.2%)
f. On the day of the exam (1.5%)".

The majority of the students preparing for the end of semester summative assessment declare that they are studying only in the last week before the exam. Moreover, students who engage in reviewing the course material through online tests during the semester period show higher performance in comparison with those who do not opt for the formative assessment and choose to learn only for the end of semester exam. The authors' conclusion is that students who performed on the online tests also perform on the final exams; and it is possible that using the formative online tests leads to an increased degree of understanding and supports students' learning (Corral et al. 2020).

The study of Hattie and Timperley (2002) shows that the students improved their abilities when receiving feedback in multiple multimedia forms, compared to students who received feedback only through written comments (text). Another study argues that there is a significant improvement of learning when it is used formative assessment such as e-portfolios and collaborative tasks along the semester (Gikandi et al., 2011). Encouraging, confirming, validating and ensuring students that they are on the right path in their learning process are critical components of feedback that help students overcome difficult times and continue to work. Knowing that someone is available to help you when encounter an obstacle and make you overcome it, it gives the student confidence that she or he will succeed (Milam et al., 2004, p. 80).

One of the most popular forms of online assessment that has been successful since the beginning of the introduction of digital tools in the evaluation process in universities is the project-based assessment. In the project-based context, the design of the assessment can require the completion of all stages of a larger project, so that students receive feedback, evaluation and suggestions for correction between each two consecutive stages of the project. Even in an a-synchronic courses, the teacher can ask the students to meet synchronously through video-conferences, in independent small groups, through video-conferences, without reducing the duration of the actual courses and seminars. In order to facilitate learning in groups of students, the teacher may ask the students not only to complete the stages of the project, but also to assess the group activities through self-reflections and about the group processes and their learning outcomes (Luckritz, 2021).

Online portfolios enable teachers to become evaluative while advisory and maintaining continuous internal and external communication. Students assessment through online portfolios is well documents and became a practical continuous (formative) assessment tool (Milam et al., 2004, p. 80).

The mediated communication technology has the following characteristics (Luckritz, 2021):

- Is effective for increasing the student participation and involvement in the learning process. If the course design follows the participation of the students, the reflective activities have a formative role in the online assessment.
- Follow the needs of students to self-direction, self-regulation and reflection.
- Effective and authentic assessments will naturally tend towards conferring the role of authors and self-didactic to the students, since students will have the ability to see themselves and their peers taking over the role of the teacher, getting involved in leadership. The students will visualize themselves in their professional role in the future, after graduation.
- Effective formative assessment allows teachers to modify tasks during the process to ensure the learning achievements, self-regulation, and the transformation of students into self-assured people in their lifelong role.

The above mentioned formative assessment goals are following the 21st century skills. *„These competencies include collaboration and interaction skills by which group of students work together to accomplish one goal by sharing expertise"* (Mok et al., 2021). The collaboration and reflective working demand different social, personal skills and professional competencies.

The way in which online assessment is implemented has implications for teachers, students and administrative staff in higher education institutions. Teachers have access to almost unlimited open resources about the methods, tools and techniques to build an authentic assessment design, with relevant content and tailored to the learning needs of the students. At the same time, an important asset of the online assessment is that encourages students for collaboration and reflective learning. In terms of the administration, online evaluation has the advantage that it can reduce the time and resources to administrate, distribute and communicate tests and examination results for a large number of students.

The use of online assessment catalyzed the *"development of many innovative assessment examples across various course modes including online, distance and on-campus courses. If designed appropriately, online assessment tasks have the potential to assess various forms of students' knowledge, skills and understanding*" (Zakrzewki & Bull, 1998). The online tests, multiple-choice questionnaires, written workloads, problem-based exercises can also be solved in other ways than those known in the classroom. The assessment process should be as complex as the learning process and should be a transparent process for the students. This perspective resolves the concern about the validity of the assessment, such as how the teacher can check whether the person submitted the assessment test is the very student who needs to be evaluated (Milam et al., 2004, p. 79).

The studies presented so far have analyzed the role of the online assessment and broadly, the role of information and communication technology in the learning process organized face-to-face or in blended format. These scientific research results have captured the benefits of using digital platforms and tools in evaluation. In general, the digital tools

are versatile and help at increasing the effectiveness of evaluation when it is formative, and when it includes tasks throughout the course entire duration and testing forms that are meant to repeatedly monitor and evaluate the learning outcomes (e.g. initial assessment, portfolios, learning journals, project-based, problem-based, quizzes, repetitive online tests). Also, a crucial role in the online assessment is played by the feedback and students' orientation toward alternative and creative solutions to complex problems (Hattie & Timperley, 2002).

I.2. ONLINE ASSESSMENT METHODS AND TOOLS DURING THE COVID-19 PANDEMIC (2020-2022)

CHALLENGES

During the first lockdown, *"by mid-April 2020, 94 percent of learners worldwide were affected by the pandemic, representing 1.58 billion children and youth, from pre-primary to higher education, in 200 countries"* (UNESCO, 2020, p. 5). When the teaching, learning and assessment were transferred from the conventional classrooms into virtual classrooms, many of the educational institutions did not have the necessary equipment to face the pedagogical challenges of distance and online learning. During the pandemic period, the online and distance learning has provided the solution to the crises in education, regardless of the level of knowledge and the actual state of the implementation of the technology (Singh et al., 2022, p. 302).

Teachers without experience and expertise in online and remote design, teaching and assessment have faced major challenges, mainly in the first pandemic lockdown (Rapanta et al., 2020). Most of the higher education institutions did not have the knowledge and practice of remote online teaching. If there were sporadic online courses, they were not part of the standardized educational process (Singh et al., 2020; Korkmaz &Toraman, 2020; Mishra et al., 2020). The lack of digital skills mostly affected students and teachers who had a low level of practice of using open educational resources before the pandemic and those who did not have access to the Internet and digital devices outside the university's computer laboratories, outside the campus (Sa & Serpa, 2020).

If designed, planned and implemented correctly and appropriately, the online assessment has the advantage to evaluate in multiple forms the knowledge and potential of the students, to measure their level of understanding and to highlight a future projection of the student's professional development. But the crisis situation in the lockdown periods of the COVID-19 pandemic have shown that there are teachers and students who do not know the potential of the online assessment techniques and tools, do not know the criteria to help them choose the most appropriate digital solutions for the exams, do not have the previous practice of testing in a protected educational situation (e.g. in laboratory classrooms, in a teachers training setting, in a formative pedagogical practice) and to implement such

solutions in the evaluation process. In these situations, some of the exams were suspended and scheduled later, developed the offer of open access training courses in the field of online assessment, and were taken systematic measures of assistance and counseling regarding the management of interpersonal contacts between students and in relation to teachers to prevent anxiety and lack of motivation for learning. These measures have been documented, and the analysis of their impact has shown a positive evolution and a remarkable progress in the achievement of digital literacy at the level of students, teachers and administrative staff in universities (König & Frey, 2022, p. 5).

The closure of universities has affected the mobility of students, especially of the international students (Marginson, 2020; Mok et al., 2021). Students have also been negatively affected from the stress, anxiety and prolonged state of uncertainty (Cao et al., 2020; Wang & Zhao, 2020) and evaluation anxiety, leading educational researchers to discuss „the implications of assessment design, including challenges of evaluating students in a way that facilitates learning and limits unnecessary evaluation anxiety" (Sotardi & Dutton, 2022). A study conducted during the 2020 – 2022 period draw attention to some issues related to online evaluation, when using information and communication technology in the learning process, and the continuous transformations that take place in the design of assessment methods in online education to adequately meet the needs of students (Singh et al., 2022, p. 323).

The problematic aspects of using the online assessment methods and tools have been involuntary tested in the COVID-19 pandemic period, when the learning activities has suddenly become heavily-dependent on technology. At the begging of the year 2020, the higher education institutions around the world have made considerable efforts and managed to adapt digital solutions for web-based distance education and successful shifted to online the teaching and learning processes for almost all the study programs in higher education. The rapid transfer to online education have risen the phenomenon called *"emergency online learning"*, which *"has created many confusions to instructors, students and higher education administrators"* (Chung et al., 2020; Korkmaz & Toraman, 2020). During this complex process, the assessment process remained the weakest link, facing various obstacles when passing to the online and remote environment. Were noticed the technical problems related to the speed of the Internet and the capacity and characteristics of the users' devices. The variability of the Internet connections, in size and quality of the image on the monitor, the variability of the hardware characteristics of the users' personal computers and the differences in the telecommunication and Internet infrastructure revealed the social problems, limited access and inequities faced by the students and teachers in many regions of the world. Then, the ability, knowledge and previous practices to use online assessment methods and tools show its importance, especially during the first lockdown of the COVID-19 pandemic, when across many countries of the world the final exams at the end of a study cycle and the admission tests were suspended at the national level, for an entire student cohort. Finally, among the difficulties encountered by the higher

education institutions regarding the online assessment, there was also ensuring the validity of the online tests and the academic integrity of the online and remote examined students.

The visible effects in virtual classrooms education occurred with the first lockdown of the pandemic (in May 2020), when many of the world's university communities faced technical problems. The authors of the studies that analyzed this type of shortcomings note the variability in the speed of the Internet, the variability in the quality and size of the screens, the environmental factors that interfered with the learning and examination activities (Armstrong et al., 2021, p. 10), the limited resources of students and teachers who did not have a personal digital device equipped to participate and carry out in optimal conditions the activities in virtual classrooms, and entire national educational systems that have failed to manage technically the administration of the national exams for admission of the assessment for completion of studies (Su, 2020, p. 1).

The transition to online education in an extremely short period of time has tested the flexibility and adaptability of higher education systems and has raised assumed issues, but also latent problems: the digitalization of education, the digitals skills of students and teachers, teacher training, the learning needs of the students and inequities in education.

A series of studies discussed the (in)equalities in distance and online education during the COVID-19 pandemic and showed that the access to education and the success in learning in online classrooms depend on the income of the student's family, the cost of tuition fees, the student's literacy in information and technology, but also on the speed of the Internet and on the access to suitable electronic devices (Mok et al., 2021; Hosszu & Rughinis, 2020). Thus, online education during pandemic has deepened the shortcomings in educational systems and created new forms of social exclusion (Hosszu & Rughinis, 2020, p. 11; Singh et al., 2022, p. 322). For the students and teachers from disadvantaged communities, the apparent advantages of learning and assessment in the virtual environment have turned into major impediments. For example, online students have the advantage of accessing learning tasks and tests from any location and from almost any digital device (personal computer, laptop, tablet, smart phone etc.). But some students do not have a room of their own or at least daily access to a room which is properly equipped (clean, illuminated, with heating system, protected from noise, having a properly equipped desk), and do not have a digital device suitable for accessing the learning and assessment materials and apps. These students, who before the pandemic relied solely on the university's resources for being able to participate in the learning and assessment processes, experienced frustration and in extreme cases, dropped out of school. Therefore, it is important to notice that online evaluation during the COVID-19 pandemic was not only a matter of "tech issue" and to realize that pandemic and post-pandemic university education gaps are primarily a social problem, which does not remain and cannot be solved only inside the universities (Hosszu & Rughinis, 2020; Selwyn, 2021) The social negative effects of closing schools differentiated by categories of students: the younger ones were strongly affected; students from families with low socio-economic status have poor learning

outcomes than those who are not part of families with low socio-economic status (Hammerstein et al., 2021; Tomasik et al., 2020; Engzell et al., 2021; Maldonado & de Witte, 2020). Hosszu and Rughinis (2020) analyzes from a triple perspective – of students, teachers and civil society – the challenges that the COVID-19 pandemic has generated and confirms that the online education in the pandemic deepens social inequity and the gaps in education by the lack of the material resources of the families, the institutional communication was poor, the decisions ineffective and lacking in strategy and management of this crisis situation. Reimers (2022) shows that *"the number of students without access to digital devices and to the Internet is higher than of those who had these resources during the pandemic"*. Analyzing these social and economic effects of the online education, Selwyn et al. (2021, p. 2) wonders whether we should not see the massive digitalization of the functions of the universities, including the strengthening of the role of AI and proctoring applications *„in terms of politics and power"* rather than as a technological and pragmatic solutions to get out of a crisis and establish a *"new normal"* in education.

Ensuring the academic integrity of online assessment, validating the requirements for evaluation (Mate & Weidenhofer, 2021, p. 7), fairness and equity in the evaluation of the student achievements and performance soon became the center of debate in universities (Coghlan et al., 2021). Many students were tempted to deceive examiner teachers, used various Online sources of inspiration, and even some took exams instead of other students (Dendir & Maxwell, 2020). The adoption of the online surveillance technology has led to *„depriving faculty members of the critical opportunity to innovatively transform teaching and assessment practices"*, focusing on possible frauds committed during exams, and has neglected other structural and societal inequalities (Lee & Fanguy, 2022). Thus, regarding the online assessment, the pressing issues that have been brought up are data security and academic integrity. Security and reliability refers to the safe and risk-free transmission of information leakage to third parties of the instructions, tasks and testing tools to the students, but also of the students' responses and other information necessary in the evaluation process, from the student to the teacher evaluator. The aspects related to the ethics and academic integrity in the online assessment process are related to the protection against the plagiarism, ensuring the honesty of the evaluated students, detecting, preventing and combating fraud behaviors in the assessment process (Su, 2020; Hosszu & Rughinis, 2020, p. 16). The digitalization of the entire evaluation process and its online and remote implementation has developed the need for accessible and secure assessment methods that are faire and ensure the academic integrity (Mate & Weidenhofer, 2021, p. 10). Many learning management systems have technical and pedagogical problems regarding the security of the exams. Online and remote exams show vulnerabilities, and students can find ways to break the rules more easily that when the exam takes place in the classroom, under the supervision of teachers and teaching assistants (Swart & Meda, 2021). Thus, efforts are made to prevent plagiarism and the use of sources of inspiration from the Internet during the exams. Moreover, the critical literature on digitalization draw attention to the

need to develop methods of assessment and online surveillance technology based on the needs identified by teachers and academia in order to protect the personal data, dignity and integrity of users (students and teachers) and to avoid excessive proctoring to the detriment of students and learning objectives of the assessment process (Selwyn, 2021, p. 5; Pötzsch, 2019; Singh et al., 2022).

The easiest solution to ensure the correctness of the evaluation is the standardized tests and the use of online surveillance systems. Millions of students have online exams and completed tests at home, being supervised by virtual systems and artificial intelligence applications (Selwyn et al., 2021, p. 2). Online proctoring involves the use of facial recognition software, motion and vision monitoring, and registers audio-video the exam. The evaluated one is tracked through an online video link, his identity is verifying, is examined in real-time, is biometrically monitored, and is detected any facial movements that would betray the student's interaction with unauthorized sources of information. AI algorithms record the student's use of multiple digital devices (smartphone, table, laptop, PC). When the exam ends, the official of the university are informed about possibly alarming conducts and are left to decide whether or not they constitute a violation of the academic integrity norms (Selwyn et al., 2021, p. 4). Online proctoring technologies have centered the assessment process on forms of control, surveillance and punishment imposed on the students suspected of cheating during the exam. At the same time, they have neglected interpersonal relationship and the socio-educational and cultural context in which the assessment takes place, which can produce inequalities (Lee & Fanguy, 2022).

Critical research on the digitalization the assessment process in higher education raises important questions about changing the nature of academic work, subjecting the student, commercializing university practicing, and increasing the parasitic relationship between technology developers and universities (Marachi and Quill, 2020; Pötzsch, 2019; Selwyn et al., 2021, p. 4). Nigam et al. (2021) discuss the need for excessive additional work after each exam to verify the proctoring system's reports. Online proctoring has given providers and IT technicians from universities a key role in the educational infrastructure and restricted the teachers' and educational experts' contribution in the process of integrating the assessment digital technology into education. Proctored assessments have become a source of additional work for teachers, together with a diminished control over the student evaluation process (Selwyn et al., 2021, pp. 11-12). Lee and Fanguy (2022) presents the example of a professor who practices a constructivist pedagogical approach and who used project-based assessment with "books on the table". In this case, the teacher kept this method of assessment, which is suitable both to the conventional onsite context and to the virtual and remote classrooms. The authors believe that universities should support such teachers who creatively develop, test, adjust and successfully implement a functional assessment method, instead of investing in proctoring technologies.

A synthesis of the challenges faced by students, teachers and administrative staff in universities during the COVID-19 pandemic period is presented in Table 6.

Table 6. ***Assessment related challenges in the "emergency online learning" during the COVID-19 pandemic, mainly in the first lockdown period***

Technical issues	**Poor Internet connection; Slow Internet speed**	Cannot connect to the online video-conference The slides or items of the online test are loading to slowly Cannot upload the content (tests, portfolios, quizzes, exercises) Fail the time-based tests Cannot access a repository
	Inadequate digital device (poor hardware characteristics, poor audio-video incorporated system)	Cannot follow the instructions, the assessment form, the assigned tasks due to the limited and unequal access Fail the filled-in tests Variability in screen size and quality can lead to unequal understanding of the learning content and evaluation forms
	Noise or other environmental distractions	Unable to organize an adequate place for studying and for the assessment process
Digital literacy for learning assessment proposes	**of the Students**	Cannot communicate and collaborate with teachers and peers The assignment takes more time to elaborate in digital form than on pen and paper classical form Risk to compromise the academic integrity principles and regulations
	of the Teachers	Simply transfer without testing and adapting the assessment materials and methods from pen and paper into a digital format Tend to use standardized tests or other ready-to-use assessment methods without considering the students educational background and the educational, social and cultural context Having no assessment training, competencies and previous practice in virtual classrooms, cannot choose the best assessment methods and tools to meet the learning objectives and students needs
	of the Administrative staff	Creates confusions for the students and teachers Have no clear procedures, rules and regulations for administrating the assessment process Depend on the IT technicians and assessment software developers in managing the assessment process
Social inequities	**for students and teachers relying on the campus infrastructure**	The access to Internet connection and to appropriate digital devices outside the campus depends mainly on the students' family income and their socio-economic status
	for educational systems without previous practice of learning outcomes assessment using ICT	Teachers having no prior training and practice in formative pedagogical assessment solutions Online assessment methods, techniques and tools were not standardized and were not used systematically and structured National exams were suspended or delayed
Stress and emotional	**Evaluation anxiety**	Increased evaluation anxiety due to the sudden change in format, rules and regulations of the exams Prolonged state of uncertainty and stress Lack of motivation for learning, lack of self-confidence due to the prolonged periods outside the physical classrooms Lack of assistance and counseling

Online proctoring	**Excessive surveillance**	Making a priority from identifying cheating, plagiarism and unauthorized behaviors that breach the academic integrity principles and regulations Additional tasks for the teachers (verifying the similarity reports, verifying the warnings detected by the proctoring software)

I.3. TESTING, PILOTING, PRACTICING

The closures of the schools and universities that followed the first pandemic lockdown, in the fall and winter of 2020, used the experience gained in the first lockdown, and much more effective measures and forms of learning were projected and implemented. The results are promising in the sense that showing the online learning is not inferior to face-to-face learning. The online learning was much more effective in the coming lockdowns compared to the first, in spring 2020. The positive effects of the lockdown on learning and assessment were recorded in learners who used online applications and tests beforehand or were already learning online and remote (Spitzer & Musslick, 2021). The use of online educational applications is sometimes more effective than those used in the conventional learning (König & Frey, 2022, 5). *"If the online assessment is used for learning improvement, it is welcomed by teachers and learners, since they can use it for homework, stage quizzes and even final exams"* (Su, 2020). The pandemic lockdowns showed that by receiving adequate support, the students can achieve the same learning outcome as in conventional classrooms on the university campus. The research findings *„encourage university management and teachers to search for multiple course delivery modes to nurture students to become caring leaders with the 21st century skills and knowledge set"* (Mok et al., 2021, 1).

The advantage of the learning management systems (LMS) is to be reactive to the learning process during the implementation period and thus, they become an essential equipment in universities, where students learn at distance, organizing their own study time. LMS is accessible from any digital device (personal computer, laptop and other mobile device). The assessment is a central point in any LMS because it can stimulate the self-reflection, cooperation, independent study, reviewing the learning materials needed for assessment, encourages self-education, learning outside the courses and seminars hours, and allows the teacher to manage large groups of students. (Swart & Meda, 2021).

Different methods of assessment have been innovated during the pandemic. The positive side of the crisis generated in education by the COVID-19 was that some of the teachers improved their teaching and assessment methods and the learning contents they deliver to the students. The students appreciated that during the lockdown periods, they had more time to study and prepare for the exams (Hosszu & Rughinis, 2020). The main findings related with the assessment practices during the COVID-19 pandemic, shows that the online learning involves self-regulation activities, the effort to coordinate one's own learning towards achieving the expected results. Self-regulation activities include: the self-reflection exercises, portfolio, task and time management for the a-synchronous learning activities and individual study. These acts re-center learning with a focus on the student

responsibility (Rapanta et al., 2020). Thus, learning would be more effective if assessment design engages students more by encouraging them to increase the amount of time spent on tasks, as Gibbs and Simpson (2004) suggested.

The general impression is that students and professionals in universities have successfully coped with the transition to the online education, even though many of them have directly faced problems related to COVID-19. There are clear needs of students and teachers in online education, so educational experts can study the perspectives of students, teachers and administrative staff about the forms of assessment practiced during the COVID-19 pandemic and how they will be used in the future for learning planning and design (Singh et al., 2022, p. 323).

One study addressed the computer-based exams in assessing the progress of the medical resident students and showed that this type of testing is effective and feasible for the learning context of medical students. The method showed its effectiveness and was explicitly agreed by the teachers and the students. Although the computer-based online testing started due the COVID-19 pandemic restrictions, it will be integrated in the study program and will continue to be used even after the pandemic-related restrictions on social distancing will be lifted (Armstrong et al., 2021, 10).

The following assessment strategy was tested on a group of over 100 students and it is suggested the standardization of these forms, the professionalization of teachers and the regularization of these assessments methods and tools: Part A: a set of items of understanding with predefined drag-and-drop responses, associative columns, filling empty space in a text, which make irrelevant the access to a PC or the Internet; Part B: video games or computer animation simulating quiz questions about the general understanding of the subject; Part C: interactive discussions based on problematizing questions or trap questions; Part D: Innovative component that may include web-based, cloud work projects uploaded to drive (collaborative or individual) attesting the understanding, analyzing and interpretation of data, using information available on the Internet (Singh et al., 2022).

Mate and Wedenhofer (2021) standardized tests to assess the learning outcomes: Prior to the examination, students signed a declaration of academic integrity; The link to the online test was available synchronously for all the students examined for a duration of 40 minutes, representing the time needed to complete and submit the test; The questions in the test were presented without the possibility of returning to a previous question, to which the student has already answered (no backtracking); The questions, as well as all the variants of answers were presented randomly; The questions were classified by the degree of difficulty of cognition into three types, using Bloom's classification (1968): simple cognitions (level 1); with tasks asking for interpretation (level 2); and questions involving the application or analysis of the key concepts (level 3). The average of results of the assessment in 2020 (19.3 points out of 30) does not differ significantly from the average results of the assessment in the same discipline in the previous year, before the pandemic, when it was implemented in a face-to-face format, in 2019 (18.6 out of 30, p=0.3 t-test), and is consistent

with the results of the examination from previous years. The authors present also the limits of transposing in online format and adapting the assessment for the pandemic conditions: Students find that the inability to return to a previously completed response was the most challenging aspect of the online examination; The random presentation of the questions and variants of answer was a stress factor for the students who received at the begging of the test questions with a high degree of difficulty (after the Bloom's classification, 1968), which could affect their self-confidence and the assessment time management; The timer included in the online format of the test was another stressor for students, as he was not present in the face-to-face exams, on paper, in the classroom; Time management was deficient in the online examination: 5.4% did not complete the last question in the test, and 3% did not complete the last 3 questions of the test (Mate & Weidenhofer, 2021, p. 10).

The students may have tasks and responsibilities outside the classroom, they will perform the learning tasks in a setting and time that is usually not dedicated to learning, and thus assessment and testing methods can be improved in online learning by adopting a continuous assessment model in virtual classrooms (Rapanta et al., 2020). The research results on this matter, conducted by Swart and Meda (2021) shows that students who completed at least three times self-assessment throughout the semester achieved 20% better academic results than students who were not engaged in a self-assessment process.

As opposite to the summative assessment, the formative assessment was introduced by Bloom in 1968, followed by other studies that researched the effects and forms of formative assessment. *"Reflective practice is defined as the ability to focus on beliefs and values"* (Swart & Meda, 2021, p. 4) that determine one's own actions, informs and motivate action through reflective and reflexive examination. Repeated self-reflection can promote self-regulation, help students create their own learning approach, and improve their skills and competencies (Gikandi et al., 2011; Swart & Meda, 2021).

Another essential characteristic of the formative assessment is the feedback, which is frequent, can be immediate, can lead to the improvement of the lectures content and the course design, and can increase the quality of learning for the students (Hattie & Timperley, 2002). The formative assessment integrates pre- and post-evaluations so that students can begin the process of self-reflection already in the preunderstanding stage (Luckritz, 2021).

Nicol and Macfarlaine-Dick (2007) identified seven principles of feedback practice:

1. Helps clarify what good performance is (goals, criteria, expected standards);
2. Facilitates the development of self-assessment (reflection) in learning;
3. Delivers high quality information to students about their learning;
4. Encourages teacher and peer dialogue around learning;
5. Encourages positive motivational beliefs and self-esteem;
6. Provides opportunities to close the gap between current and desired performance;
7. Provides information to teachers that can be used to help shape the teaching (Nicol & Macfarlane-Dick, 2007).

CONCLUSIONS

Teachers have used the advantages of technology in the COVID-19 pandemic for the need to find out what and how the students learn at every moment. The use of technology has added spontaneity and creativity, and stimulated connectivity of ideas, the synthesis of learning capabilities in various ways, which go beyond the possibilities of conventional learning in on-campus classrooms. A list of characteristics of the formative assessment in virtual learning environment is presented in Table 7.

Table 7. ***Formative assessment. A viable and practical solution for Online assessment***

Responsive to the learning needs of the students	o Online tests, quizzes, drop-and-drag questions, debate, interactive activities, and all the synchronic online assessment forms measures in real-time the learning progress of the students o The results of the synchronic online assessment give the teacher an accurate picture of what the students have learned and how they learned and also, the possibility to adapt, modify, correct the teaching strategy in order to respond to the students learning needs and direct their efforts to achieve the learning objectives of the course o Integrates initial and post-evaluation, so that teacher follows the actual learning needs already from the preunderstanding stage and through the entire learning process
Effective and feasible	o Automatic administration of systematic and organized assessment o Easy to assess large groups of students o Easy to register, ordinate, structure and analyze the students learning outcomes and to use it to improve the teaching design and courses content
Reflective	o Encourages self-reflection, peer-reflection and reflective practice o Develops education through self-regulation of time, effort and task management o Stimulates autonomous study, preparing students for a life-long learning
Simulate real-life professional context	o Stimulates creativity, innovative responses, the use of personal skills and educational background of the students
Feedback	o Online assessment tools support immediate feedback o Easy to administer repetitive feedback and to link the assessment results with the previous measurements of the student progress o Stimulates the teacher-student authentic dialogue o Allows teacher and students to intervene immediately with remedial actions, change and tailor the learning approach to be more suitable for the student's learning needs o Clarifies the learning objectives, defines performance in accordance with the actual context (sensitive to the classroom, economy, socio-cultural factors)

The web platforms and tools enables interactive online teaching, learning and assessment by offering the possibility of systematic, organized, and automatic administration, and reporting the students' progress and learning outcomes.

Formative assessment is relational in the sense that includes a two-way feedback between teachers and students, and can substantiate the classroom community. Reflectivity plays a key role in adult education and lifelong learning, and formative assessment supports

the development of learning through self-regulation. Through the online formative assessment, we can know concretely that students learn, we can frequently assess their knowledge, their progress and how students feel during the learning and assessment process. The online assessment techniques offer the possibility of frequent feedback, give the teacher the opportunity to enter the classroom being prepared with learning materials and teaching methods tailored on the needs of students, and insist on those learning contents which require more attention and more explanations. Thus, the learning and assessment processes should not be based only on the teachers' competencies, but should use the teaching-learning relational system.

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Chapter II. ASSESSMENT OF THE DEVELOPMENT OF TRANSVERSAL COMPETENCIES IN VIRTUAL CLASSROOMS

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ABSTRACT: In the university policies of the last years, the emphasis is put more and more on the development of the transversal competences, in addition to the professional ones. Transversal competencies or as they are also called soft skills, 21st Century skills or transferable skills are defined in our acceptance as sets of knowledge, skills and attitudes that can be used in a variety of contexts throughout life, exceeding the specific framework of a particular profession. It is important that higher education graduates have transversal competencies to be able to integrate more easily on the job market and to be professionally competitive. Many transversal competencies frameworks have been proposed, but those competences that are considered in this project are the top 6 transversal competencies prioritized for HE and project-based virtual learning: communication, teamwork, ICT, critical thinking, problem-solving, and cultural understanding. There are some difficulties in assessing transversal competencies, which can be best overcome by using online assessment methods. The most useful and current methods of online assessment of transversal competencies are presented in this chapter.

In an era of continuous and rapid development of new technologies and professions, the most valued skills are those who permit us to adapt, be flexible and competed in any work field. High-performing HEIs are those that enable graduates to be competent in a specific professional field (hard skills), but also help them develop skills that allow them to easily adapt to professional reconversion, job reconfiguration, or integration of new scientific progress (soft skills). More and more, in the current labour market, skills like teamwork, communication, problem-solving, decision-making, self-management or cultural understanding, are as valued as professional competences. It is the mission of HEIs to integrate the needs of the labour market on their curricular offer, so that their graduates to be efficient and suited to the needs of the labour market. The emphasis on the nature of required skills is changing, from past competencies who were hard, to the present soft competencies and to those of the future who will be softer (El Messaoudi, 2021). The professional competencies are important especially from the graduate perspective and help us to get a job interview, but the transversal skills are important from the employer perspective and help us to obtain and retain the job (Binsaeed et al., 2017).

Educational researchers, practitioners and employers underline the importance of developing a set of non-specific competencies in higher education. They will help future professionals to rise to the required professional standards but also to achieve personal and professional goals and will give them the satisfaction of professional fulfilment (Chamorro-Premuzica et al., 2010).

Transversal competencies are conceptualized in different manners and are referred to in various ways. There is a lot of transversal competencies frameworks, therefore, for the beginning, it is important to define our understanding of transversal competencies and to present the transversal competencies framework adopted in the Classroom Laboratory UVT-NTNU Joint Course and in this book.

II.1. WHAT ARE THE TRANSVERSAL COMPETENCIES?

The first clarification needed is between the concepts of skills and competencies. The term skill is generally used in relation with a simple action when a person uses its knowledge and abilities to successful perform a simple task. The skills are learned and applied abilities which effectively use a person's knowledge to perform tasks and obtain performance. The skills demonstrate what a person can do. The term competence is used when we refer to the successful accomplishment of elaborate actions, with an increased degree of complexity. A competence includes knowledge, abilities, attitudes and even skills and lead to successfully complete a complex action. The competencies reveal how a person performs a complex task, or a job (International Atomic Energy Agency [IAEA], 2020).

An even greater confusion, caused by the variety of terms, is in the field of transversal competences or soft skills. The same concept, the skills transferable to diverse context is named differently by diverse authors, frameworks, or organizations. The most common terms are soft skills, transversal skills, transferable skills, key competencies, 21st century skills, (Economou, 2016), non-technical skills, life skills, generic competencies, future work skills, skills for social progress (Cinque, 2016).

The evolution of the term transversal skills is illustrated by Cinque (2016) in figure 8.

Figure 8. ***Cinque`s (2016) chronological presentation of the terms for soft/transversal skills***

The most used term is skills, and they were divided in two main categories: hard and soft skills (Litecky, 2004). The hard skills refer to the specific ability to perform a precise professional task, while the soft skills refer to the abilities that are not directly related to a specific task, but are used in any profession or professional role (Cimatti, 2016). Some of the most mentioned soft skills are communication, collaboration, teamwork, critical thinking, problem-solving, conflict resolution, creativity, self-management, time-management, long-life learning, cultural awareness, citizenship, leadership, or adaptability and resilience.

Quizi (2020) proposes the following common features of soft skills:

- there are skills that allow you to get a job, but also to maintain it.
- they are important for both professional and personal life; they allow you to achieve happiness.
- they are difficult to develop and evaluate, especially through traditional methods.
- their role is not limited to the profession; they mainly include interpersonal skills, which makes them transversal.

Similarly, Whitemore (2018) summarizes the main features of transversal competencies:

- they can be applied and are transferable in various professional fields or in different life contexts.
- most of them are intra- or interpersonal in nature.
- they are `cross-functional and cross-curricular` and can be used in blended learning approaches.
- communication is a basic transversal competence, which highlights and facilitates the other transversal competences.
- they are needed especially in contexts that involve novelty and rapid change.
- can be observed, measured, developed.
- it would be recommended to train them from childhood.
- they are learned especially through experience in personal development and can be taught in formal contexts only through highly interactive strategies.
- they develop together with self-awareness and self-knowledge.

II.2. IMPORTANCE OF TRANSVERSAL COMPETENCIES

There is an increasing emphasis on the development of non-academic skills and competences in the context of higher education. Although different authors and bodies have identified different sets of competencies and transversal skills, they all support the importance of their training and development in future professionals (Chamorro-Premuzica et al., 2010). Some pertinent arguments for the importance of developing transversal competencies in HEIs are:

- Having transversal competencies allows for sustainable personal and professional development, lifelong learning and professional satisfaction (Manasia & Dima, 2021).

- Enables states to develop a new economy, based on artificial intelligence, virtual reality or digital production (Sereda, 2020).
- Allow graduates to have employability skills, which gives them the chance to be hired based on their competency profile (Sa & Serpa, 2018)
- Allow the application of knowledge learned in a formal educational context in non-academic contexts (Hanover research, 2014).
- Assure compatibility to core academic subjects, enabling a `balanced approach` to higher education. (Hanover research, 2014).
- Make a positive direct impact in performing in core academic disciplines, enabling students to develop high professional competencies. (Hanover research, 2014).
- Allows application of knowledge to real-life problems (Tabaishat et al., 2009).
- Post COVID-19, a more digitalized society emerged. Learning in HE will be hybrid or virtual forwards. (Antón-Sancho et al., 2021) Lots of economic or social sectors embedded ICT in their day to day life, so digital and social skills are a must.
- Support personal empowerment and community engagement (UNICEF, 2019).
- Allow coping with trauma and build resilience (UNICEF, 2019).

II.3. COMPETENCIES FRAMEWORKS

Various international bodies, researchers, and research or educational projects have developed competency frameworks over time. Through them they wanted to explain, classify, and recommend ways to develop the necessary skills in different temporal, social or professional contexts. Economou (2016) has made a comprehensive synthesis of competence taxonomies. She described 11 of the most well-known taxonomies, including enGauge 21st Century Skills: Digital Literacies for a Digital Age (Lemke, 2002), The Definition and Selection of Competencies: Theoretical and Conceptual Foundations (OECD, 2003), The Key Competences for Lifelong Learning – A European Framework (European Commission [EC], 2018), UNESCO ICT competency standards for teachers (ICTCST), (UNESCO, 2008), Assessment and Teaching of 21st Century Skills and the KSAVE model (Griffin & Care, 2015). The most recent framework is conceptualized by OECD (2018), presenting the future skills for Education 2030. In Figure 9 some of those models are illustrated. Voogt and Pareja Roblin, (2010) synthetized the following similarities and differences between frameworks (Table 8):

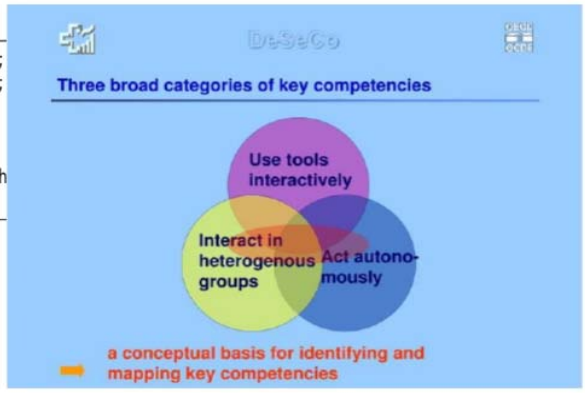
Cinque (2016) listed the following similarities between the competencies frameworks:

- All include basic (fundamental) skills, like literacy, ICT, numeracy
- All include interpersonal skills, like communication, collaboration, teamwork
- All include thinking skills, like critical thinking, problem-solving, planning, conflict resolution
- All include intrapersonal skills, or personality traits such as perseverance, punctuality, self-confidence, self-management
- All include business skills, like entrepreneurship, innovation, management

- All include community skills, like civic behaviour, citizenship.

Figure 9. *Competencies frameworks*

Organization	Name	Skills
WHO (World Health Organization) — 1993	*Life skills*	— decision-making and problem-solving; — creative thinking and critical thinking; — communication and interpersonal skills; — self-awareness and empathy; — coping with emotions and coping with stress.
ISFOL (Istituto per lo Sviluppo della Formazione Professionale dei Lavoratori) — 1994/1998	*Transversal skills*	Useful to: — *diagnose* the nature of the environment and task (mainly cognitive skills); — *relate* to people and issues of a specific context (interpersonal or social skills, which is the emotional



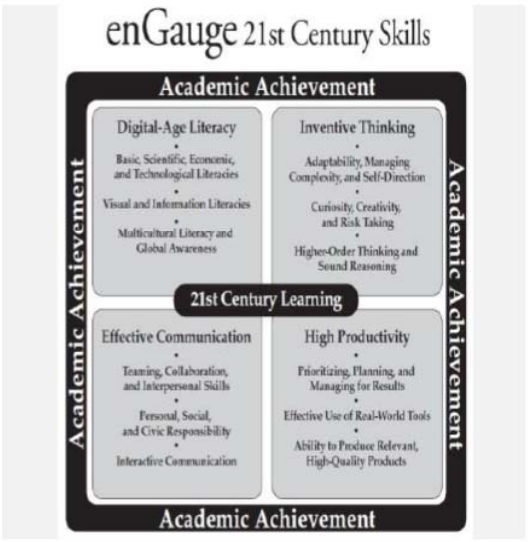


Table 8. ***Similarities and differences between 21st century competences frameworks (Voogt & Pareja Roblin, 2010, p. 309)***

Mentioned in all frameworks	Mentioned in most frameworks	Mention in a few frameworks	Mentioned in only one framework
Collaboration Communication ICT literacy Social/and or cultural skills; citizenship	Creativity Critical thinking Problem solving Develop quality products/ Productivity	Learning to learn Self-direction Planning Flexibility and adaptability	Risk taking Manage and solve conflicts Sense of initiative and entrepreneurship

II.4 OUR UNDERSTANDING OF TRANSVERSAL COMPETENCIES

The mission of our university, West University of Timisoara (WUT) is to develop the potential of each student, through both professional skills and transversal competencies of collaboration, reflexivity, involvement, and entrepreneurship. WUT has developed an educational brand, based on reflexivity and collaboration, in which it promotes the development of transversal competencies. They are defined in this document as `sets of knowledge, skills and attitudes that can be used in a variety of contexts throughout life, exceeding the specific framework of a particular profession` (WUT, CDA, 2020, p.4)

The current transnational project aligns with this mission because it aims to develop students' transversal skills through cross-cultural learning in virtual classrooms. In the previous project, Classroom Laboratory, the classroom was conceptualized as a space for interdisciplinary and sustainable learning (Berge, 2020). The learning outcomes were defined in terms of transversal competences. The following transversal competencies have been targeted to be developed: communication, cultural understanding and diversity, teamwork, critical thinking, interdisciplinary, ICT, and problem solving and decision making. In figure 10 a Frayer model of transversal competencies is presented.

In the current project we aim to find the most valid measurement methods in the virtual environment of these transversal competencies. Being a continuation of the previous project and building on previous experience, we propose a model that refers to the transversal competences mentioned above. In figure 11 we compiled some of the most needed competencies in HE and world of work.

Figure 10. *Frayer model of transversal competencies*

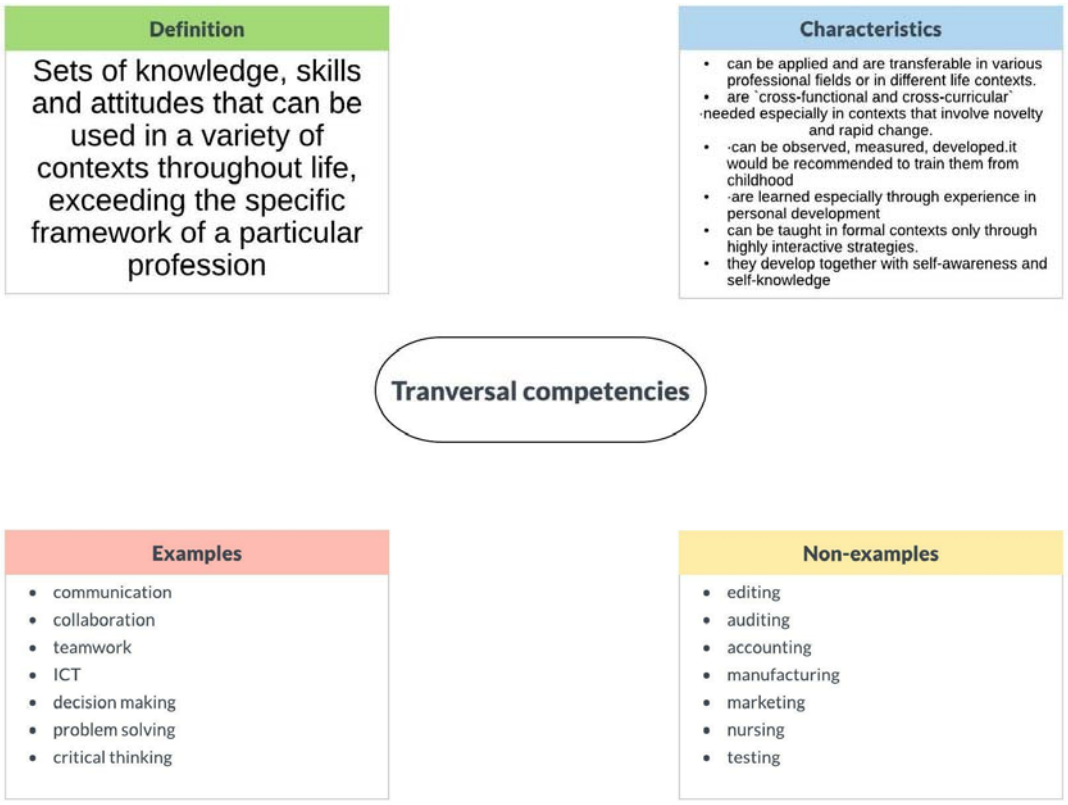
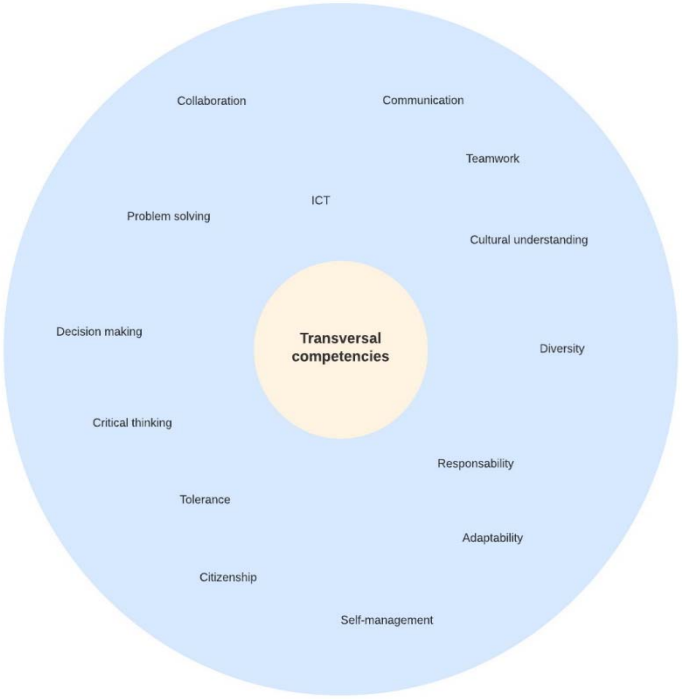


Figure 11. ***Transversal competencies important for HE and world of work***

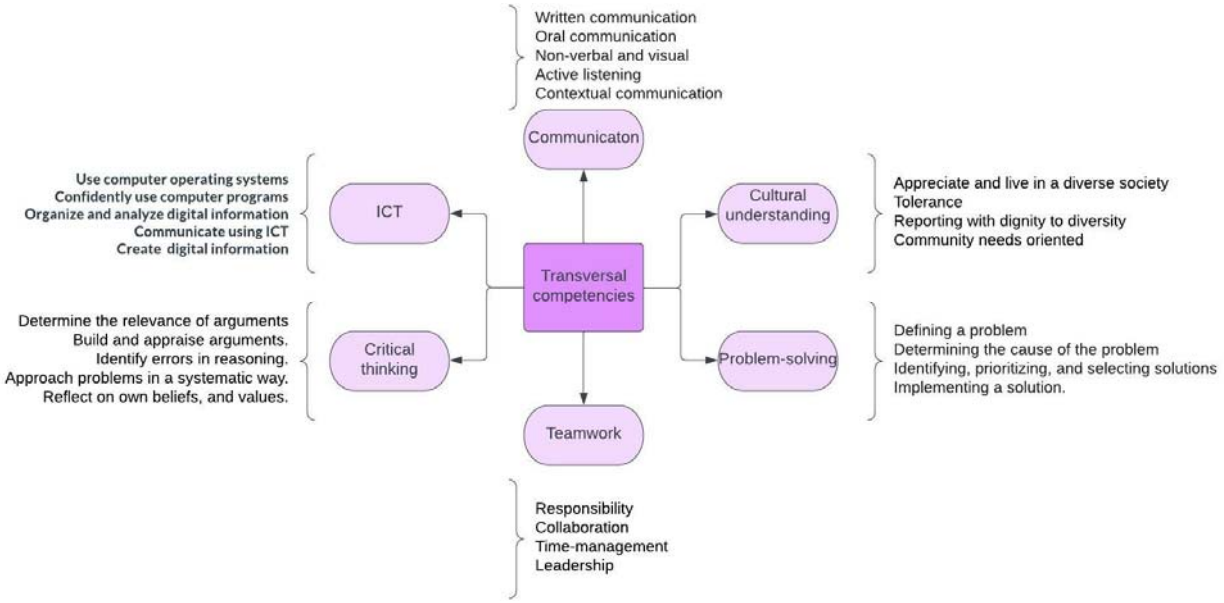


In Figure 12 our model of top 6 transversal competencies prioritized for HE and project-based virtual learning, with their corresponding transversal skills is presented.

II.5 TRANSVERSAL COMPETENCIES IMPORTANT FOR HE AND WORLD OF WORK

To understand the assessment process, firstly an understanding of the concepts which we evaluate is needed. The transversal competencies are mainly personal or interpersonal attributes and cannot be measured with traditional methods. Informal methods, such as observations, psychological tests, scales, peer-evaluation are recommended for transversal competencies assessment. In the following we will present briefly, the most important characteristics of the 6 selected transversal competences.

Figure 12. ***Transversal competencies model***



COMMUNICATION

Communication is the process by which we express ideas, the content of our thinking, our intentions, our needs. It is the process by which we relate and establish social contacts. In the context of learning, a social process, the more efficient the communication, the better the understanding and transmission of information. Most of human activities and work task involve interaction and collaboration. They are not possible without effective communication. Communication helps you to ask questions, to have a dialogue, to listen to what others have to say, to present your arguments and opinions, to speak in public, to read body language, to read, to write, to present yourself effectively to others. Communication is a transversal competence because it leads to efficiency and performance in all contexts, personal, educational, social, or professional. All types of communication - oral, written, active listening, understanding, non-verbal should be mastered to reach a good communication competence.

An important part of today's communication is digital. From the lowest grades to adult education, social media or the workplace, digital communication is ubiquitous.

To learn effectively, you need to know how to use electronic resources, to use educational platforms, e-mail, chats, social media, to know how to use educational software or common programs (Word, Excel, PowerPoint).

Most people are also part of virtual social media communities, where we need to know how to communicate effectively through the content of our posts or comments. Through our social media accounts and the virtual image, we create, we communicate how we are, our values, our concerns, our beliefs. Even employers sometimes check the candidate's social media accounts at the job interview to get to know him better.

In any profession you can no longer perform your duties if you do not know how to communicate digitally, especially through e-mail and discussion groups. Digital technology is extremely present in any sector of activity, and after the COVID pandemic many work teams collaborate virtually.

TEAMWORK

Learning in groups and teamwork are an increasingly present reality. In the personal resume, an important quality that employers are looking for is the transversal competence of teamwork. In education, the paradigm shifts from teacher-centred to student-centred has made learning more active and experiential. teachers to propose collaborative strategies that involve teamwork. This competence must be taught and learned as early as possible, so that it becomes second nature, deeply integrated into the work style of each of us.

Teamwork involves working with others in a group (and not individually) to achieve a common goal or perform a common task. Effective collaboration occurs when each member of the group feels comfortable expressing their ideas, and debating openly, without fear of being judged or excluded. To be competent in teamwork, you must be able to

collaborate, to be responsible, to assume roles, including leadership, to have a good management of work and time, to get involved, to communicate.

Current work teams are different from those before the pandemic: they are much more digitized, more diverse, spatially dispersed and dynamic. In order to be effective, the basic condition is that the members are competent in teamwork, collaboration and communication. In addition, several conditions must be met: compelling direction, strong structure, supportive context, and shared mind-set (Hass & Mortensten, 2016).

ICT

The concept of Information and communication technology (ICT) appeared in the 1980s and includes reference to all devices, networking elements, applications and systems that allow interaction in the digital world. ICT can contribute to increasing accessibility in education or work, to a quality and modern teaching or to a work environment adapted to the needs of the employee. ICT has become one of the most appreciated and developed transversal skills, necessary in education, work, or personal life. Accelerated digitization after COVID 19 has made any field, from learning at any level, work, social and cultural life, to shopping to take place virtually. More and more categories of the population (very young or old, different professions) needed to form and develop digital skills.

Developing ICT competences can go through three levels (Gil-Alegre et al., 2017):

Level 1: basic instrumental use of electronic devices, such as, computers, laptops, e-phones, tablets, iPads

Level 2: ability to access and manage information in the virtual world.

Level 3: advanced competence, which enables people to create and produce online information, using ICT skills as communication and expression tools.

In education, ICT has become an indispensable tool. Virtual or hybrid education cannot take place without students having knowledge of the use of computers, software or educational platforms. The unlimited educational resources that can be accessed by students are not missing from the curriculum of any discipline. Educational communication includes e-mail, chat, professional or social networks. Regardless of age, you cannot participate in formal education if you do not have ICT skills.

In any profession, among the transversal competencies required in any job is that of ICT. Advanced technology of any task, remote work, collaboration in virtual teams, communication in the organization include the ICT component.

CRITICAL THINKING

Critical thinking is an intellectual process by which information is understood, conceptualized, applied, analysed, and synthesized, or evaluated. Information can be acquired directly through observation, analysis, learning, or indirectly through reflection, reasoning, or communication. Critical thinking is also a cross-cutting skill primarily because it is ideally based on universal intellectual waves, such as clarity, accuracy, precision,

reasoning, or depth. Secondly, critical thinking is a process involved in various disciplines, professions, intellectual or personal contexts.

A person who thinks critically:

- Asks important questions about what he is learning or working on, formulates them in a relevant and clear way.
- Gathers and evaluates the level of relevance of the information and it tests them by applying correct criteria
- Is open to alternative solutions, new ways of thinking, or divergent ideas
- Communicate effectively with others to find solutions to complex problems

Critical thinking is a powerful competence to have both in learning and working. It can lead to new ideas, solution, allows you to overcome obstacles, makes you a creative and productive person. If you have critical thinking, you are more autonomous in carrying out tasks, a necessary and appreciated quality in both fields.

PROBLEM SOLVING

Problem solving is the activity of finding solutions to problems. Problem solving involves several stages: defining the problem, identifying, prioritizing and selecting solutions, testing them and getting the right result. Any field of activity contains problem solving, from the theoretical to the practical or every day. A good problem-solving ability ensures not only good school performance, but also success in professional tasks or personal dilemmas.

CULTURAL UNDERSTANDING

Cultural understanding is the ability to accept without judging the differences between people, to have a tolerant mind-set and to accept diversity. Understanding diversity means accepting that people differ in many attributes, cultural, racial, ethnic, but that they do not create a hierarchy of values. In learning or in work groups, the quality of understanding diversity allows you to collaborate with others without prejudice, to accept everyone's contribution, to trust them, to be a true teammate. Understanding diversity entails capitalizing on differences and even seeking a diverse cultural environment.

II.6 DIFFICULTIES IN ASSESSING THE TRANSVERSAL COMPETENCIES

The educational evaluation aims to measure the learning outcomes of students, but also the efficiency of the teaching process, being responsible for the feedback to ensure the quality of the educational act. The educational evaluation aims to assess the learning outcomes of students, but also the efficiency of the teaching process, being responsible for the feedback that ensure the quality of the educational act. The evaluation provides feedback to students, parents, teachers, school, decision makers, on the effectiveness of the educational process. Through evaluation we can determine the set of competencies needed

to be developed, the effectiveness of the teaching strategies, as well as their potential for development or change. The assessment should be carried out as a coordinated system that gathers evidence on the relevance, development, and potential of the various competencies. Evaluation is not an isolated function of the educational system or the work organization. We evaluate the level of fulfilment of the objectives, depending on the proposed curriculum, teaching strategies and other components of the educational system. The results of the evaluation are important for further learning: improving the curriculum, personalized or differentiated teaching, improving educational programs or policies.

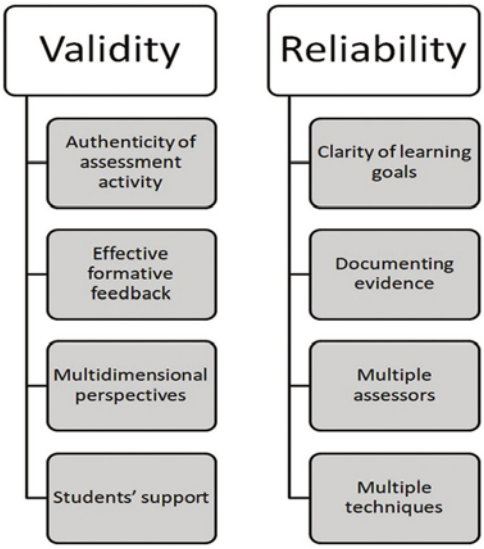
One law of evaluation is that we always measure what we teach. And because education is an extremely complex system, in order to be able to evaluate transversal competences, the whole educational process must be designed so as to propose as learning outcomes the development of transversal competences. First of all, the decision-makers must decide to increase the emphasis on the development of transversal competences, to propose educational policies, curricula, curricula to develop transversal competences and only then evaluate them.

Hill and Barber (2014) described the following aspects about the characteristics of assessment for the future:

- Assessment should cover a wide range of students' skills.
- Assessment should provide a lot of useful information about learning outcomes.
- The assessment should accommodate the full range of valued outcomes.
- Assessment should be ethical and used to motivate students interested in improvement and to stop further fraud.
- Assessment should support students and teachers to use assessment results to individualize learning and make it more relevant to the student.

The online assessment should be more fit to serve these purposes, because is more flexible, personalized, offer accessible feedback (Barbosa & Garcia-Penalvo, 2005). In figure 12 the validity and reliability of online assessment are presented.

Figure 13. ***Main characteristics of formative online assessment (Sayiad et al., 2020 p.153)***



For the online assessment to be a formative efficient tool it should be (Barbosa & Garcia-Penalvo, 2005):

- Designed with a variety of resources (images, video, graphs) to improve students` understanding of the task
- Embedded in a complex assessment, with different types of assessment methods.
- Based on students` characteristics and the content.
- Containing the points for each item or the assessment criteria
- State clear timeframe and scoring scale.

Kendle and Northcote (2003, apud. Barbosa & Garcia-Penalvo, 2005) proposed the following standards for the design of an online assessment:

- Variety: should include both quantitative and qualitative methods/items.
- Authenticity: including creative tasks, related to the world-of work problem solving situations.
- Collaboration: permit teamwork in completing the tasks, either with colleagues or with employers, using online communication tools.
- Feedback: enable immediate and relevant feedback, from teachers or peers.
- Online resources: in designing the task electronic resources should be included.
- Student responsibility: providing options and opportunities for accountability within assessment task.

II. 7. METHODS OF ONLINE ASSESSMENT OF TRANSVERSAL COMPETENCIES

Educational assessment is a complex process of gathering information, analysing and making decisions about learning outcomes and performance levels (Kechagias, 2011). Airasian and Russel (2007, apud. Kechagias, 2011) described six purposes of evaluation:

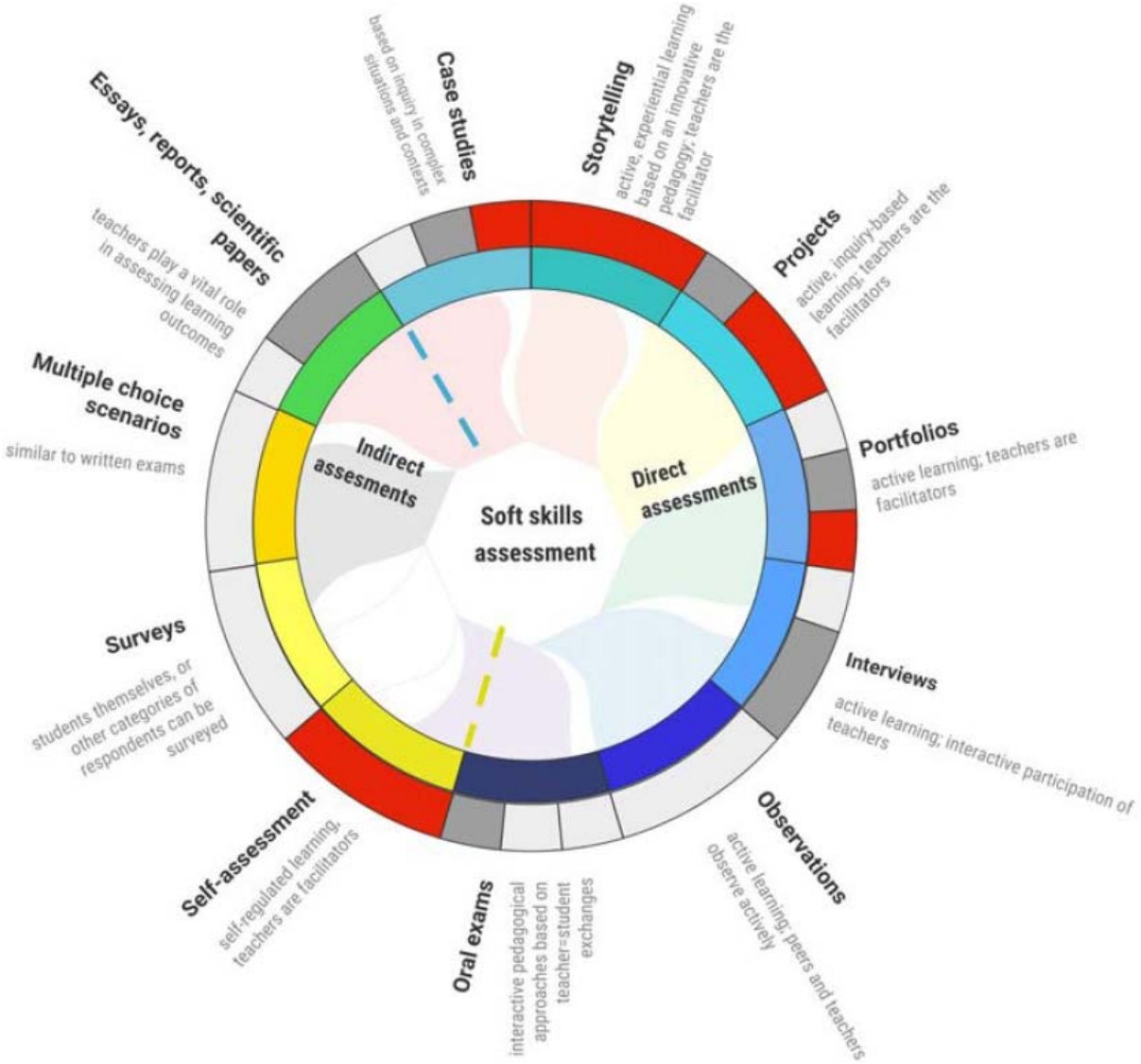
- Identifying learning difficulties
- Assessment of academic results and performance
- Plan for students` placement
- Planning instruction
- Maintain class symmetry and stability.

The methods used in the assessment of transversal competencies should be more direct, formative, and participatory. Traditionally, assessment has followed the extent to which certain normative standards have been met and basic knowledge and skills have been acquired. Because the educational focus in HE has changed, currently taking more into account the soft skills, the characteristics and methods of assessment must also change. Now the assessment must address more complex or specialized skills, but also transversal skills, demonstrated in various learning environments and directly related to the needs of the labour market.

Binkley et al. (2011) proposed some principles of soft skills standards and assessment. The most interesting are:

- To propose in the curriculum as fundamental objective, the development of transversal competences (or soft skills). Before the learning assessments the teacher should explicitly communicate what is important and will be considered in the assessment.
- To combine specific objectives with those aimed at transversal competencies. Transversal skills are in symbiosis with specific ones, helping to integrate, synthesize and creatively apply knowledge in unique situations. Consequently, soft skills assessments should systematically require students to think critically about specific knowledge, solve applied problems in the field of study, communicate results, or work in teams.
- To enhance learning results. The assessment task itself should have a formative value, including development of transversal competencies, to put the student in a position to critically analyse, evaluate a content, formulate recommendations, communicate the results publicly, or collaborate with colleagues.
- To be fair and non-discriminatory. All the students should be assess using the same criteria and have equal chances to score the maximum grade. All the students should have the opportunity to demonstrate their knowledge in the best way possible for them.
- Valid for purpose. The assessment should measure the intended objectives. For transversal competencies to deliver valid measurements is more difficult than for standardized tests. Test results should be both educationally sensitive and generalizable.
- Generate useful information for future learning. The information should not only be quantitative, how much of the goal has been achieved, but also qualitative, to indicate how the student performs different types of tasks or how he uses independently the information in various contexts.
- Provide feed-back for all purposes. Stakeholders, teachers, or the students, will utilize the assessment results, and they need to have reliable evaluation reports available.
- Development of skills for both teachers and students. Abstained feedback from the assessment process can provide valuable information about the entire teaching and learning process to both students, teachers and decision makers. The evaluation process thus becomes formative, developing competencies itself.
- Be part of a comprehensive assessment system designed to improve learning at all levels.

Figure 14. ***Clusters of soft skills assessment methodologies (Manasia et al., 2021, p.21)***

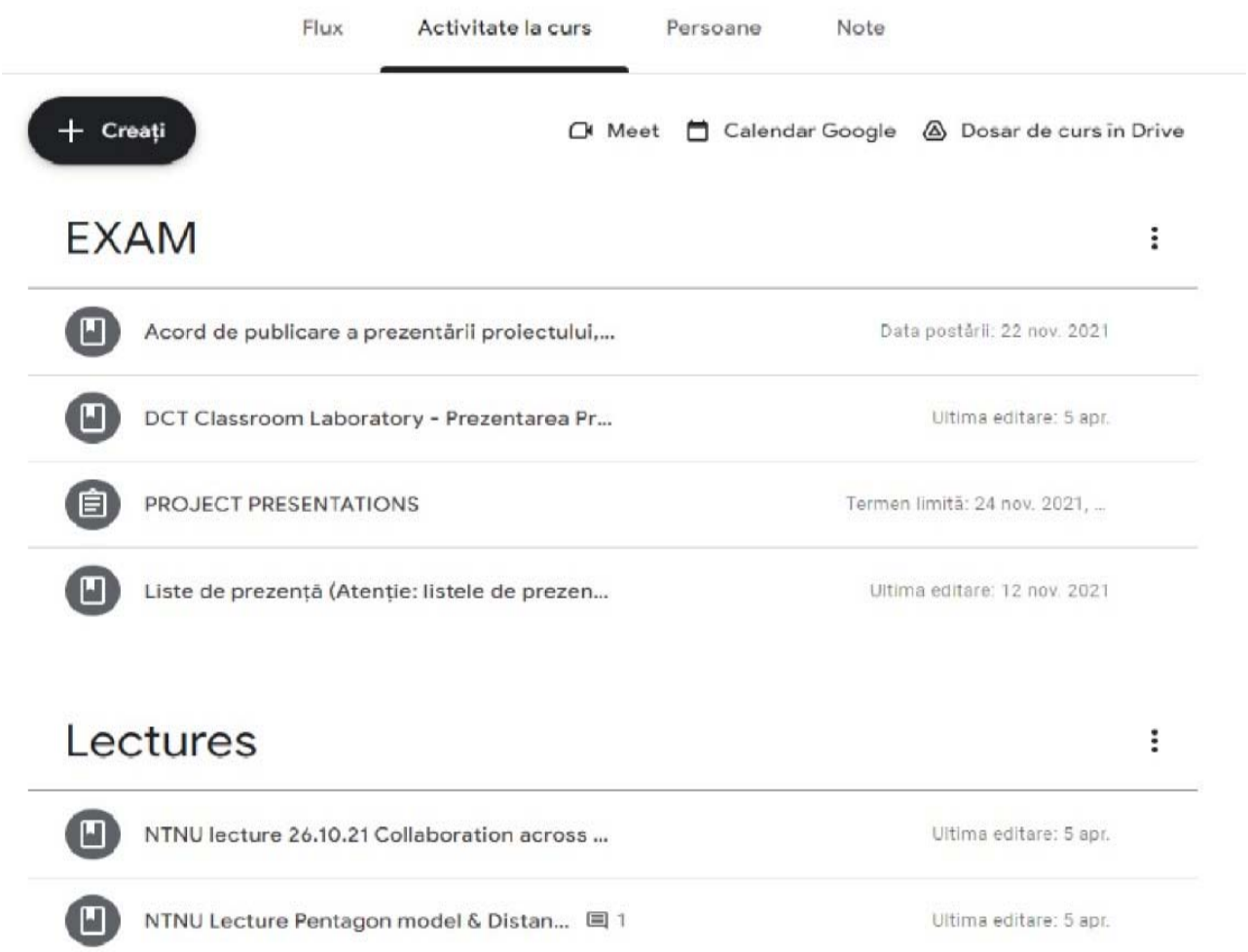


Direct assessment refers to situations of direct didactic interaction, which involves social interaction, and active participation. The teacher plays the role of facilitator, who through the proposed assessment tasks puts the student in a position to demonstrate the level of competence achieved. In the online environment, direct assessment involves synchronous interaction between teacher and students. The indirect assessment refers to traditional methods, in which the access is based on specific competencies and the evaluation process is much more directive with a much more predominant role of the teacher. In online evaluation it can be done both by synchronous and asynchronous methods because the social interaction is minimal, and the feedback is not in real time.

LEARNING MANAGEMENT SYSTEMS (LMS)

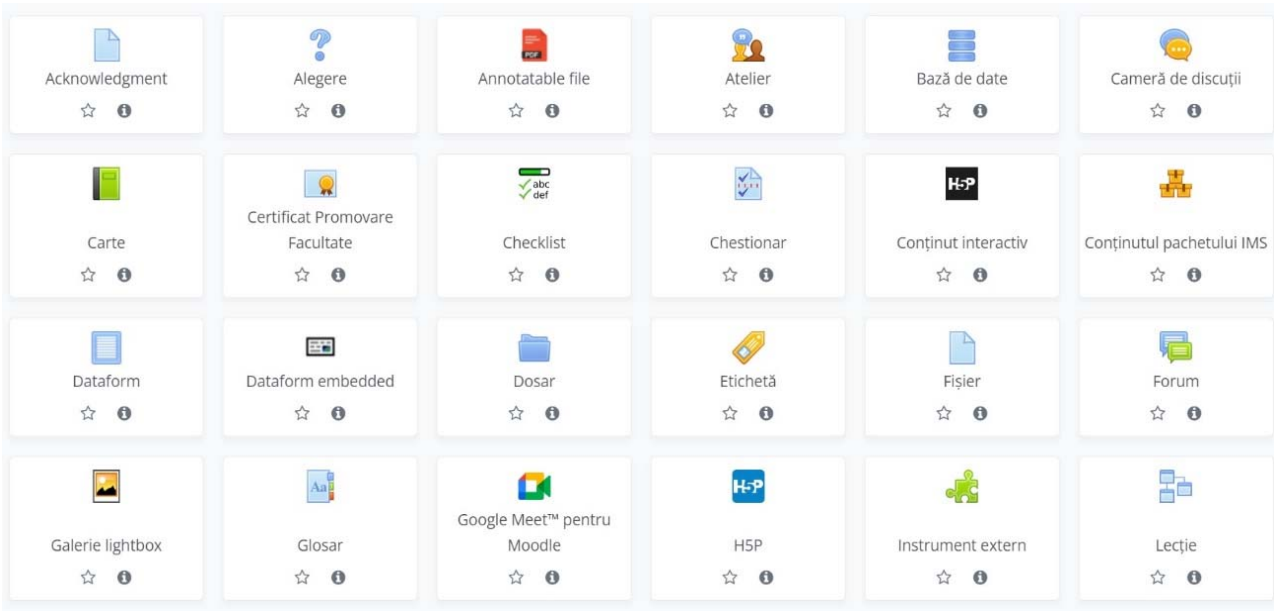
Google classroom is a LMS that allows teachers and students to interact synchronously or asynchronously, teaching and learning environment where virtual classrooms take place. It allows virtual meetings, posting materials, assign tasks, assess student progress, participation in discussion forums, give feed-back, all in a differentiated or individualized manner.

Figure 15. ***Google Classroom LMS***



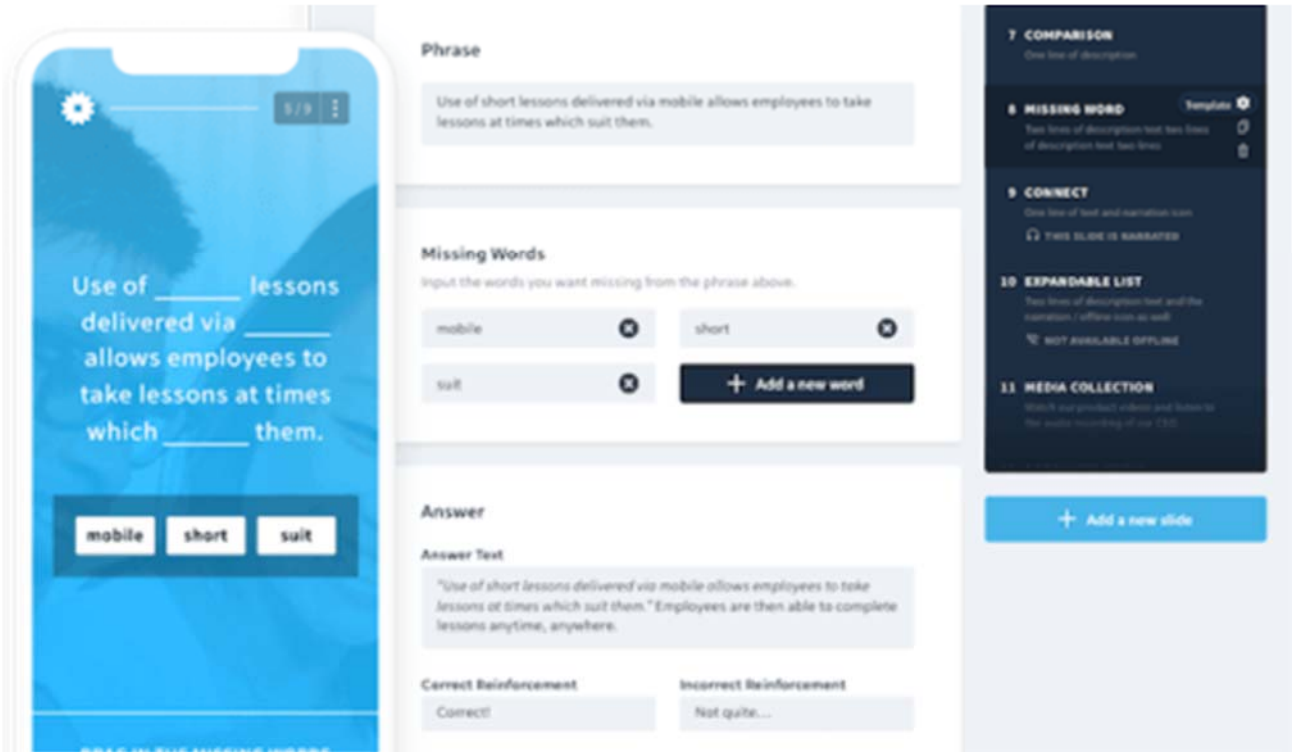
Moodle system. Moodle-type databases provide data and statistics about student assessments and performance, such as test scores, time spent on assignment, submission date, viewing materials posted by the teacher (Ćukušić et al., 2014).

Figure 16. ***Moodle Platform***



Learning Management system EdApp (including a free section with a lot of features, including build in gamification, leader boards, social and peer learning, virtual classrooms, digital feed-back, completion certificates). Via EdApp collaborative learning can be implemented, real-time discussions carried out, like and comment to show appreciation for those who have contributed significantly to the lessons, discussion forums initiated.

Figure 17. ***EdApp LMS***



OPEN EDUCATIONAL RESOURCES (OER) REPOSITORIES

OER repositories are online communities design for sharing educational resources and collaboration between teachers and students all around the world. In these repositories not only materials for specific courses and disciplines can be found, but also a lot of assessment materials, including transversal competences assessment. Some examples of OER repositories for HE are:

The Mason OER Metafinder (MOM) - Real-time federated search for OER content https://oer.deepwebaccess.com/oer/desktop/en/search.html

MERLOT (Multimedia Educational Resources for Learning and Online Teaching) https://www.merlot.org/merlot/index.htm

OASIS (Openly Available Sources Integrated Search) https://oasis.geneseo.edu/index.php

OER Commons https://www.oercommons.org/oer

Figure 18. *MERLOT*

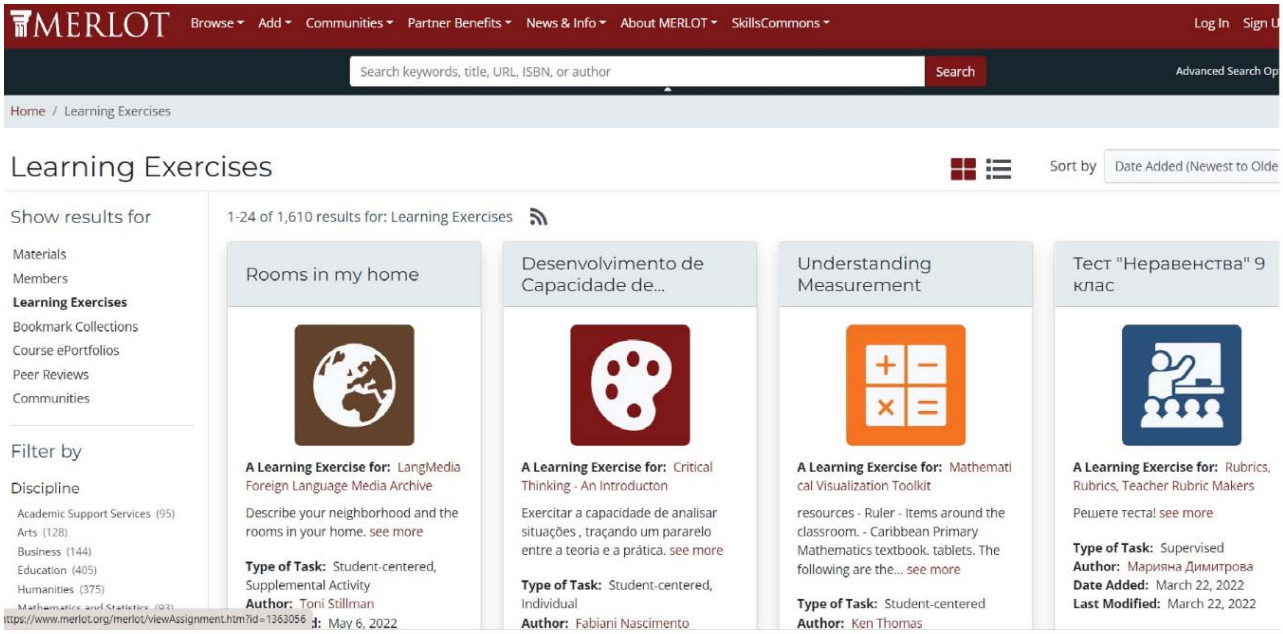


Figure 19. *OASIS*

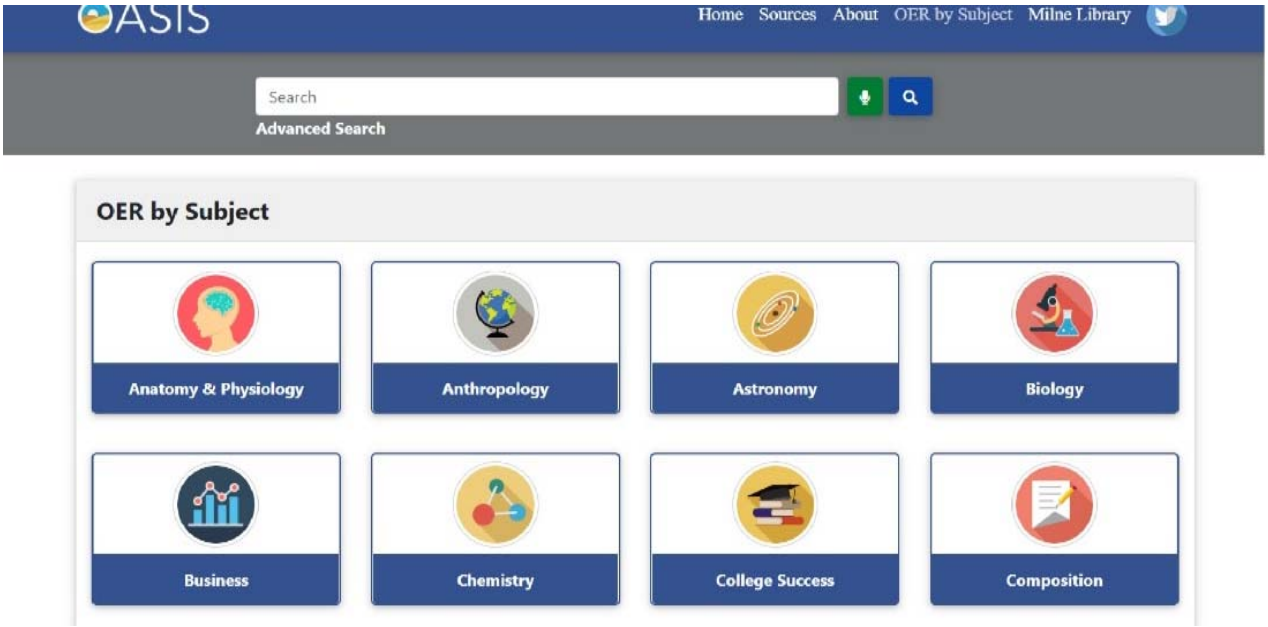
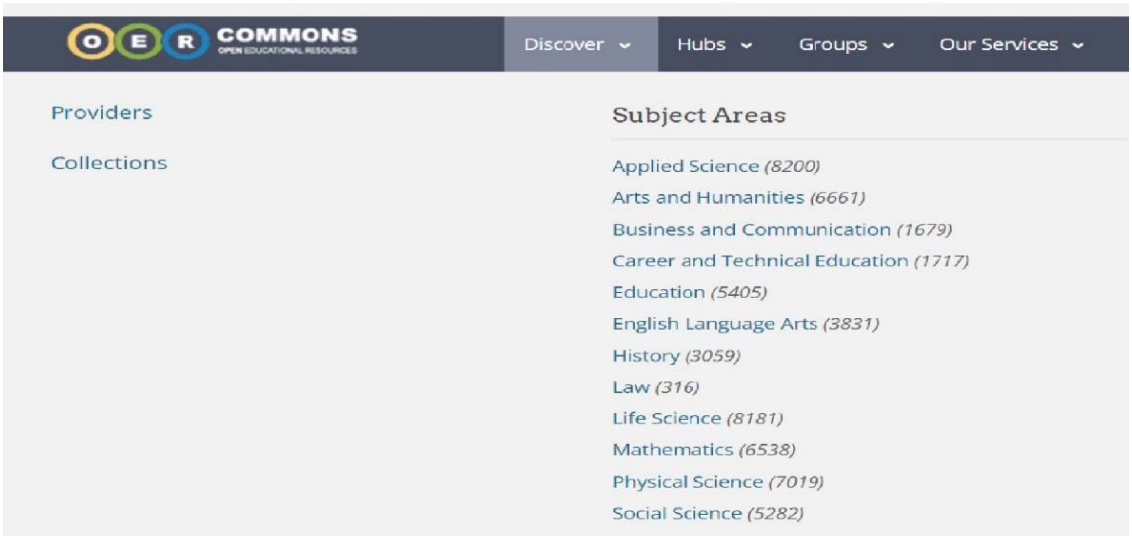


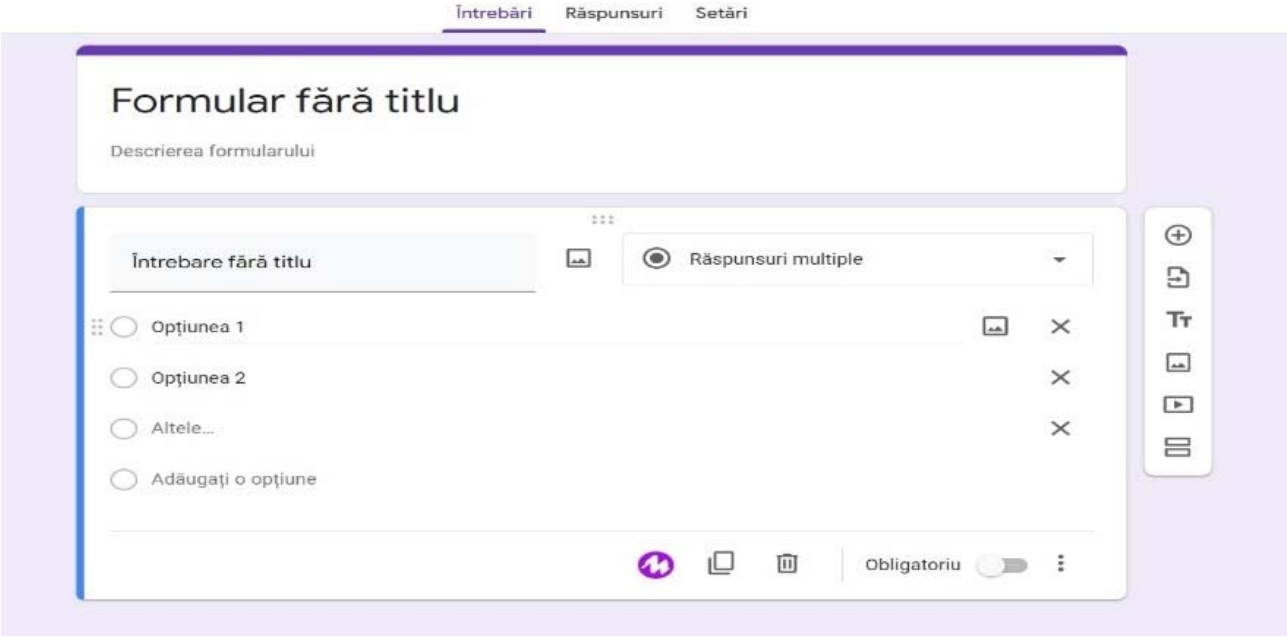
Figure 20. *OER Commons*



ONLINE MULTIPLE-CHOICE (MC) QUESTIONS AND SURVEYS is an indirect method that allow teacher to assess the learning outcomes, both in terms of specific and transversal competencies. There are many surveys, tests, questionnaires and quizzes to assess the transversal competences that can be taken over and adapted to the teachers` needs. Also, the teachers can create their own surveys, specially design in relation with the course objectives and content.

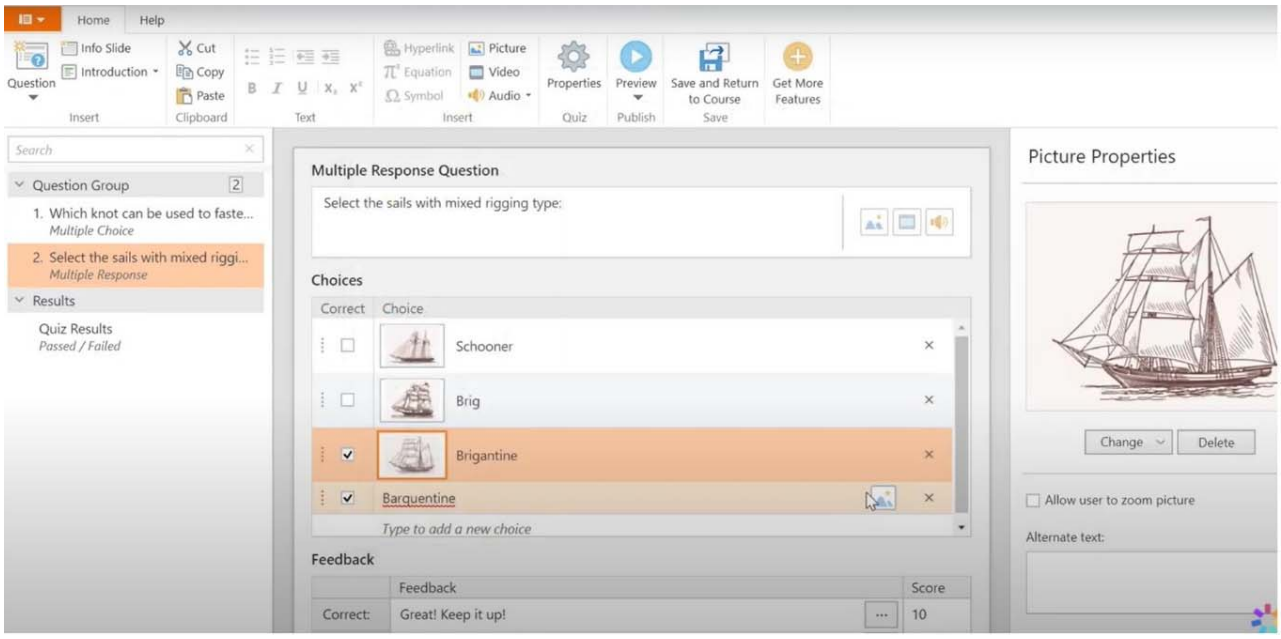
Google forms, from Google suite is one of the most used free online tools for quizzes development. It allows teachers to create and share quizzes and surveys and analyse the answers on the spot**.**

Figure 21. ***Example of G forms quiz maker***



ISpring Free QuizMaker is an online quiz maker tool (free for minimal features) that allows teachers to create innovative and fun quizzes, engaging and formative for students.

Figure 22. ***Example of ISpring quiz maker***

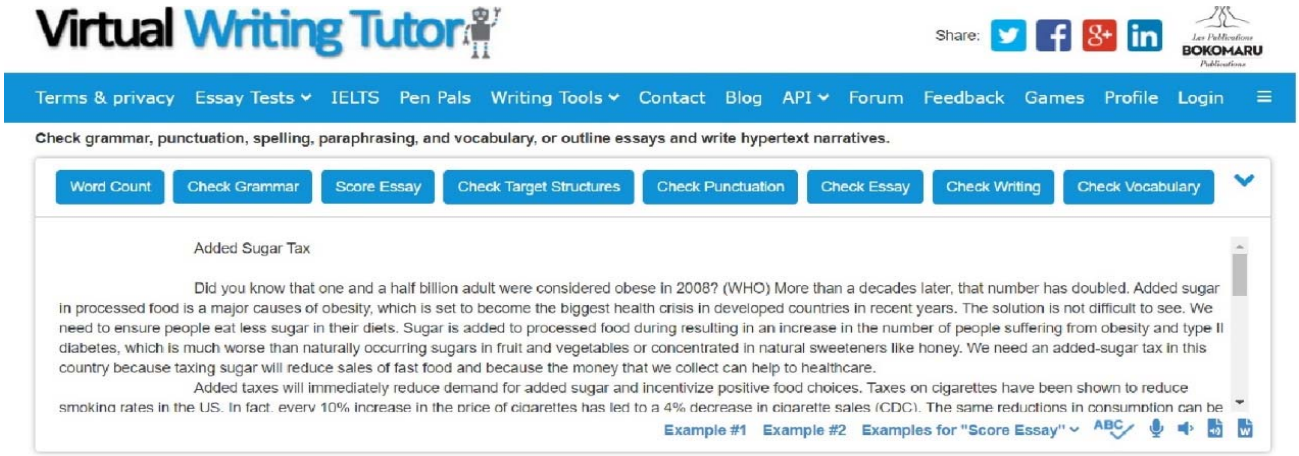


DIRECT ASSESSMENT

Essays and scientific papers assess mainly the specific competencies but can be used also as methods for transversal competency assessment. The essays are analytic or interpretative writings, so the students should display their communication writing and ICT skills, analytic thinking, problem solving and creativity. As teachers we should include and communicate in our assessment criteria these transversal competencies. Very important is our feedback that provide formative inside on individual learning needs.

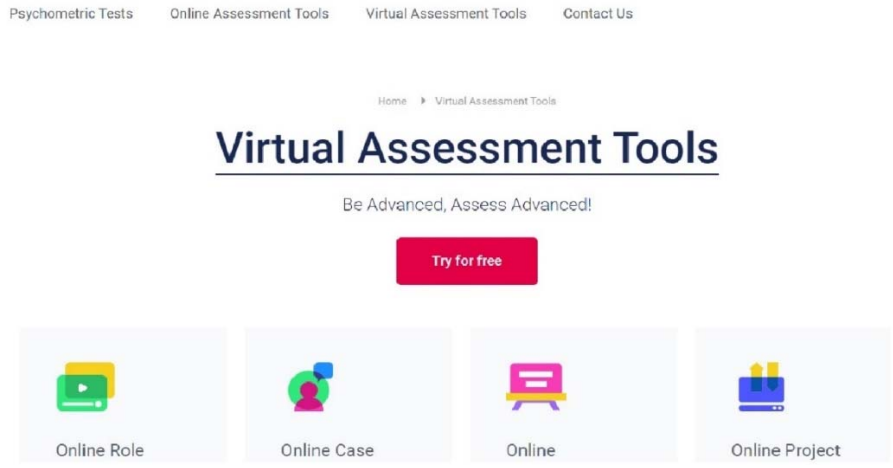
Virtual writing tutor https://virtualwritingtutor.com/ is an online tool that allows students and teachers to check grammar, score essays, check target structures, check writing, vocabulary or an entire essay and provides good feed-back in each task.

Figure 22. ***Virtual Writing Tutor***



Case studies are in-depth analysis of a real-life phenomenon, of a person or reality, aiming to characterize special phenomena or to find solutions to unique problems. Carrying out a case study involves transversal skills such as communication, critical analysis, problem solving, and depending on the analysis performed cultural understanding. Case studies can be implemented and presented both individually or in students' teams, in which case teamwork skills can be assessed and developed. Case studies can ne researched and presented online or even using virtual reality. There are online applications allowing teachers to virtually asses students` case studies. An example is Talentate, https://www.talentate.com/virtual-assessment-tools that offers virtual assessment tools.

Figure 24. ***Talentated***

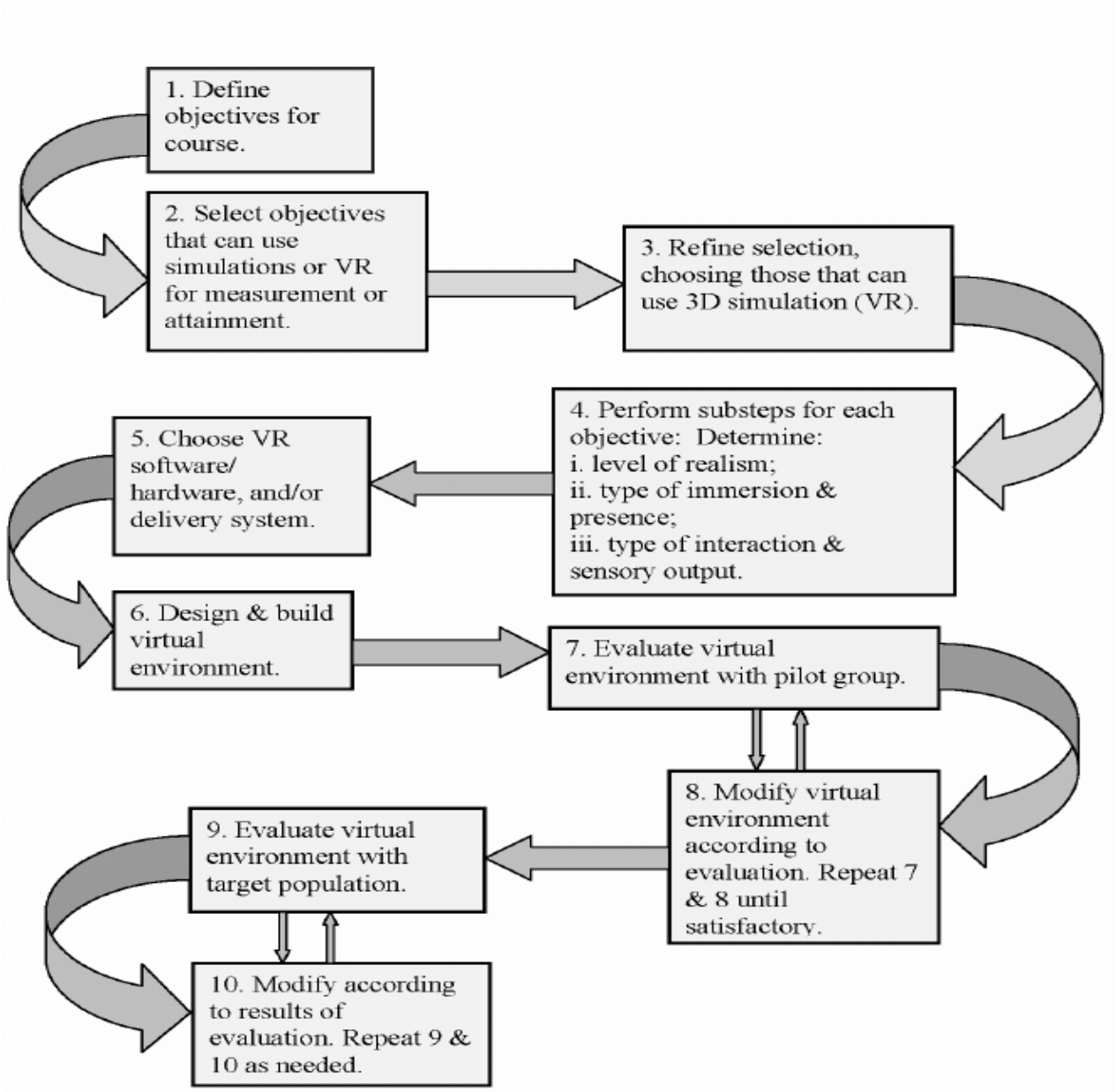


The 3D virtual environments (AR, VR, AI) can be used to model authentic learning environments in which competences might be applied and evaluated on its context. VR is already used to assess skills in the workplace. There are platforms developed for VR training and assessment in the workplace. Using VR, they propose also soft skills development and assessment, through Immersive learning that allows participants to experience real-like like situations and go through real emotions and reactions. VR and AR could be used in HE, in collaboration with software developers who can create the virtual content adapted for the course objectives. In Figure 24, a model for when to choose VR in education is presented (Pantelidis, 2009).

Commenting and discussing posts via forums, chats, discussion boards, or chats. the teacher can formulate a problem, launch a debate, propose an idea and students must contribute with opinions, opinions or solutions. This method allows the evaluation of both specific competencies, if the proposed topic is a specialized one, but also of the transversal ones. Through contributions with posts, students could demonstrate their level of written communication, critical thinking, problem solving, ICT, negotiation, or argumentation. The method uses a modern manner of student engagement because it appeals to a usual way of communication and to applications / sites that students prefer. The discussion forums can take place on the LMS used in teaching, all include forum or chat options: Google Classroom, Moodle, EdApp. There is a possibility for the teacher to create written or video blogs in which students can contribute, or to post on open discussion groups, the best known of the course, so that students can discuss not only with colleagues but also with professionals with different opinions.

Concept and mind maps is a teaching but also an assessment method. The students are asked individually or in collaboration to represent a concept in a chart, table, flowchart, graphic organizer, and so on. In terms of transversal competences using concept maps we can determine students` reasoning, analytic and synthetic thinking, problem solving, ICT. There are several sites specialized in concept mapping, such as eDraw (https://www.edrawsoft.com/) MindMup (https://www.mindmup.com/) Visme (https://www.visme.co/?ref=viktoriia21) Miro (https://miro.com/) MindOmo (https://www.mindomo.com/) MindMeister (https://www.mindmeister.com/)

Figure 25. ***Model for determining when to use VR in education (Pantelidis, 2009, p. 68)***



Debating can be also used for transversal competences assessment. In debate participants should demonstrate good oral communication, argumentation, critical thinking, problem solving, creativity, persuasion. There are some apps design for debating, that could be used in assessment also: Kialo https://www.kialo-edu.com/ or Debatoria app.

Figure 26. Kialo

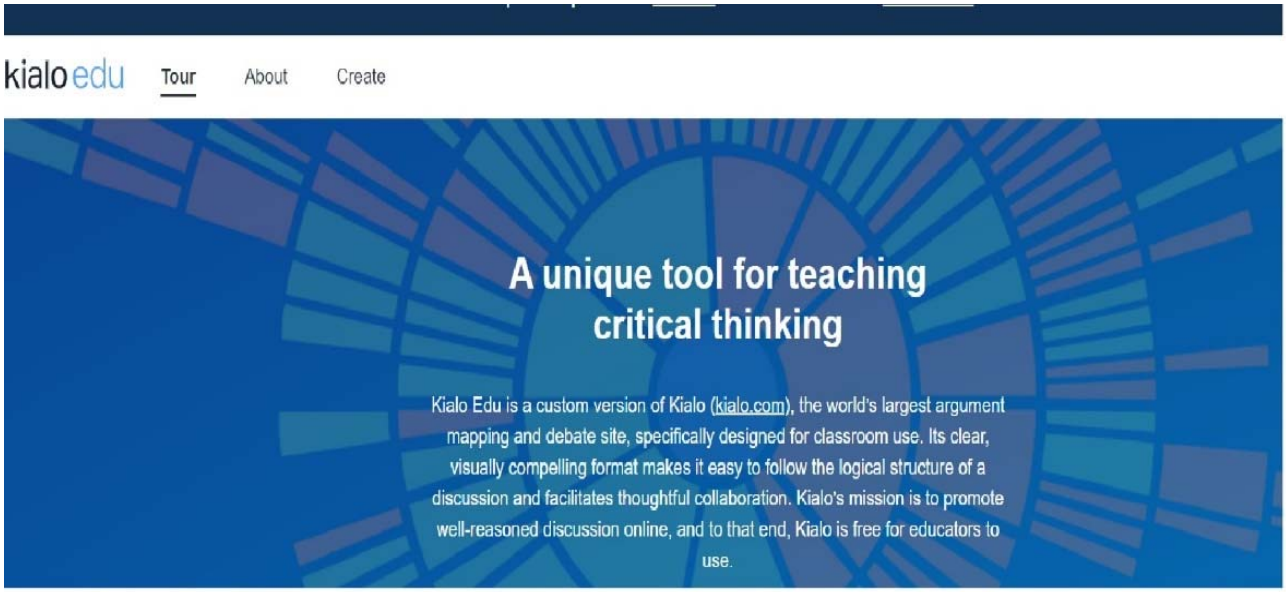


Figure 27. ***Debatoria***

e-Portofolios are a collection of student work that monitor and demonstrate the student's learning progress. Portfolios may include essays, essays, projects, blogs, multimedia recordings, interviews, presentations, graphic content. Through the e-portfolios we can measure the transversal competences of work management, ICT, communication, problem-solving, critical thinking, collaboration (if there are collaborative). Some apps for e-portfolios are Portoliobox https://www.portfoliobox.net/ or FolioSpaces https://www.foliospaces.org/

Figure 28. ***Portfoliobox***

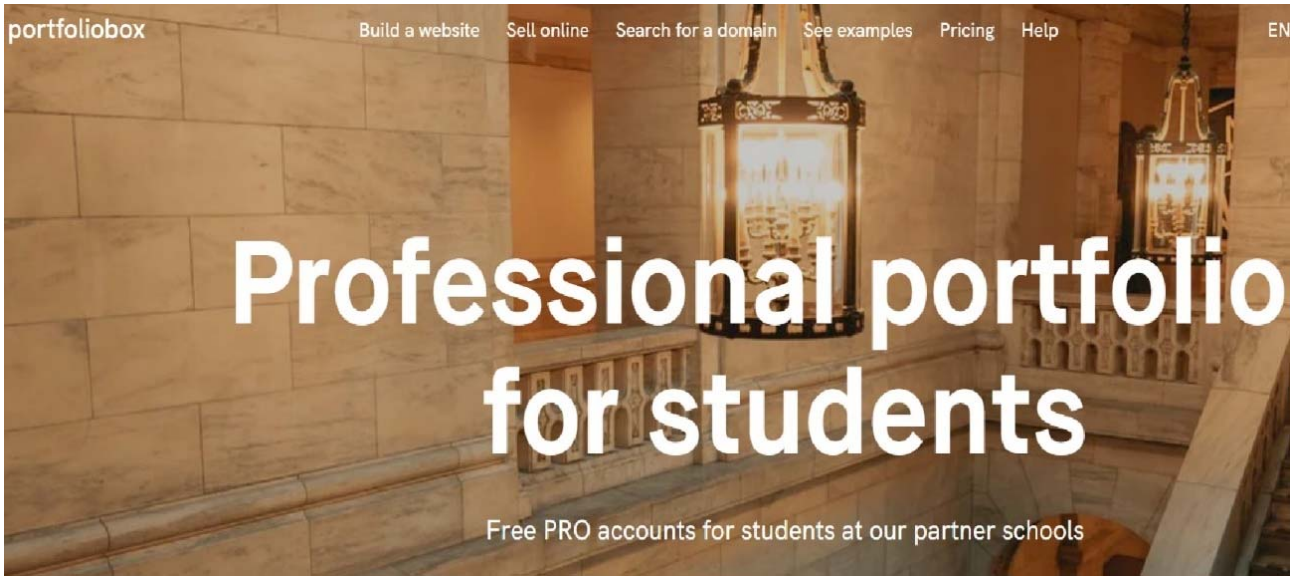
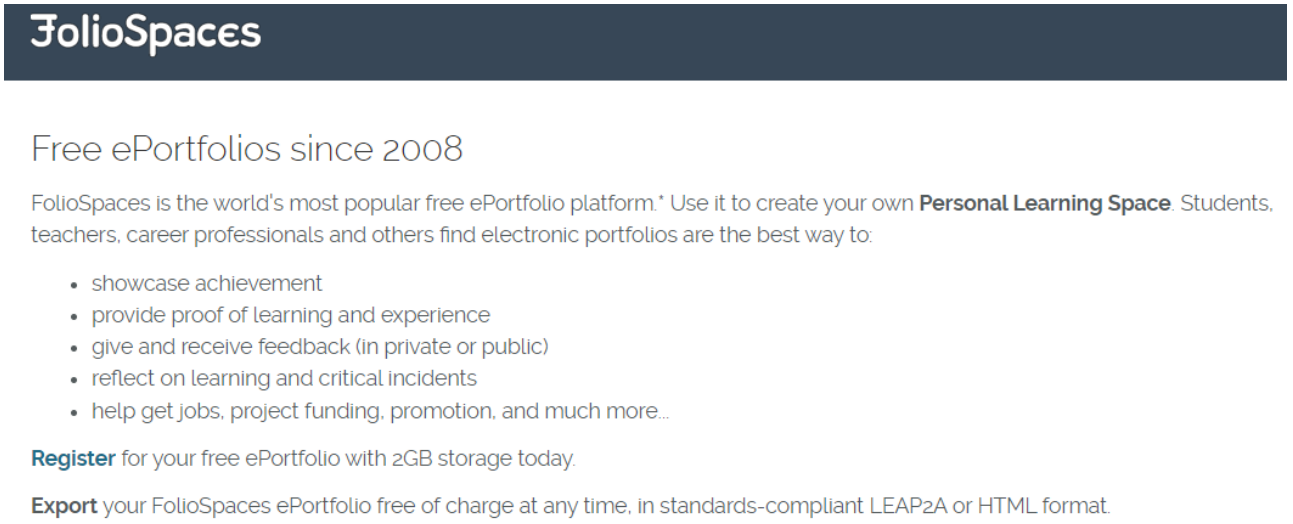
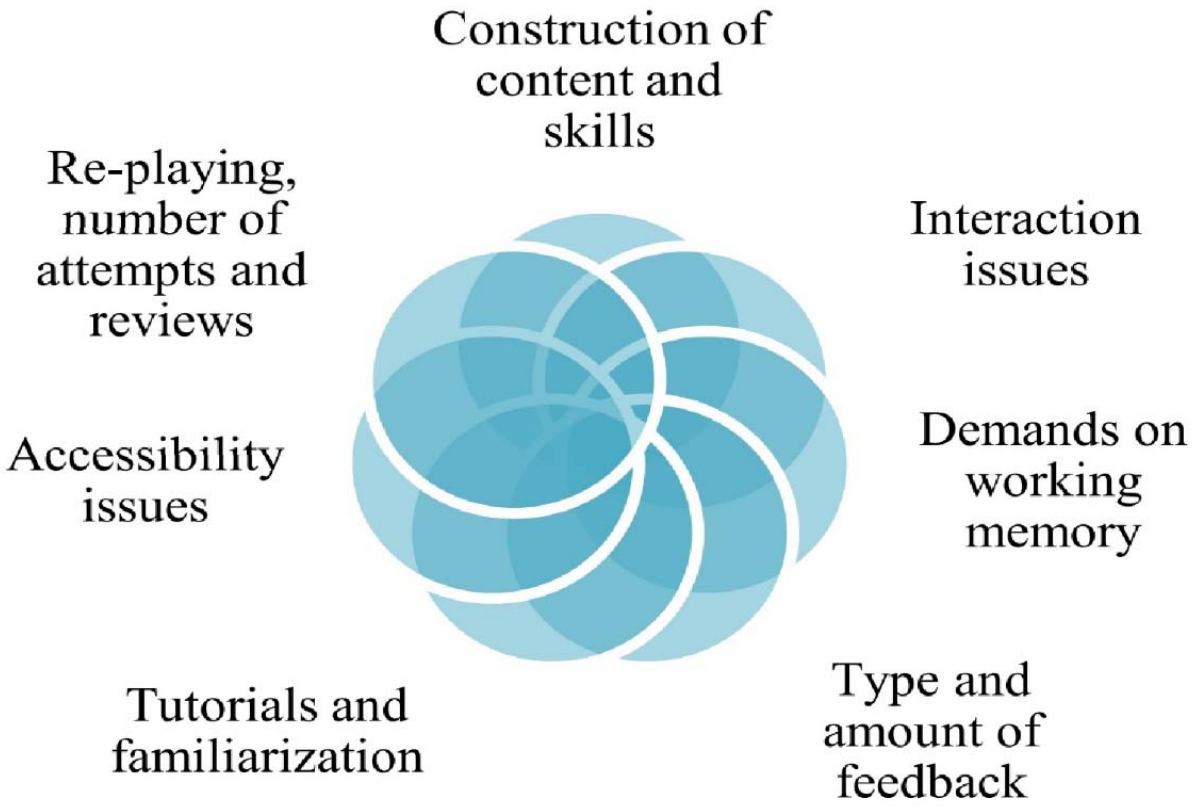


Figure 29. ***Foliospaces***



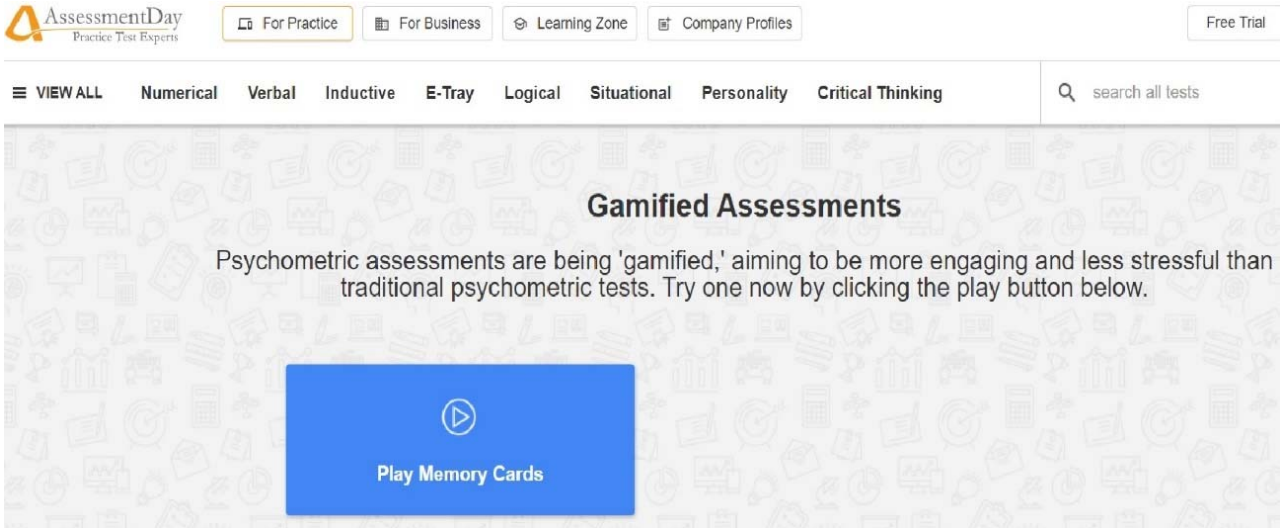
Gamification is a method for teaching and assessing students learning using educational games. It has a powerful involvement effect. The gamification also organizes data about student learning, providing more efficient, accurate and timely information for teachers, parents and students (Menezes & De Bortolli, 2016).

Figure 30. *Potential of gamification for evaluation. (Zapata-Rivera & Bauer, 2012, apud. Menezes & De Bortolli, 2016)*



There are several apps for assessment through gamification, such as:
Socrative https://www.socrative.com/
Assessment Day https://www.assessmentday.com/gamified-assessments.htm
SP Library https://sp-sg.libguides.com/c.php?g=938123&p=6804014

Figure 31. *Assessment Day*



Collaborative projects are an important teaching and formative assessment method. Through collaborative projects students develop specialized knowledge, but also transversal competences such as teamwork, collaboration, communication, leadership, creativity, and so on. The projects can be carried out virtually, using VR, AR, learning management systems or social communication systems. The students can decide if they want to use Google Classroom, Jamboard https://jamboard.google.com/ Weje https://weje.io/ Miro https://miro.com/ Trello https://trello.com/ Gmeet, WhatsApp, Skype and so on.

THE SELF-ASSESSMENT methods, although they are indirect and do not involve real-time interaction between the participants, favour the development of transversal skills, therefore, depending on the targeted skills, they can be considered formative. The transversal skills that can be developed through self-assessment are learning management, cognitive strategies, metacognition, time-management and self-reflection. An important condition for becoming an autonomous learner is to be able to monitor your progress, and self-assessment methods develop this ability.

Technology can support self-assessment by increasing the degree of anonymity, objectivity, by providing digital feedback, by developing students' ability to adjust their performance, and generally increasing the effectiveness of assessment (Seifert and Feliks). Recommendations for a formative self-assessment (Manasia et al., 2021 p.28):

- Define the expectations and criteria of assessment
- Teach students what are expected from them
- Offer feed-back for the self-assessment
- Offer enough time to complete the task
- Do not turn self-assessment into self-evaluation by counting it toward a grade.

Students can complete online tests, quizzes, write reflective journals or blogs. There are some specialized sites for reflective learning, such as:

Reflective learning https://reflectivelearning.co/

Reflection4Learning https://sites.google.com/site/reflection4learning/Home

Reflection Toolkit https://www.ed.ac.uk/reflection

THE PEER-REVIEW method uses peers to assess the quality of colleagues` work and provide feed-back based on teachers` benchmarks. The method improves students' understanding of course materials as well as improve their metacognitive skills. Some benefits of peer-review are:

- builds student investment in learning and helps students understand the relationship between their efforts and their coursework.
- gives students opportunities to learn from one another and clarify the assessment goals.
- allows students to clarify their own ideas.
- provides professional experience for students.

Some sites that provides a virtual space for peer-feed-back are peerScholar https://www.peerscholar.com/ or comPAIR https://ubc.github.io/compair/

CONCLUSIONS

- The transversal competences are the link between the specialized competences, which they enhance, the high competitiveness on the labour market and the personal development.
- The HEIs should include in their mission the development of transversal competencies for their graduates.
- The HEIs should make available for teachers' curricular design training programs for the development and assessment of transversal competencies.
- Online education offers multiple opportunities both for the development and for the evaluation of transversal competencies.
- Digital learning tools should be taught to both teachers and students for their effective use.

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Chapter III. THE IMPACT OF BRINGING REAL-LIFE CASES IN VIRTUAL CLASSROOMS

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ABSTRACT: The dynamics of the labor market and the technological progress of the last years have determined the employers to look for well-trained employees, both theoretical and practical, in order to face the demands and challenges of the job. Higher education institutions have been put in a position to train future specialists, ensuring not only a consistent and updated background of theoretical knowledge, but also the necessary practical skills for future professionals, an approach that has meant the adoption of a curriculum design (teaching - learning - assessment) focused on authenticity. Authentic learning means experiential learning, focused on the needs of students, in which they develop knowledge and skills on real-life problem situations that they are put in a position to solve. This learning process requires the formation and development of transversal skills (communication, teamwork, critical thinking, problem solving, ICT). Another characteristic of authenticity is reflexivity, students being encouraged to reflect on their own learning and, through feedback, on the learning and progress of colleagues. In an authentic learning design the teacher is a facilitator of learning, which stimulates students' autonomy and motivation for learning. This chapter analyses the characteristics of authentic learning, as well as the impact that authentic learning has on the professional training of students.

III.1. FROM CLASSICAL LEARNING TO AUTHENTIC LEARNING

According to Friesen & Lock (2010), we are witnessing a transition in education, from classical models of teaching and learning to modern ones, adapted to the necessities and characteristics of today's people, referring to how they learn, what skills and knowledge they are supposed to acquire, the technological progress, and the curriculum and pedagogical shift.

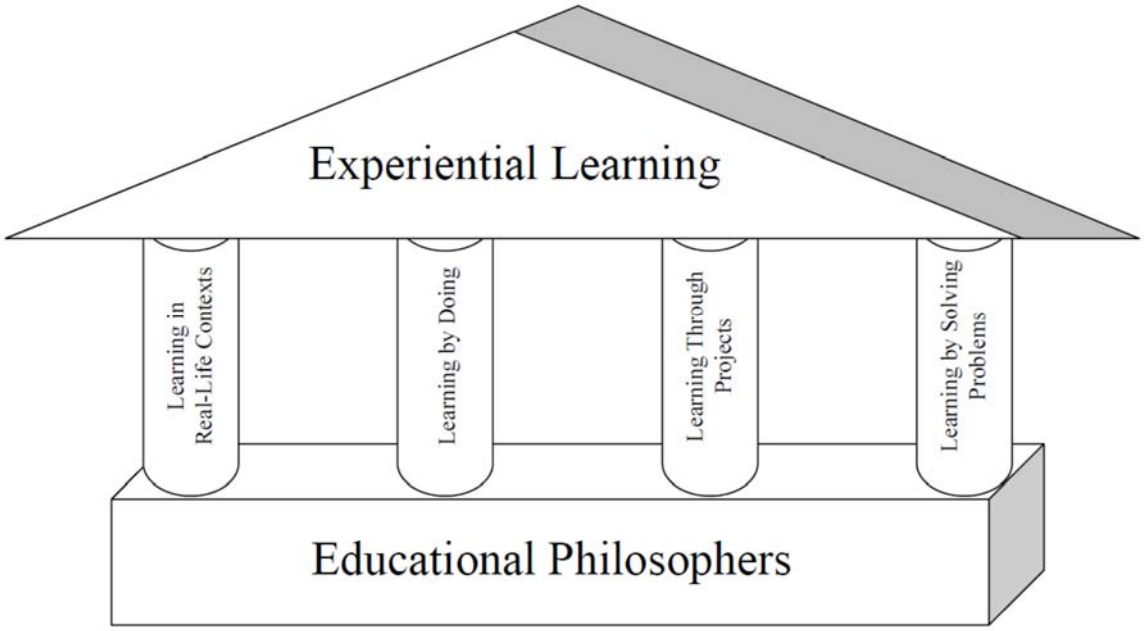
Nowadays, teaching and learning are based on the premise that students show interest in learning, for the contents they are taught, more attracted to relevant topics, with applicability in real life, being motivated to train their competencies and skills and to accumulate knowledge that will ensure them a better preparation to deal with various situations (Iucu & Marin, 2014, p. 410). Learning for the future means learning in an authentic and continuous way (Vu & Dall'Alba, 2014, p. 787). Paddison & Mortimer (2016, p. 332) argue the need to shift from "understanding", "wisdom" and "critique", to "skills" and "competencies", from "knowing" to "doing" and "being".

Table 9. ***Comparison between classical learning and authentic learning (Herrington et al., 2004, p. 9)***

Real-life	In-school
1. Involves ill formulated problems and ill structured conditions.	1. Involves 'textbook' examples and well structured conditions.
2. Problems are embedded in a specific and meaningful context.	2. Problems are largely abstract and decontextualized.
3. Problems have depth, complexity and duration.	3. Problems lack depth, complexity, and duration.
4. Involves cooperative relations and shared consequences.	4. Involves competitive relations and individual assessment.
5. Problems are perceived as real and worth solving.	5. Problems typically seem artificial with low relevance for students.

Experiential learning (*"learning by doing"*) is much more effective than classical learning, based on listening and observation (Lombardi, 2007, p. 2).

Figure 32. ***Experiential learning (Knobloch, 2003, p. 27)***



One of the ways in which this experiential learning can be implemented in the classroom is through authentic learning activities and tasks, which expose students to everyday reality (Wornyo et al., 2018, p. 56).

Nicaise et al. (2020, pp. 79-80) bring together a series of critiques of classical learning in the literature since the last century, such as: paying considerable attention in teaching the existing knowledge, to the detriment of discovering new knowledge; teacher-centered teaching, instead of student-centered teaching, that is focused on the needs of learners; the lack of authentic and relevant learning for students, which would involve assigning meaningful tasks to students, in which they use certain knowledge, preferring the transmission of knowledge. Unfortunately, this system does not contribute to stimulating students' interest and motivation for learning. In order to obtain the highest possible grades, students will focus on memorization, and not on the practical use of knowledge in order to solve real problems that they may face at some point.

Table 10. Comparison between authentic learning and experiential learning (Knobloch, 2003, p. 30)

	Tenets of Experiential Learning				
	Authentic Learning (Newmann et al., 1996)	**Dewey** (1938)	**Knapp** (Bliss, 1952)	**Stimson** (1919)	**Lancelot** (1944)
Components	**Construction of Knowledge** • Challenging adult-like roles that require higher-order thinking, consideration of alternatives, and organizing information.	Experimentation and reflective thinking.	Experimentation and the field demonstration method.	The inductive method.	The problem solving method.
	Disciplined Inquiry • Engagement in cognitive work that involves inquiry into an in-depth understanding of a prior knowledge base through substantive conversation.	Learning of theory/intellectual and practice/active should be done together in a real-life context.	Instruction should create a love of investigation and direction for learning by doing.	Project work organizes definite and coherent bodies of knowledge which recurrent seasons will naturally and of necessity call into use.	Understanding knowledge by using it, seeing it in relationship to other knowledge, and by explaining it orally or in writing.
	Value Beyond School • Knowledge and problem task are communicated, performed, or acted on for an audience beyond the school.	Learning should involve everyday social applications, economic and industrial problems.	Instruction should be practical, of easy application, in solving agricultural problems done in the local community.	Active participation in agri-cultural operations of real economic or commercial importance.	Good teachers keep good problems created out of situations before the minds of their students.

For ensuring an in-depth understanding and learning, students must go through the four stages of learning, seen as a cyclical process, namely: concrete experience, reflection, conceptualization (thinking) and experimentation (action) (Radović et al., 2021, p. 2711).

Chai et al. (2015, p. 390) consider that learning practices in the 21st century should consider six principles, namely learning in a self-directed, collaborative and meaningful way, with the help of technology, thinking critical and creative, and last, but not least, authentic problem-solving. Thus, students will be better prepared to cope with the constant progress in technology and information, the ever-changing social conditions and the dynamics of the labor market (Lock, 2015, p. 138).

Bransford, Brown and Cocking (2000, cited by Lock, 2015, p. 139) believe that learning must be centered on students, knowledge they acquire, their assessment and also the needs of the real world.

Thomas and Seely Brown (2011, p. 50 cited by Lock, 2015, p. 138) talk about a "new culture of learning", according to which in a world in permanent dynamics a change is required in terms of teaching and learning, in which technologies and new media can facilitate peer to peer learning, and learning is done in a natural and easy way. In this new culture, the learning environment is one of team, of collaboration, in which students interact and learn together.

Herrera-Pavo (2021, p. 1) showed that students appreciate collaborative practices instead of traditional learning methods. Lombardi (2007) also argues that students prefer to be put in the situation of doing, not listening. Traditional learning does not support freedom of expression, interaction, debate, is not tailored to the needs of students, requires a considerable effort of students to keep their attention and concentrate during lectures focused on content delivery. Even seminars or interactive tutorials can be ineffective if they only involve reading and analyzing some readings, as most likely the same students will be involved each time, lack of training in argumentation and speech technique will be felt, involvement will be reduced, and the development of near-non-existent skills (Howell, 2021, p. 1-2). Traditional learning, carried out exclusively in the classroom, tends to become monotonous and boring.

In order for students to use what they are taught in the real, professional life, what students learn needs to be authentic (Hung, Shu-Shing & Lim, 2012; Aynas & Aslan, 2021, p. 147). Authentic learning is meaningful to students, produces knowledge, and is not based on simply reproducing ideas; it involves investigation, based on a certain level of prior knowledge, in-depth understanding, the ability to organize, synthesize and integrate new knowledge in different contexts. Authentic learning is valuable, beyond its formal assessment, through the impact, including personal, it has on students (Cumming & Maxwell, 1999, pp. 178-179).

According to Hung et al. (2004, p. 3), students engage in an authentic activity when they have to use the knowledge they have in situations of uncertainty, to solve ill-defined problems, when experimenting, when working in teams where knowledge and resources are shared, and when there is collaboration with experts who provide advice and support in carrying out their tasks.

The goals of authentic learning are (according to Nachtigall et al., 2022): to create meaningful learning activities for students, to capitalize on the potential of professionals in a particular discipline, to make a connection between students and the world of work, and to reflect real-life experiences.

III.2. AUTHENTIC LEARNING

At the core of authentic learning are the constructivism principles. Constructivism is a psychological and educational theory having its origins in the works of Dewey, Piaget, Montessori and Vygotsky, who argued that learning should be an active process, focusing on students, on their learning and understanding, in which the role of the teacher is that of facilitator and mentor (Gürgil, 2018, p. 2061). Real and genuine learning appears as a necessity arising from the fact that the education system and the real world are not connected, as a reaction to the fact that students are not prepared to solve real world problems, there is no transfer of knowledge, and the knowledge they possess remains only at a theoretical level (Karakaş-Özür & Duman, 2019, p. 29).

Constructivism underlines learning should be collaborative and contextualized, with emphasis on problem solving, on the application of acquired knowledge, on individual and collective reflexivity, on self-assessment and peer assessment (Mundkur & Ellickson, 2012, pp. 370-371), elements that we also find in authentic learning.

Lee (2020, p. 2) talks about two approaches to authentic learning, namely epistemological learning (based on the principles of constructivism, it focuses on learning design, on relevant scenarios and contexts for students, inspired by real life, on the formation of skills and the accumulation of new knowledge) and the ontological one (based on the transformative learning paradigm, known from adult education, which supports the importance of adult transformation during learning).

Aside from the constructivist principles, authentic learning is based on the requirements of the labor market, employers being more and more interested in hiring competent, well-trained people, both theoretically and practically (Mundkur & Ellickson, 2012, p. 371).

A definition of authentic learning states that authentic learning is student-centered. In authentic learning, students have to perform real tasks, to solve real problems, specific to the professional field in which they are trained and want to work at the end of their studies. In this approach, students use the same resources and tools that professionals use in their work, developing relevant and necessary skills for the labor market. Authentic learning thus succeeds in truly training professionals who can manage the issues and challenges of the workplace (Chabeli et al., 2021, p. 12).

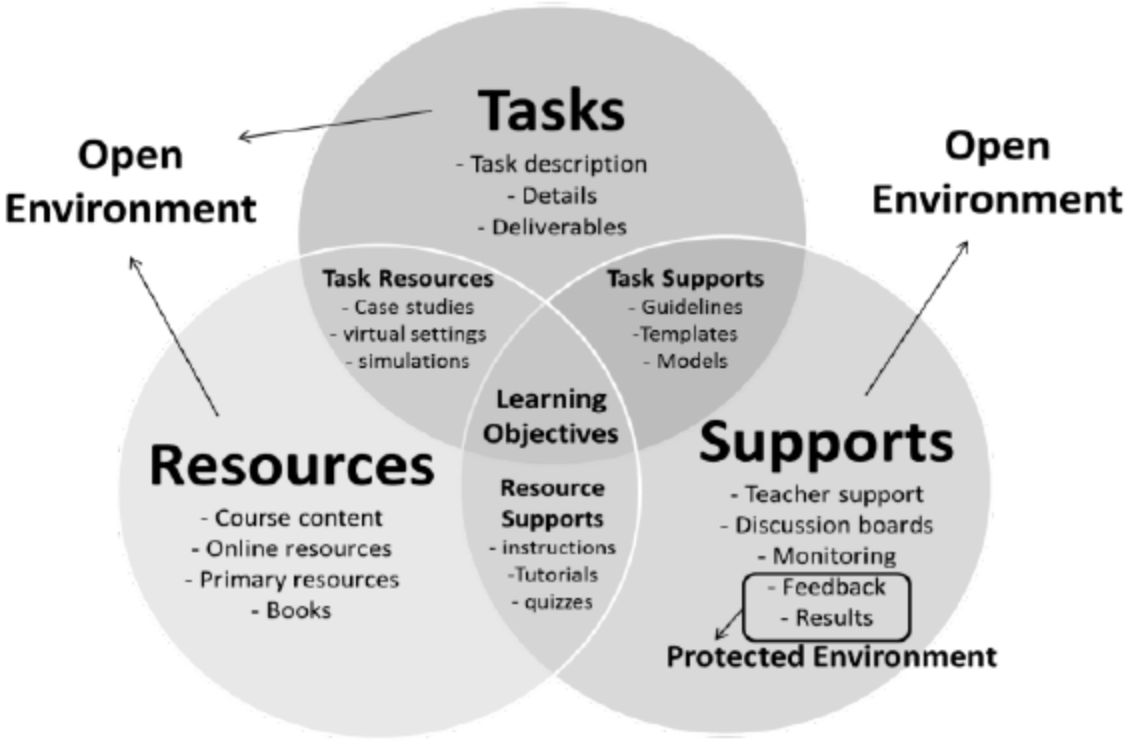
Authentic learning can be considered a learning strategy, a "cognitive apprenticeship", whose purpose is not to teach in a direct manner, but to help students find solutions to real problems, and thus accessing and constructing knowledge. Authentic learning supposes a constructivist alignment of tasks, activities and assessment (Karakaş-Özür & Duman, 2019, p. 29). Authenticity in learning refers to the extent of reconstructing and recomposing the professional context within the learning environment, whether physical or virtual, in all its complexity. Learning takes place when students use tools, knowledge and skills specific to the professional environment, when they imitate the behaviors of professionals and develop relevant results (Radović et al., 2021, p. 2711).

Table 11. ***Components of authentic learning (Karakaş-Özür & Duman, 2019, p. 29)***

Authentic context
Authentic activity/task
Multiple perspectives and roles
Expert performance
Cooperation
One-to-one training
Reflection
Speak clearly
Authentic assessment
Structured support

Gulikers et al. (2008) state that authentic learning has five dimensions: students have to perform complex tasks, placed in a real life context, similar to the professional one (this is about the knowledge and skills needed by the professional) in which they will work at the end of their studies; the evaluation must be based on measurable indicators, and also be authentic and realistic.

Figure 33. Elements of authentic learning (Herrington et al., 2010)

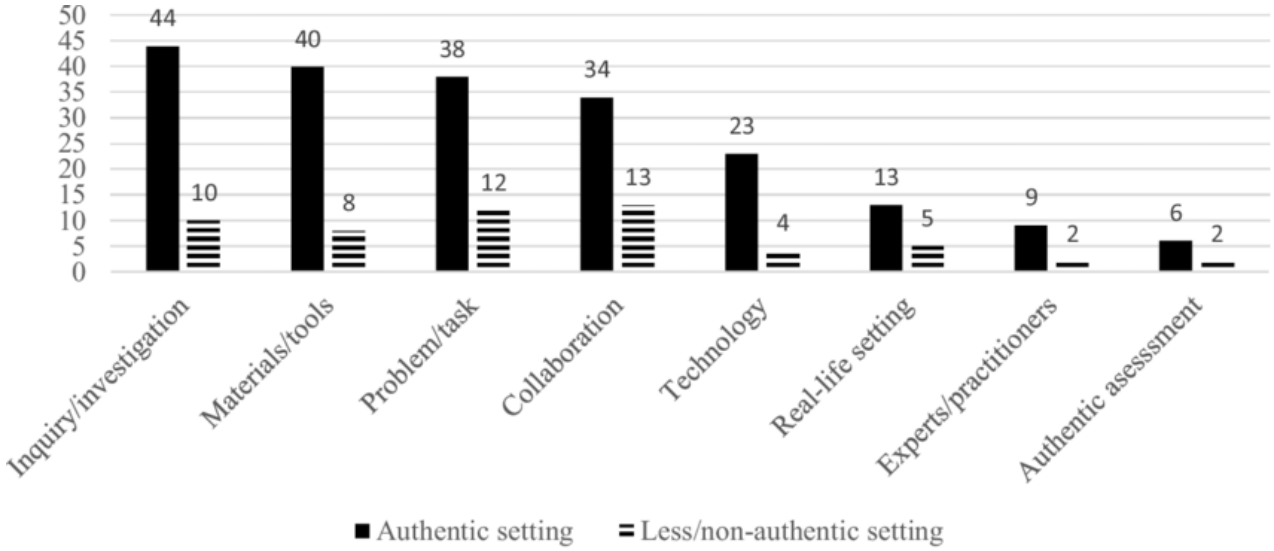


In Knobloch (2003, p. 23) we find the steps we should follow in implementing authentic learning: the first step is to motivate students, to stimulate them in order to learn, and this can be achieved through challenges, role-playing games, essays, inciting to dialogue, public speaking; in a second stage, students must be put in the position of a research approach, in which to use the previously accumulated knowledge and to carry out an in-depth learning; the last step is assessment, which should not focus on demonstrating

or displaying the knowledge gained by students, but should have practical, professional value and be relevant for the needs of students.

Nachtigall et al. (2022) realize an analysis of authentic learning literature and conclude that an authentic learning context involves the collaboration of students in order to find solutions for a problem that is real, unstructured and complex, through a research approach in which they benefit from the support of experts and professionals, and use resources and tools specific to the latter.

Figure 34. ***Characteristics of authentic learning (after Nachtigall et al., 2022)***



Authentic learning refers to learning by solving real-world problems. Realistic problems, taken from real life, must meet four conditions (Renzulli, Gentry, & Reis, 2004, pp. 2-3): a personal frame of reference (provided, in addition to cognitive reasons, the emotional dimension of the subject), either of the student or of the group trying to solve the problem; there is no single solution; the purpose of solving the problem is to create a new product, or to produce a change (of attitude, action, beliefs); targets a real audience.

Chabeli et al. (2021, p. 12) even argue that realistic problems need to be solved in real contexts, outside the classroom, for better integration of real-life learning through the use of students' cognitive, intra- and interpersonal skills, such as critical thinking, reflectivity, problem solving, decision making, collaboration or communication, emotional intelligence and metacognition.

The standards based on which we can analyze whether or not learning meets the characteristics of authentic learning are presented by Knobloch (2003, p. 24).

Authentic learning is task-based, inter-multidisciplinary and multidisciplinary. It requires a transfer of information between students and the real world. Students must conduct research and investigation responsibly, using appropriate resources, acting as true professionals (Aynas & Aslan, 2021, p. 147). In genuine learning, students need to focus on what is meaningful, use, transform, apply, and reinterpret the information and knowledge they have (Lock, 2015, p. 141).

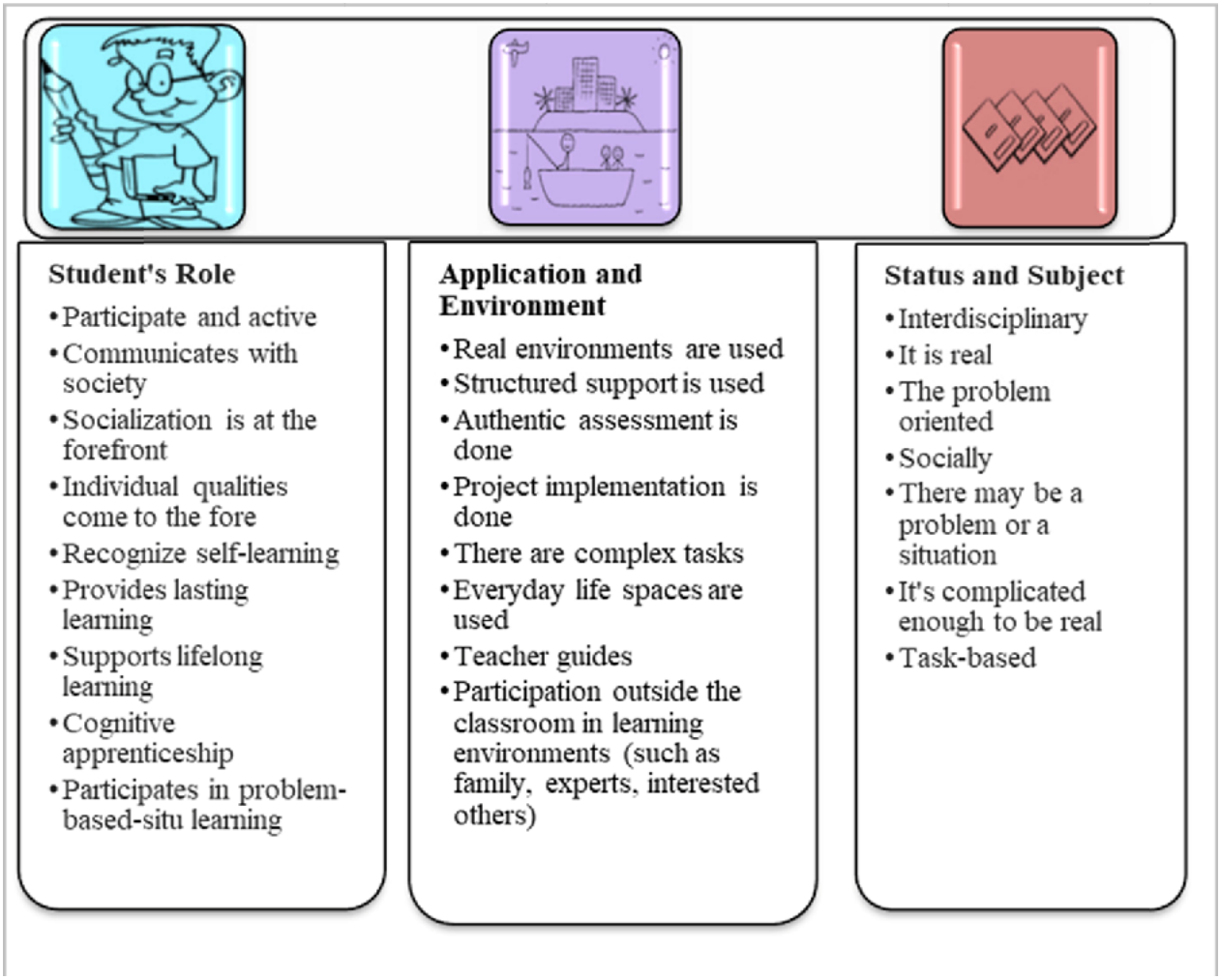
Table 12. *Authentic learning standards (Knobloch, 2003, p, 24)*

Authentic Learning Standards		
Criteria	**Instruction**	**Assessment**
Construction of Knowledge	**Standard 1: Higher-Order Thinking** Are students engaged in manipulating information and ideas by synthesizing, generalizing, explaining, hypothesizing, or arriving at conclusions that produce new meaning and understanding for them?	**Standard 1: Organization of Information** Does the task ask students to organize, interpret, explain, or evaluate complex information in addressing a concept, problem, or issue? **Standard 2: Consideration of Alternatives** Does the task ask students to consider alternative solutions, strategies, perspectives, or points of view in addressing a concept, problem, or issue?
Disciplined Inquiry	**Standard 2: Deep Knowledge** Does the learning experience address central ideas of a topic or discipline with enough thoroughness to explore connections and relationships and to produce relatively complex understandings? **Standard 3: Substantive Conversation** Are students engaged in extended conversation exchanges with the teacher, adults, or their peers in subject matter in a way that builds an improved and shared understanding of ideas or topics?	**Standard 3: Disciplinary Content** Does the task ask students to show understanding and/or use ideas, theories, and perspectives considered central to an academic or professional discipline? **Standard 4: Disciplinary Process** Does the task ask students to use methods of inquiry, research, or communications characteristic of an academic or professional discipline? **Standard 5: Elaborated Written Communication** Does the task ask students to elaborate on their understanding, explanations, or conclusions through extended writing?
Value Beyond School	**Standard 4: Connections to the World Beyond the Classroom** Do students make connections between substantive knowledge and either public problems or personal experiences?	**Standard 6: Problem Connected to the World Beyond the Classroom** Does the task ask the students to address a concept, problem, or issue that is similar to one they have encountered in life beyond the classroom? **Standard 7: Audience Beyond the School** Does the task ask students to communicate their knowledge, present a product or performance, or take some action for an audience beyond the teacher, classroom, or school building?

If the learning is authentic, then it will meet the following criteria: the research approach undertaken by students is based on a need, a problem, an issue, a relevant professional challenge, which interconnects the educational environment with the real life and with the professional context. This problem is either identified by students, or can be formulated with the help of an expert, as a result of his activity and work. The whole research process carried out by students in their pursuit for solving the problem is a collaborative, team one, in which the roles are well established, leading to the accumulation

of knowledge, and all tasks and activities must have a high level of complexity (Galileo Educational Network, 2000–2013, p. 1, cited by Lock, 2015, p. 143).

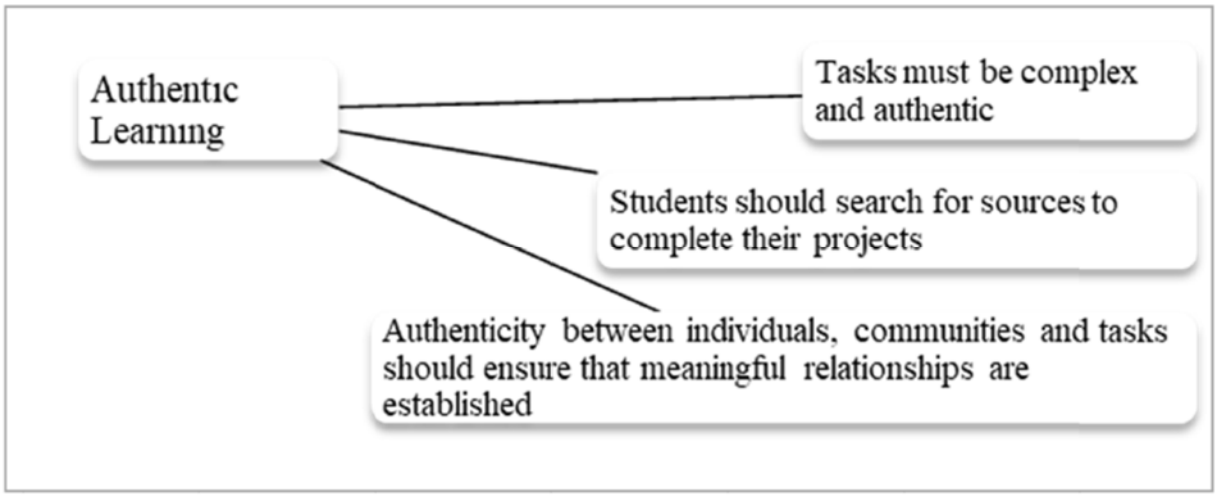
Figure 35. ***Features of authentic learning (Karakaş-Özür & Duman, 2019, p. 30)***



Carrying out authentic learning activities, students develop, according to Lombardi (2007, p. 3) so called "portable skills", such as: the ability to discern between different sources of information, abilities of argumentation, making generalizations and being flexible (Lombardi, 2007, p. 3).

Authentic learning represents a model of curricular design, which is based on the idea that learning means not only memorization, but also the use of knowledge, not only to know what, but also to know how. In authentic learning, learning objectives are aligned with realistic tasks, content and contexts. Authentic learning is based on the constructivist approach in which students learn new content by updating previous knowledge, using various resources in a research activity and through direct experience (Roach, Tilley & Mitchell, 2018, p. 496).

Figure. 36. ***Design principles of authentic learning (Karakaş-Özür & Duman, 2019, p. 30)***



Lombardi (2007, p. 2) considers that at the core of the authentic learning lies a real life, complex issue, that students strive to solve using a variety of tools in a collaborative environment.

Herrington & Kervin (2007, p. 221) present the premises of authentic learning, the first steps in this direction being made in 1987, with the introduction by Resnick of the concept of "*bridging apprenticeships*", in order to reduce the distance between the training offered to students through classical formal learning, respectively the requirements of the labor market. Two years later, Brown, Collins, and Duguid introduced the "*cognitive apprenticeship*" model, in which students were involved in genuine activities and social interaction.

Authentic learning occurs when learning is integrated in real life situations, achieved through projects or problems with a realistic purpose, allowing their investigation and discussion in contexts with applicability in real life (Iucu & Marin, 2014, p. 411).

The educational theory that underlies authentic learning supports the importance of active, experiential learning in building knowledge. ICTs (including VR) are often used to integrate complex elements of reality into learning, to simulate reality, and to engage learners in an active learning process (Wornyo et al., 2018, p. 57).

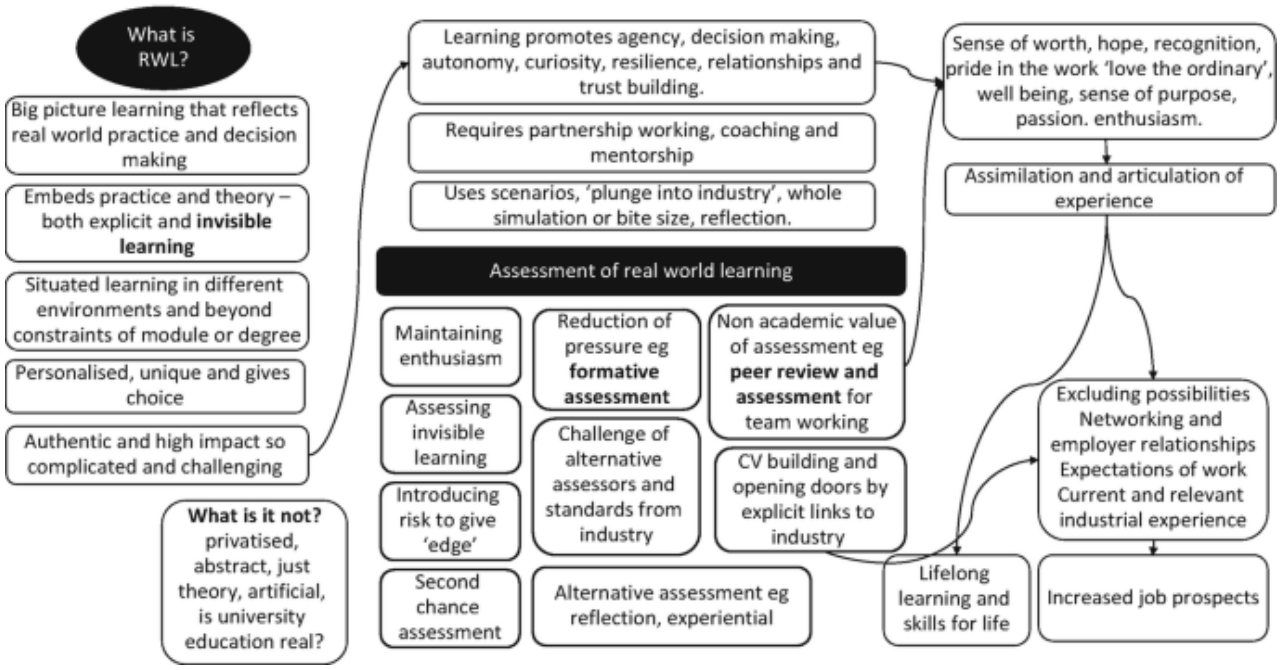
Authentic learning ensures the formation and development of students' transversal competencies (especially critical thinking, taking notes, problem solving, communication and research skills, academic writing, speech technique) (Iucu & Marin, 2014, p. 412). Students learn through direct experience and discovery, free from any coercion and discrimination, engaging in discussions and debates that develop their ability to think and express their own views.

Table 13. ***Authentic learning dimensions (Nachtigall et al., 2022)***

Shaffer and Resnick (1999)/Fougt et al. (2019)	Polman (2012)/Polman et al. (2018)	Strobel et al. (2013)	Doyle (2000)
Personal authenticity	Authentic to self	Value authenticity	Child-centered authenticity
Disciplinary authenticity	Authentic tools	Task authenticity	Subject-centered authenticity
	Authentic to others	Impact authenticity	Situated authenticity
Real-world authenticity			Context authenticity
Authentic assessment			
Teacher authenticity[a]			

Authentic learning ensures a harmonious blend of learning content, the learning process and the personal, active involvement of students in learning. The student is no longer a mere memorizer, but an investigator, while the teacher is no longer an instructor or a disseminator of knowledge, but a facilitator, a mentor, a source of resources. The emphasis is not so much on the product, but on the learning process, on the cognitive, affective and motivational processes involved in learning (Renzulli, Gentry, & Reis, 2004, p. 3).

Figure 37. ***Real World Learning (Archer et al., 2021)***



Being able to solve real problems, students acquire or develop skills and abilities such as research and investigation, communication, cooperation, taking responsibility, asking questions, participating in discussions (Yıldırım & Ortak, 2021, p. 195).

Other concepts that are connected to authentic learning are: "work-integrated learning (WIL)" (Ajjawi et al., 2020), "real world learning (RWL)" (Archer et al., 2021), or "self-regulated learning". The last one requires students to have a high level of motivation for learning, collaboration, reflexivity, organization of learning, planning and monitoring the activity carried out in order to achieve goals, as well as choosing tools and strategies appropriate to the aims pursued (Hung et al., 2004, p. 4; DiDonato, 2013, p. 25).

III.3. AUTHENTIC TEACHING

There are similarities between authentic learning and PBL (Bessa, Santos & Duarte, 2019, p. 453) (self-directed learning, high motivation to learn, structuring learning through professional practice), but also differences (PBL may not always be authentic) (Roach, Tilley & Mitchell, 2018, p. 497).

APBL (Authentic project-based learning) is a form of PBL that involves projects that require realistic solutions for real clients or users. The use of APBL in teaching has proved

useful in stimulating the involvement, increasing motivation, performance and retention of students (Zhang, 2022, p. 58).

Problem-based learning is an authentic form of learning focused on solving a real problem (so on the cognitive side of learning, not on a finished product, like project-based learning). The use of problem-based learning in teaching has the great advantage of forming and developing students' skills (communication, teamwork, critical thinking, problem solving), but on the other hand also ensures the accumulation of theoretical knowledge related to the subject of the analyzed problem. In PBL, students benefit from access to information or support materials from teachers and experts. The purpose of the PBL is to share relevant and useful knowledge to students, to develop self-directed reasoning and learning strategies, to increase motivation for learning and to develop communication and teamwork skills (as the problem is solved in a group of students, in which responsibilities are divided) (Hung et al., 2004, p. 5).

In the case of PBL, it is essential that the problem to be solved is real, as it is difficult to simulate a sufficiently authentic and detailed problem. In addition, the more real it is, the more attractive the problem is to students (Hung et al., 2004, p. 6).

Whether we are talking about problem-based learning or project-based learning, the starting point is a real problem that students are put in a position to solve, collaborating with their colleagues and developing strategies during structured, investigative activities.

According to Zualkerman (2006, cited by Wornyo et al., 2018, p. 58), creating an appropriate environment for authentic learning, necessary to prepare the student for the challenges of professional life, requires four conditions, namely: providing the necessary information, assigning appropriate tasks, activating the appropriate cognitive components and adapting to the learning style of students and, last but not least, achieving the desired goals.

An authentic learning environment reproduces the real world conditions and context, where students perform authentic tasks, providing access to the expertise of specialists and to various points of view; knowledge is built through collaboration and reflection; the teacher provides support in critical situations; assessment is an integral part of students' tasks. When we talk about an authentic learning context, we are not just referring to real-life examples, but to a complex situation that provides motivation for learning and ensures sustainable learning. The use of technology can be helpful in bringing reality to the classroom (Herrington & Kervin, 2007, pp. 221-222).

An authentic learning environment requires the student to reflect on learning, to consolidate their learning by solving problems, testing hypotheses and experimenting in order to identify the optimal solution. In an authentic learning context, students carry out their tasks in groups where they discuss, present their ideas to colleagues, organize debates, share resources (Herrington & Kervin, 2007, pp. 227-228).

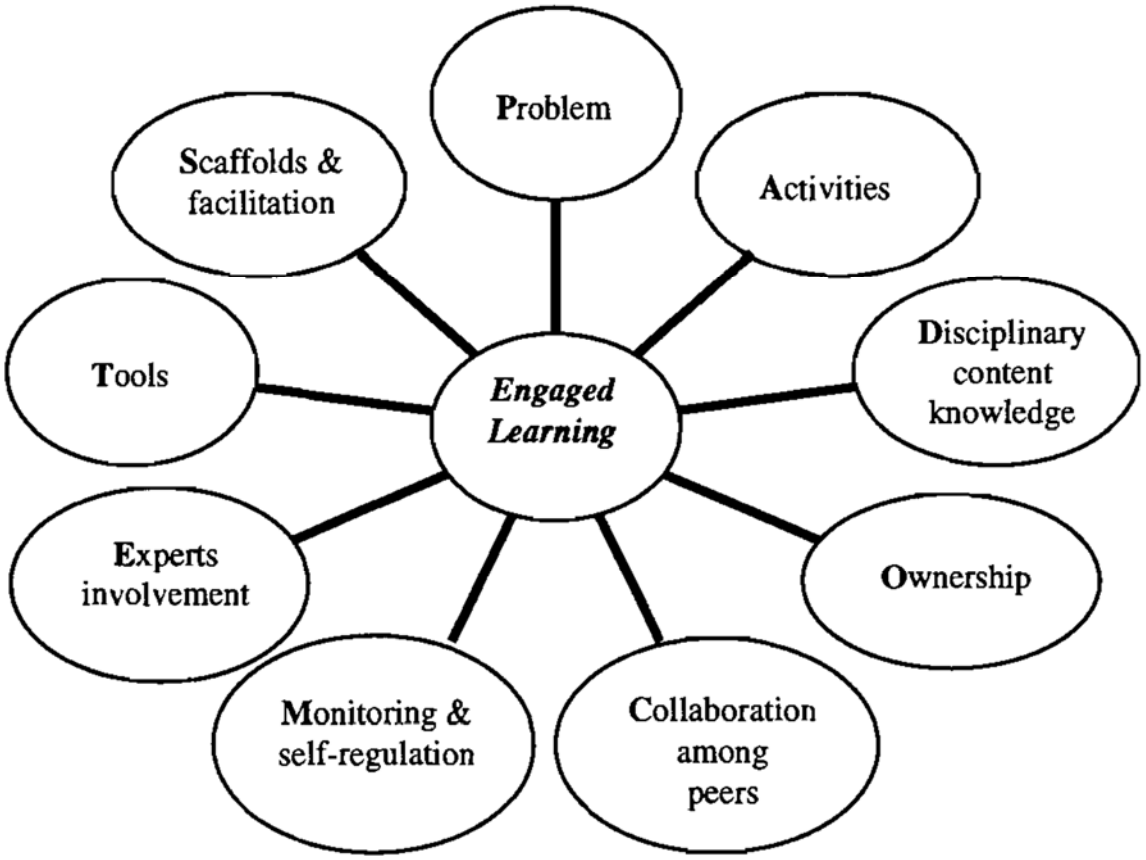
Students often have authentic learning experiences outside the classroom, allowing the transfer of knowledge to real and concrete situations, the formation of skills and the

accumulation of information in an applied way, by solving some problems they face (Wornyo et al., 2018, p. 57).

A genuine learning environment may be created through simulation and participation. The simulation is performed in formal learning contexts that try to get as close as possible to the real context; contact with practitioners and experts is reduced, and the real world is recreated with the help of tools or objects. In turn, participation gives students the opportunity to effectively interact with professionals, to engage in hands-on activities with each other (Hod & Sagy, 2019, p. 146).

Hung et al. (2004, p. 9) elaborated an engaged learning framework with the following elements:

Figure 38. *Engaged learning framework (Hung et al., 2004)*



The task that students have to fulfil in order to solve the problem must be based on the learning outcomes, objectives and the needs of students; students must engage in activities that they would normally carry out in the specific context of their profession; in solving a problem students must use relevant knowledge; learning is centered on the student, who is empowered and solely responsible for his entire research approach, for the resources and tools he accesses; in order to solve the problem, the students engage in a collaborative, team approach, and interact with specialists who can offer them help; students' progress is monitored, and remedial action is taken as needed; the teacher's role is that of a facilitator of learning; the usefulness of staged students' research approach structuring.

In the same study (Hung et al., 2004), we also find a synthesis of the main aspects that one must consider when designing an authentic learning activity, in accordance with the nine principles stated above:

Table. 14. *Engaged learning design (Hung et al., 2004)*

	Design considerations and tools for engaged learning
Problem	There is a need to provide a problem that is co-formulated by the students and teacher(s). The problem can be simulated in a learning environment after being co-formulated. The specific goals must be related to real-life cases according to the realities of the community of practice. Videos such as in anchored instruction can be adopted to describe the problem.
Activities	The problem can be subdivided into a series of activities and subproblems. These activities could be supported with technology-based templates that guide the learners through the problem solving process.
Disciplinary knowledge	Disciplinary knowledge is needed for solving problems, and such knowledge can either be searched for through information tools or through artefacts and communication with teachers, experts and other peers.
Ownership	The problem or case example must be interesting to the community (both students and teachers, and even experts).
Collaboration	The cases/problems are situated in a real-life context. The learners, teachers and practitioners each play a different but realistic role in solving the problem.
Monitoring	Students need to have tools to monitor and reflect on their learning experiences such as reflection logs, peer critiquing tools and other forms of monitoring aids.
Experts	There should be plenty of opportunity for experts such as practitioners to operate within the learning environment. These activities can be scaffolding in terms of increasing complexity and diversity.
Tools	Tools are used throughout the process, in particular, social-constructivist tools for collaboration/communication between the students, teachers and experts, in particular the co-formulation of problems, co-setting of goals, co-experimentations co-explanations, and co-explorations of 'what-if' questions. Mind tools and other forms of constructivist learning tools (e.g., concept mapping and visualisation–simulation tools) are useful here. Information resources of precious cases, problems and related information are crucial. Learners should receive appropriate feedback from each other, the teachers and experts through the supports provided.
Scaffolds	Scaffolds are the structures that are put in place in order to enable the learner to progress from one stage to another. At the macrostages level, technologies probably do not have a significant place. However, technology can aid in the problem solving processes, such as providing procedural cues as prompts to cognition.

In the opinion of Audrey C. Rude (quoted by Iucu & Marin, 2014, p. 411), authentic learning is based on four principles, namely: focusing on practical, real-life problems, the solution of which can be transferred to outside the classroom; research and reflection over own learning and progress; encouraging participants to discuss and debate; learners have the right to choose and manage their own learning and tasks.

Herrington and Oliver (2000, pp. 26-27) identified nine principles of authentic learning: real life setting; real life tasks; experts' perspectives; different points of view and resources; cooperation; reflection; sharing resources, information, ideas; peer to peer supporting and knowledge transfer; authentic evaluation. These principles could be

grouped into three categories: authenticity (realism), teamwork (opportunities for collaboration and communication), and guidance (from the teacher and experts).

Lombardi (2007) states the fundamental elements of authentic learning, these being: instructional design through which students are placed in situations similar to those they will find in professional life; complex, unstructured tasks, requiring multiple investigations; reflectivity and self-assessment are an integral part of tasks; Teamwork is essential, as students need to consider multiple perspectives of all stakeholders who may be targeted by the task of students.

Herrington et al. (2007) formulated 10 characteristics of authentic learning:

- relevance to the real world (possible activities to be performed in professional life);
- lack of structuring (problems can be solved through a multitude of possibilities, can be interpreted in various forms, not at all simplistic and algorithmic), students being put in the situation to organize their own activity and tasks;
- involve complex activities that require the allocation of considerable resources and that take place for an established duration;
- students have access to a multitude of resources and information on the problem they have to solve, selecting the ones they consider to be most relevant, this approach developing their analysis skills and critical thinking;
- offers students the opportunity to collaborate in order to complete tasks;
- students are put in a position to reflect on their learning;
- is accessible and versatile, promoting interdisciplinary, taking on different roles and gaining diverse experiences;
- assessment is an integral part of the task that students have to perform;
- the purpose of authentic activities is a finished product, not an exercise or a training;
- allows a variety of results, multiple and original solutions.

In authentic learning, the teacher is no longer the only repository of knowledge and his one-way transmitter. He must create the framework, the scenario in which students can learn in an autonomous, non-directive way, to motivate them to learn, to encourage them to document themselves, providing them with a variety of resources, to stimulate them to think and to reflect on their own learning, to put them in the situation of collaborating with other colleagues in tasks focused on real problems (Iucu & Marin, 2014, p. 411). The teacher must create lessons in which to give students the opportunity to experiment, not to rely on instruction, all the more so as students learn better and more effectively by experimenting than by listening or observing (Yıldırım & Ortak, 2021, p. 194).

Authentic learning is a form of collaborative learning that involves a paradigm shift in the role of the teacher, which ceases to be a transmitter of knowledge, becoming instead a facilitator of individual and collective learning processes, a mediator with the role of dynamizing the interaction, to provide continuous, personalized feedback, adapted to the needs of students (Herrera-Pavo, 2021, p. 2). The role of teacher facilitator can also be fulfilled by more experienced students (Herrington & Kervin, 2007, p. 229).

The teacher must be willing and available to provide support, supervision and guidance to the students; to create an appropriate learning environment; to support students to overcome their fears; to manage possible crisis situations (Vu & Dall'Alba, 2014, p. 788).

Kirschner et al. (2004, pp. 29-34) speak of *task ownership*, *task character* and *task control* as the three basic features of collaborative learning.

Task ownership - in a collaborative learning environment emphasis should be placed not on individual student achievement and performance, but on their group performance, student autonomy, self-regulation and group self-regulation, on individual and collective responsibility, on involvement in the development of activities, on evaluation and self-evaluation mechanisms. Students themselves, in a collaborative learning environment, should be encouraged to consider not only personal progress but also that of their peers, the achievement of common goals that can only be achieved as a team, in interdependence with other peers. In order to ensure the cohesion of the group, a good organization is needed in the sense of assigning specific roles, creating a group identity, a meeting space.

Task control - refers to the role, the strategies that the teacher, but also the students, use during their activity (the role of students in terms of organizing individual and group activities, respectively the role of the support teacher, mediation, stimulation of autonomy and student involvement).

Task character - refers to the task that students must perform, with an emphasis on relevance, authenticity, complexity and openness to allow a diverse and flexible approach. In traditional learning, tasks are student-centered, well-structured, short, and follow the learning content, not the reality. An authentic learning task is complex, unstructured, based on real life scenarios, with a practical purpose (Herrera-Pavo, 2021, p. 4).

Citing bibliographic sources and various studies, Herrera-Pavo (2021, pp. 2-3) supports the importance of creating a meaningful learning environment for students, in which ICT means more than technologies that facilitate interaction, but allow the creation of a collaborative learning environment that is easy to use by students.

From the point of view of the socio-constructivist perspective, learning is the result of the interaction between people and the environment. In this sense, as a space of interaction, the Internet can be considered a natural area of learning (Herrera-Pavo, 2021, p. 1). The constructivist approach to learning has proven to be effective in increasing student performance, comprehension and retention, which is why contemporary pedagogy recommends using such an approach, with an emphasis on collaboration and interaction, authentic learning, use of technology, correlation of information with practical experience (Zielinski, 2017, p. 668).

Information and communication technologies (ICT) foster collaboration in a learning situation, facilitating asynchronous processes and ensuring non-discriminatory access to learning resources. The use of ICT can lead, according to Wenger (1998, apud Herrera-Pavo, 2021, p. 2) to the creation of a "community of practice", which is based on three fundamental

elements: shared understanding; mutual involvement leading to cohesion and unity within the group; a common baggage of information resources.

Reflection is an integral part of authentic learning, which is deliberate thinking in order to improve an action or activity. By reflection we understand a process of thinking, evaluation, design and planning of activities carried out in order to accumulate knowledge, with a regulatory role, used to monitor individual progress, which helps to achieve performance (Chan & Lee, 2021, p. 1).

Reflection can be achieved by assigning authentic tasks to students, by writing journals or blog interventions, but also by discussions with colleagues or forums, therefore both as individual and collective reflection (Herrington et al. 2014). Simple experience does not provide learning. Genuine, deep and life-long learning implies reflection (Chan & Lee, 2021, p. 1).

Herrington et al. (2014) cite Boud, Keogh & Walker (1985) and present the three stages of reflection: recalling, updating knowledge or experiences, sometimes by sharing them with other people; reliving the feelings generated by that experience or event; reassessing the situation based on and with the help of new knowledge.

Starting from these stages, Pappas (2010) developed a taxonomy of reflection, based on Bloom's taxonomy, in which he integrated some suggestions for questions that students could ask during the reflection process:

Table 15. *Taxonomy of reflection (Pappas, 2010)*

	Bloom's taxonomy (cf. Anderson & Krathwohl, 2001)	Reflection taxonomy (Pappas, 2010)
Remembering	Retrieving, recognizing and recalling relevant knowledge from short- or long-term memory.	What did I do?
Understanding	Constructing meaning from oral, written, or graphic messages.	What was important about what I did? Did I meet my goals?
Applying	Carrying out or using a procedure through executing or implementing. Extending the procedure to a new setting.	When did I do this before? Where could I use this again?
Analyzing	Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose.	Do I see any patterns or relationships in what I did?
Evaluating	Making judgments based on criteria and standards.	How well did I do? What worked? What do I need to improve?
Creating	Combining or reorganizing elements into a new pattern or structure.	What should I do next? What's my plan/ design?

Learning journals are a very useful tool for stimulating students' reflection. Herrington et al. (2014) identified a number of advantages of using this tool, namely: it stimulates students to think in a structured way, to make certain choices or connections; provides opportunities for students with verbal communication difficulties to express their opinions in writing; develops critical thinking.

Another way to stimulate students' reflection is through reflective examination, in which reflexivity is practically an integral part of the assessment process, with the help of reflection questions that students are asked to answer (Herrington et al., 2014).

Authentic learning stimulates critical thinking (Watagodakumbura, 2013, p. 300), contributes to the development of learning skills; provides in-depth, long-term learning; realizes the connection between real life and learning contents; increase the level of performance and responsibility of students; provides social support to students and identifies solutions to problems; ensures the synthesis of information; reduces absenteeism in class; is based on research and investigation; shows the multidimensional nature of events and brings an interdisciplinary perspective (Gürgil, 2018, p. 2061).

Knobloch (2003, p. 23) mentions other advantages of genuine learning, namely that it teaches students to apply their knowledge, to see the usefulness of their knowledge, to be creative, and to understand that the purpose of learning is to be used in real contexts.

By implementing authentic learning, students come into contact and experience problematic situations, which can be encountered in real or professional life, such as time management, managing difficult or recalcitrant clients, technical problems, lack of funds (Lowell & Moore, 2020, p. 582).

Authentic learning has the advantage of combining theory with practice, improving students' comprehension skills, and their motivation for learning (Yang & Goh, 2022, pp. 2-3). It is flexible, with changes, new tasks or activities introduced along the way (Gürgil, 2018, p. 2062).

Authentic learning responds both to the needs of students (to face challenges, to have the freedom and time to explore specific problems of real professional life, which can give them meaning and motivation for learning, a sense of fulfilment and satisfaction for a completed task), also of teachers (to help their students feel prepared for the challenges of the labor market and their professional life). In an authentic learning context, students carry out activities that allow them to interact outside the classroom, being fully responsible for their learning (Van Donge, 2018, p. 5).

The access of all team members to the same resources, in order to design activities, solve possible problems or prepare possible papers and presentations is one of the advantages of collaborative work (Crişan & Enache, 2013, p. 6). Another advantage of authentic learning is that it allows the fulfilment of the three goals of learning: developing skills, understanding information and the implementation of what was learned (Wornyo et al., 2018, p. 57).

Herrera-Pavo (2021, pp. 5-6) conducted an experimental study in three university classes, one in a virtual context, one blended and one flipped-classroom. Along with the observation method, the students had to complete a learning diary, answered a questionnaire, participated in group discussions and were interviewed, following the students' perception of learning, collaborative work and peer evaluation (task ownership); interaction within learning groups, distribution of roles and tasks within teams, autonomy and decision-making, distribution of resources, how information was transmitted, organization of activity in time and space (task control); the skills acquired by the students according to the degree of structuring the tasks, the use of coordination and communication

to solve the tasks received. In all three cases, authentic, complex tasks were proposed, involving collaborative learning.

Following this study, Herrera-Pavo (2021, p. 10) concluded that the structuring of a task has negative implications on the collaboration and organization of activities within the group. An unstructured task gave students the freedom to organize and make decisions.

III.4. AUTHENTIC ASSESSMENT

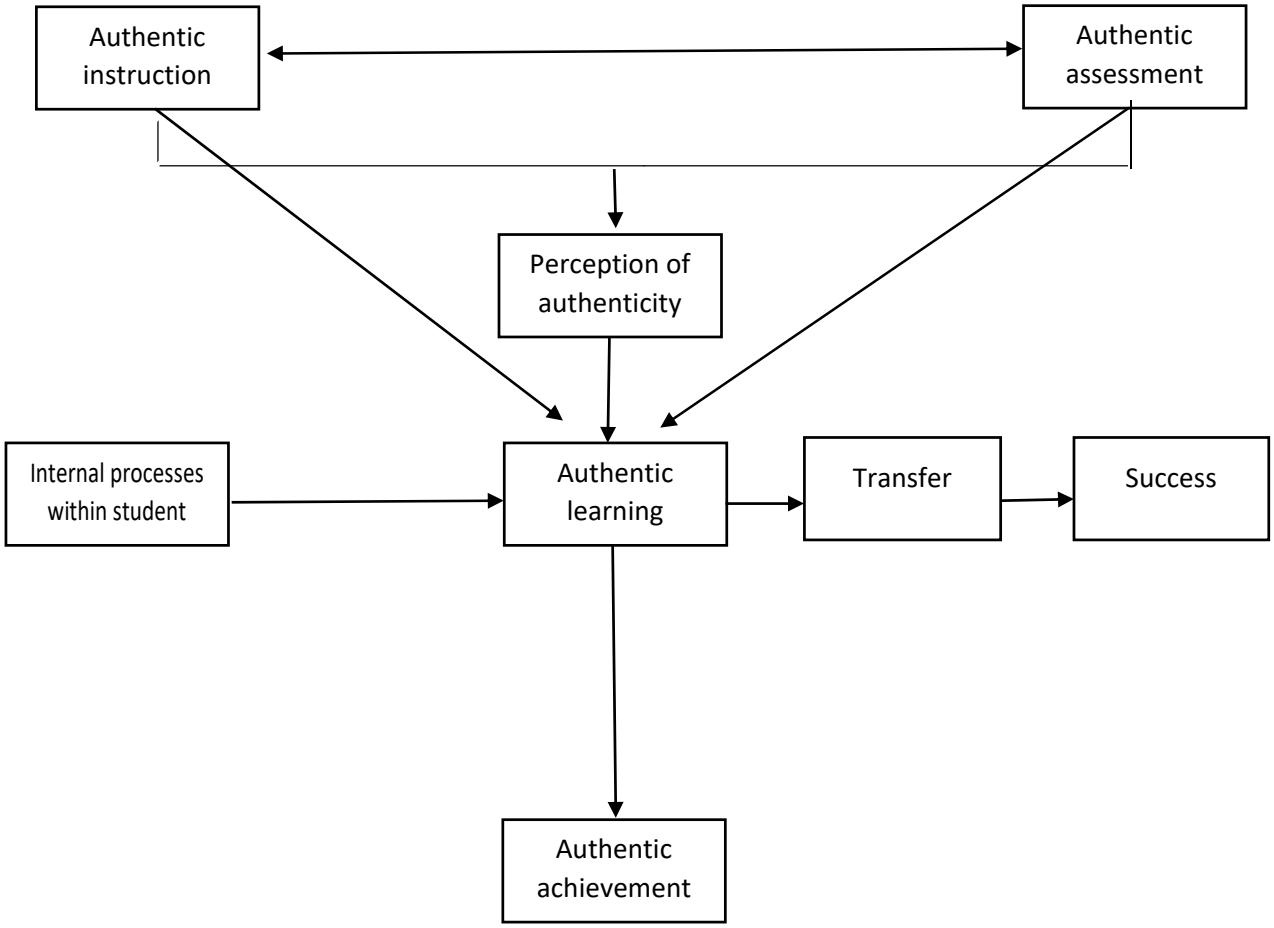
In order to develop professional skills among students, along with an authentic learning, connected to the problems and needs of the real world, the teacher must ensure an authentic evaluation of the students. This assumes that students are put in a position to use knowledge, skills, tools and methods specific to the professional environment in which they will work. A genuine assessment is able to stimulate students' in-depth learning (Speth & Lee, 2013, p. 3).

Figure 39. ***Authentic learning alignment (Karakaş-Özür & Duman, 2019, p. 31)***

An effective assessment, which maximizes the potential of students, must be, in the opinion of Meyers & Nulty (2009, p. 567), authentic, meaning that is realistic and connected to the real life. In preparing for such an assessment, students need to be motivated, to manifest a certain interest and desire to involve in a cognitive process guided by the learning objectives and outcomes.

Gulikers et al. (2004, p. 68) argue that an authentic assessment is effective in terms of its two dimensions, namely construct and consequential validity. Construct validity refers to the fact that the assessment is adequate, fulfilling three conditions: the tasks reflect the competencies to be assessed; evaluation consists of authentic tasks, represented by real problems; to perform the assessment task, the reasoning and cognitive processes used by experts and professionals in real life contexts are used. Consequential validity refers to the curricular alignment proposed by Biggs (1996), in which teaching, learning and assessment are interdependent.

Figure 40. ***General framework of authenticity (Gulikers et al., 2004, p. 70)***



For the first time, the notion of authentic evaluation appears and is implemented in primary and secondary education in the 80s, the first studies belonging to Archbald and Newmann (1988) (Schultz et al., 2022, p. 78).

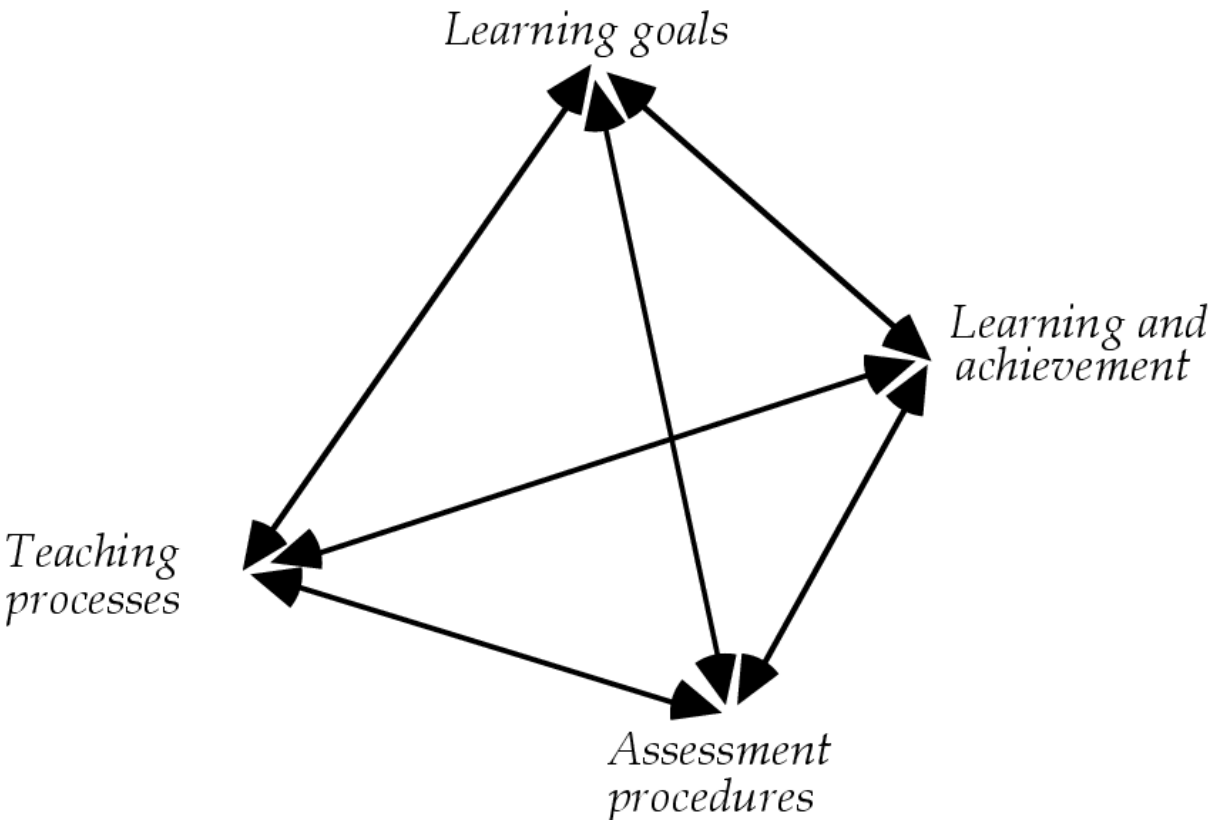
Authentic assessment involves investigative spirit, the ability to solve problems, the transfer of knowledge on a personal and social level (Cumming & Maxwell, 1999, pp. 178-179).

There is a close link between teaching and assessment, with students' learning being influenced by the way assessment will be done, the teacher's perception of the tasks assigned to students for assessment, the learning objectives and, last but not least, the students' perception of evaluation. If students perceive assessment exclusively summative, in the sense of reproducing a quantity of information, then they will focus on memorization, on a superficial learning, and not on a deep learning (Gulikers et al., 2008, p. 402).

Gulikers et al. (2004, p. 70) identified five dimensions of authentic evaluation: task evaluation, physical and social context, evaluation outcome, and criteria used in evaluation. These dimensions of assessment are found and can be applied in the case of authentic learning, the authors developing a framework for learning and assessment (Gulikers et al., 2004, pp. 72-73, figure 2, 3).

Assessment is what signals to both students and teachers what is relevant and necessary in learning, as presented below by Cumming & Maxwell (1999):

Figure 41. *Curricular alignment (Cumming & Maxwell, 1999)*



As Vu & Dall'Alba (2014, p. 787) show, authenticity is not a feature of tasks, but rather of the educational process. Gulikers et al. (2008, p. 401) appreciate that authenticity, meaning similar to what students will do in their future professional activity, is a subjective, dynamic dimension, being influenced by the level of experience or age of individuals.

For an effective assessment, it is necessary for it to take into account the requirements of the university curriculum, the needs of the students, but also the requirements of the professional environment. In an effective assessment the individual must involve completely, with his entire knowledge, skills, resources, personality (Dall'Alba & Barnacle, 2007, p. 691, after Vu & Dall'Alba, 2014, p. 779). An authentic assessment must be able to show students how theory is put into practice, how it contributes to the development of relevant professional skills (Gulikers et al., 2008, p. 402).

Cumming & Maxwell (1999, p. 188) speak of the so-called camouflaged evaluation, which means a traditional evaluation, which is only masked and superficially authentic, by introducing realistic elements, but not meeting exactly the characteristics of authenticity, namely: thinking depth, realistic activities, communication, complex activities, performance facilitation.

The same authors raise another issue, namely the simulation of real tasks. These are situations in which authenticity is mimicked or artificially recreated, through hypothetical

scenarios and problems, which have the characteristics of real situations, which require the use of the same resources or methods that would be accessed in a real situation, but that does not meet the criterion of complexity, defining for a truly authentic task (Cumming & Maxwell, 1999, p. 191).

Assessment is extremely important in the evolution of students, because the way it is done puts its mark on students' attitudes towards learning, on learning outcomes, but also on the preparation of students for professional life. A classical summative assessment could lead students to focus strictly on its purpose ("what I need to do to pass the exam") (Ajjawi et al., 2020, p. 305). Authentic assessment, on the other hand, helps students understand the importance and relevance of studying, to contextualize learning outcomes, to reflect on learning, and to become actively involved in learning (Ajjawi et al., 2020, p. 306).

Authentic assessment is not a purpose in itself, but a way for students to prepare for life and a constantly changing world of work (Vu & Dall'Alba, 2014, p. 779).

An authentic assessment also focuses on peer evaluation, encouraging students to provide feedback. In academia, feedback is an integral part of summative assessment, with students usually receiving feedback when grading a task, which does not allow for further improvement on the part of students. In contrast, in the professional environment we find a wide variety of types of feedback that an employee can receive during his activity, from 360^0 feedbacks, to reports or corrective measures. Even if it is not the ultimate goal of education, the academic environment must prepare students for professional life, including to get feedback, not always in a pleasant or easy way (Dawson et al., 2021, p. 287).

Authentic assessment is thus a type of formal assessment, which puts students in a position to solve problems, tasks or answer meaningful questions for everyday life, to use in-depth reasoning, to structure, organize and prioritize resources and efforts on their own in order to meet the indicators and evaluation criteria, to provide and receive feedback (Hobbins et al., 2021, p. 4).

Wiggins (2014, cited by Schultz et al., 2022, p. 78) proposed 27 criteria of authenticity, including among others structure, logistics, features of intellectual design, grading, fairness, its positive impact on motivation.

Cumming & Maxwell (1999, pp. 180-182) present four approaches to authentic evaluation, depending on the size considered to be the most relevant:

Table 16. *Authentic assessment typology (Cumming & Maxwell, 1999)*

Interpretation	Underlying learning theory	*Intrinsic components	*Latent components	Additional features
Performance and performance assessment	Complex performance must be contextualised, holistic and integrated. The whole is more than the sum of the parts.	2 3c	1 3a, 3b (5a, 5b)	Realistic tasks. Communication.
Situated learning and situated assessment	Context of learning affects what is learned. Degrees of 'situatedness', with some arguing no generic transfer.	2 3a	3b, 3c 5a, 5b (6)	
Complexity of expertise and problem-based assessment	Draws on situated learning and expert performance with expectation of transfer. Use of complex scenarios to develop knowledge base and problem-solving skills.	2 3a, 3b, 3c 5a, 5b 6	1	
Competence and competence-based assessment	No apparent underlying learning theory.	4b	4c	'Real world'. Direct application to workplace.

An authentic evaluation is realistic and formative, and needs to challenge students' knowledge (Shultz et al., 2022, p. 78).

Bosco & Ferns (2014, after Ajjawi et al., 2020, p. 306) realizes the Authentic Assessment Framework (AAF), which is based on four criteria: involvement of students in an approach similar to the professional one; involvement of students in in-depth cognitive processes; students' reflexivity and self-evaluation of their own performance; involvement of experts and professionals in student evaluation.

Authentic evaluation has the following characteristics:

- asks students to perform tasks appropriate to the professional environment in which they will work (in the event of a written assessment, the teacher may choose case studies, problem solving or essay method);

- is cognitively challenging (encourages students to use previously acquired knowledge to solve problems and make decisions, to make connections between existing knowledge and direct experience);

- encourages students' reflectivity;

- stimulates students' formative self-assessment (Ajjawi et al., 2020, pp. 306-307; Ashford-Rowe et al., 2014).

Another authentic evaluation framework was designed by Dawson et al. (2021, pp. 287-290), at the base of which are five principles, namely: realism, cognitive challenge, evaluative judgement, affective challenge and enactment of feedback.

Realism:

A realistic assessment is attractive and motivating for students. The realism of the assessment must take into account the physical and social context in which it takes place. The physical context means not only the space or framework in which the evaluation takes place, but also the evaluation and feedback tools (checklists, observation sheets, comments). The social context refers to relationships with colleagues, whether it is collaboration, competition or dialogue.

Cognitive challenge:

In an authentic environment, learning focuses not on memorization, but on the development and use of skills, such as problem solving or synthesis skills. Authentic feedback means that students can capitalize on it and integrate it into decision-making or problem-solving.

Affective challenge:

No matter how useful and beneficial it is, students do not always receive feedback from their teachers or colleagues in a constructive and relaxed manner. That is why it is necessary to develop students' resilience in order to face, emotionally speaking, the challenge of receiving and giving feedback.

Evaluative judgment

The purpose of feedback in the professional environment is to improve employee performance. In academia, however, there is no such expectation on the part of students, with feedback often being equivalent to summative assessment. In the case of assessment and genuine feedback, however, their purpose is to develop students' ability to make value judgments, towards their own activity (through self-assessment), or towards the activity of others (through peer assessment). In an authentic assessment, this is done with the help of clear, quantifiable and measurable criteria and indicators, in full accordance with the requirements of the professional environment.

Enactment of feedback

Usually, in the process of evaluating students, feedback does not produce any form of improvement action on their part. In authentic learning and assessment, feedback is provided in order to be used, integrated by students in the tasks they have to perform, designed to stimulate their evolution and progress.

Hobbins et al. (2021, p. 5, Table 1) developed a tool that can be used in authentic evaluation, and which the authors applied, validating it, in 455 evaluations in 62 different courses:

Table 17. *Tool for authentic assessment (Hobbins et al., 2021)*

	LOW (1)	MODERATE (2)	HIGH (3)
Realism: -assessment engages students with problems or important questions that are relevant to everyday life beyond the classroom.	• Assessment **minimally** engages students with problems or important questions that have relevance beyond the classroom; gap remains between classroom and real-world context	• Assessment **moderately** engages students with problems or important questions that have relevance beyond the classroom; begins to bridge the gap between classroom and real-world context	• Assessment **highly** engages students with problems or important questions that have relevance beyond the classroom; bridges the gap between classroom and real-world context
Cognitive Challenge: -categories of cognitive process related to using, modifying or rebuilding knowledge into something new.	• **Memory Skills:** requires student to identify &/or provide info or facts; recognition or understanding (associated verbs: identify, describe, summarize, define, recount, explain).	• **Application and Analytical Skills:** requires the unpacking and organization of information in multiple sources, types or relationships; requires a response to a hypothetical situation (associated verbs: compare /contrast, relate, interpret, integrate).	• **Transfer skills:** require students to design or put elements together to form a coherent whole &/or make an original product (associated verbs: judge, decide, critique, suggest, design, create, innovate).
Evaluative Judgement Criteria: -assessment provides opportunities for students to critically judge their own performance based on clear expectations.	• Students are provided with published (**explicit**) criteria a priori • (e.g. instructions, rubric, grading scheme)	• Students are provided with published AND **latent** criteria (those used in judgement when grading) a priori • (e.g.: follow-up to initial instructions via discussion, email, post on Courselink (D2L); Graded exemplars may be shared; criteria may be co-created with students).	• Published and latent criteria are not only provided a priori, but **students are engaged** with such criteria pre- &/ or post-completion • (e.g.: critiques/critical reflections, self and/or peer assessment using those criteria)
Evaluative Judgement Feedback: - assessment engages students with meaningful feedback to allow for improvement.	• **Content-specific** feedback &/or a grade is provided in response to the graded assessment.	• Content-specific feedback AND generic **skill feedback** are provided in response to the graded assessment.	• Content-specific feedback AND generic skill feedback are provided in response to **multiple iterations** of a similar assessment (graded or ungraded) i.e. drafts, practice tasks.

III.5. AUTHENTIC LEARNING AT THE WEST UNIVERSITY OF TIMISOARA – STUDY CASE

From 2019, at the West University of Timisoara, the process of implementing a teaching and learning brand was started, which, following a constructivist approach, aims to create authentic learning designs, contextualized by reference to real life cases. A teaching brand is an instructional design model specific to an educational institution, applicable and adaptable in the framework of all teaching activities supported in the respective university currently. Reflection, collaboration and experiential learning in an authentic context are considered the optimal ways to develop students' professional and transversal skills, the ultimate goal being to ensure the premises for lifelong learning and to have graduates better prepared for the professional requirements of the labor market.

UVT Teaching & Learning brand (2019) is based on a reflective-collaborative training model, student-centered, on the development of skills and the use of empirical evidence, based on four values (collaboration, reflexivity, involvement and entrepreneurship) and five

principles of learning (collaboration, contextually, students' autonomy, alignment between teaching, learning and assessment), through which to achieve in-depth learning of students.

This teaching & learning brand is based on the principles of student-centered learning (Magliaro et al., 2005), curricular alignment (Biggs, 1996; Biggs, 2003), the instructional design models of Frerejean et al. (2021) and Posner (1998), as well as Bloom's taxonomy (Armstrong, 2010).

Figure 42. *Biggs' (2003) curricular alignment*

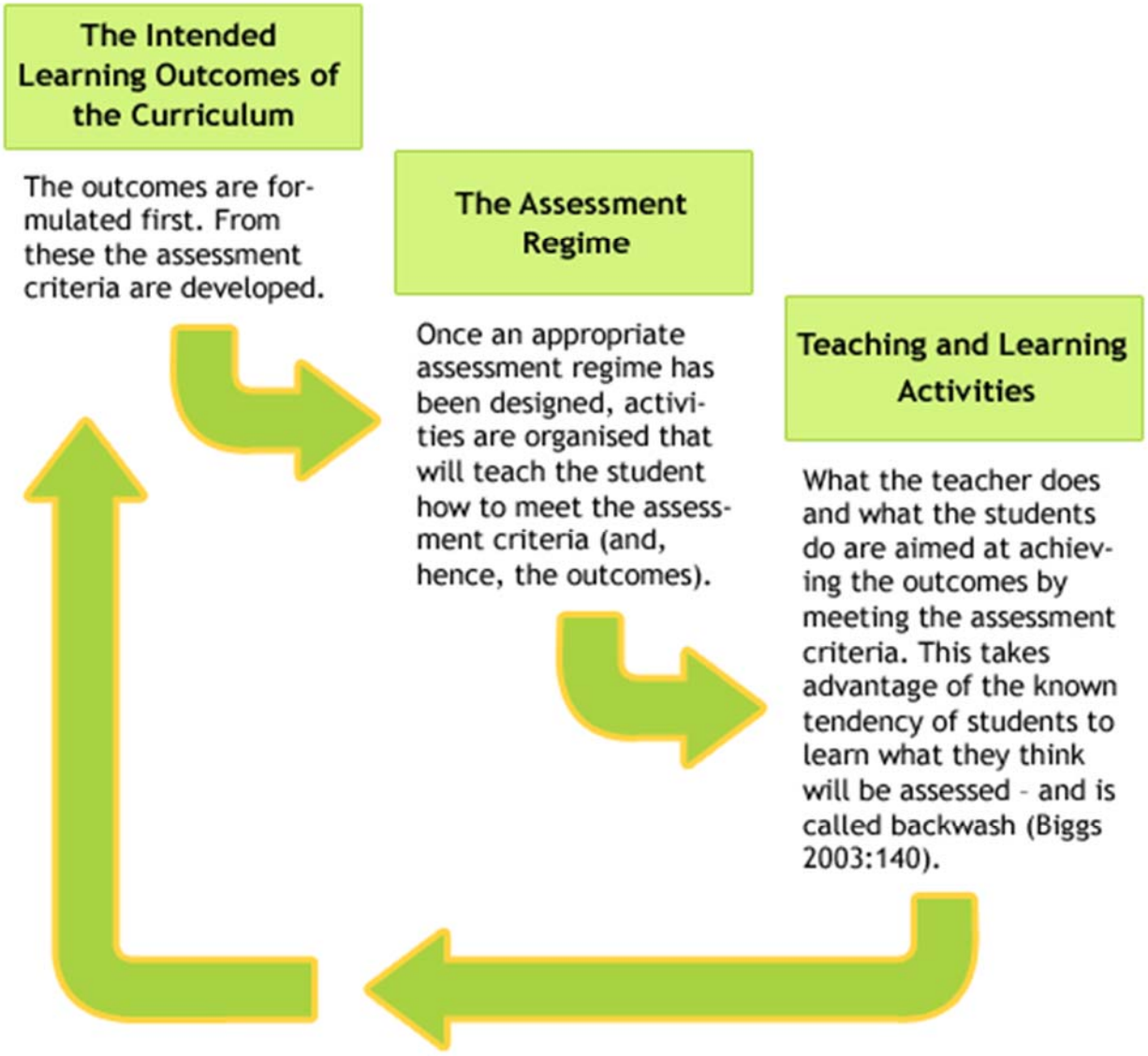
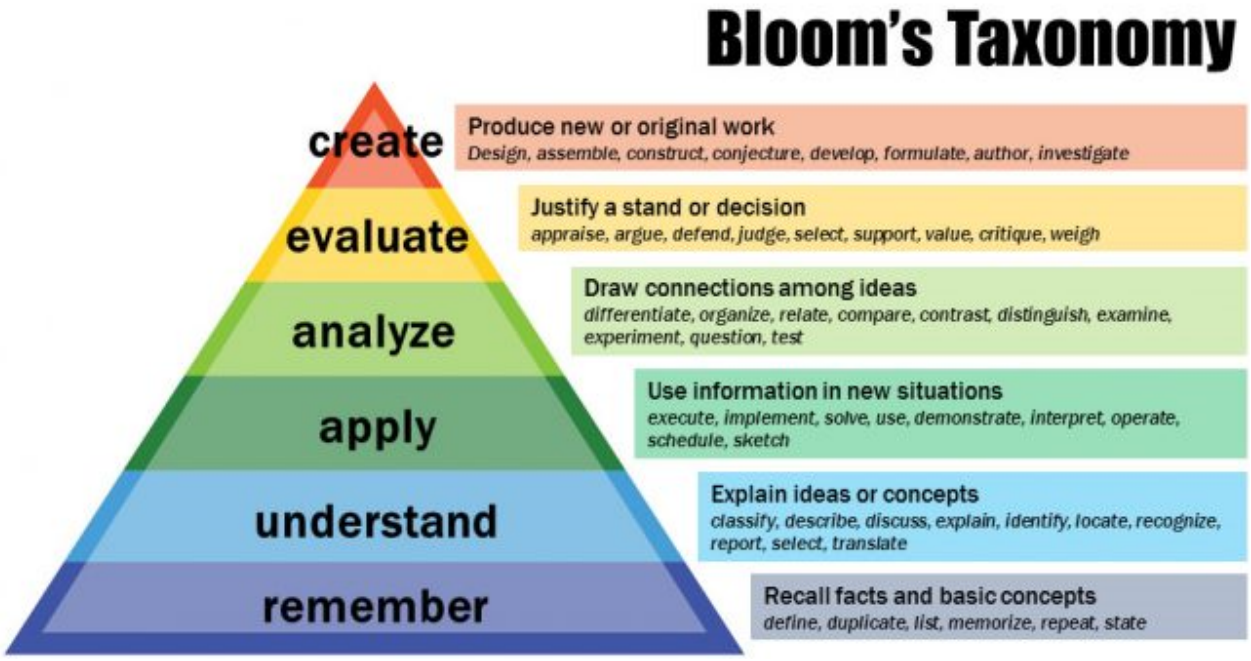


Figure 43. *Bloom's taxonomy (after Armstrong, 2010)*



One of the models behind RCL is mARC (more Authentic, Reflective, and Collaborative), developed by Radović et al. (2021). The mARC model assumes that students will be assigned tasks with a high level of complexity, specific to the professional environment in which they will carry out their activity; students will involve in an investigative approach in which they will accumulate new knowledge and skills; the tasks assigned to students follow a concrete, pragmatic finality; learning is experiential, student-centered, non-directive; the tasks are rigorously distributed temporally, they are performed in a collaborative way, benefiting from the support of professionals and practitioners; during the learning process students go through several stages in terms of knowledge, reflection leading to re-contextualization (use of previously acquired knowledge to understand and manage a concrete situation) and finally to de-contextualization (generalization).

The three pillars of this instructional model are authenticity, reflection and collaboration, which ensure not only active, student-centered learning, in-depth learning, but also a transfer of knowledge to real contexts.

Figure 44. *mARC instructional design model (Radović et al., 2021, p. 7)*

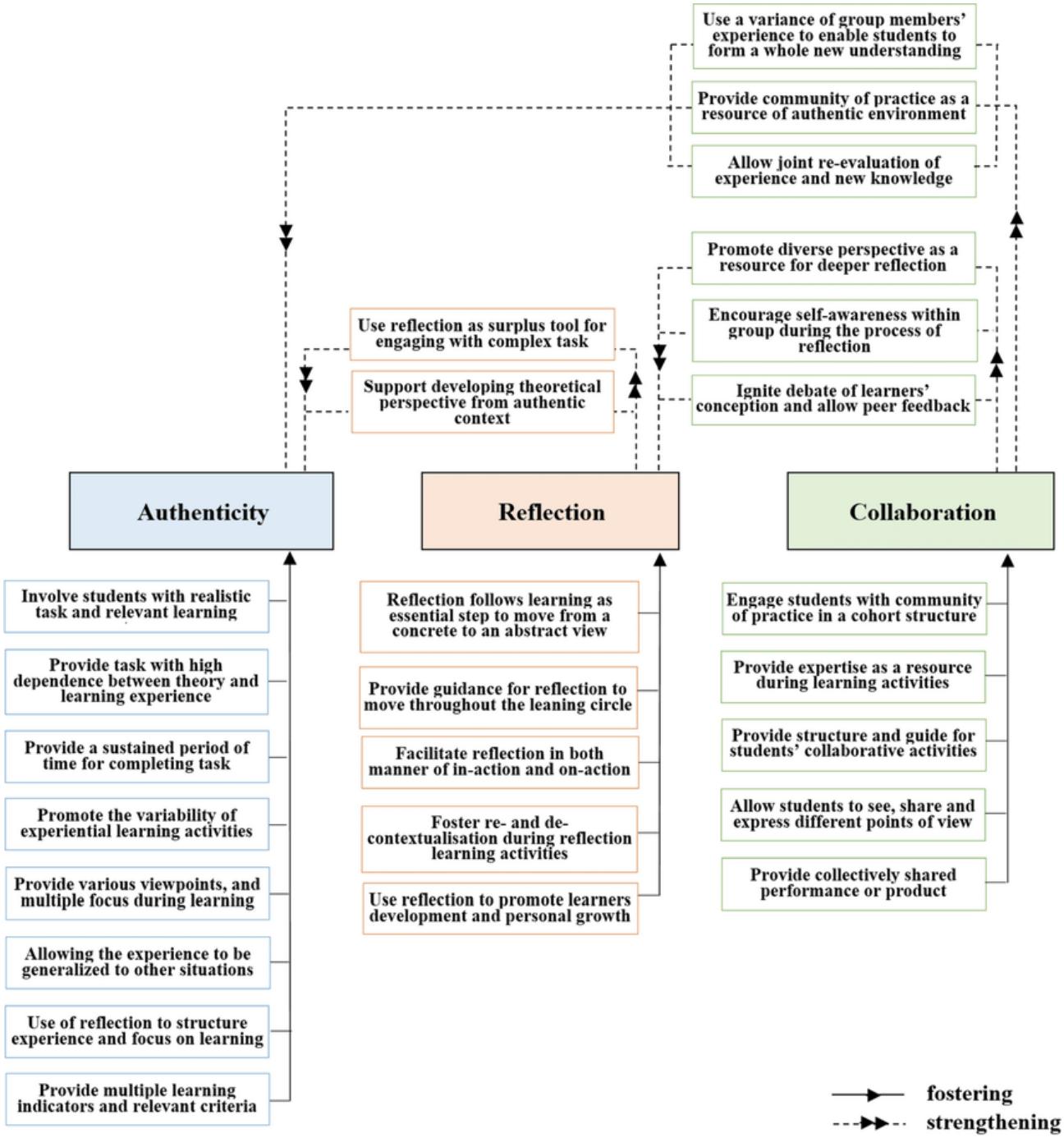


Table 18. ***Authenticity (Radović et al., 2021, p. 7)***

Elements	Elements description
Involve students with realistic tasks and relevant learning (Wenzlaff and Wieseman 2004).	The first form of 'realism' is when students are able to identify relations between learning outcomes and learning process. Learning process should question student knowledge and exercise their higher levels of thinking, while focused on relevant learning outcome, product or performance (Ashford-Rowe, Herrington, and Brown 2014; Wald and Harland 2017). Rather than forcing students to remember procedures and facts (Elvira et al. 2017).
Provide tasks with high dependence between theory and learning experience (Celik 2012).	The second form of 'realism' is the presence of a real context (Gulikers et al. 2008) that reflects the complexity of real work settings (Villarroel et al. 2019). Professional situations, reassembled in a learning environment, engage learners in more meaningful learning (Herrington and Kervin 2007). More importantly, learners' perceptions of the dependence between knowledge and experience facilitate the processing of learning experiences at a deeper level of reasoning in order to construct theory (re-contextualisation).
Provide a sustained period of time for completing task (Bain et al. 1999)	Solving complex tasks over a longer period of time has the potential to increase the ability of students to think more critically, reason effectively, and build understanding while looking at learning experience (Bain et al. 1999; Ursin and Paloniemi 2019). Moreover, sufficient time is needed for learners to be able to see and investigate all the connections between task, learning experience and academic context (Ashford-Rowe, Herrington, and Brown 2014; Elvira et al. 2017).
Promote the variability of experiential learning activities (Aiken and Day 1999)	Students should move through experiential learning cycle without consistency and fixed patterns in order to see the complexity of concepts that need to be understood (Elvira et al. 2017; Herrington and Kervin 2007). Moreover, when learners are challenged to associate between various and different learning experiences, it is likely that a coherent and more structured understanding will be developed.
Provide various viewpoints on, and multiple foci during learning (Hagevik, Aydeniz, and Rowell 2012)	Herrington and Kervin (2007) pointed out that providing opportunities for learners to explore different perspectives during learning can support explicating procedural knowledge into conceptual and vice versa. In addition, different angles or approaches during learning processes provoke a wide range of cognitive strategies, such as 'repetition, elaboration, analysis, organisation or deduction' (Elvira et al. 2017, 195).
Allow the experience to be generalised to other situations (Howard, McClannon, and Wallace 2014)	Learners should be provided with a mechanism to go beyond the reproduction of fragments of learning experience to achieve a deeper understanding (de-contextualisation) (Villarroel et al. 2019). Such a procedure can lead to further use of knowledge, or re-contextualisation to other, unrelated situations (Elvira et al. 2017). However, something learned in one situation is often not easy to transfer to other problems, situations and contexts (Tynjälä, Välimaa, and Sarja 2003).
Use reflection to structure experience and focus on learning (Korkko, Kyro-Ammala, and Turunen 2016)	Reflection should be used as a mechanism to connect learning experience with a broader context of knowledge, in an endeavour of making new understanding or solving complex tasks (Slavich and Zimbardo 2012). Elvira et al. (2017, 196) state that through reflection 'tacit knowledge can become explicit'.
Provide multiple learning indicators and relevant criteria (Cowan 2012)	Learning indicators should be a true representation of the criteria the learner has to meet in real-life or professional carrier (Herrington and Oliver 2000). Moreover, students should be able to estimate their effort with desired standards and to plan their learning activities using skills of self-monitoring, planning and self-evaluation (Elvira et al. 2017).

The reflexive-collaborative model of instructional design in UVT involves the completion of the following stages:

- Analysis of the professional environment
- Analysis of possible interactions between the scientific area of the discipline and the professional environment
- Elaboration of the courses syllabus (establishing the professional and transversal skills that will be developed for the students; formulating learning objectives and results, which are associated with contents, teaching and assessment methods centred on the student and in accordance with the expectations of the professional environment).

According to the UVT Teaching & learning Brand, the assessment must first be formative (during the semester), and then summative (at the end of the semester), with an emphasis on feedback, on the training needs of the students, on stimulating deep learning, and not on their classification (the difference between assessment and evaluation). The evaluation is not an end in itself, but a means by which the teacher evaluates both the progress of the students and his/her own academic activity.

The evaluation is also intended to be a 360^0 type, in which:
- the student self-evaluates, through a reflective approach regarding his own learning and academic performance, with the help of learning indicators corresponding to the expected learning outcomes;
- the student receives feedback from his colleagues, through peer to peer assessment;
- the student receives feedback from the teacher for the tasks he performs during the course and seminar hours during the semester, in order to achieve the expected learning outcomes.

According to the UVT Teaching & learning Brand, in the design of the teaching activity, teaching content and assessment must be coherently organized from the beginning, in a unified whole, based on learning objectives and learning outcomes. This information is integrated in the syllabus, a document that is made known to the students from the first course, made available to them, and used as a frame of reference throughout the teaching activity. Students thus have, from the beginning of each semester, a clear picture of what they will learn, of the skills they will acquire, of the objectives they will achieve, but also of the assessment methods, detailing the tasks to be completed, of the indicators to be reached, of the minimum and maximum performance standards.

According to the principles enunciated within the UVT Teaching & learning Brand, student-centred learning also requires a student-centred assessment, in which not the accumulated knowledge is evaluated, but the competencies (whether we are talking about professional or transversal skills), operationalized in the form of knowledge, skills and attitudes. The evaluation must be sustainable, must be considered learning and empowerment (for more details consult the information on the page of the Academic Development Centre within UVT https://cda.uvt.ro/documents/).

UVT Teaching & learning brand therefore aims to implement in all the university training programs it proposes (both for initial training, but also for master's degree, all specializations), this model of authentic educational design, to bring real life into classrooms, whether we are talking about a classical or online education, in order to better

meet the training needs of students and to train better prepared graduates, in accordance with the requirements of the labor market.

III.6. THE CLASSROOM LABORATORY UVT-NTNU JOINT COURSE. AN AUTHENTIC LEARNING ENVIRONMENT

The first attempt to create an authentic online learning environment took place in 2000, through the efforts of Herrington and Oliver, who developed an instructional design model, based on the principles of constructivism, making a clear demarcation between classical, abstract teaching, and authentic teaching, in which knowledge is applied through problem solving. The model proposed by Herrington and Oliver is based on nine principles: it is authentic and realistic, meaning that students will be put in situations similar to those they will face in their professional life, they will be put to carry out authentic activities and they will be assigned authentic tasks; will collaborate with experts and will benefit from their support in carrying out their tasks; they will be given access to multiple resources; the tasks will be carried out in teams, through collaboration with other colleagues; reflection and feedback will be encouraged; the teacher will have a facilitator role, who will support and advise the students in their activity, intervening if necessary; the evaluation will be authentic and will aim at the way in which the students fulfilled their tasks and especially what, how and how much they learned as a result of this experience (according to Lee, 2020, p. 2).

Table 19. ***Comparison between epistemological and ontological approaches to authentic learning (Lee, 2020)***

	Epistemological approach	Ontological approach
Philosophical foundations	Knowledge-focused: Constructivist learning paradigm	Existence-focused: Transformative learning paradigm
Learning purpose	Constructing meaningful knowledge	Becoming a more authentic person
Learning process	Problem-solving, collaborative knowledge production, reflection	Critical reflection, rational dialogue, multiple becomings
Learning outcome	New knowledge and skills	New perspectives and critical awareness
Learning model	Situated learning	Transformative learning
Tutors' roles	Instructional designers: Designing authentic learning activities and facilitating knowledge production	Emotional supporters: Triggering disorienting dilemmas and providing emotional supports
Pedagogical limitations	A lack of political direction and emotional emphasis	A lack of pedagogical direction and practical design principles

The idea of the need to transfer from a classical learning, strictly limited to the university environment, to the pragmatic university, to the triple helix, based on the connection between the academic environment, the world of work and society appears in the literature since the 90s of the last century (Tynjälä et al., 2003, p. 148).

The *Classroom Laboratory UVT-NTNU Joint Course* presented at the beginning of this book managed to achieve this triple helix, to create a learning environment in which students came into contact, communicated, collaborated and created knowledge together,

beyond the barriers of geographical space, shared their own culture and life with the help of technology.

In the Classroom Laboratory, the virtual exchange was used. Virtual exchange (VE) names the various ways in which students interact and collaborate online, with partners from different cultural backgrounds and geographical backgrounds, as an integral part of a course assignment and under the guidance of a teacher, facilitator or expert (O'Dowd, 2021, p. 1).

Classroom Laboratory is also part of what the literature has called "global classroom", in which learning took place under the sign of intentionality, meaning that students are fully responsible for their learning, that is meaningful for them. Students were actively involved in learning, in an autonomous way; through collaboration and communication with teammates. They not only accumulated new knowledge, but formed new competencies and learning abilities, exchanging information and opinions, instead of classical learning, based on memory.

In Classroom Laboratory students collaborated in interdisciplinary, transnational teams, where they were put in the situation to communicate, to learn together, to exchange knowledge and good practices, to help each other when needed, to organize and manage for themselves the tasks they had to perform.

Another feature of the global classroom which Classroom Laboratory accomplished, was that it used ICT appropriately, with students choosing the right technologies to perform their tasks and interact with teammates.

As a global classroom, Classroom Laboratory conducted learning activities that went beyond the strict framework of the university environment, made the connection with the professional environment through access to a group of experts, acquired and used skills required in the world of work (teamwork, problem solving, decision making, communication, project management). The interdisciplinary and transnational character of the teams led to the development of cultural awareness.

The *Classroom Laboratory UVT-NTNU Joint Course* is thus part of UVT's efforts to implement an educational design based on authenticity, with the following general characteristics:

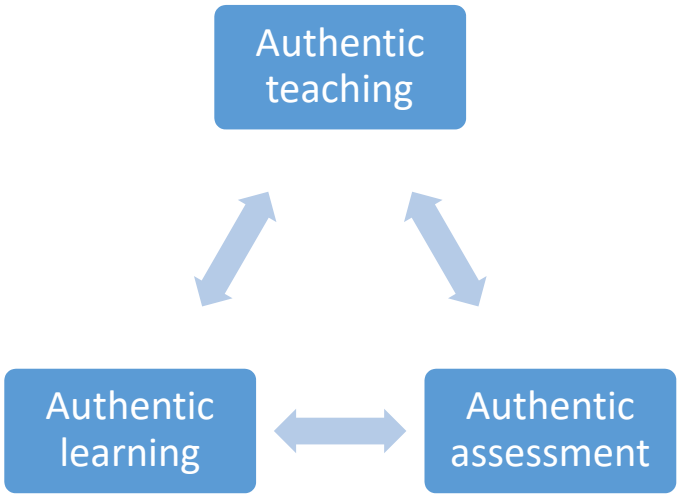
- realistic tasks that students had to fulfill in the project-based learning framework of the course;
- collaboration and communication practiced in teamwork;
- reflexivity and feedback that contributed to self-learning and peer learning;
- autonomous, non-directive learning, learning by doing;
- collaboration with experts from the world of work who provided consultancy to students during the development of their projects;
- the role of facilitators and mediators of learning assumed by the teachers who coordinated the course.

The *Classroom Laboratory UVT - NTNU Joint Course* thus fulfills all the conditions that an authentic education presupposes, focused on bringing real life into the classroom (for more information regarding this course, access the course website: https://vrclassrooms.uvt.ro/HTML/jointCourse.html).

CONCLUSIONS

Bringing real-life cases in virtual classrooms, as well as in face to face classrooms, means designing an authentic learning environment.

Figure 45. *Authentic learning constructivist alignment*



Authentic learning assumes that students are the main actors in the learning process. They learn autonomously, through experience and discovery, through activities and tasks similar to those they will have to perform at work. This investigative approach of students is done by working in a team, with other colleagues, collaborating with specialists and experts who provide support, communicating, reflecting on their own learning and supporting through feedback the learning and progress of colleagues. In this scenario, the role of the teacher is fundamental, because he is the one who brings real-life cases in the classroom. He no longer transmits knowledge, but offers students the opportunity to discover themselves, intervening only when needed. What differentiates the virtual class from the face to face one is the use of technology, ICT, sometimes VR, essential for communication, organization of learning, collaboration and accomplishment of tasks. Bringing real-life cases in virtual classrooms helps students not only to acquire fundamental knowledge for their field of study, but also to develop the skills and abilities necessary to perform on the job market, thus being better prepared for the challenges of professional life.

The main characteristics of the authentic learning are presented below:

Table 20. *Main features of authentic learning design*

Authentic learning	- Realistic; - Involves ill-structured, complex, meaningful, contextualized problems students need to solve; - Teamwork, collaboration of students; - Experiential, learning by doing; - Practical use of knowledge in realistic tasks, for solving real professional life problems; - Self-directed, autonomous, student-centered learning; - Students use resources and tools specific to the professionals in their field of science.
Authentic teaching	- Authentic learning environment, recreating real world conditions and context; - Teacher is facilitator, mediator, he/she offers support, stimulates and encourages students to learn and to reflect on their learning and progress; - Use of ICT; - Problem-based learning or Project-based learning.
Authentic assessment	- Realistic, connected to the real life through tasks similar to the professional environment; - Evaluate tasks, outcomes and learning process; - Formative assessment; - Feedback, peer-evaluation, self-evaluation; - Reflection on learning.

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