athena

Athena Design Thinking for Digital Learning

Project Athena - University Goes Digital for a
Global Sustainable Education
|August 2021|

iscte INSTITUTO UNIVERSITÁRIO DE LISBOA   Université Gustave Eiffel   POLITECNICO MILANO 1863   WEBWISE investimento com retorno   SFU Sigmund Freud PrivatUniversität Wien

Technical Information

Main partners :

iscte — INSTITUTO UNIVERSITÁRIO DE LISBOA

Université Gustave Eiffel

SFU Sigmund Freud PrivatUniversität

POLITECNICO MILANO 1863

WEBWISE
investimento com retorno

athena

Associated partners :

AUF Agence UNIVERSITAIRE DE LA FRANCOPHONIE

HERIOT WATT UNIVERSITY

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO

ESSECT
Ecole Supérieure des Sciences Economiques et Commerciales - Université de tunis

Microsoft

US Universidade de Santiago
O futuro ao teu alcance

UNIVERSIDADE FEDERAL DE SANTA CATARINA

جامعــة التقنية والعلوم التطبيقية صلالة
University of Technology and Applied Sciences - Salalah

With the support of the Erasmus+ Programme of the European Union

Table of content

Background and Purpose

The purpose of the Project University Goes Digital is to improve digital skills of University teachers, to reinforce their capacity to respond to the challenges Universities are facing during the COVID-19 pandemic or will face in future similar challenges. With active involvement of the lecturers and students from the beginning of the project, ATHENA will create, test and implement innovative digital practices, putting technologies in use to create new pedagogical approaches and achieve better learning and teaching experiences. The project seeks to foster cooperative learning environments, making them transformative and inclusive through the effective adoption of new technologies, such as e-learning, gaming platforms, virtual and augmented reality, systematically modelled to activate key competencies in digital learning. The project will create templates that lecturers can adopt and adapt to their classes, using different pedagogical approaches. It will be a toolkit that includes ebooks, videos, games, quizzes, AR and AI.

RESULTS:

O1 - a multi-regional Platform Digital Learning Live HUB for Lecturers (eLEARN-HUB) to support lecturers to implement online/e-Learning courses. The eLEARN-HUB wil have: 1) a Pedagogic Model of Digital Learning, with course learning design (learning outcomes, syllabus, schedule, teaching methodology, assessment, academic resources, technological tools); and 2) a Prototype of Digital Learning Solution.

O2 – a Universal Toolkit for Digital Learning, to be used and tailor made by lecturers from all the scientific areas.

O3 – O6 – four online courses: Technology in Architecture, Organization and Leadership, Logistics and Research Methodology. The 4 Courses will be tested with pilot groups of professors and students, with active online participation of teachers from non-European Countries (Cape Vert, Brazil, Tunisia). The final version of the courses will be implemented in training events with lecturers from the 4 partners. In the testing phase, using pilot courses and staff training events, Lecturers of the 4 Universities of the project will be given the skills to develop digital tailor-made courses for their students, using: GBL VR/AR, video classes, and AI systems.

For Intellectual Output 1 three main themes made explicit in the Athena Digital Learning Pedagogical Model; Athena Design Thinking methodology; Athena Pedagogical Model have been defined as worth investigating in the research phase and to be implemented along the project.

Those themes are all related to digital learning and inspired by the Digital Education Readiness program of the European Commission.

Theme 1: Digital Learning State of Art
Digital learning literature review and Experiences from the field

Theme 2: Athena Design Thinking for Digital Learning Field Diagnosis
Towards students-centred systems
Towards an effective Digital Education Technological Solution

Theme 3: Athena Digital Pedagogical Model
Towards a relevant digital educational provision

This report is regarding Theme 2 and the goal is to present the design thinking methodology involving the students and the teachers, in order to define the requirements for the digital learning technological solution.

Introduction

Some rapid changes are occurring in our society in general. Education is also facing new challenges related with technology, sharing economy and general access to information. Covid19 pandemic accelerated this process and higher education students and teachers had to reinvent their roles and themselves. Some questions arose around the impact of technologies, internet and content digitization on traditional education models and also the impact of social deprivation in academic results and psychological level.

To exploit these challenges, difficulties and opportunities Athena Project adopts Design and Future Thinking methodology (Annex 1), to reach a deeper understanding of what teachers and students feel and dream based on creative techniques, such as context mapping identifying the agents/ PERSONAS affected by these changes in HE environments and institutions.

After identifying the PERSONS affected by these changes in HE environments and institutions, and framing the problems (empathy phase), a new stage takes place to hear them, draw ideas, in a divergence process, and focalize on those that can be a starting point (convergence process) to build a new educational model and pedagogy. Brainstorming and ideation was the methodology adopted to awake inspirational moments, based on the following principles:

Postpone judgement: all ideas are welcome	Quantity over quality	One conversation at a time
Use headlines	Build on top of other ideas	BE WILD.

Ideation is a creative and an exciting stage in a Design Thinking process and aims to generate a large quantity of ideas. Based on these ideas it is possible to filter and cut down into the best, most practical or most innovative ones in order to inspire new and better Education models and pedagogy, where students and teachers accomplish better educational results.

Starting point: 4 ideation sessions were developed between 24 and 25 June involving 21 teachers and other stakeholders. The sessions had 120 minutes duration and followed a scripted structure:

Duração	Elapsed	Moment	Description	Type	Team
0:05	0:05	(tolerance)	-	-	-
0:05	0:10	Melting the ice	Welcome and "Introduce myself"	Shot	Manuel
0:10	0:20	Context Mapping	Exercise to map the context	Practical	All
0:15	0:35	PERSONAS' analysis	Review the PERSONAS and create new ones	Practical	All
0:15	0:50	Problem Statements	Create a structure	Practical	All
0:10	1:00	How Might We	Exercise - unlocking HMW	Practical	All
0:15	1:15	Brainstorming	Ideation phase	Practical	All
0:10	1:25	Idea Clustering and Voting	consolidate ideas and vote	Practical	All
0:20	1:45	Storyboarding	Writing a story	Practical	All
0:10	1:55	Testing	Identify one person to explore the storyboard	Practical	All
0:05	2:00	Wrap-up	Close and thank you	Shot	Manuel

Before the session take place, all participants agreed individually, with the recording of the sessions:

WE'RE RECORDING

- Before we start, I must tell you that this Ideation Session will be recorded for data analysis.
- At the end of the project, in February 2023, all collected data – videos, sound, images and other artifacts - will be destroyed.
- After that moment, no personal identifiers of any kind will be retained, and the data will be fully de-identified.
- As such, we require your approval to record this session, one by one.

To melt the ice each participant presented themselves using the following structure:

For the ideation sessions the following structure was adopted: Context Reviewing; Getting to Know Our PERSONAS; Defining Problem Statements; Ideation Priming; Brainstorming; Idea Clustering and Sorting; Prototyping.

The sessions took place in a virtual space and the tool used to interact was Mural, a collaborative tool where people can place post-its on a shared digital board and interact with each other:

After these 4 ideation sessions and to have some qualified feedback from other stakeholders – the students, the results from the ideation sessions were narrowed and went further on the dialogue towards reaching our conclusions. A total of 9 students split between 2 sessions. (…)

Design Thinking Methodology

Design Thinking methodology is a creative and iterative process based on the intention to improve situations by analyzing and understanding users and how they "are" and "feel" in those situations, investigating the conditions in which they occur. So, Design Thinking is a centered-user methodology: all activities are developed around making the user's life better, cross sectors and activities, and aims to identify alternative strategies and solutions or reach better results in societies, organizations, services, products, education […] improving experiences or answering to new challenges.

Design Thinking is a methodology that involves all stakeholders, to achieve a full understanding and communication. All participants in Design Thinking process participate in a goal setting, reasoning and a detailed planning. To achieve results, they need to share the vision behind the situation that is in focus. Time is wisely spent in the beginning to smooth the following implementation steps. Involvement of participants has to be 100%.

The result of Design Thinking activities is a prototype or a common understanding of what to achieve and a plan on how to proceed building the Minimal Viable Product (MVP) and which features should be added after it goes live. On top of that, there will be the need to build a set of functions that user's really want and need.

The purposes of Design Thinking process are:

- Uncover real users´ needs using a user centricity approach
- Boost communication and understanding around the problems
- Create value and test solutions for these users' needs
- Be better and faster on building solutions for "pains" and problems
- Be focused and measurable to extract clear goals from real users' needs
- Get prioritization to identify the most pertinent features

Design Thinking is a fast paced exercise, with the goal to create a concrete problem framing and an implementation plan for the most promising solution. It is organized in several stages:
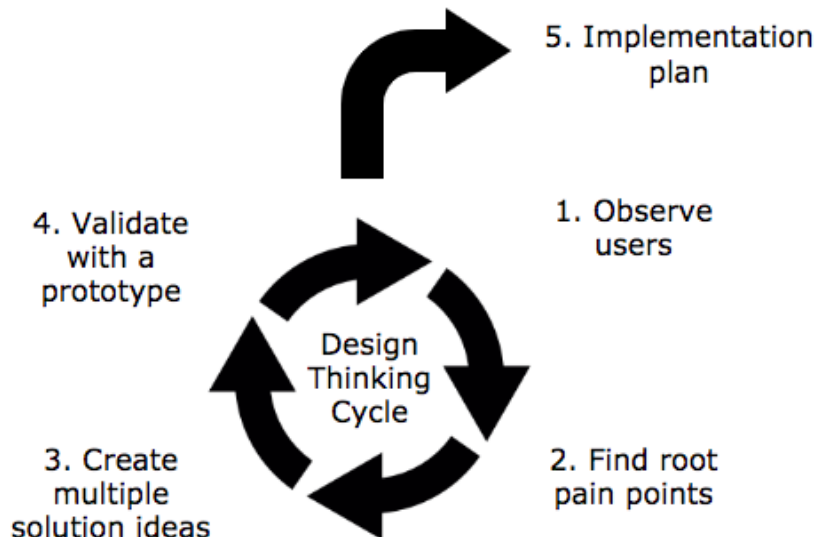
The starting point are the PERSONAS and their problems, pains and gains. Using different techniques - direct observation, interviews and questionnaires or storytelling - it is possible to collect data about the users. This **observation** phase results in a better understanding of the users and their real "pain points". As the **root "pain points"** are identified they have to be systematized in an experience map document. The next stage is to **create multiple ideas** applying ideation techniques such as brainstorming sessions.

The **paper prototype** challenges the solution idea from ideation with the lowest possible effort and tries to resolve the user's pains. The **implementation planning** starts right after the finalization of the paper prototype.

Design Thinking in Athena´s Project
Design Thinking methodology was applied to Athena´s Project with the purpose to improve digital skills of university teachers and reinforce their capacity to respond the challenges universities are facing during COVID-19 pandemic and will face on future with the ubiquitous of technology and digitalization. With active involvement of teachers and students since the beginning of the project, Athena is able to create, test and implement innovative pedagogical practices and approaches, not only using digital resources but also meeting the physical, social and psychological needs of the students in order to achieve better teaching and learning experiences and results and develop a Digital Learning Live HUB for Lecturers.

The project followed a workflow to design the most suitable approach:
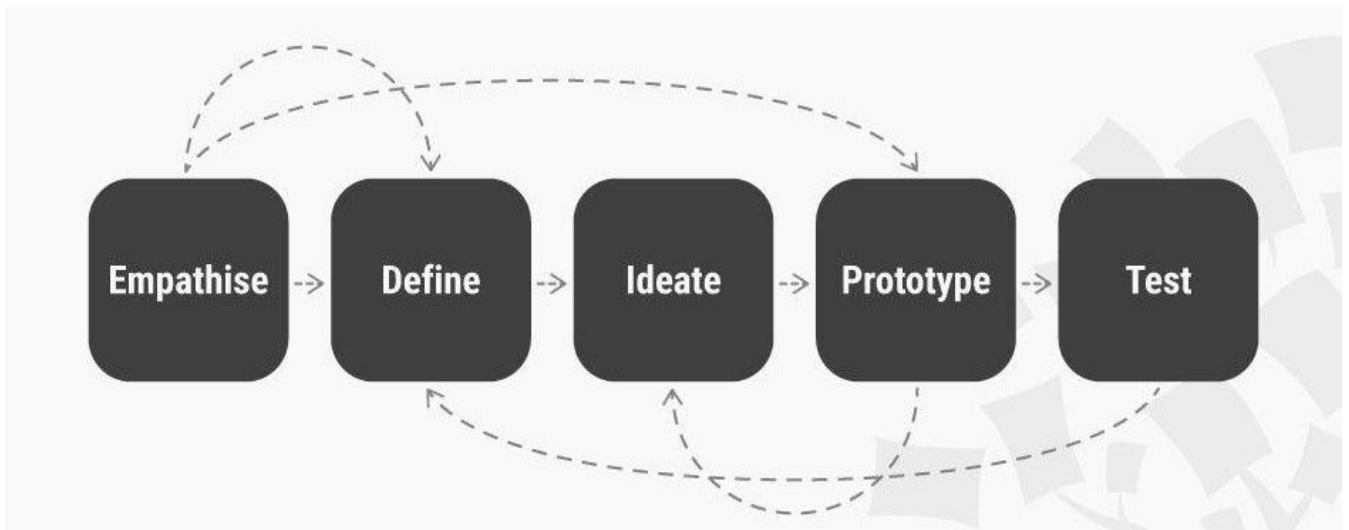
The methodology is grounded on two dimensions, the **problem space**, where the pains are debated and the problem is framed, and the **solution space**, where the solutions are set and an implementation plan defined to meet the pains identified:
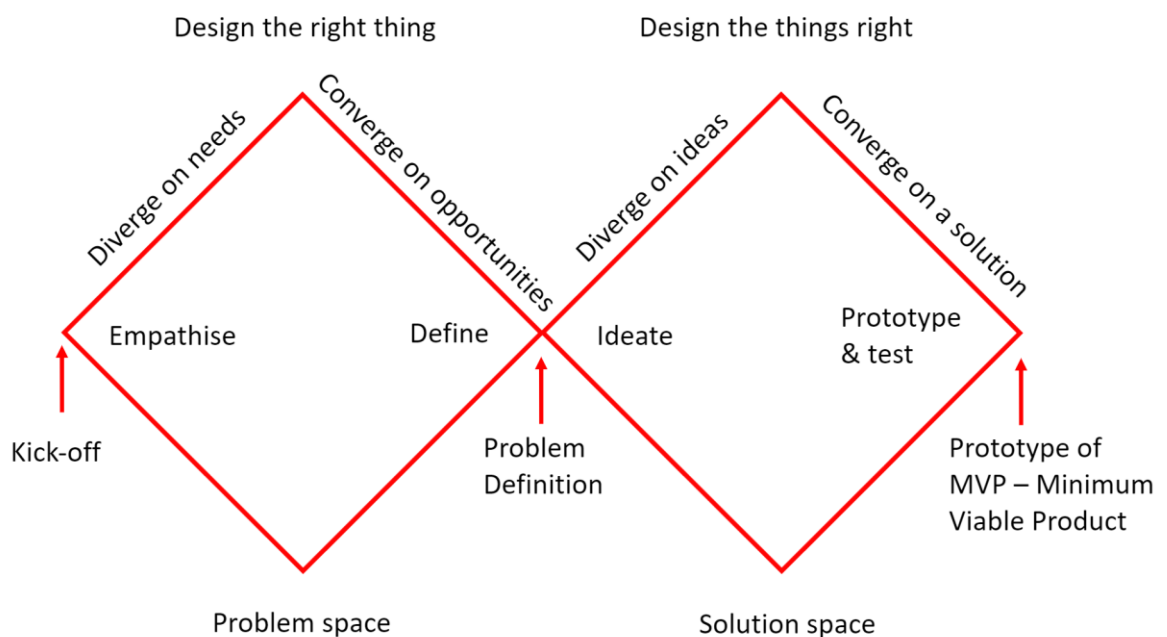
Side by side with a research to characterize the "AS IS" environment in Higher Education context, given by literature review, the first step of the process was to empathize with the targeted users to know their difficulties and pains, and build stereotypes/ PERSONAS to work. Applying these concepts and methodologies to educational contexts, Design Thinking in ATHENA´s project revolves around a deep

interest in developing an understanding of teachers, students and other stakeholders related with High Education.

For this process 2 main activities were developed:
- **Questionnaires/interviews** with the stakeholders – teachers, principals, students - using a set of dimensions to characterize them, their tasks, user journey and difficulties;
- **Storytelling** sessions in which some stories, successful or not, were shared to inspire later opportunities, ideas and solutions. These stories were framed around real people and real experiences, providing concrete details that can help to imagine solutions to the problems in solution space.

With these activities it was possible to define the PERSONAS and the empathy maps.

Personas, and Empathy Maps Based on Observations

3.1 Text Mining based on the Questionnaire

This study analyses the open questions from the Erasmus + Athena survey, creating a terms co-occurrence, cirrus map and clustering network map based on text data. For this analysis, we used two open-source tools of text mining - visualisation, namely VOSviewer (VOSviewer 2021) and Voyant (Sampsel 2018). These tools visualise the information in different ways. VOSViewer illustrates the relations and interactions between the most commonly used terms in a network clustering map and shows the links' strength. Voyant illustrates the relations and interactions between the most commonly used terms in Bubblelines and Cirrus views and shows the term's correlation.

VOSViewer is a tool for creating and visualising bibliometric networks based on text data and allows to visualise the co-occurrence networks of terms. This analysis illustrates the relations and interactions between the network's elements (nodes) of the most commonly used terms, allowing identifying networks properties, such as clusters and node centrality. VOSviewer calculates node links and weight, showing each node's importance in the network. This allows us to visualise and identify the main terms of respective relations for quantitative analysis. The size of nodes presents the degree of centrality: the larger the node, the more times it is mentioned in the text data. The thickness of edges presents the number of times two linked nodes are mentioned, indicating their relevance; by default, the networks are distributed from the largest to the smallest (VOSviewer 2021).

Voyant is a web-based text analysis tool that shows word frequency, words in phrases and word trending. This analysis illustrates the relations and interactions between the most commonly used terms, allowing identifying correlations, trends, and links between them. Voyant presents the terms in a Bubblelines view with different granularity and in Cirrus views. Bubblelines visualises the frequency and distribution of terms in text data. Each text data is represented as a horizontal line and divided into segments of equal length (50 segments by default). Each selected term is defined as a bubble with its size indicating the word's frequency in the corresponding segment of text. The larger the bubble is, the more frequently the word occurs. Cirrus is a word cloud that visualises the most frequent words of the text data. The word cloud places the words such that the terms that occur the most frequently are positioned centrally and have bigger size. The algorithm goes through the list and attempts to draw words as close as possible to the visualisation centre. It's important to understand that the colour of words and their absolute position are not significant (Sampsel 2018).

3.1.1 Text Analysis

The analysed text data were retrieved from the answers to the following 10 open questions (Table 1):

Number	Question
14	Please state your 3 top goals, as a professional or a student
15	Please state your 3 top frustrations, as a professional or a student
21	What happens before you carry out the activity? How do you prepare yourself for the activity?
26	What is the expected operational result after completing the activity? In the case of different results, please prioritise them.
34	Describe the space you use to carry out the activity (for example, U shaped room, auditorium, home, ...).
45	For each device you selected in the previous 2 questions, please describe who else uses the devices and in which environment (if the question does not apply, please answer 'Not applicable')?
46	What other types of objects do you use when performing the task (if the question does not apply, please answer 'Not applicable')? If applicable, please also describe who else uses such objects and in which environment?
51	What are the biggest problems and/or challenges you face when performing the activity and how much do you know about these challenges? For each problem it would be helpful if you clarify. What are the biggest problems and/or challenges you face when performing the activity and how much do you know about these challenges? For each problem it would be helpful if you clarify. A. Why did it occur? B. Why is the problem important ? C. Who is involved and/or affected? D. Who is the decision maker? E. When did the problem start? F. Where has it been solved?
52	What are the opportunities for improvement and benefits you can think of, regarding the tasks you perform? If possible, please rank them by importance.
53	Do you have any observations or reflections to add?

Table 1: Questions

For the needs of this analysis, we had to clean and pre-process the text data and remove outliers. We selected only the 10 open questions, we confirmed there is no duplicate data, and we removed the 'Not applicable', 'No', 'No, thank!' questions responses. In more detail, we drop the outliers and remove the undesirable responses using Python with the Panda library in the Jupyter notebook programming environment. The total number of responses was 42, and after removing outliers, 41. Finally, we had to convert the excel file into plain text format to be used as an input to the two open-source text mining - visualisation tools

3.1.2 VOSViewer Analysis

Terms co-occurrence analysis was performed using the mentioned text mining tool for network analysis, VOSviewer. The analysis was performed utilising a full counting method, encompassing 57 screened terms, with a minimum threshold of 4 co-occurrence. Of the total 57, only 34 terms were selected for the purpose of the analysis (Table 2).

Term	Occurrences	Link Strength	Term	Occurrences	Link Strength
Learning	13	65	DIFFICULTY	6	21
Organization	5	64	EXAM	4	21
Participant	4	60	COMMUNICATION	5	19
Lot	9	53	VIDEO	5	14
Tool	11	49	WORK	10	13
Lesson	7	48	SCHOOL	4	13
Topic	6	46	COMPETENCY	11	12
Exercise	6	44	TEACHING	7	12
Place	4	38	PERSON	6	11
Skill	13	37	BIGGEST PROBLEM	4	10
Covid	4	34	GROWTH	8	9
Year	9	33	TABLET	6	9
Opportunity	6	27	BOOK	4	9
Note	7	26	KNOWLEDGE	9	5
Paper	6	25	TEST	6	4
Impact	5	23	HOSPITAL	5	3
Question	11	21	LECTURE	7	0

Table 2: Terms of co-occurrences ranked by link strength.

Most of the analysed terms were related to learning, organisation, participant and tools. The top five identified terms were learning (13 occurrences, 65 total link strength), skill (13 occurrences, 37 total link strength), tool (11 occurrences, 49 total link strength), question (11 occurrences, 21 total link strength) and competency (11 occurrences, 19 total link strength). In terms of co-occurrence analysis, 6 clusters (Figures 1 and 2) were identified with 34 items and 175 links. The biggest nodes of each cluster were identified as learning (green), competency (purple), question (blue), teaching (yellow), skill (red) and lecture (cyan).
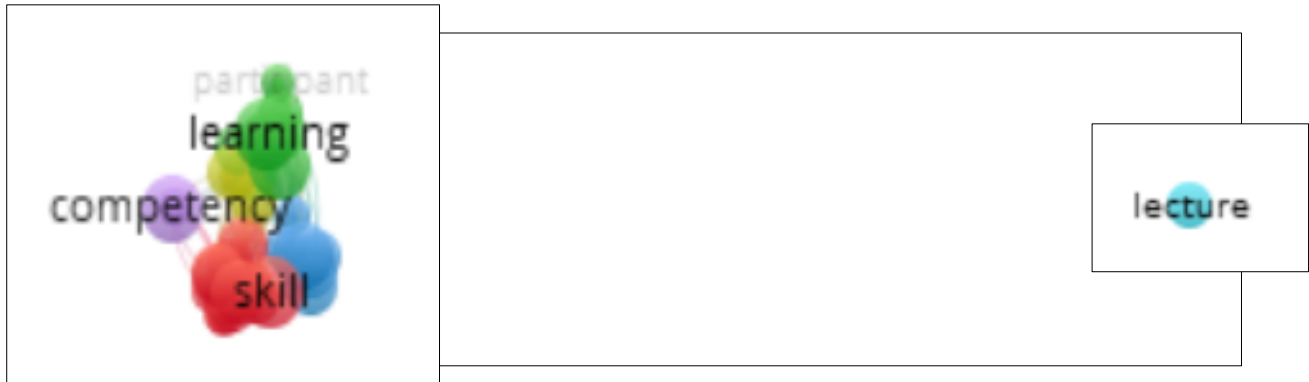
Figure 1: Terms of occurrence network visualisation – All clusters.
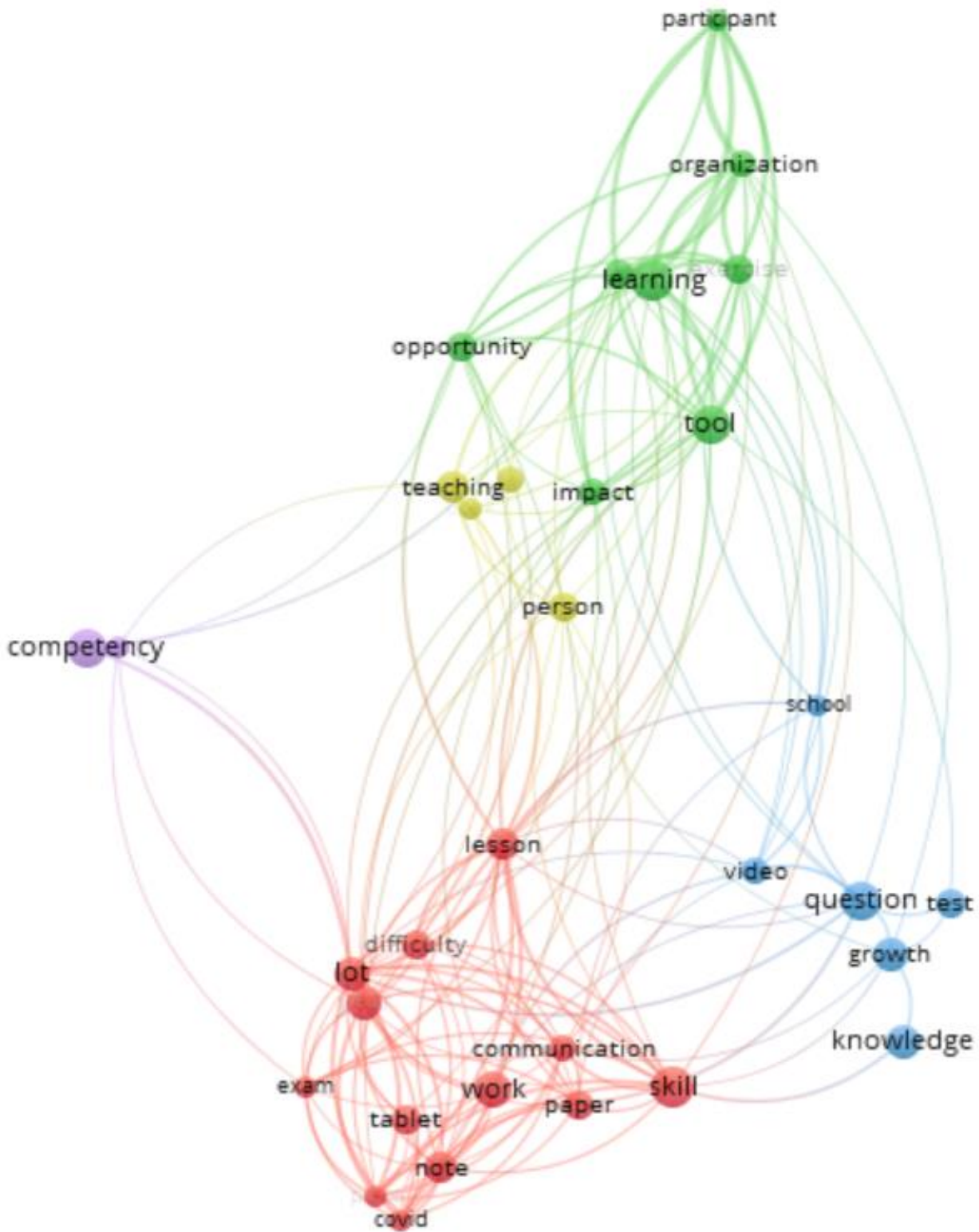
Figure 2: Terms of occurrence network visualisation – Clusters in relation.

There is a large, interconnected network of terms and groups of terms that occur together, but as Figure 1 shows, the lecture cluster (cyan) has no links and connects with the other clusters.

Looking closer at the interconnected network of Figure 2 (33 items, 5 clusters and 175 links):

- The competency term (purple cluster) has a connection with the terms topic (green cluster), and lot (red cluster);
- The learning term (green cluster) has a connection with the terms lesson (red cluster), question (blue cluster) and teaching (yellow cluster)
- The question term (blue cluster) has a connection with the terms lesson, lot, paper, note (red cluster) and learning term (green cluster);
- The teaching term (yellow cluster) has a connection with the terms year (red cluster), biggest problem (purple cluster), learning and tool (green cluster);
- Finally, the skill term (red cluster) has a connection with the terms person (yellow cluster), tool and organisation (green cluster) and growth and knowledge (blue cluster).

3.1.3 Voyant Tool Analysis

Using the Voyant Tool, the analysis was performed utilising a full counting method, encompassing 173 screened terms, with a minimum threshold of 4 co-occurrence (Figure 3 and Annex 2).

Figure 3: Terms occurrence Cirrus Vie

Figure 3 shows the word cloud that visualises the 173 top frequency terms. Looking closer to the cirrus view, we can notice that also in this view that the lecture term has no links, and it connects with the other terms. Moreover, it is important to mention that the term **elaborate** has a strong correlation with the terms **capacity**, **collective**, **colleagues** and **resolve**. The term **organisations** and **participants** have a strong correlation with the terms **family** and **english**, and finally, the term **fair** has a strong correlation with the terms **prepared**, **unexpected** and **audience**.

The correlation between the terms is shown in Table 3.

Term 1	←	→	Term 2	Correlation (r)	Significance (p)
BIGGEST			used	1	0
DECISION			maker	1	0
ADOPT			hospital	1	0
AFFECTS			hospital	1	0
CASES			hospital	1	0
FAIR			tests	1	0
HOSPITAL			related	1	0
HOSPITAL			researchers	1	0
HOSPITAL			studies	1	0
INNOVATIVE			quality	1	0
PREPARING			top	1	0
AUDIENCE			tests	1	0
BASICALLY			psychology	1	0
DAYS			psychology	1	0
FLORENCE			psychology	1	0
FOLLOWING			psychology	1	0
HEALTH			psychology	1	0
LP			tests	1	0
MENTAL			psychology	1	0
PREPARES			tests	1	0
TESTS			totally	1	0
TESTS			unexpected	1	0
ASSESSMENT			engage	1	0
ASSESSMENT			equipment	1	0
CERTAIN			type	1	0
CHARTS			examples	1	0
CHARTS			improving	1	0
CLASSROOMS			whiteboard	1	0
CLEAR			say	1	0
COMFORTABLE			documents	1	0
COVER			e.g	1	0
COVER			organizations	1	0
COVER			participants	1	0
DEFINE			preparing	1	0
DEFINE			top	1	0
DISSERTATIONS			preparing	1	0

Term 1	←	→	Term 2	Correlation (r)	Significance (p)
DISSERTATIONS			top	1	0
DIVERSE			preparing	1	0
DIVERSE			top	1	0
E.G			organizations	1	0
E.G			participants	1	0
EXAMPLES			improving	1	0
GROUP			projects	1	0
HIGH			preparing	1	0
HIGH			top	1	0
INCLUDE			leadership	1	0
LAPTOPS			platforms	1	0
LIVE			slides	1	0
MAPS			opportunity	1	0
MARK			preparing	1	0
MARK			top	1	0
ORGANIZATIONS			participants	1	0
PREPARING			requires	1	0
PREPARING			sequence	1	0
PREPARING			universities	1	0
REQUIRES			top	1	0
SEQUENCE			top	1	0
TOP			universities	1	0
ACHIEVE			elaborate	1	0
AUDIENCE			fair	1	0
BASIS			cover	1	0
BASIS			e.g	1	0
BASIS			organizations	1	0
BASIS			participants	1	0
CAPACITY			elaborate	1	0
COLLECTIVE			elaborate	1	0
COLLEAGUES			elaborate	1	0
CONTROL			cover	1	0
CONTROL			e.g	1	0
CONTROL			organizations	1	0
CONTROL			participants	1	0
COVER			english	1	0
COVER			family	1	0

COVER			flow	1	0
COVER			longer	1	0
COVER			pace	1	0
COVER			qualitative	1	0

Term 1	←	→	Term 2	Correlation (r)	Significance (p)
COVER			quantitative	1	0
COVER			value	1	0
CREATIVE			elaborate	1	0
DIFFICULTIES			positive	1	0
E.G			english	1	0
E.G			family	1	0
E.G			flow	1	0
E.G			longer	1	0
E.G			pace	1	0
E.G			qualitative	1	0
E.G			quantitative	1	0
E.G			value	1	0
ELABORATE			resolve	1	0
ENGLISH			organizations	1	0
ENGLISH			participants	1	0
FAIR			lp	1	0
FAIR			prepares	1	0
FAIR			totally	1	0
FAIR			unexpected	1	0
FAMILY			organizations	1	0
FAMILY			participants	1	0
FLOW			organizations	1	0
FLOW			participants	1	0

Table 3: : Terms occurrence correlation

The frequency and distribution of the top 5 terms, namely the students (87 occurrences), time (34 occurrences), home (31 occurrences), class (29 occurrences) and classes (28 occurrences), can be seen in Figure 4, with 100 segments of equal length.
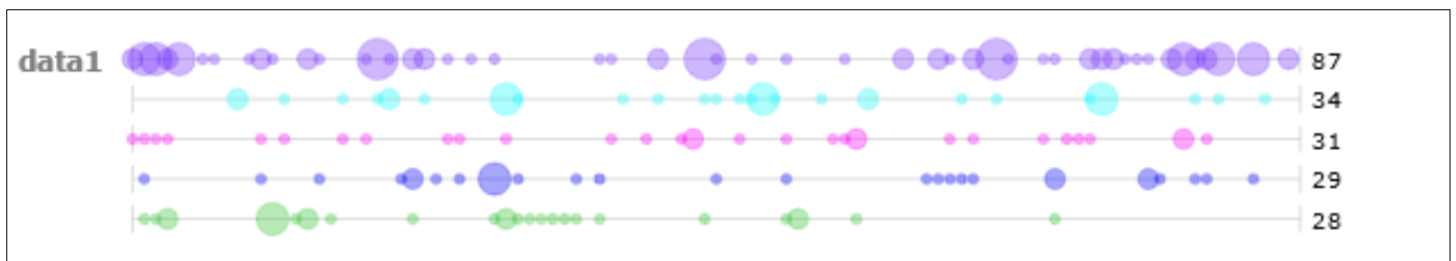
Figure 4: Top 5 Terms frequency Bubblelines View

To sum up, the Voyant Tool (173 terms) found more common terms than the VOSviewer tool (34 terms). The shared common terms in both tools are shown in Table 4.

	VOSviewer	Voyant
Terms	Occurrences	
Learning	13	26
Lot	9	9
Tool or Tools	11	9
Lesson	7	6
Topic or Topics	6	4
Exercise or Exercises	6	5
Place	4	4
Skill or Skills	13	12
Covid	4	6
Year or Years	9	5
Note or Notes	7	6
Paper	6	6
Impact	6	5
Question or Questions	11	12
Difficulty	6	4
Exam or Exams	4	4
Communication	5	5
Video	5	8
Work	10	14
School	4	4
Teaching	7	23
Growth	8	8
Tablet	6	4
Knowledge	9	12
Test or Tests	6	5
Hospital	5	6
Lecture or Lectures	7	4

Table 4: Common terms in both tools

The network map and the correlation analysis showed different relations between the common terms. Finally, the analysis showed that both tools identify the lecture term as a single cluster with no links and connections with the other terms. Moreover, the Voyant Tool has more visualisation limitations than the VOSviewer tool: the first cannot analyse more than the top 10 identify terms.

Personas, and Empathy Maps

They were identified 5 PERSONAS /Profiles, 2 types of students and 3 types of teachers, their motivations and frustrations, learning dynamics, goals and technologies:

Manuel Silva

Junior Professor (I prepare classes)

Traits: Curious, Patient, Active, Emotional

Demographic:
- 35 years
- Portuguese
- Social Sciences
- PhD

Technology:
- Laptop, smartphone, tablet, whiteboard
- I use videoconference, messaging, e-mail, productivity

Motivations:
- Be a good educator and team leader
- I learn by practicing
- Personal gratification for a job well done
- Students getting new competences

Frustrations:
- Too little time to address an issue
- Too many students in one class
- Students lack of motivation
- Few dynamics

Teaching Dynamics:
- I use simulation
- Standing up & Sitting down
- I lecture several days per week
- I hear and debate with students
- Asynchronous digital learning;
- Problem based learning
- Project based learning
- Adaptive teaching

Goals:
- Make the course easier
- Improved learning outcomes
- Make the course more attractive

Isabella Ricci

Evaluator Professor

Traits: Patient, Emotional, Curious, Courageous

Demographic:
- 45 years
- Italian
- Psychology
- PhD

Technology:
- I prepare questions and put them on Moodle
- I use apps: office tools, videoconference, statistical software and LMS
- I use laptop, desktop and smartphone

Motivations:
- Growth
- Satisfaction
- Achievement

Frustrations:
- it is complex to create equivalent versions to test learning outcomes
- Lack of feedback by students
- Lack of involvement by students
- Lack of possibility for my personal growth

Teaching Dynamics:
- I work with peers and students
- Context based learning
- I learn by practicing and observing others
- I don't receive feedback from students

Goals:
- Development
- Meaning
- Improved learning outcomes
- Fair evaluation

Tobias Weinhaus

Senior Professor (I lecture classes and I am also a leader)

Curious

Active

Compassionate

Optimistic

Demographic:

43 years

Austrian

Exact Sciences

PhD

Technology:

I use VR & AR & gaming software

I use PC, laptop, tablet, whiteboard, video, lab equipment

I use apps: office tools, videoconference and LMS

Motivations:

Gratification for a job well done

Growth, social incentive and achievement

Frustrations:

Network/Server problems at work

Work-life balance

Bureaucracy that affects productivity

Lack of funding for research

Lack of funding for teaching

Teaching Dynamics:

I innovate: flipped classroom: hybrid, problem & case based learning

Auditorium for more than 150 people

Goals:

Students able to perform autonomously basic techniques

Improved learning outcomes

Good researcher

Good teacher

Related with the PERSONAS, were built the respective empathy maps, one per PERSONA. Empathy maps are a collaborative visualization construction about a particular type of user. Empathy maps aim to externalize knowledge and leverage the available information on the PERSONAS, creating a shared understanding of their needs, focusing on what they think, feel, say, see, hear and do; their pains and gains.

Empathy Map — Louise Poincaré (#37 #39)

What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

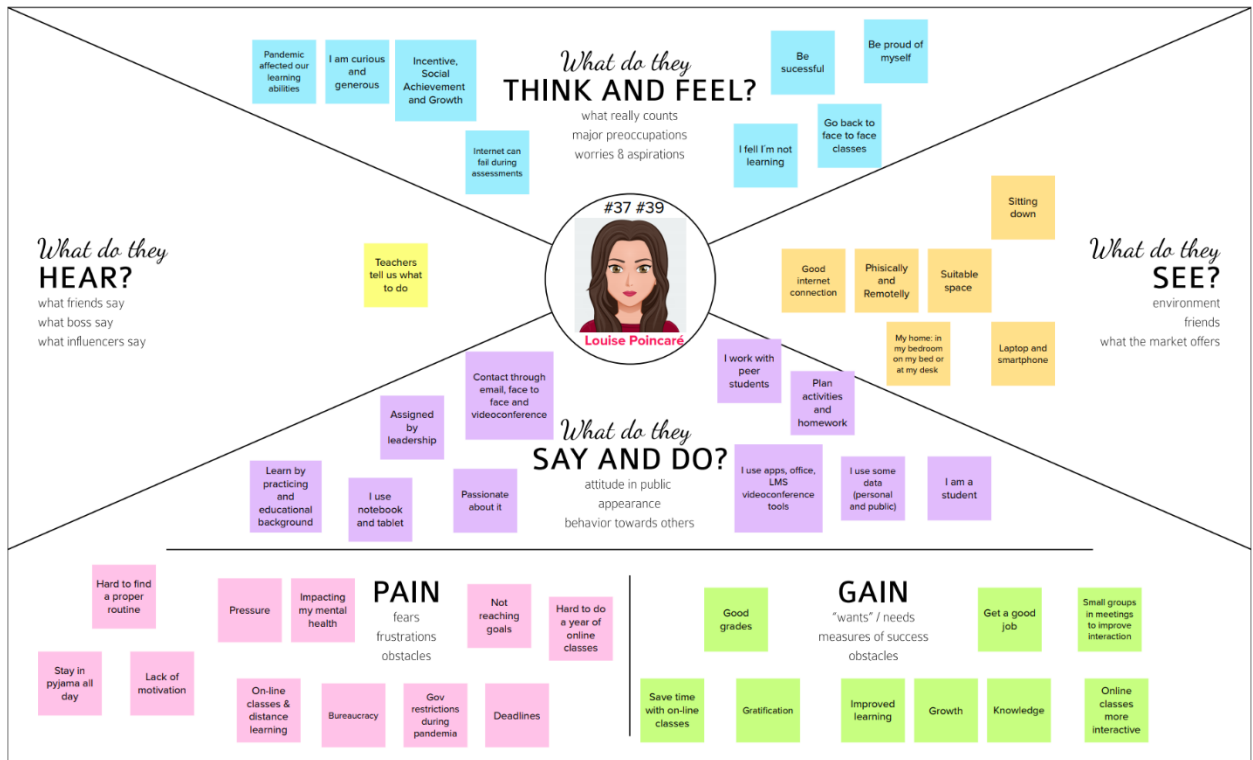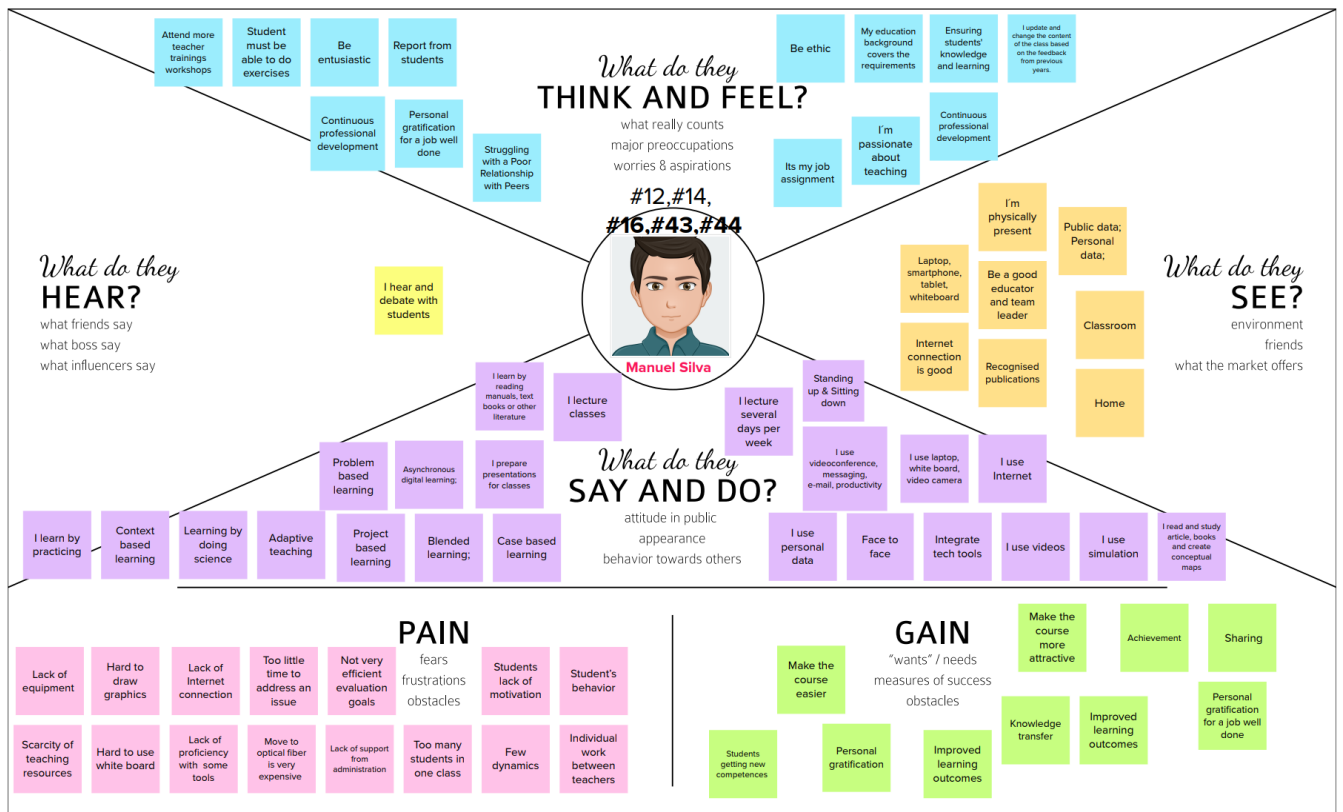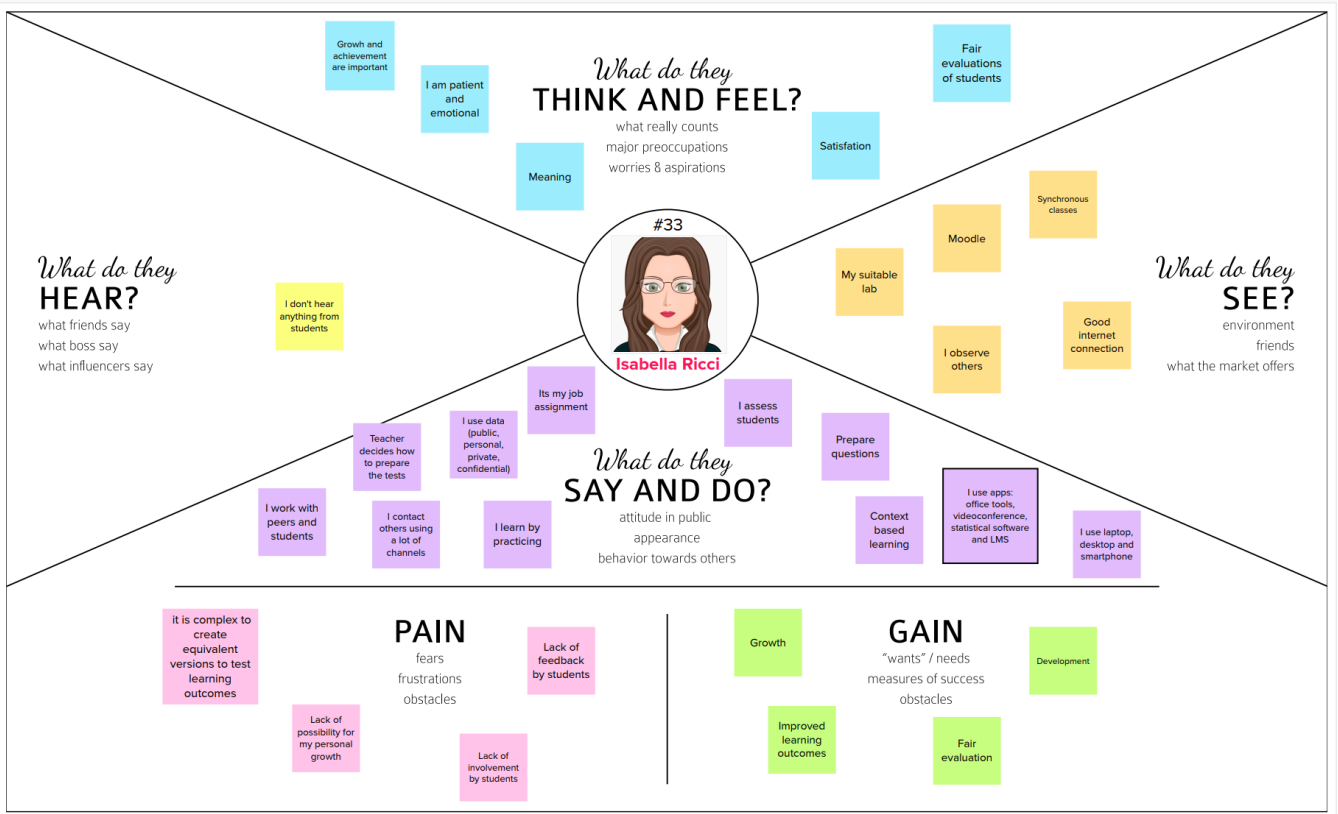- Pandemic affected our learning abilities
- I am curious and generous
- Incentive, Social Achievement and Growth
- Internet can fail during assessments
- Be sucessful
- Be proud of myself
- Go back to face to face classes
- I fell I'm not learning

What do they HEAR?
what friends say
what boss say
what influencers say

- Teachers tell us what to do

What do they SEE?
environment
friends
what the market offers

- Sitting down
- Good internet connection
- Phisically and Remotely
- Suitable space
- My home: in my bedroom on my bed or at my desk
- Laptop and smartphone

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- Contact through email, face to face and videoconference
- Assigned by leadership
- Learn by practicing and educational background
- I use notebook and tablet
- Passionate about it
- I work with peer students
- Plan activities and homework
- I use apps, office, LMS videoconference tools
- I use some data (personal and public)
- I am a student

PAIN
fears
frustrations
obstacles

- Hard to find a proper routine
- Pressure
- Impacting my mental health
- Not reaching goals
- Hard to do a year of online classes
- Stay in pyjama all day
- Lack of motivation
- On-line classes & distance learning
- Bureaucracy
- Gov restrictions during pandemia
- Deadlines

GAIN
"wants" / needs
measures of success
obstacles

- Good grades
- Get a good job
- Small groups in meetings to improve interaction
- Save time with on-line classes
- Gratification
- Improved learning
- Growth
- Knowledge
- Online classes more interactive

Empathy map for persona Manuel Silva

THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

#12,#14, #16,#43,#44

- Attend more teacher trainings workshops
- Student must be able to do exercises
- Be entusiastic
- Report from students
- Continuous professional development
- Personal gratification for a job well done
- Struggling with a Poor Relationship with Peers
- Be ethic
- My education background covers the requirements
- Ensuring students' knowledge and learning
- I update and change the content of the class based on the feedback from previous years.
- Its my job assignment
- I'm passionate about teaching
- Continuous professional development

HEAR?
what friends say
what boss say
what influencers say

- I hear and debate with students

SEE?
environment
friends
what the market offers

- I'm physically present
- Laptop, smartphone, tablet, whiteboard
- Public data; Personal data;
- Be a good educator and team leader
- Internet connection is good
- Classroom
- Recognised publications
- Home

SAY AND DO?
attitude in public
appearance
behavior towards others

- I learn by reading manuals, text books or other literature
- I lecture classes
- I lecture several days per week
- Standing up & Sitting down
- Problem based learning
- Asynchronous digital learning;
- I prepare presentations for classes
- I use videoconference, messaging, e-mail, productivity
- I use laptop, white board, video camera
- I use Internet
- I learn by practicing
- Context based learning
- Learning by doing science
- Adaptive teaching
- Project based learning
- Blended learning;
- Case based learning
- I use personal data
- Face to face
- Integrate tech tools
- I use videos
- I use simulation
- I read and study article, books and create conceptual maps

PAIN
fears
frustrations
obstacles

- Lack of equipment
- Hard to draw graphics
- Lack of Internet connection
- Too little time to address an issue
- Not very efficient evaluation goals
- Students lack of motivation
- Student's behavior
- Scarcity of teaching resources
- Hard to use white board
- Lack of proficiency with some tools
- Move to optical fiber is very expensive
- Lack of support from administration
- Too many students in one class
- Few dynamics
- Individual work between teachers

GAIN
"wants" / needs
measures of success
obstacles

- Make the course more attractive
- Achievement
- Sharing
- Make the course easier
- Personal gratification for a job well done
- Knowledge transfer
- Improved learning outcomes
- Students getting new competences
- Personal gratification
- Improved learning outcomes

Empathy Map #33 — Isabella Ricci

What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

- Growh and achievement are important
- I am patient and emotional
- Meaning
- Fair evaluations of students
- Satisfaction

#33 — Isabella Ricci

What do they HEAR?
what friends say
what boss say
what influencers say

- I don't hear anything from students

What do they SEE?
environment
friends
what the market offers

- Synchronous classes
- Moodle
- My suitable lab
- Good internet connection
- I observe others

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- Its my job assignment
- I assess students
- Prepare questions
- Teacher decides how to prepare the tests
- I use data (public, personal, private, confidential)
- I work with peers and students
- I contact others using a lot of channels
- I learn by practicing
- Context based learning
- I use apps: office tools, videoconference, statistical software and LMS
- I use laptop, desktop and smartphone

PAIN
fears
frustrations
obstacles

- it is complex to create equivalent versions to test learning outcomes
- Lack of feedback by students
- Lack of possibility for my personal growth
- Lack of involvement by students

GAIN
"wants" / needs
measures of success
obstacles

- Growth
- Development
- Improved learning outcomes
- Fair evaluation

Empathy Map #45, #6 — Tobias Weinhaus

What do they THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

- Good teacher
- Good researcher
- Mostly optimistic and curious
- Growth, social incentive and achievement
- Students do not harm the patient

#45, #6 — Tobias Weinhaus

This is a title…
What do they HEAR?
what friends say
what boss say
what influencers say

- I hear and debate with students

What do they SEE?
environment
friends
what the market offers

- My suitable auditorium
- I observe others
- My suitable lab
- The patient's bed
- My home

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- I work with peers, students, patients & tech staff
- I design and plan courses
- I work face 2 face
- I use PC, laptop, tablet, whiteboard, video, flip chart, lab equipment
- I use VR & AR & gaming software
- I use data (public, personal, private, confidential)
- I update lecturing materials
- I write scripts & books
- Simulation
- I prepare materials for classes
- Gamification
- I teach
- I innovate: flipped classroom: hybrid, problem & case based learning
- I practice
- I read to learn
- Its my job assignment
- I'm trained in this
- I'm passionated about it
- I use apps: office tools, videoconference and LMS

PAIN
fears
frustrations
obstacles

- Network/Server problems at work
- Work-life balance
- Bureaucracy that affects productivity
- Lack of funding for research
- Lack of funding for teaching

GAIN
"wants" / needs
measures of success
obstacles

- Gratification for a job well done
- Auditorium for more than 150 people
- Improved learning outcomes
- Students able to perform autonomously basic techniques

These findings emerged from the analysis of the content of the questionnaires and research of the keywords using specific text mining software (VOSviewer, Voyant) and SPSS.

Developing these activities of observation and interaction it was possible to create empathy with target users questioning the problem, questioning the assumptions, and questioning the implications. A set of "HOW MIGHT WE…" questions were identified, asking significant questions and challenging assumptions and framing the problems.

Based on these challenging assumptions the ideation phase took place hearing PERSONAS - teachers and students - about their difficulties and problems, but also creating many ideas in brainstorming and discussion sessions, and adopting a hands-on approach in prototyping and testing.

All these activities were recorded to a later content analysis and the activities took place in a virtual space, using Mural software to create a visual interaction space, in which everybody participated by writing virtual sticky notes.
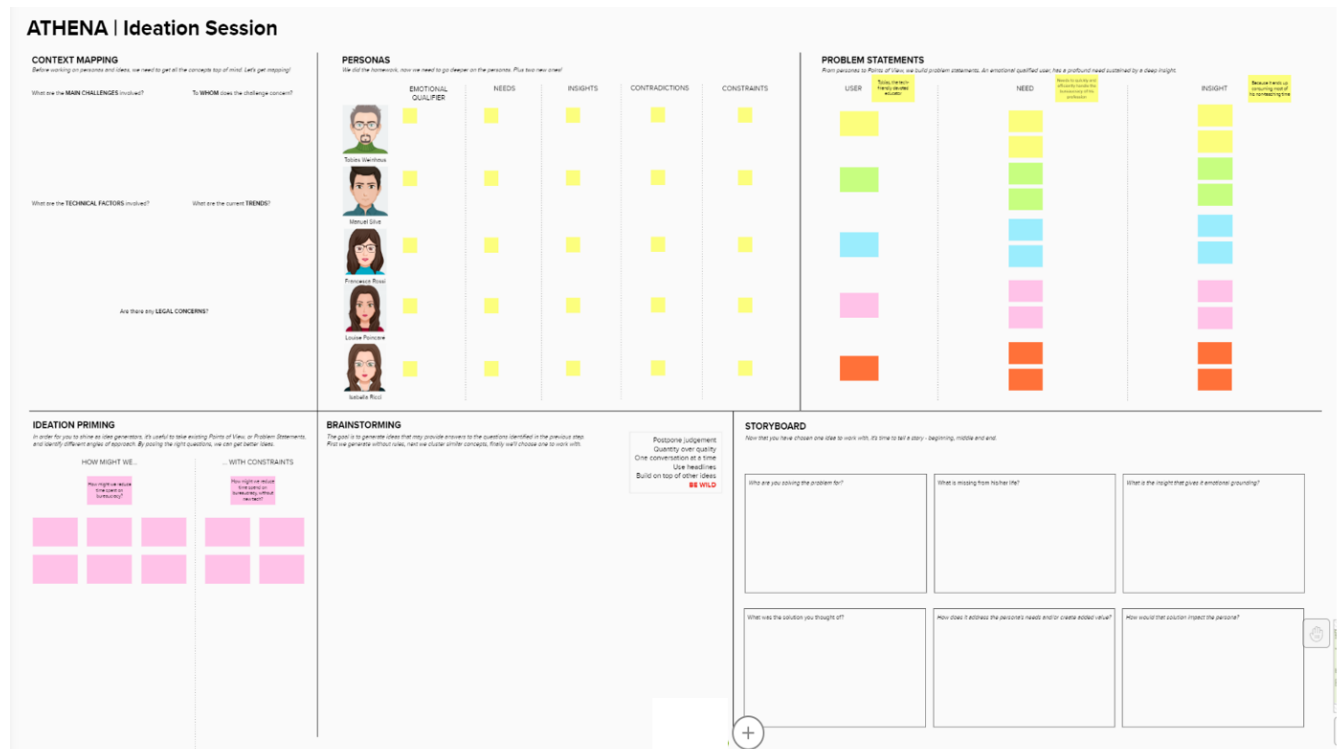
Brainstorming and **ideation** was the methodology adopted to exploit the problems and awake inspirational moments, based on the following rules:

- Postpone judgement: all ideas are welcome
- Quantity over quality
- One conversation at a time
- Use headlines
- Build on top of other ideas
- Be wild and share all ideas, even the odd ones
-

This creative exercise had a first moment to generate a large quantity of ideas; the second moment was to cluster, filter and select the best, most practical or most innovative ones in order to inspire new and better education models and pedagogy, where students and teachers accomplish better educational results. For the selection of the best idea to work it was used a voting programme, in which each participant had an equal number of votes.

Ideation process was supported on four 120 minutes sessions, involving 21 teachers and other stakeholders. From the ideas and clusters, one was selected to be worked with teachers drawing solutions and "story-boarding" it, to be tested later with students.

16 Students participated in 4 focus group sessions of around 45 minutes. Focus Groups are informal discussions on a number of scripted topics, with an audience representative of a specific type, and aims to gauge their opinions, inputs and insights and extrapolate for a larger audience. In this informal environment students were challenged to debate "education now", "education in the future" and "What if". In this last item "What if" were explored the prototypes and conclusions developed in the previous ideation sessions with the teachers:

THE NOW

- Do you think school today is adapted to how you learn new things? Does it captivate you? If not, why not?

- Do you think teachers today are prepared to create engaging classes? If not, do you think it's a matter of capability or resistance to change?

- Do you think admin tasks (registration, attendance, grading, etc) are an enabler, a roadblock or indifferent in your day-to-day participation in school?

THE FUTURE

- What would higher education look like in the next ten years, for you? How would the school be different? How would the teachers? How would you?

- How important do you think technology will be in the future of education? Would it work without it?

WHAT IF

- What if we gave teachers a toolkit of technology platforms they could use to make classes more engaging?

- What if we gave teachers more training in pedagogy and classroom dynamics?

- What if school was more like a game, where you earned points instead of grades, you had quests instead of assignments, you had a virtual avatar, etc?

- What if we created a hybrid campus, online and physical, that you could interact with in the real world and the digital world?

To systematize all data from this phase all the recorded sessions were analyzed – **content analyzes** – by a team and the conclusions compiled in a report of recommendations. These conclusions were also used to draw the best solution and the functional requirements, and to create the implementation plan.

Ideation Process

In Athena´s Project, ideation phase aims to hear all the agents involved in the educational processes and validate the data collected regarding the "problem space", ie, PERSONAS, problem statements, context constraints, user journeys and generate ideas targeting specific challenges and opportunities based on the users' experiences. The goal is, not only to obtain a greater understanding of the challenge and the opportunities, but also to produce a set of valuable ideas that enables us to showcase what could be the result of the project.

The ideation phase had 3 moments. The first one was addressed to faculty and university staff in general, and the other two moments (Focus Group and L´Esplanade) were targeted to students to validate the ideas and solutions generated in the ideation sessions:
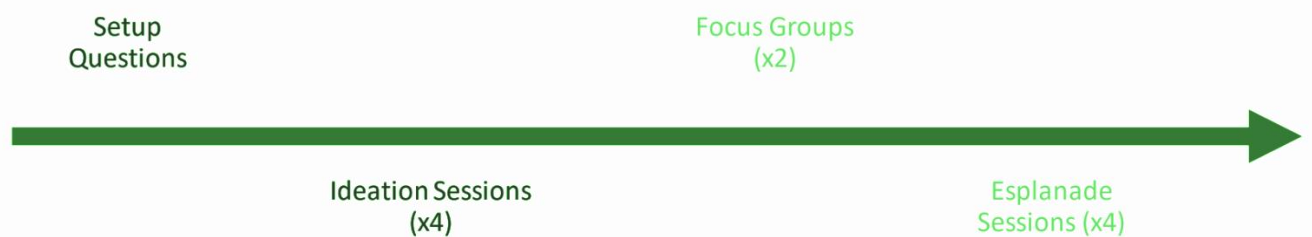
The ideation process started 3 days before the ideation sessions with some challenges, presenting the PERSONAS and asking for input.

The rationale was:

• Preparation work aimed at increasing the added value of the following ideation sessions.

• Emphasis on familiarizing the participants with the context, goals and PERSONAS.

The aim was:

• Leverage the available information on the PERSONAS that were identified during the empathy stage. • During the days leading to the session (3 days), share 1 email a day, in each of those emails, one PERSONA was introduced and asked questions (5 questions) for the participants to "fill in the blanks".

• This way, the problem-focused mindset needed for the sessions to be more productive and informed was created.

There were 4 ideation sessions, involving 21 people. These sessions were developed on-line and anchored in the following agenda of 120 minutes, each:

Moment	Description	Duration
Intro and Context	Introducing the facilitator and reviewing context and work so far.	10 mins
Iterate on Personas	Reviewing the existing personas and iterating for added value and new angles.	10 mins
POV Statements	Reviewing and breaking down persona needs and insights to increase problem space.	15 mins
"How Might We" Breakdown	Identifying creative opportunities to empower the ideation step.	10 mins
Brainstorming	Generating ideas targeting specific opportunities.	20 mins
Idea Convergence and Voting	Clustering ideas and choosing the ones to explore.	10 mins
Storyboarding and Sharing	Prototyping ideas and sharing for feedback.	40 mins

From these ideation sessions 50 questions were developed "HOW MIGHT WE" to be answered in the "ideation space". The work was developed under 5 principles, (1) no judgement: all ideas are welcome; (2) quantity over quality, (3) one conversation at a time and all participate, (4) build on top of other ideas and (5) be wild and share all the ideas. These sessions had 200 outputs and 20 clusters of ideas.

By a process of voting, 4 clusters were discussed and prototyped, creating a set of suggestions to be transformed in the solution to support digital learning for HE contexts. These suggestions were tested with a group of students involving 18 students. There were 4 sessions with students, 2 Focus Group and 2 informal sessions that we named the "Esplanades". Each Focus Group had a duration of 45 minutes, and each Esplanade 30 minutes, supported in a casual discussion with scripted and circumstantial subjects.

Focus Group is an informal discussion on a number of topics, with an audience representative of a specific type and aims to gauge their opinions, inputs and insights and extrapolate for a larger audience. In this informal environment students were challenged to debate "education now", "education in the future" and "What if". In this last item "What if" were explored the prototypes and conclusions developed in the previous ideation sessions. The questions were:

➔ *What if we gave teachers a toolkit of technology platforms they could use to make classes more engaging?*
➔ *What if we gave teachers more training in pedagogy and classroom dynamics?*
➔ *What if school was more like a game, where you earned points instead of grades, you had quests instead of assignments, you had a virtual avatar, etc?*
➔ *What if we created a hybrid campus, online and physical, that you could interact with in the real world and the digital world?*

The composed analysis / outputs from ideation phase were:

CONTEXT MAPPING

PERSONAS AND PROBLEM STATEMENTS

IDEATION PRIMING

EMOTIONAL QUALIFIER | NEEDS | INSIGHTS | CONTRADICTIONS | CONSTRAINTS

HOW MIGHT WE... WITH CONSTRAINTS

IDEATION PRIMING (cont.)

STORYBOARD

CONTEXT MAPPING

PERSONAS AND PROBLEM STATEMENTS

IDEATION PRIMING

IDEATION PRIMING (cont.)

BRAINSTORMING

STORYBOARD

Context Mapping

Educational context has changed, facing new challenges related with fast advancements in technology, sharing economy and Covid19 pandemic. Hear directly people involved in the context – **teachers, students, researchers, administrative staff, university members, technical staff** - their pains and gains, how/when/with whom do they experience these educational contexts, allows to build a wider picture of the situation, collecting information and insights and building awareness around that.

The starting point of these phases are the PERSONAS built previously in the empathise phase. These PERSONAS are omnipresent in the ideation sessions and act like polarizing "totems" that iterate with each of every ideation group. This way, they "belong" to everybody.

In context mapping the group discussed the main issues and challenges for teachers/stakeholders while moving HE to the digital side and to adopt new concepts considering people as digital but also physical and psychological beings. Contextualizing by this, the main challenges were defined by participants in ideation sessions.

Session 1	
- Not everyone has access to the internet - Not having eye contact to see if the audience is getting bored - Different assessment strategies - Learner motivation - Great stakes of the world to be addressed - Learner motivation	- Learners with special needs - Non engaging students - Teaching methodology - Not enough time to address all the needs - Access to technology - Student´s authenticity - Guarantee equality in the access

Session 2	
- Change management (Universities) - Different time zones in online courses - Motivation - Different cultural backgrounds in online courses - Time zones - Load	- Evolving physical models to digital - Students are used to be lead (not used to autonomy) - Students do not feel part of a community - Engage Students - Possibility of experiential learning

Session 3

- Lack of interaction during the lessons
- Some good tools need a subscription. There's no procedure to enable this.
- Lack of a community of teachers in the HEI to further our digital competencies together and develop dynamic use of blended learning. I feel we are quite isolated.
- Get the student motivated and concentrated
- Assessment
- time zone of international students

- To be sure that the lecture is understood and that we delivered a skill
- difficulty to organize IT tools in a single mode, because of the differences between disciplines
- difficulty to check plagiarism during the examination
- Change Management
- Getting students focused and concentrated
- Teacher training... not only in terms of tools, but especially in methodologies

Session 4

- Student attention span
- recording classes sometimes does not incentivize attention and effort
- Watching content later does not allow for in-time questions
- Engagement
- Good pedagogical approach for digital learning
- Unbundling of courses
- physical distancing
- Quality assurance

- informal interactions missing
- limited interaction
- customizing teaching to each student need
- online social interaction codes
- Visual feedback in online classes
- Big groups of learners
- Professors competencies
- Student participation
- Academic Services online

4.1.1 Problem framing and ideation priming

"How might we" questions for students: Franscesca, the ambitious student, and Louise, the curious but socially dependent student.

How might we; create a context that gets students more engaged with the learning process; give students regular and constant feedback; sustain the attention of students all along teaching activities; get mentally resilient students to help their colleagues; provide social and emotional support for students; provide digital support to teachers and learners; improve the access to online classes; help students become more mentally resilient; help students become more mentally resilient, just using technology; provide face-to-face contact, digitally; foster interactions between students; teach students to keep focused while online; improve our pedagogy, when nobody in my institution is qualified pedagogically; make classes shorter and more appealing (especially online)?

Specific problems:

Francesca:

- Regular feedback so that she can grow
- Shorter and more appealing classes, so that she won't get distracted or bored

Louise:

- Social contact and proximity so that she can link learning with social environments
- Reduce the pressure of keeping up with classes so that she is more mentally resilient

4.1.2   Context Mapping

Main challenges:

Pedagogy:	
- Appropriate pedagogical approach for digital learning - Professors competencies - Assessment processes	- Customizing teaching to each student needs - Quality assurance - Unbundling of courses

Infrastructure:	
- Online academic services - Classrooms' technical equipment	- Engineers will solve all technical issues - Connection quality

Students behaviors:	
- Student attention span - Recording classes sometimes does not incentivize attention and effort - Watching content later does not allow for questions in the right moment - Students' participation and engagement - Large groups of learners - On-line and physical distancing - Informal interactions missing - Limited interaction - Online social interaction codes - Visual feedback in online classes - Current trends - Microcredentials	- Hybrid model - Project-based learning - Shared learning – flipped classroom - E-learning platforms - MOOC - Open source - Proprietary - LMS - Proprietary - Legal framework - GDPR - Student authentication - Bologna system - Blended learning

4.1.3 Solution Ideation

For the teacher	Class dynamics	For the student
Facilitator training program for the teacher	Using improved techniques to fully engage students	As a role model, teacher could provide feedback on failures
Coaching would help create the social contact and sense of belonging	Turning high stakes one-off events into low stakes regular moments	Fun antics would create a more informal setting (reducing pressure)
Create a safe space to fail (fail forward)	Class dynamics coaching	Create "let's eat together" moments
Teacher toolkit for class dynamics		Bringing joy into the classroom (clowns, jokes, silliness)

Athena Design Thinking for Digital Learning - IO 1

Impact of the solution in the Personas:

- Decreasing anxiety and pressure before class
- Having some positive expectations
- Increasing social trust
- Connected to the class community (including the teacher)
- Reduced friction between students, faculty and staff
- Increased transparency
- Bringing balance into the ecosystem

Teachers and students have a wide range of digital tools to improve their teaching/learning experiences. But some influential factors related with context have to be considered and were identified collaboratively by the ideation groups:

Regarding ethics:

- Equity of access
- Technology availability

Regarding pedagogic practices:

- Lack of appropriate pedagogical approach for digital learning
- Need for customizing teaching to each student need
- Improvement of Professors competencies
- Enforcement of quality assurance
- Unbundling of courses
- Inadequate assessment processes
- The high number of students compromises the quality of the course

Regarding infrastructure to support teaching-learning:

- Technology investments by Universities
- Availability of online academic services
- Technical issues with classrooms technical equipment
- Issues with Internet connectivity quality
- Lack of proficiency with e-learning and on-line tools
- Usability issues with the tools
- Lack of best practices and well established design principles in the design of learning resources
- Compatibility issues due to a wide range of systems e.g. browsers, mobile tech
- Lack of technology awareness
- Availability of licenses
- Lack of technological diversity

Regarding students' behaviours:

- Limited student attention span
- Recording classes sometimes does not incentivize attention and effort
- Watching content later does not allow for questions in the right moment
- Improvement of students participation and engagement
- Large groups of learners
- On-line versus physical distancing:

  - Informal interactions missing in on-line settings
  - Limited interaction in on-line settings
  - Specific on-line social interaction codes
  - Visual feedback issues in online classes

Regarding legal framework

- GDPR
- Student authentication
- Bologna accreditation system
- Security and privacy issues
- Concerns about cheating control in assessments

Some legal considerations also must be taken into account related with GDPR, student authenticity, Bologna accreditation system, privacy, licensing, copyright, similarity, content use, cheating control in assessments and security, as identified by the ideation groups participants. Also, the bureaucracy prevents teachers from reaching all students.

In the actual context teachers are mainly using some digital tools and platforms and implementing strategies to address students' needs and difficulties, while improving student´s engagement. These trends are supported in new pedagogical methodologies such as blended learning, flipped classroom learning, bite-sized learning, and with the intense introduction of technology support, such as smartphone learning, VR+AR, gaming and gamification, cloud computing, IoT, collaborative digital models and platforms.

Some other questions that arose related to physical models in some technological subjects that only are possible in face-to-face contexts. Also, the age of students and their familiarity with technology was mentioned, given that only the youngest generation – digital natives – are really prepared and comfortable with the use of ICT. But education is for all, and higher education students span across different age groups.

4.2 Reviewing the PERSONAS

PERSONAS began to be introduced to the participants of the sessions 3 days before, one each day, under the challenge MEET [Persona]. So, participants were already familiar with them because they had already engaged with them answering some questions related with their profile, activities, needs and constraints:

University Goes Digital For a Sustainable Global Education

MEET TOBIAS

Hi! I'm Tobias Weinhaus, a 43-year-old leading Senior Professor in the Exact Sciences domain, from Austria. I'm actively curious, optimistic and compassionate, and am no stranger to using innovative methodologies like flipped classroom and problem/project-based learning, nor technology like the latest videoconference software and LMS, as well as gaming, AR and VR, to engage my students. I'm motivated by personal growth and a sense of achievement, but I also appreciate social recognition on a job well done. However, I'm frustrated by the impact educational bureaucracy has on my workload and personal life as well as the lack of funding for innovation in teaching and research. My main activities include but are not restricted to designing and planning courses, preparing and lecturing classes and assessing student knowledge and learning outcomes.

Having introduced myself, I'm looking to get your input:

University Goes Digital For a Sustainable Global Education

MEET MANUEL

Hi! I'm Manuel Silva, a 35-year-old Junior Professor in the Social Sciences domain, from Portugal. I'm actively curious, patient and somewhat emotional, and I often use innovative methodologies like problem/project-based learning and simulations, while being comfortable using videoconference software in dealing with my students. I'm motivated by becoming a good educator for my students and team leader, I appreciate getting recognition from my peers and to continue learning by doing. However, I'm frustrated by the lack of time to address all my students' needs – they are too many with too little motivation. My main activities include but are not restricted to preparing and lecturing classes and assessing student knowledge and learning outcomes.

Having introduced myself, I'm looking to get your input:

University Goes Digital For a Sustainable Global Education

MEET FRANCESCA

Hi! I'm Francesca Rossi, a 29-year-old Master's Student of Psychology, from Italy. I'm curious, patient, compassionate and generous, and am used to using technology for school, from videoconference software to more specific tools like some LMS, SPSS for statistical analysis and Microsoft Office, both on my computer and my smartphone. I'm motivated by acquiring more knowledge and skills, becoming more competent and react well to social recognition on a job well done. However, I'm frustrated by the duration of some of our classes, they are to long to keep continued focus, and the lack of continuous and timely training and feedback. Also, I feel the impact the quality of an internet connection can have on my educational success is too big. My main activities include but are not restricted to attending classes, studying, working on class projects and attending other school activities.

Having introduced myself, I'm looking to get your input:

1. How would you qualify myself emotionally?

2. What do you believe are my most pressing needs in my day-to-day activities? What do I need to get done and find it hardest to do?

3. Why do you believe those would be my most pressing needs? What's the motivation behind them?

4. What contradictions, if any, do you see in my profile? Does anything seem counter intuitive?

5. What do you believe are the main constraints on my activities? Time? Money? Proficiency?

All the answers were systematized and organized in 5 dimensions – emotional qualifier, needs, insights, contradictions and constraints – and presented in the ideation sessions to produce interaction among participants, to enrich persona's profiles and build new ideas from them. The senior professor and junior professor personas correspond to real teachers, themselves and their colleagues, according to the participating teachers. They also recognize the students' personas in some students.

From the debate some new ideas arose:
-   There are some differences in the profiles addressing the subjects/fields of the teachers
-    The student´s profile can also vary in the motivations and areas. In this context a new PERSONA was discussed, representing a 23 year old student that felt that her mental health was impacted by the lockdown and she saw face-to-face lessons as key for her motivation.

MEET LOUISE

Hi! I'm **Louise Poincaré**, a 23-year-old **Junior Management Student**, from France.

I'm **patient, curious and generous**, and am used to using technology for school, from **videoconference software to some LMS and apps**, both on my computer and my smartphone.

I'm motivated by **acquiring more knowledge and skills,** and the **social recognition from my peers and professors**.

However, I'm **frustrated by the lockdown**. Staying home has **impacted my mental health and my ability to keep up with the online schedules and demands**, finding it harder to handle the pressure of deadlines. Despite online classes having become more interactive, **I feel I am not learning unless I'm working with my peers**. Face-to-face is key for my motivation.

My main activities include but are not restricted to **attending classes, studying, working on class project**s and attending other school activities.

- The actual span of attention (concentration duration) of a young student – generation Z – is 8 minutes versus 45 minutes defended for generations X and baby boomers
- Change the way teachers teach, lectures of 45 minutes are inefficient , because students concentration time is 8 minutes and teachers have to adapt to new students characteristics and needs; comparing lectures to small episodes
- Students are tech savvy but do prefer to have face-to-face lessons
- Students need social interaction
- Students emotional state is very fragile
- The importance of belonging to a community
- Students value recognition from their peers
- Important to have another PERSONA, the one that builds digital resources
- Students are being very creative in finding ways to watch lectures using technology

Problem Statement/Framing and Ideation "Priming"

Using PERSONAS and profiles, their problems, and anguishes, it is possible to draw questions to address in the brainstorming moment.

The ideation priming precedes the ideation process and aims to facilitate the creative process. In this phase questions are created (**HOW MIGHT WE** ...) and are given different angles to approach a problem to be answered and explored in the brainstorming activity. By doing the right questions it is possible to get better ideas. At this phase the only important thing is to ask questions, not thinking about the answers, nor to worry about any solution.

The "**HOW MIGHT WE**" questions related with the PERSONAS, built during ideation sessions, were:

- How might we reduce time spent on bureaucracy?
- How might we prevent ourselves from being emotionally struggling?
- How might we keep teachers from feeling overwhelmed?
- How might we take technology out of the way for students?
- How might we make sure the resources are freely available/open source technology?
- How might we keep students from getting distracted?
- How might we create shorter and more appealing classes?
- How can we keep admin tasks from overflowing to personal time?
- How might we help teachers interact with their students and peers more often?
- How might we design methods to provide regular and constant feedback to students?
- How might we split lectures into segments and make them interesting and appealing?
- How might Francesca's colleagues help her feel like she is growing all the time?
- How might we exploit technology to engage students?
- How might we design interactive activities to engage learners?
- How might we help Manuel get more institutional support for his innovative approaches?
- How might we design learning that enables us to provide regular feedback?
- How might we ensure the security of the contents provided as part of the lectures?
- How might we embed formative assessment in teaching?
- How might we exploit technology to efficiently complete the admin tasks?
- How might we know that our teaching method is engaging?
- How might we reduce time spent on bureaucracy, without new tech?

- How might we help reduce stress?
- How might we help teachers plan their classes better?
- How might we help schools provide better management tools?
- How might we help students feel part of the community in online classes?
- How might we digitally create the sense of face-to-face?
- How might we break down delivery of classes in bite size portions?
- How might we provide support for new academics on managing expectations?
- How might we ignite the learning passion?
- How might we improve career management based on future signatures paths?
- How might we build "straight to the point" tutorials?
- How might we help students to manage time?
- How might we streamline the admin tasks in teaching?
- How might we reduce anxiety created by technology?
- How might we improve the feedback process on students' work?
- How might we encourage successful practices?
- How might we create a sense of learning that doesn't depend on her peers?
- How might we limit impact on personal time?
- How might we help students to evaluate their goals?
- How might we use clear and fair assessment tools?
- How might we reward the "extra mile" for the professors?
- How might we effectively engage students in the learning process?
- How might we reward the "extra mile" without increasing the budget?
- How might we have administrative staff from University supporting?
- How might we define the rules upfront?
- How might we limit frustration from class duration?
- How might we provide support for tutors in creating innovative teaching methods?
- How might we move all the teaching modes to a project based learning approach?
- How might we reward the "extra mile"?
- How might we avoid getting distracted?
- How might we reduce time spent on bureaucracy, without new tech?
- How might we help each professor to manage it's personal time?
- How might we provide "straight to the point" technology update?
- How might we keep students from getting distracted?
- How might we help senior students to assist younger students?
- How to help students using new tech in an effective manner?
- How might we streamline the admin tasks in teaching, without allocating more admin staff hours?
- How might we avoid project overload?

- How might we create a process for teachers to subscribe to good tools, without having to pay for it themselves?
- How might we catch the attention of students?
- What tools/strategies/methodologies can be used to increase student engagement?
- How might we find time and resources for teacher development?
- How might we identify the digital skills students need and make sure they acquire those skills?
- How might we provide better feedback?
- How might we create a community of teaching?
- How might we catch the attention of students?
- How might we guarantee the same conditions to both in-presence and online students during the blended Learning?
- How might we help teachers become more efficient?
- How might we make them focus?
- How might we identify and communicate best practices?
- How might we rethink the exam session in order to avoid plagiarism?
- How might we provide regular and constant feedback to students?
- How might we save time?
- How might we get mentally resilient students to help the ones in need?
- How might we make teachers love the admin tasks?
- How might we create shorter and more appealing classes?
- How might we help teachers create better course plans?
- How to motivate teachers to attend training in new methodologies and tools?
- How to motivate them to step out of their comfort zone and try new things without fear of failing?
- How to help teachers adapt their curricular units (design) in terms of content and assessment and teaching methodologies?
- How might we make classes more engaging?
- How might we simulate face-to-face contact digitally?
- How might we help students become more mentally resilient?
- How might we keep teachers from becoming overwhelmed?
- How to provide technical, pedagogical and emotional support to students using new technologies such as IA, Analytics, IoT, ...?

Although each country has their own culture that can be an issue to draw a global solution as values, social context and cultural background have strong impact, we consider that the questions can be supported and relevant for a global educational model.

Leaving the problem space, ideation sessions participants had to draw answers for the questions and problems that they identified in the "HOW MIGHT WE" process.

The methodology used was brainstorming to generate ideas. The basis of brainstorming is to generate ideas that may provide answers to the questions identified in the previous step. It has 3 steps: the first one is to generate ideas (quantity over quality with no judgment), secondly cluster similar concepts and finally choose one to work with and prototype on it. In this creative, brainstorming activity around 100 ideas were generated, using the rule "quantity over quality":

- create short videos for course delivery, less than 20 mins
- Game designers helping design courses
- provide online, live tech support
- Conducting workshops on time management
- Provide pedagogical training to professors
- Conducting professional development courses
- Teach professors how to use the distance learning tools
- Deploying solid procedures and policies regarding students online assessment
- eate more interactive content and pre-recorded content
- Shorter and more interactive classes
- instead of adapting the professor, adapt the syllabus
- Create techological coaching programms
- Provide stratight to point dtechnology tutorials
- provide mentoring for new academics, learn from the experience colleagues
- Create interactive communications e-platforms
- Rethink the format of lectures from ground up
- Create templates for related topics
- create mentoring for "working at home"
- Use adaptative learning to create short cuts and reduce the time of learning
- Use time management and task management tools for students
- Conducting workshops on online teaching challenges
- Create a mentorship program (jedi / padawans)
- develop interactive collaborative tools
- Invite guest lecturers for promoting innovative approaches
- Creating comunities of practice for share best practives
- create online relaxation times in between learning sessions
- Create more moments of work without assessment
- Creating a safe space to fail
- Create for e asignati comple compet
- Super Project that encompasses ongoing curriculum
- Move the learning process to a proble solving learning
- Extra days vacation for professors that comply with admin tasks
- Have more breaks
- Deploying policies of performace appraisal
- Create a feedback economy for students and faculty
- Students creating education platforms
- organise student led sessions
- Create student competitions around new approaches/tech
- Awards points for activities (experience points)
- Create project based learning bootcamps for faculty
- Create project based toolkits for faculty members
- Involving external stakeholders/community members in online teaching issues
- Encouraging students to conduct research regarding online teaching issues
- Developing innovative student's assessemnt tools
- Create learning milestones (learning KPIs)
- Share best practice older>>younger
- Move the learning process to a project based learning
- Conducting workshops for studnets on interpersonal skills development
- Provide hardware and software for students and academics
- Using effective platforms on teaching
- virtual social space for the students
- Create online space without academic supervision
- Developing innovative online teaching strategies
- make use of chatbots to enhance student learning
- reduce the redtape and repetition of admin tasks
- Use AI and ML to handle admin tasks
- Invite celebrities to share their stories
- Connect with the alumni network to share consequences
- Hybrid campus (vr/ar)
- 3d virtual campus

Make the university classrooms more equipped (e.g. ambient audio, sensored cameras), in order to put closer in-presence and online students

Schools must be prepared with adequate technology and must ensure that their students have individual equipment (social responsibility and inclusion)

BETTER USE OF CAMERAS

Make the administraive people better understand the constraints

Game designers help teachers design courses and classes

The attention of students can be catched using gamification and video games and VR.

Using gamification strategies to motivate students (and teachers).

Train teachers in gamification, which is something that seems to work well. Students love Kahoot for example. But I'd like to go far beyond Kahoot

One

The students can be more focus using project ativities

The students can be more enrvolved and know Promoting team building actions.

Working group dedicated to best practices in online & blended learning

Several assessment strategies and instruments.

Bu

Student and teacher avatars to interact with each other

Use points for every student deliverable (grade grows as points grow)

Tutorial support can be supported by online materials, e.g., videos and gamification

Feedback Economy for teachers and students (KUDOS)

Host competitions for the most innovative teachers

Institutional subscriptions to best tools, such as Zoom & Padlet

Get classes more homogenous in terms of levels

Create tailored simulations for an immersive experience

Use more multi media tools to make theoretical topics more intuitive

Bite-sized learning

opening non class wtih no schedule

Socall support for some studens

Assign a short-deadline to see the recording of the lessons (to avoid that students see the videos only few days before the exam)

Recognise that HE is a social experience, not just an academic one. The informal curriculum needs to be recognised and valued.

Invite celebrity speakers

Extra vacation days for completing admin tasks

Using IoT for more efficient and secure campus management.

nstitutions need to have staff in instructional design, assessment design and content (and production.

Teachers follow a MOOC or an in-house training session simultaneously and share ideas & insights via a social media platform or forum on LMS

More training for teachers for the classes to be more attractive

Promote pedagogical innovation courses on a regular basis for teachers.

Have supply teachers

HIRE TEACHERS

Promote online socialization and coaching spaces.

MODIFY THE CLASS DURATION

Organize learning sessions on platforms for both students and teachers at the beginning of the academic year (we change platform - MS Teams, Webex etc. - every year)

Teacher efficiency training

train

Using analytics and artificial intelligence can help create personalized learning pathways.

We can save time using automatic processes like ML and Deep Learning and other intelligent algorithms to develop burocratic tasks.

An emotional support chatbot for students and teacher

Virtual Campus (VR)

Partnerships with personal development companies (research to pay for training)

Create a learning path for teachers to explore and/or follow (tech, soft skills, pedagogy, etc)

Use AI in the answer of our stiudent

AI and ML handling the admin tasks

Use facial recognition

Hybrid Campus (AR and VR)

Build a virtual campus

Regular mental resilience Workshops on campus (digital and physical)

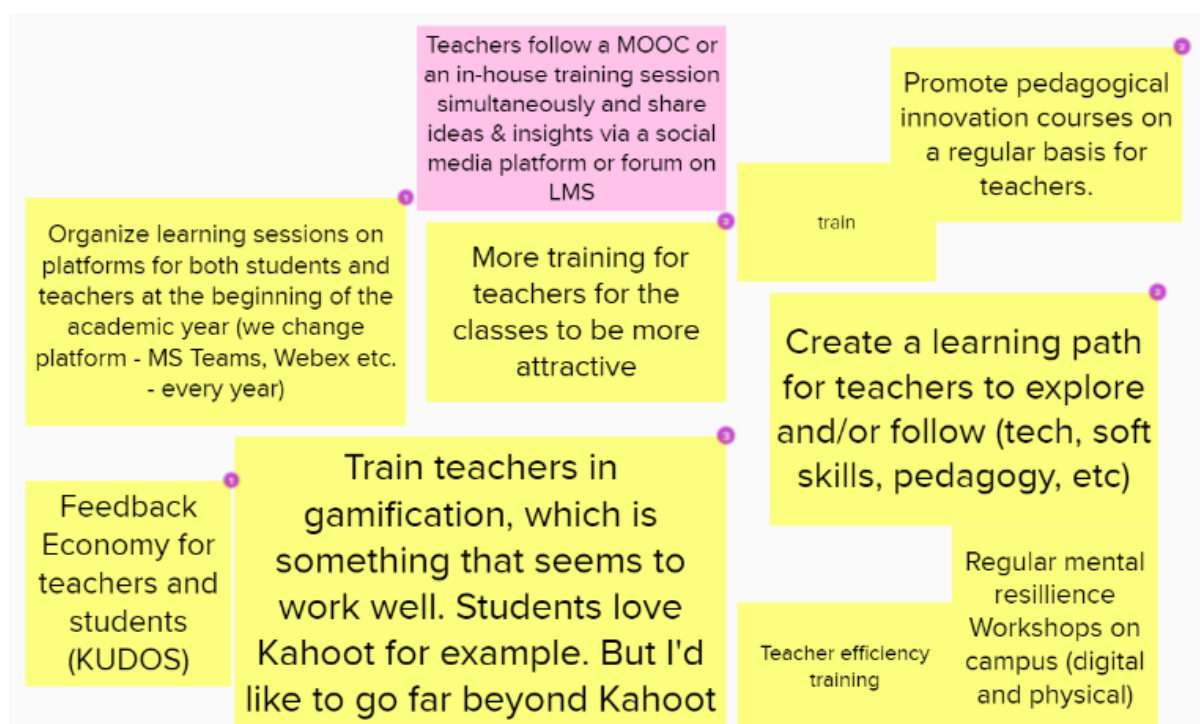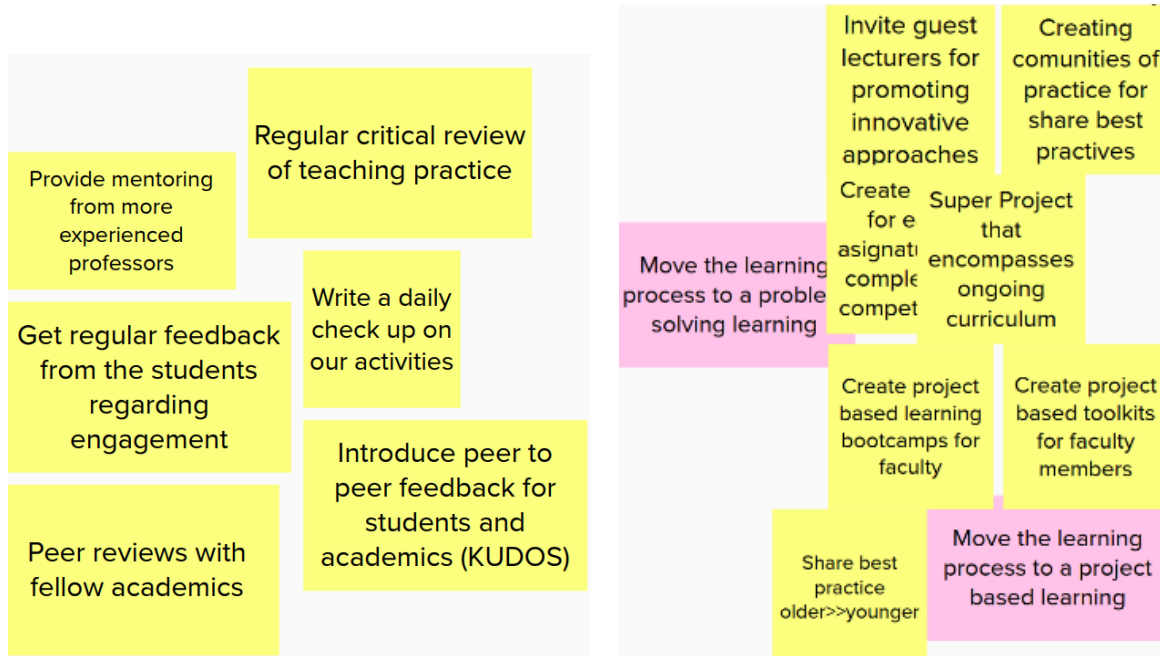The Community of teachers can be feeded by social networks

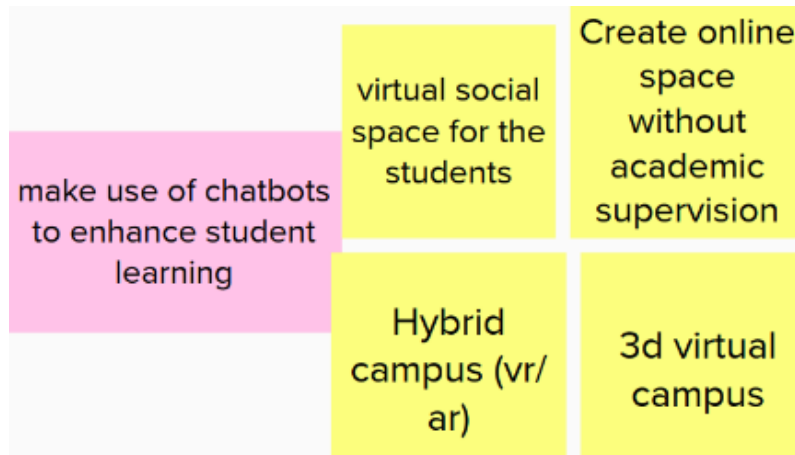The ideas built over the sessions pointed to several clusters:
- Promote mentoring, workshops and training for teachers, in some dimensions: pedagogical, technological (how to use digital tools) and personal (for instance time management).

- Promote regular communication among teachers and have feedback 360º, involving all stakeholders in the educational process – internal (university staff) and external (for instance digital content makers specialists).

Provide mentoring from more experienced professors

Regular critical review of teaching practice

Write a daily check up on our activities

Get regular feedback from the students regarding engagement

Introduce peer to peer feedback for students and academics (KUDOS)

Peer reviews with fellow academics

Invite guest lecturers for promoting innovative approaches

Creating comunities of practice for share best practives

Move the learning process to a proble solving learning

Create for e asignati comple compet

Super Project that encompasses ongoing curriculum

Create project based learning bootcamps for faculty

Create project based toolkits for faculty members

Share best practice older>>younger

Move the learning process to a project based learning

- The importance of interaction, communication and peer work (social dimension) for students; combine digital with face-to-face education.

make use of chatbots to enhance student learning

virtual social space for the students

Create online space without academic supervision

Hybrid campus (vr/ar)

3d virtual campus

- The importance of interaction, communication and peer work (social dimension) for teachers as well; building an online community.
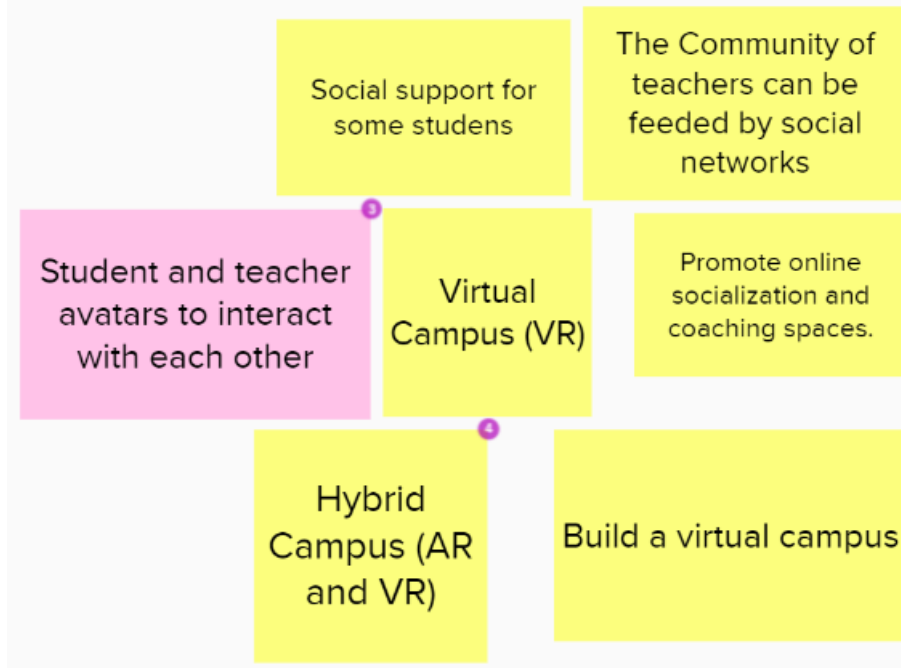
- Change contents, syllabus, lecturers, assessments and courses structure and rationale to meet students needs and profiles.
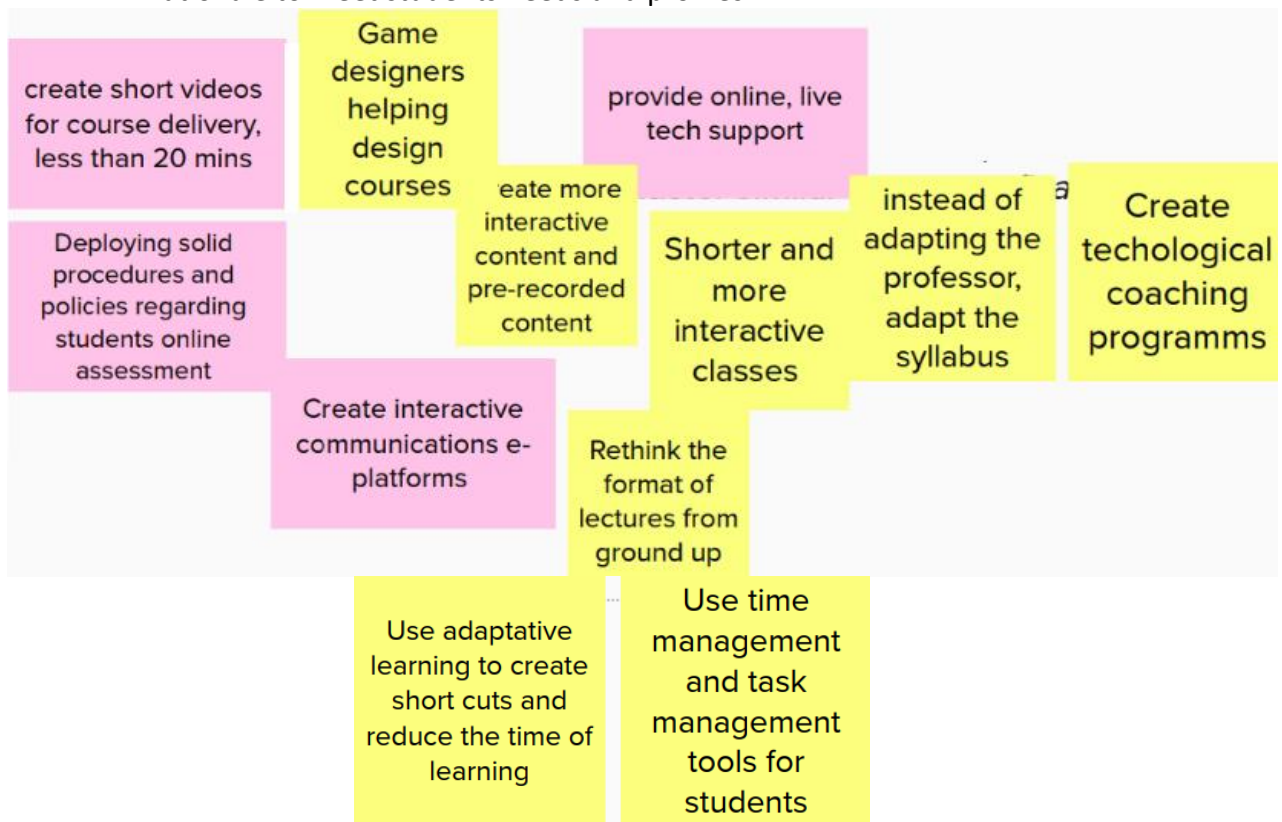
- Recognition, choice, challenges and feedback as an important part of motivation for students
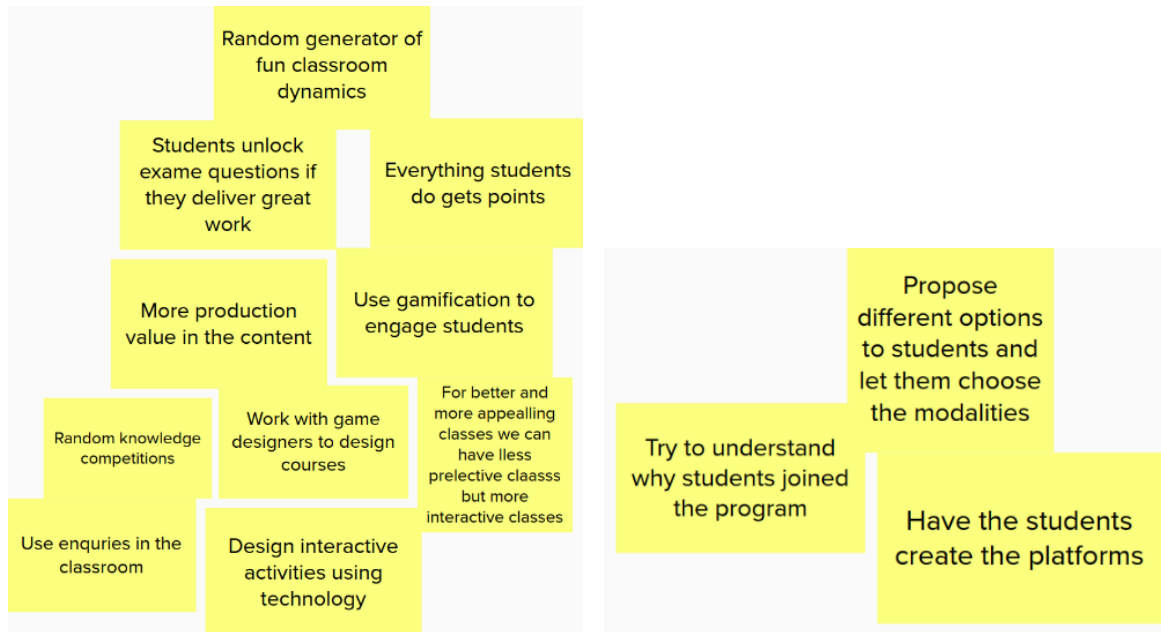
- Challenges, events, partnerships and benefits are motivating aspects for teachers

- The use of Artificial Intelligence, Machine Learning and Natural Language Processing to streamline the administrative tasks, save time, improve assessment, customize the learning path, and provide emotional support
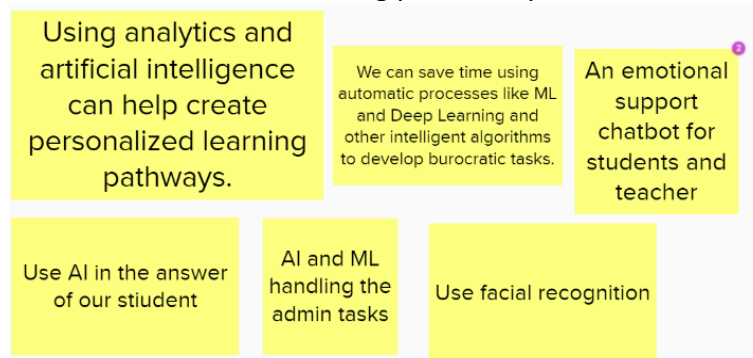
-   More teachers, specialized staff and institutional support.
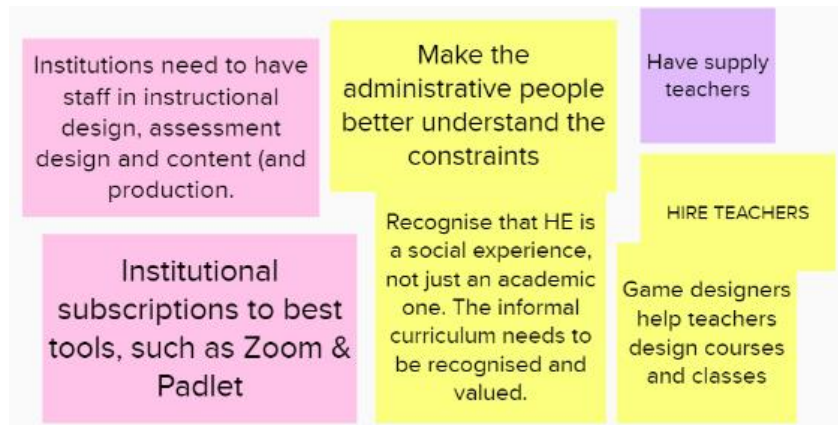
-   New class dynamics (gamification, tutorials, videogames and AR) and organization (classes more homogenous, short-deadline to tasks, classes with no schedule, several assessments and instruments)
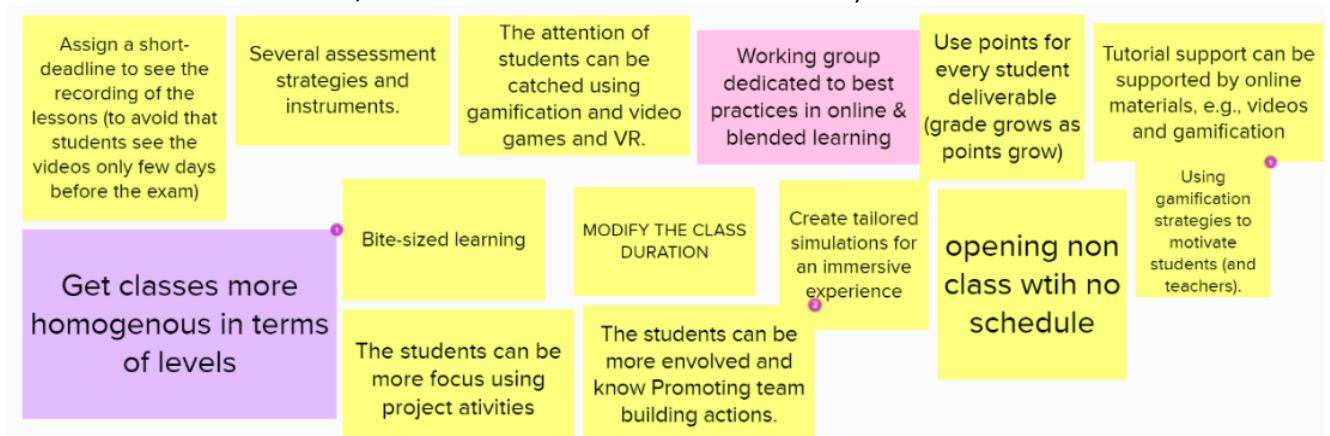
An improved use of technology in classrooms for better learning, safer technology, more equipment and better fit
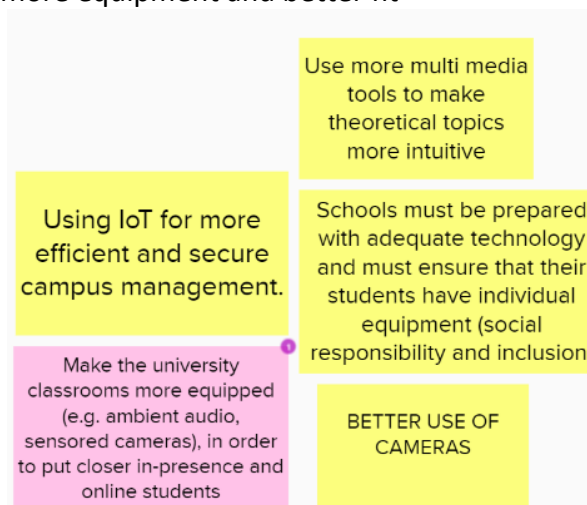
All the ideas developed under brainstorming activity point to some tools and recommendations that allow teachers to build individual educational paths to students that guarantees a self-paced learning, more autonomous study, but also a social dynamics component with collaborative and practical work, supported in problem based or project-based learning. Some points to highlight:

- Contents tagged individually for students (to level them for instance)
- Social dynamics component: Face-to-face moments; project based learning; social learning (among peers) and feedback 360º from colleagues and teachers; guarantee the feeling of "belonging" and community (social and psychological dimensions)
- Motivation based on social interaction, fun, gamification
-

To implement this kind of solution that addresses the needs of young generations, Universities should surpass some obstacles:
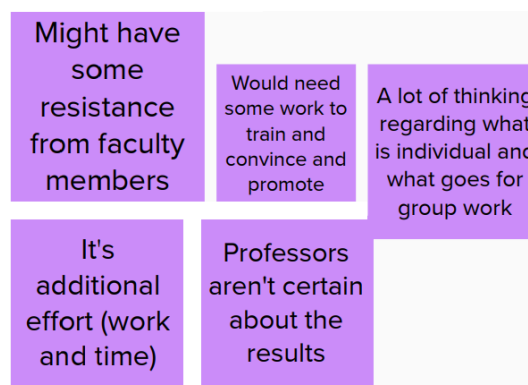
Some resistance of innovation by Universities and teachers can be surpassed promoting:
- Mentorship programs to university teachers
- Programs to share good teaching experiences and best practices...
- Training teachers with effective learning programs and mentorship (internal and external)
- Teaching to create better contents and suitable to new generation needs (for instance the span of attention)
- Training teachers to use more efficiently digital tools and distance learning technology
- Integrating new pedagogical models and testing them

Results Analysis, Trends, Key Points

TO WHOM does the challenge concern?

> Students
> Teachers
> Researchers
> Administrative Staff
> Technical staff
> Faculty members

6.1 Technical Factors

> Lack of proficiency in tools
> Not comfortable with new tools
> Bad internet connection
> Usability issues
> Equity of access
> Compatibility issues due to a wide range
> of systems e.g., browsers, mobile tech,
> Technology awareness

6.2 Trends in Digital Learning

> "Blended" learning
> "Bite-sized" learning
> Smartphone learning

6.3 Ideation priming - Teachers

The ideation process applied the brainstorming technique to the teachers and gather their opinion and suggestions as follows:

➔ How might we reduce time spent on bureaucracy?
➔ How might we keep Tobias from emotionally struggling?
➔ How might we keep Manuel from feeling overwhelmed?
➔ How might we take technology out of the way for students?
➔ How might we make sure the resources are freely available/open-source technology
➔ How might we keep students from getting distracted?
➔ How might we create shorter and more appealing classes?
➔ How might we make the students more interested in classes
➔ How can we keep admin tasks from overflowing to personal time?
➔ How might we help Manuel interact with his students and peers more often?
➔ How might we design methods to provide regular and constant feedback to students
➔ How might we split lectures into segments and make them interesting and appealing
➔ How might Francesca's colleagues help her feel like she is growing all the time?
➔ How might we exploit technology to engage students
➔ How might we design interactive activities to engage learners
➔ How might we help Manuel get more institutional support for his innovative approaches?
➔ How might we design learning that enables us to provide regular feedback
➔ how might we make sure the security of the contents provided as part of the lectures
➔ How might we embed formative assessment in teaching
➔ How might we exploit technology to efficiency complete the admin tasks
➔ How might we know that our teaching method is engaging

Focus Group - Teachers
- ➜ Work on organizational culture
- ➜ Design institutional workshops and presentations for management
- ➜ Propose activities that are different from digital?
- ➜ Question the role of universities together
- ➜ Write some papers on his innovative approaches
- ➜ Try to understand how the course fits into the global program
- ➜ Invite celebrities to attend
- ➜ Invite guest speakers/specialists
- ➜ AI and Machine Learning to automatically complete admin tasks
- ➜ Work on development of dedicated tools/LMS
- ➜ AI and Machine Learning to automatically complete admin tasks
- ➜ Regular critical review of teaching practice
- ➜ Provide mentoring from more experienced professors
- ➜ Get regular feedback from the students regarding students' engagement
- ➜ Write a daily check up on our activities
- ➜ Peer reviews with fellow academics
- ➜ Introduce peer to peer feedback for students and academics (KUDOS)
- ➜ Propose different options to students and let them choose the modalities
- ➜ Try to understand why students joined the program
- ➜ Have the students create the platforms
- ➜ Random generator of fun classroom dynamics
- ➜ Students unlock exam questions if they deliver great work
- ➜ Everything students do gets points
- ➜ More production value in the content
- ➜ Use gamification to engage students
- ➜ Random knowledge competitions
- ➜ Work with game designers to design courses
- ➜ For better and more appealing classes, we can have less prelective classes but more interactive classes
- ➜ Use enquiries in the classroom
- ➜ Design interactive activities using technology
- ➜ Pedagogical and psychological training for teachers
- ➜ Work on faculty development/ training
- ➜ Work on individual "soft skills"
- ➜ Teach professors some game design
- ➜ Virtual campus with social capabilities
- ➜ Use augmented reality for more engagement

➔ Hybrid campus (virtual and physical)
➔ Group assignments
➔ Promote project-based learning
➔ Design group and problem-based learning
➔ Adoption of collaborative platforms by all the faculty body
➔ Promote collaborative culture in the class
➔ Student-teacher workshops on multiple topics

6.4 Ideation priming - Students'

After exploiting teachers' point of view, their difficulties, anxieties and strategies to answer the challenges during Covid 19 pandemic, 4 moments were developed targeting higher education students. 2 Focus groups with a scripted debate with a duration around 1 hour with 9 students, and plus 2 informal 45 minutes conversation with 7 students.

6.4.1 Focus Group

In Focus Groups some questions were debated regarding present education and projecting ideal ways of teaching and learning. This research was based on a script that aimed to answer 3 questions about the **present of education (NOW),** other about the education in 10 years from now **(Future)**, as well as exploring some potential **future** scenarios **(What if)**.

Exploring the first questions, the NOW dimension-, students drawn a set of considerations:

- Educational system is old (as the classes are implemented) and do not captivate attention because it is not interactive; teachers are sticked to traditional ways of teaching
- Teachers should adapt more to available technologies
- Lectures are based on projecting slides and teachers talking about it and it is hard to follow and are boring "above all if we are in on-line classes"
- Should be more interactive and participative
- Include more videos and quizzes at the lessons
- Lessons that were more engaging involved students' participation
- Internet is now a place to gather information, so school should teach other skills to be more practical (how to search information, references, practices)
- Tech should be more practical
- Teachers have lack of information on how to do different
- It is necessary to change on-line but also in-person classes. On-line sessions show that the classical approach is not engaging (slide-based, oral presentation by teachers, no interaction)
- Teachers should have some training seminars about engaging students. Some of them are excellent researchers but when moving to classes they are not able to engage students

- The length of the classes is too long. Students cannot follow
- İn the digital world all living dimensions take place in the same space (home) and this is not healthy. Some strategies should be developed to separate work/study time from home/relatives time
- On-line classes are a time and money saving way of teaching
- On-line classes are an opportunity to do other things. "But we need to have the capacity to manage time and have good internet connection"
- Nowadays students adapt the way they learn accordingly with the teachers
- Sometimes teachers want to innovate and universities don't let them do differently
- Some teachers are trying to do different things at the classes (introduce jokes/guesses). Students feel the lessons were made with them
- Use projects to learn – build a process and reuse it
- Learning things in a process: university gives information, students work and research, apply it in concrete situations – apply it on the course (get and apply that information)
- Methodology that gives students autonomy and very little help – is a way to motivate students, make them more responsible, and to improve time management
- Older teachers had more difficulties in using technologies. Teachers need training programs
- Online teaching was very traditional: reading content on-line and attending lectures

Exploring the future dimension based on some questions and "WHAT IF" scenarios, students drawn a set of considerations about ideal education:

- Students can choose what to learn
- Students can choose where to learn (on-line or in-person)
- Possibility to record the lessons
- Greater participation of the students
- Teachers more like facilitators/monitors, to help students and level the classes
- More democratized, giving students the possibility to attend lessons and lectures worldwide
- More flexible: students can learn on-line or in-person
- It should combine on-line and in-person learning
- Students with the option to attend in-person classes or on-line from home or wherever they are
- With the pandemic a new education model was revealed. Until that moment only classical models of education were known
- The tools students and teachers are now using should be improved
- New educational models should be hybrid, as some classes need more interaction
- Having the choice to choose remote or in-person
- Great teachers can be invited to come physically for seminars
- In-person classes are important to maintain the social link

- The physical spaces at school could change and people can attend classes at the social spaces
- Remote learning give more possibilities to participate globally
- Not only technology but also languages should be improved as English becomes the universal language
- Pedagogy: teachers should learn new techniques to engage students
- More screens and cameras at classrooms and interactive boards for students attend and interact
- Holograms and cameras
- Students should explore more: instead of teachers give the information, they can create challenges to students exploit and gather information, understanding and creating the logic behind the information, changing the way knowledge is revealed/acquired
- more theoretical classes; medicine with simulations using AR/VR)
- Focused on the students, teachers should do what is the best for the students
- Flexible where students can choose on-line classes or in-person classes
- Enable people to work with technology
- Subjects evolves and teachers stay at the same level
- Teachers have a great focus on the grades
- Create immersive experience in education – make education for students to enjoy – better experiences
- Everything related with school should be available on the mobile phones (documentation, appointments, communication)
- Need of informal talk around the topics
- Softwares to simulate real situations (for instance in management)
- Schools should be prepared for students to attend classes even in social spaces (good internet connection, laptops...)
- Project oriented school, more practical; lifelong learning – people learn what they need when they need – university as a service

With "WHAT IF" challenges, some suggestions arose to improve education system and models:

- Teachers should have training/instructions on how to use the platforms
- Give a wide range of tools and tell them how to use it in the classrooms, specific classes, and topics (demonstrate it). It will be excellent to older teachers
- Give the teachers the possibility to exploit and use the best tools for them
- A solution with some filters to find specific tools to use in the lectures (categories / subjects / etc) for them to choose – some tutorials also to teach them (promote open source tools)
- Models adapted to different cultures and countries
- Universities should have other KPIs. Grades are not so important
- Many teachers don't want to learn new things. It should be mandatory for them to learn

- Give teachers some guidelines for them to follow to standardize procedures
- Evaluation should consider soft skills as leadership, management, stress management, personal and social skills
- Education should consider students in the center of the process
- Add social dimension in the training and evaluation
- Gamification "not very fond of the idea"
- Gamification can be more motivating to help advancing in the learning path
- Gamification is really interesting but has to be more practiced. "Instead of simplifying my experience, it didn´t simplify it but made it more complex"
- Should implement some game activities but not lose the serious dimension of school; school is not a place to have fun, stay there and enjoy the moment. "Add some points YES. Have it in any situation NO"
- Can be more engaging but removing some responsibility. Should start with a prototype and evaluate first (for instance one game-based course)
- Students have the possibility to choose how they are evaluate (example: tests; projects; problems) – the possibility to choose the way like a game

6.4.2 L´Esplanade

L´Esplanade activities were taken in an informal environment with 2 groups of 7 students, under the discussion of a set of topics:

a. What do you think about create a learning path for higher education teachers, including technological, pedagogy, time management areas

b. What do you think about teachers having a toolkit, with a "bag of classes dynamics" where they can pick or choose tools, for instance brainstorming techniques, improvisation techniques, how to introduce a new topic, tools, exercises, games, etc.

c. What do you think about gamifying higher education: transforming school assignments into challenges, earning points instead of grades, promoting competitions individual ou in a teams, social spaces, game designers helping teachers to create classes curriculum.

After the discussion students were asked to vote each of these ideas in 3 dimensions: the easiest idea to implement; the most popular; the most disruptive

a. About the first item – to create a **learning program/path for teachers in higher education** (tech / pedagogy / time management, etc), students consider the following opinions:

- Teachers struggled on the use of tech tools
- Teachers during the pandemic had short time to learn how to use the software
- Pandemic raise the pedagogic strategies
- Teachers don't like to be taught about how to teach, so can have some "tips" in an on-line way: how to keep students engaged in online classes, conferences, etc
- Almost all of the time teachers are reading slides and students get disengaged
- Even good teachers when moved to on-line classes did not give any feedback; they had no idea how to work, how to manage classes. "We were all alone. Teachers should have a training to develop their abilities''
- Teachers have different levels of preparation
- English training can also be important because most of master classes are in english and if teachers don't speak well English it is disappointing
- "boring, full of text Materials" that made the classes even more difficult because they are not appealing – teachers should investigate another way of presentation
- They don't know how to motivate themselves. Reading a book is the same
- They need to learn more pedagogy
- Teachers had the training regarding new ways to present and teach (for instance how to make videos, canvas, audio) but don't apply it because they are sticked to the traditional methods, because it is hard and they don't want to take that time
- It is important to teach technology but also to teach why that is important

b. The second topic was around the idea that teachers have a **toolkit with a set of information**.
    - Instead of a training path they will have a toolkit of class dynamics/a "bag of dynamics" where they can pick – brainstorming techniques, improvisation techniques, introducing a new topic, tools, exercises, small games (they will be able to say I have this challenge and search tools/dynamics to choose) to create a safe space in which everybody can participate

With this idea launched students referred some ideas:

- Students are most engaged if they can participate actively in the learning process and can choose
- Some support material as a manual to start a course
- Students view: greater participation of students. For instance, if there is a student with a passion of one topic, it can be empowered to explain its point of view to the teacher and colleagues
- For theoretical classes teachers only show text slides and talk; this is not appealing and it is difficult to track and pay attention to the classes, specifically "if we have classes at 8 AM" and students can study everything from the slides.
- Everything teachers can use to make classes more dynamic and fun will be amazing
- The classes are so long and just reading. Most students stop pay attention or just leave (face-to-face classes and on-line) and it was even worse as students are at home with so many stimulations around
- Teachers don´t invest in alternative strategies (for instance brainstorming) because they have short time to follow the syllabus/program
- In presentations, there is unilateral communication. Sometimes students put questions only to interact a little
- Teachers if they have this platform will not use it
- There are a lot of platforms: it is important to find a way to teach teachers about the platforms features because many times they are not comfortable with the platforms and technologies

c. To the third topic - Gamify higher education, transforming school assignments into challenges, earn points instead of grades, competitions individual or teams, social spaces, game designers helping teachers create the class curriculum – i.e. transform the way students experience the lessons, instead of simply learning the content.

- Teaching more oriented to problem solving
- More dynamic, more challenging, putting students work together and with the students (creation of contents together)
- Platform where students can login and see their advancements and teachers work as the game master
- Suggestion to change the word "game" to something else
- "I think it is fun and makes students more active"
- "It seems like a different world"
- It makes students entrepreneurs in a certain way as they are working in different aspects with team mates
- The education system is old in the sense that the evaluations are based on a written test and then "you forget all the things you learnt" so "I think it is a good way to keep things in our heads and can use it in the future"
- "Prepares us for the working world"
- İmplement gamification strategies to evaluate teachers too, not only students; teachers have some goals to accomplish
Some other problems were identifies to gamification contexts:
- Rewards people with more free time
- a threat work/study-life balance

In the 2 groups the voting shows that students think:
The easiest idea to implement is number one (with 1+3 votes),
followed by idea number 2 (3 votes)
The most popular is number 3 (4 votes) against idea nr 1 (3 votes)
The most disruptive is number 3 (4+3 votes)

Digital Learning Technological Solution

To meet these challenges, a communication platform will be developed in the scope of the project "University goes Digital" with the goal of divulge and create a set of resources (external sources or produced inside the project) accessed in a toolkit to help teachers to reinvent themselves and the methodologies of teaching they adopt, using a shared economy approach as well as an open 360º communication strategy, considering contributions from universities stakeholders, peers and students.

Teachers will have a communication platform, working as a network, to share and access information among them and students. The information that will be shared, can be references of some already existing content or content created by themselves. In order to identify the best contents, they will be rated by all participants. So, it will be possible to create a ranking and help teachers to find easily the most suitable contents that help them in teaching strategies aiming for "digital born" students.

It will be considered several layers – roles – in this communication ecosystem aiming to share information that helps teachers to choose the best practices. The dynamic will be based on 2 axes: (1) participation in several groups of discussion and (2) access/share/create contents.

The communication groups will be accessed accordingly with the roles, but the main principle is *everybody can participate and subscribe groups*:

➔ Teachers can discuss with other teachers in several levels:
- ◆ Between universities
- ◆ Universities
- ◆ Area/science
- ◆ Class

➔ Teachers can discuss, among peers, techniques to engage, onboarding, contents, strategies, websites and other resources, helping them to improve their methods of teaching

➔ Teachers communicate with students
- ◆ Inside the class group
- ◆ Individually (one to one)

➔ Students can discuss with other students in several levels:
- ◆ Between universities
- ◆ Universities
- ◆ Area/science
- ◆ Class

Athena Design Thinking for Digital Learning - IO 1

Roles:
1. General administrator
2. Teacher responsible for University
3. Teachers
4. Students

Features:

Administrator (manage back office system)
➔ Create universities: ISCTE | Gustave Eifel | Sigmund Freud | Milano University | (*new...*)
➔ Create scientific area (Research Methodology | Organisation & Leadership | Technology in Architecture | Logistics | (*new...*)
➔ Create Classes (associated to each area)
➔ Create subjects (associated to classes)
➔ İnvite *Teachers responsible for university* (email notification)

Teachers responsible for universities
➔ Create profile using the invitation functionality
   ◆ confirm university (list)
   ◆ choose scientific area (list)
   ◆ choose class (list)
   ◆ choose subjects
   ◆ create/choose themes (list)
   ◆ name & alias (free text)
   ◆ photo
   ◆ (...)
➔ Login
   ◆ Homepage with the complete feed of the groups subscribed (first time: default; later: subscribed groups)
   ◆ Groups
   ◆ İndividual page
➔ Can invite teachers and students
   ◆ using notification/email
   ◆ choose the role (teacher/student) (list)
   ◆ choose university
   ◆ choose scientific area (list)
   ◆ choose class (list)
➔ Access groups (teachers/teachers + teachers/students)
➔ Subscribe other groups (Follow / unfollow)
➔ Share contents

- ➔ Comment contents (communication)
- ➔ Contents (toolkit):
    - ◆ search contents
    - ◆ rate contents
    - ◆ reference contents:
        - ● web free contents
        - ● subscribe channels (You Tube)
    - ◆ create contents
        - ● web contents
        - ● upload Youtube Athena channel
- ➔ Approve contents

Teachers
- ➔ Create profile using the invite
    - ◆ confirm university (list)
    - ◆ choose scientific area/class (list)
    - ◆ choose subjects/themes (list)
    - ◆ name & alias (free text)
    - ◆ photo
    - ◆ (…)
- ➔ Login
    - ◆ Homepage with the complete feed of the groups subscribed (first time: default; later: subscribed groups)
    - ◆ Groups
    - ◆ İndividual page
- ➔ Can invite teachers and students
    - ◆ using notification/email
    - ◆ choose the role (teacher/student)
    - ◆ choose scientific area
    - ◆ choose class (list)
- ➔ Access groups (teachers/teachers + teachers/students)
- ➔ Subscribe/unsubscribe groups
- ➔ Share contents
- ➔ Comment contents (communication)
- ➔ Contents (toolkit):
    - ◆ search contents
    - ◆ rate contents
    - ◆ reference contents
    - ◆ subscribe channels (You Tube)
    - ◆ create contents
- ➔ Approve contents

Students
- → Create profile
- → Login
  - ◆ Homepage with the complete feed of the groups subscribed (first time: default; later: subscribed groups)
  - ◆ Groups
  - ◆ İndividual page
- → Create contents
- → Comment contents
- → Give a rate to the contents (only students that contribute with contents can rate others)

The toolkit site allows:
- → Categorize/tag information – areas/science
- → Ranking content
- → Specific tasks will be awarded with points
- → Present a list of links with access to the contents (per category)

The content list is presented in a ranking (aggregating the rates of teachers and students)
- → Contents can be searched
- → The contents can be commented by teachers and students in the communication platform
- → Subscribe contents in YouTube Channel – bot running daily to search new contents – (teachers/admin approve them)
- → Create a project YouTube *Athena* channel
- → (+ content center associated with the classes?)

Draft of the IT solution to support trends in university digital learning
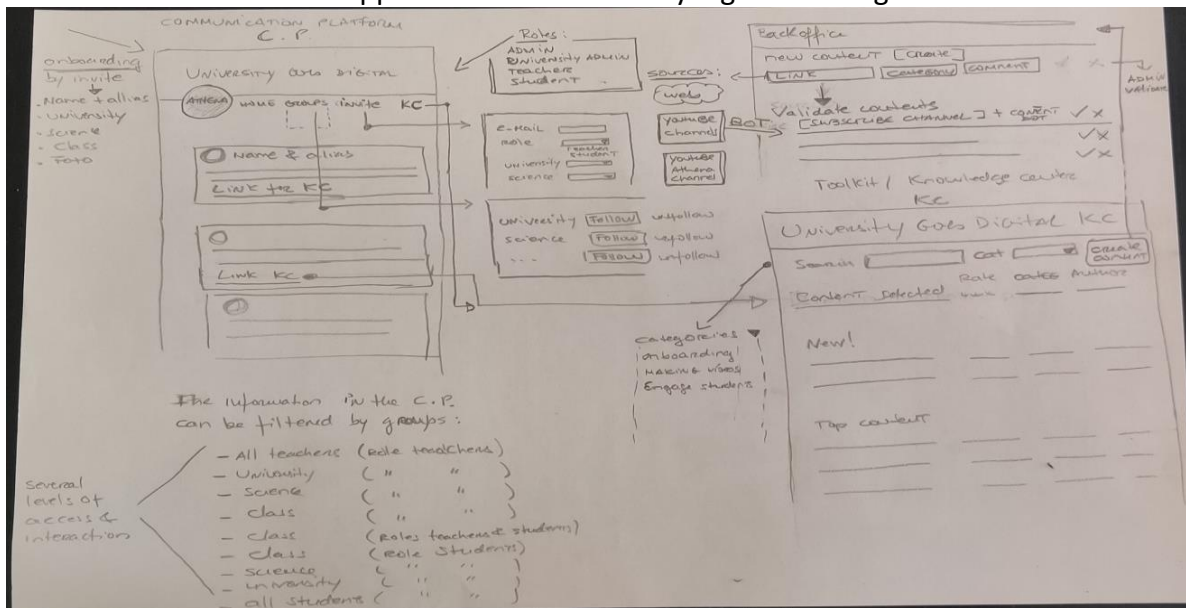
Conclusions

Covid 19 pandemic showed that old methodologies to teach and learn are obsolete. The "sage on the stage" traditional educational model doesn´t meet generation Z characteristics. They are social human beings, and value social experiences, but also digital and mobility beings. As the internet and information become accessible to everyone and they are "digital-born" they overtake teachers in some aspects related to information and technology. So teachers have to adopt a new role, not as content master but as a learning master, teaching how to learn and helping students to carry out the knowledge acquired during university along their lives, not only in a technical way but also as human beings respecting the universal values.

Indeed, a sharing economy arose in which contents can be accessed and created by everyone, and students want to choose and participate in the knowledge construction, understanding their basis and rationale. Moreover, they want to have teachers and universities as a service (UaS) to deep their knowledge in a specific area they need in a specific time and context, and this only can be reached in a mastery and meritocracy level, where students can choose the best for them – how to attend classes (on-line or hybrid), how will they be evaluated (tests, project-based, problem-based…), and even which teachers they want to evaluate them, etc. This demands a shift in the teaching paradigm with focus on the students and their needs. Teachers have to be available and flexible to learn more, not only about their scientific area, but how to engage students, how to motivate them, how to facilitate them, how to address individual difficulties, how to lead them.

The first step can be done by implementing a platform based on several levels of communication and a knowledge centre to share and access resources, in which everyone can participate in a shared economy paradigm:

➔ Teachers can discuss with other teachers in a multidisciplinary approach.
➔ Teachers can discuss, among peers in their scientific areas, techniques to engage, contents, strategies, websites and other trustworthy resources.
➔ Teachers prepare all the learning moments and make materials and contents available (all contents are on-line); in-person classes coexist with on-line contents and classes (some practical areas and labs can be "free accessed spaces" to students attending the classes). Physical spaces should evolve making available cameras and screens. Students should have the possibility to choose between on-line classes and in-person.
➔ Teachers discuss inside the school/class, giving space to discuss with students, let them expose their ideas and leverage global knowledge. This can be reached by allowing

Athena Design Thinking for Digital Learning - IO 1

students to share ideas, and also record the contents, to be available to peers and teachers.

➜ Let students choose how and with whom they want to be evaluated:
  ◆ Tests
  ◆ Problem-based evaluation
  ◆ Project-based evaluation

The future in learning is a collaborative space, either digital and in-person, where everybody can create content (even students, for instance if they have a passion for a theme probably, they have a deep knowledge about it that can be shared). So, everybody can contribute to develop each scientific area. Also, a space where contents can be corrected by everyone, rating them.

Internet based learning is the most democratic model involving the participation of all – university principals, technical staff, experienced teachers, new teachers and students.

References

Sampsel, Laurie J. 2018. "Voyant Tools." *Music Reference Services Quarterly* 21(3):153–57.

VOSviewer. 2021. "VOSviewer." Retrieved (https://www.vosviewer.com/).

Annex

Annex 1

Milestones & activities:

Meetings	Goals	Responsible	Notes
22/03/2021	Problem Frame: Assessment "As IS" Challenges	ISCTE	(*)
06/04/2021	Storytelling: Inspiring stories experiences	ISCTE	(*)
19/04/2021	Situation Point & Tech Sessions (gamified platform)	ISCTE	
03/05/2021	Situation Point & Tech Sessions (Microsoft)	ISCTE	
17/05/2021	Situation Point & Tech Sessions (EON Reality VR/AR)	ISCTE	
31/05/2021	Situation Point & Tech Sessions (Quantum Computing in Practice (Sigmund Freud))	ISCTE	
14/06/2021	Conclusions: Collected data	Webwise	
28/06/2021	Report Conclusions & Solutions Preparing the IO2	ISCTE	

(*) Important note: The completion of the PROBLEM FRAMING PHASE must be achieved at least 1 WEEK before the 1st ideation session is executed as it will have a huge impact not on the structure but on the content of the session itself. The PERSONAS will be constructions from the core team.

Annex 2 - Text Mining

Term	Occurrences	Term	Occurrences
students	87	TOOLS	9
time	34	GROWTH	8
home	31	LIKE	8
class	29	QUESTIONS	8
classes	28	TEACHERS	8
learning		VIDEO	8
use	25	INSTITUTION	7
teaching	23	KNOW	7
problem	22	LECTURE	7
lack	19	MANAGEMENT	7
classroom	18	OUTCOMES	7
online	18	PERSONAL	7
make	17	PLAN	7
student	17	PROCESSES	7
prepare	16	PROFESSIONAL	7
important	15	RESOURCES	7
improve	15	STUDY	7
auditorium	14	WAY	7
university	14	ACTIVITY	6
work	14	ASPECTS	6
good	13	BEST	6
room	13	BIGGEST	6
activities	12	BUREAUCRACY	6
competencies	12	COVID	6
face	12	DECISION	6
knowledge	12	EVALUATION	6
new	12	HOSPITAL	6
research	12	INTERNET	6
skills	12	LABORATORY	6
teacher	12	LESSON	6
content	11	MAKER	6
course	11	MATERIAL	6
able	10	NEED	6
help	10	NOTES	6
think	10	PANDEMIC	6

Term	Occurrences	Term	Occurrences
difficult	9	PAPER	6
hard	9	POSSIBLE	6
having	9	PROBLEMS	6
lot	9	REAL	6
methods	9	SMALL	6
Term	Occurrences	Term	Occurrences
sure	6	UNDERSTAND	5
training	6	YEAR	5
used	6	YEARS	5
working	6	ALLOW	4
write	6	ASSESSMENT	4
better	5	CASE	4
challenge	5	CONNECTION	4
change	5	CREATE	4
check	5	DESK	4
communication	5	DESKTOP	4
computer	5	DIFFICULTY	4
courses	5	DIRECTLY	4
degree	5	DISCUSS	4
develop	5	DOING	4
devices	5	EFFICIENT	4
different	5	EXAMS	4
donâ	5	FIELD	4
environment	5	GOALS	4
equipment	5	HOMEWORK	4
exercises	5	INNOVATIVE	4
future	5	INTERACTION	4
groups	5	ISSUE	4
impact	5	IT'S	4
involved	5	JOB	4
just	5	LECTURES	4
laptop	5	LEVEL	4
learn	5	MODEL	4
limited	5	NEEDS	4
little	5	PEOPLE	4
number	5	PLACE	4
office	5	PREPARATION	4

Term	Occurrences	Term	Occurrences
pen	5	PREPARING	4
provide	5	PRESENTATION	4
psychology	5	PREVIOUS	4
reach	5	QUALITY	4
results	5	QUESTION	4
sessions	5	READ	4
set	5	REALLY	4
solved	5	REVIEW	4
start	5	SCHOOL	4
studying	5	STAFF	4
support	5	TABLET	4

Term	Occurrences	Term	Occurrences
task	5	top	4
teach	5	TOPICS	4
team	5	VIRTUAL	4
technical	5	TESTS	5

Table 5: Terms co-occurrences - Voyant Tool.