Michele Paludetti

Lectour

Smart schooling platform
for engagement and
collaboration enhancement

POLITECNICO
MILANO 1863

Tutor
Valentina Auricchio

Lectour: Smart schooling platform for engagement and collaboration enhancement

Author
Michele Paludetti
917644

Tutor
Valentina Auricchio

Politecnico di Milano
Faculty of Design
Product Service System Design
Master of Science
A.Y. 2019-2020

POLITECNICO
MILANO 1863

Table of contents

Figures 8
Graphs and Maps 10
Abstract Italiano 12
Abstract English 14

1 BACKGROUND 16

1.1 About COVID-19 breakout 18
1.2 Situation in Italy 20

2 RESEARCH 22

2.1 Research breakdown 24
2.2 Benefits of distance learning 26
2.3 Distress linked with distance learning 28

3 FRAMEWORK AND SCENARIO DEFINITION 30

3.1 Catching up with naming confusion 32
3.2 What does literature say? 34
3.3 Smart school vs. Tele school 36
3.4 How are Smart and Tele different? 38
3.5 Defining the characteristics of a Smart school scenario 40
3.6 Why do we need this distinction? 42

4 QUANTITATIVE RESEARCH: SURVEYS 44

4.1 Survey among students from different schools 46
4.2 Liceo Classico Paolo Sarpi, Bergamo, Italy 50
4.3 Survey among students from Liceo Sarpi 52
4.4 Insights from quantitative research 54

5 QUALITATIVE RESEARCH: INTERVIEWS 57

5.1 Ada (4th year) 58
5.2 Federica (3rd year) 60
5.3 Beatrice (4th year) 62
5.4 Ilaria (2nd year) 65
5.5 Prof. Maria Nardone (Latin, Greek) 68
5.6 Prof. Letizia Pagliarino (Italian, Latin) 71
5.7 Prof Elena Mazzacchera (Italian, Latin, Greek) 74
5.8 Insights from qualitative research 77

6 CASE STUDIES 80

6.1 Unibg e-Learning, Latin and Greek exercise platform 82
6.2 UNESCO distance learning solutions for COVID-19 84
6.3 Proctorio, AI based proctoring service 86
6.4 Universal Learning Programme 88
6.5 Gamification in Corporate e-Learning 90
6.6 Coursera, Learning platform 92

7 DEFINING THE AREAS OF OPPORTUNITY 94

7.1 Market positioning 96
7.2 Challenge definition 98
7.3 HMW positioning 100
7.4 Learnings from the case studies 102

8 CO-DESIGN AND FAST PROTOTYPING 105

8.1 Co-design workshop with the students 106
8.2 Low-fi prototype and test with professors 110
8.3 The four concept ideas 112 112
8.4 Results of the test 120 120

9 LECTOUR 124

9.1 The final concept: Lectour 126
9.2 About open access teaching 129
9.3 Unique value proposition 131
9.4 Service offering map 133
9.5 The users journey 136
9.6 Teacher user persona and journey map 137
9.7 Student user persona and journey map 145
9.8 Website architecture 152
9.9 Key pages user flow 154
9.10 UI design: Community 156
9.11 UI design: Dashboard 158
9.12 UI design: Lecture editor 160
9.13 UI design: Browser extension 162
9.14 UI design: Remote controller 164
9.15 UI design: Lectour popups 166
9.16 UI design: Quiz review 168
9.17 UI design: Feedback giving and review 170
9.18 Service Blueprint 173
9.19 Business strategy 180
9.20 Business model canvas 182

10 BIBLIOGRAPHY 184

10.1 Bibliography 186
10.2 Webliography 189

Figures

1 - Kid during online class | *Pexels* 27
2 - Survey on E-learning (screen capture) | *Google Forms* 47
3 - Survey on E-learning (screen capture) | *Google Forms* 47
4 - Liceo Classico Paolo Sarpi | *Google Maps* 51
5 - Exercises from Unibg e-Learning | *Nuova Secondaria Ricerca* 83
6 - Exercises from Unibg e-Learning | *Nuova Secondaria Ricerca* 83
7 - Distance learning solutions (screen capture) | *UNESCO* 85
8 - Proctorio landing page (screen capture) | *Proctorio* 87
9 - Proctorio about page (screen capture) | *Proctorio* 87
10- Universal learning programme logo | *UNESCO* 89
11 - Prototype of gamified learning app | *eLearning Industry* 91
12 - Prototype of gamified learning app | *eLearning Industry* 91
13 - Coursera landing page | *Coursera* 93
14 - Lecture preview on Coursera | *Coursera* 93
15 - Results from the workshop with students (screen capture) 109
16 - Screens of the prototype: student dashboard 113
17 - Screens of the prototype: teacher notification center 113
18 - Screens of the prototype: teacher analytics 113
19 - Screens of the prototype: teacher reports a student 113
20 - Screens of the prototype: dashboard 114
21 - Screens of the prototype: lecture editor 115
22 - Screens of the prototype: lecture remote 115
23 - Screens of the prototype: interactive quiz 115
24 - Screens of the prototype: online test 117
25 - Screens of the prototype: instructions 117
26 - Screens of the prototype: test editor for student 118
27 - Screens of the prototype: test creation 119
28 - Screens of the prototype: test review 119
29 - Screens of the prototype: test review (comparison mode) 119
30 - Woman studies at the computer | *Pexels* 130
31 - Avatar for Teacher persona | *Pexels* 138
32 - Avatar for Student persona | *Pexels* 146
33 - Lectour community screen 157
34 - Lectour teacher dashboard screen 159
35 - Lectour student dashboard screen 159
36 - Lectour lecture editor step 1 161
37 - Lectour lecture editor step 2 161
38 - Lectour teacher browser extension (teacher) 163
39 - Lectour student browser extension (student) 163
40 - Lectour remote controller 165
41 - Lectour student quiz 167
42 - Lectour student multimedia visualization 167
43 - Lectour teacher quiz answer review 169
44 - Lectour student feedback giving 171
45 - Lectour teacher feedback review 171

Graphs and Maps

1 -School closures during COVID-19 (July 2020) | *European data portal* 19
2 - Distribution of PCs for study in every home in the European countries | *OECD* 21
3 - Visual representation of definition overlap of distance learning-related names inspired by Moore et al. (2011) 33
4 - Matrix of characteristics of scheduled and flexible school and work environments 41
5 - From questionnaire 1: Effectiveness of school management and organization 48
6 - From questionnaire 1: Effectiveness of online classes in the students' opinion 48
6 - From questionnaire 1: 1-5 evaluation of tele schooling 48
7 - From questionnaire 1: Most frequent problems when using video call platforms 48
9 - From questionnaire 1: Students that have a reliable internet connection at home 49
10 - From questionnaire 1: 1-5 evaluation of traditional school 49
11 - From questionnaire 1: Overall judgement of tele schooling 49
12 - From questionnaire 1: How the study management changed during tele schooling 49
13 - From questionnaire 2: Most missed aspect of traditional school 53
14 - From questionnaire 2: Best evaluation method 53
15 - From questionnaire 2: Activities that could be done without the teacher 53
16 - From questionnaire 2: Attention spawn during tele schooling (minutes) 53
17 - Case studies positioning map 97
18 - Case studies positioning map with design opportunity 101
19 - Lectour offerinng map 134
20 - Teacher journey map (service set up) 141
21 - Teacher journey map (service) 142
22 - Teacher journey map (post service) 144
23 - Student journey map (service set up) 149
24 - Student journey map (service and post service) 150
25 - Lectour website architecture 152
26 - Lectour user flow 154
27 - Service blueprint (part 1) 174
28 - Service blueprint (part 2) 176
29 - Service blueprint (part 3) 178
30 - Business model canvas 182

Abstract Italiano

Il 2020 è stato un anno che ha portato molti settori e servizi ad un punto di svolta. A causa della pandemia di SARS-CoV-2, molti Paesi nel mondo hanno dovuto affrontare un lungo lockdown che ha forzato molte attività a fermarsi. Le scuole di ogni grado, essendo uno dei principali luoghi di aggregazione, sono state chiuse nella maggior parte dei Paesi nel mondo. Professori e studenti sono dovuti improvvisamente passare ad un metodo di didattica a distanza (DaD). Le sfide che questo cambiamento ha portato con sé hanno colto impreparati buona parte delle scuole e degli insegnanti, sia per quanto riguarda gli strumenti, sia per i metodi della DaD. I licei Italiani hanno sofferto in particolar modo per via del basso grado di indipendenza degli studenti e la rispettiva importante richiesta di impegno scolastico. È irrealistico pensare che il metodo di insegnamento tradizionale che fa così tanto affidamento sul contatto diretto con gli studenti possa essere semplicemente spostato online senza considerare le sue proprie sfide e opportunità. Verrà fatta un'analisi di cosa DaD e tele scuola implichino, e verranno definite le caratteristiche di una scuola smart in modo da muoversi verso una più efficiente esperienza di scuola a distanza. A seguito di una ricerca sulla letteratura e interviste con i protagonisti di questo sistema, le sfide primarie verranno individuate nella mancanza di coinvolgimento degli studenti e nella difficoltà della valutazione. Gli studenti saranno quindi coinvolti in un processo creativo con lo scopo di trovare soluzioni ad una o entrambe le due sfide citate. Il risultato del lavoro di co-creazione verrà prototipato e testato con i professori per validarne l'effettiva efficacia e potenziale impatto. Alla fine di questo processo nasce Lectour: una piattaforma online che coinvolge gli studenti mentre rende più semplice per i professori creare lezioni adatte all'online. Lectour mira anche a creare una comunità di studenti e insegnanti che condividono il loro materiale educativo multimediale per essere riutilizzato da altri insegnanti nel costante miglioramento del coinvolgimento per i ragazzi.

Abstract English

2020 has been a year that led many industries and services to a turning point. Because of the SARS-CoV-2 pandemic most countries around the world went through an extensive lockdown that forced businesses and activities to shut down. Being a major gathering point, schools of every grade closed in the majority of the world countries. Teachers and students had to suddenly move towards what is usually referred to as “distance learning”. The challenges of this change caught most teachers and schools unprepared both on the tools and on the methods of distance learning. Italian high schools suffered particularly because of the low degree of autonomy that students have and the high study effort they are asked. It is not realistic to think that the traditional teaching method that relies so much on direct contact with the students might just be moved online without considering its unique challenges and strengths. An analysis of what distance learning and tele schooling will be done, and the characteristics of smart schooling will be defined in order to move towards an efficient experience of distance learning. After conducting literature research and direct interviews with the primary actors of this system, the two main challenges will be: the lack of engagement and the troubles with testing. Students will then be involved in a creative process with the aim of finding valuable solutions to solve one or both of the two main challenges. The results of this work of co-creations will be then prototyped and tested with professors to validate their effectiveness and real impact. At the end of this process is Lectour: an online platform that enhances engagement with students while making it easier for high school professors to adapt their classes to an online format. Lectour is also aiming at creating a community of teachers and students that share their multimedia teaching material in order to be embedded and reused by others to constantly improve the engagement of students.

1
Background

1.1

About COVID-19 breakout

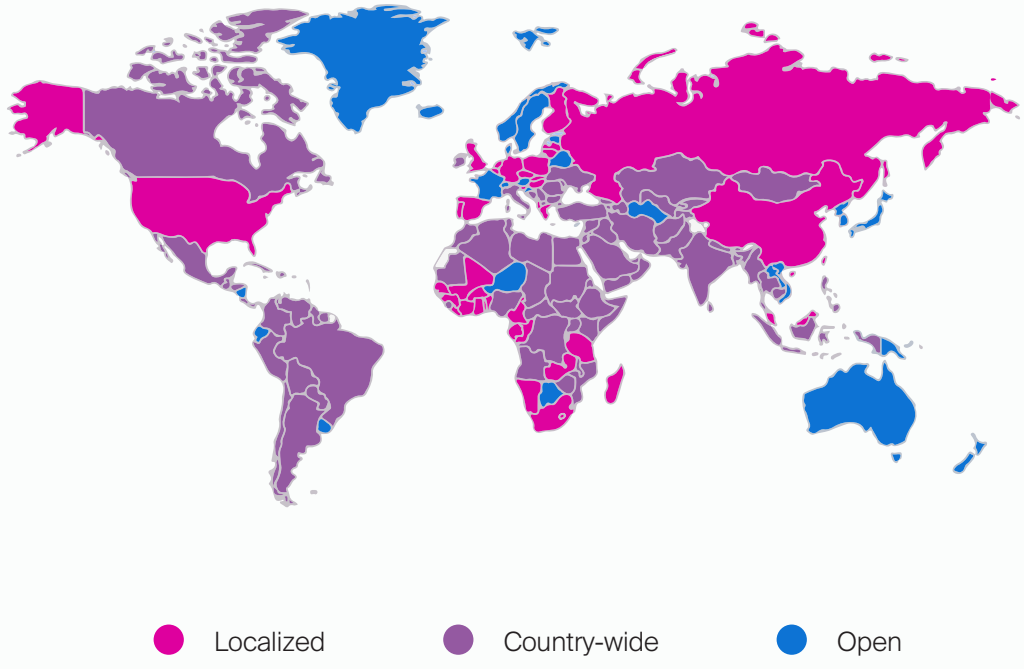
From the first months of 2020, many countries in the world took restrictive measures in order to arrest the spread of COVID-19. Many schools were closed, until when, at the crisis peak, 1.6 billion students had to stay home in 195 countries worldwide[1]. When the crisis started, only 10% of countries had some ongoing e-learning program and infrastructure.

10% of countries had e-learning program before 2020

1.6 B students had to stay home

1. Education during COVID-19; moving towards e-learning. (2020, June 22). *European Data Portal.*

School closures during COVID-19 (July 2020)



Graph 1. School closures during COVID-19 (July 2020) | European data portal

1.2

Situation in Italy

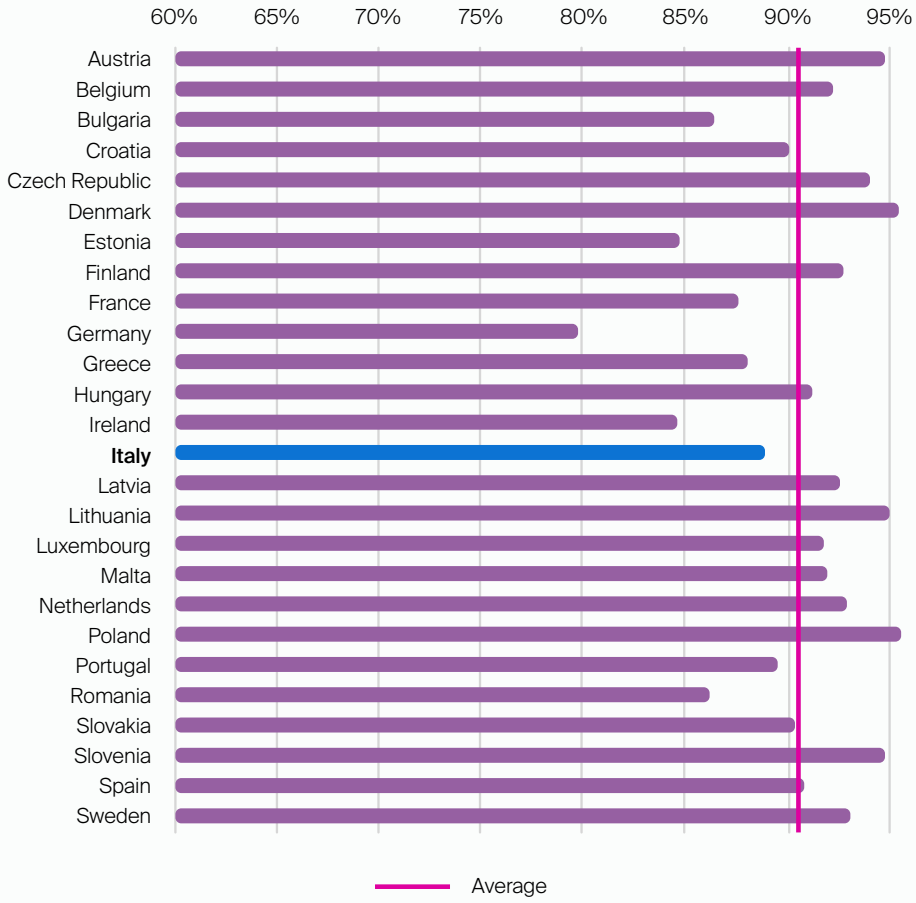
There are big discrepancies worldwide about easy internet access among different socio-economic groups. However, the digital infrastructure in Europe is rather advanced, since most schools and households have access to internet. In Italy in particular, around 89% of highschool students declared to have a computer at home for school and a quite place to study. Even though the percentage is fairly high, it's important to notice that Italy still sits below the European average, which is 90%[2].

In Italy, one out of ten 15-years old student doesn't have a PC for school at home [2].

In Italy, one out of ten 15-years old student doesn't have a PC for school at home [2].

2. OECD (2020), "Coronavirus special edition: Back to school", Trends Shaping Education Spotlights, No. 21

Students with a PC at home for school



Graph 2. Distribution of PCs for study in every home in the European countries | OECD

2
Research

2.1

Research breakdown

The aim of this research is to understand which are the opportunities and threats of the e-learning, understand how it has been done, the perception of teachers and students and what can be improved. The research will have the following structure:

1. Understand the benefits and downsides of tele/smart school, starting from existing literature and studies.

2. An overview of what are the characteristics of smart-working and how these can be applied to school, in order to obtain a framework and define a scenario.

3. Quantitative research among students with questionnaires to define the main challenges of students during tele school.

4. Qualitative research with students and professors to discuss the unique challenges of liceo classico and what has been done up to now.

2.2

Benefits of distance learning

A Brandon Hall study found that learning through e-learning typically requires 40% to 60% less time thanks to the usage of external material and asynchronous learning[3]. The positive aspect of the asynchronous learning was also underlined by the students of the University of Modena in a study done by Russo et al: in this survey, the most appreciated factor was the possibility to pause the lecture to absorbe the information at the right peace. The second most appreciated aspect was the time saved because of the lack of commuting[4]. The reduced commuting has been studied having also major benefits for the reduction of CO2 emissions, calculated up to 85% by the researchers of the Open University[5].

3. Hall, B. (1995). Return-on-Investment and Multimedia Training: a Research Study. Multimedia Training Newsletter.
4. Russo, M., Colombini, S., Pavone, P., Alboni, F., Sartori, L., Piscitelli, G., & Di Santo, E. (2020). Gli studenti EIDI al tempo del coronavirus. Risultati della rilevazione online del 21 marzo 2020. Center for the Analysis of Public Policies (CAPP)
5. Roy, R., Potter, S., Yarrow, K., & Smith, M. (2005). Towards Sustainable Higher Education: Environmental impacts of campus-based and distance higher education systems. Design Innovation Group, The Open University.

Fig 1. Kid during online class | Pexels

40-60%

less time when doing e-learning[3]

85%

fewer CO2 emissions per student[5]

2.3

Distress linked with distance learning

The perception of online schooling is greatly influenced by the context in which it takes place. A questionnaire to students of the department of Economy in the University of Modena Reggio Emilia found out that 15% of students had difficulties related with the COVID 19 emergency and/or were worried for the health of friends and relatives[6].

Without doubt, the context in which this happened left a negative impression in many people that will likely generate biases on the online school. In the same study, 52% of students said they have difficulties in studying, and 79% of these difficulties were related to study management.

52% of students had difficulties in studying

↳ **79%** of difficulties related to study management

Another study on 7,143 college students in China found that 25% of students suffered from severe anxiety due to e-learning crack-up, mostly caused by the fear of academic loss[7]. In Italy, the Government promoted extraordinary measures to avoid student year loss (Decreto Legge 22/2020) which prevented this kind of distress among Italian students.

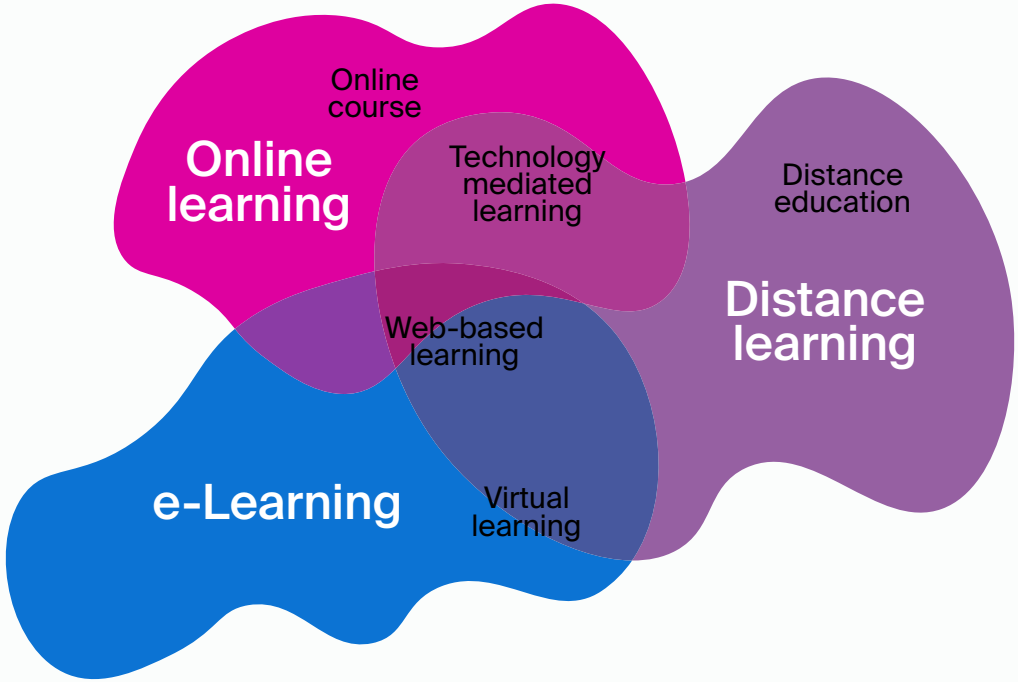
6. Russo, M., Colombini, S., Pavone, P., Alboni, F., Sartori, L., Piscitelli, G., & Di Santo, E. (2020). Gli studenti EIDI al tempo del coronavirus. Risultati della rilevazione online del 21 marzo 2020. Center for the Analysis of Public Policies (CAPP)
7. Hasan, N., & Bao, Y. (2020). Impact of “e-Learning crack-up” perception on psychological distress among college students during COVID-19 pandemic: A mediating role of “fear of academic year loss”. Children and Youth Services Review, 118

3
Framework and scenario definition

3.1

Catching up with naming confusion

When speaking about online learning, it is possible to find numerous names and definitions of the phenomenon, among the most used: distance learning, online learning, e-learning, and smart schooling. For the sake of this research, it is important that a definition of the phenomenon is defined. Moore et al.[8] analyzed the difference in meaning and perception of the three most popular terms: distance learning, e-learning and online learning.



Graph 3. Visual representation of the definition overlap of distance learning-related names inspired by Moore et al. (2011)

8. Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? The Internet and Higher Education, 14(2), 129-135.

3.2

What does literature say?

The premise of the study is that there is little agreement on the definition of each of these terms. Distance learning was first mentioned when computers started to be widely used and it refers to the physical distance of teacher and learner. E-learning and online learning have been more difficult to describe. Moore found that there is little consensus in literature whether these terms are defined by the technologies they use or by the method used to learn. In a survey, Moore tried to define if the users of these kinds of learning methods perceived the names as describing different things, hierarchical categories or other. The results in definitions were conflicting, mirroring the lack of consistency in terminology already spotted in the literature. A key insight from this study is the fact that lack of consistent terminology might indeed affect users and designers approaching these learning methods with unclear expectations.

Distance Learning

- Probably the oldest
- Instructional delivery of an instructor to a learner physically located in different places
- Umbrella term
- Differs from distance education

e-Learning

- Learning based on online technologies, broadcasting technologies and digital supports like CD-ROMS (struggles to define the technologies)
- Includes a degree of interactivity
- Sometimes considered a type of Online learning

Online Learning

- Born in same period of e-Learning
- Considered the most difficult to define
- Sometimes considered direct evolution of Distance learning

3.3

Smart School vs. Tele School

For the sake of this research, it is important to choose the terminology that is going to be used. In order to do so, an analogy with smart working will be done.

Smart working commonly refers to a kind of work execution broken into phases or objectives and without precise requirements of time and place for the employee to observe. Smart working differs from teleworking as this last one requires the employee to observe the same timetable and undergo the same performance assessment as traditional work, only in a remote place.

- No requirements of time and place
- Evaluation through reached objectives

- Follows the same timetable of regular employees
- Performance is evaluated with regular criteria, meaning tele working can't be done for extensive time periods

3.4

How are Smart and Tele different?

With COVID-19, teachers and students found themselfs in the condition of going to school without leaving home. The peculiarity of this situation makes it difficult to choose and apply one name to define distance learning.
In Italy, the government commonly referred to it as Didattica a Distanza (DaD), which translates with distance learning.
The analogy that I want to make is with the job world: we are going to consider students as employees and teachers as managers.

This analogy is due to the fact that during the COVID-19 pandemic, the challenges of many employees and students were the same: organizing the work from home and managing the different time availability and using unfamiliar technologies; and the challenges of managers and teachers were comparable, the biggest one being evaluating the performance without the possibility to overview the work in person. Every interviewed professor reported in the interviews that the greatest challenge was testing the students using reliable test methods.

Smart Working

Its advantage is to have a higher degree of freedom in self management that allows enhanced productivity.
On the other side, it is difficult for managers to evaluate the performance of employee without being present.

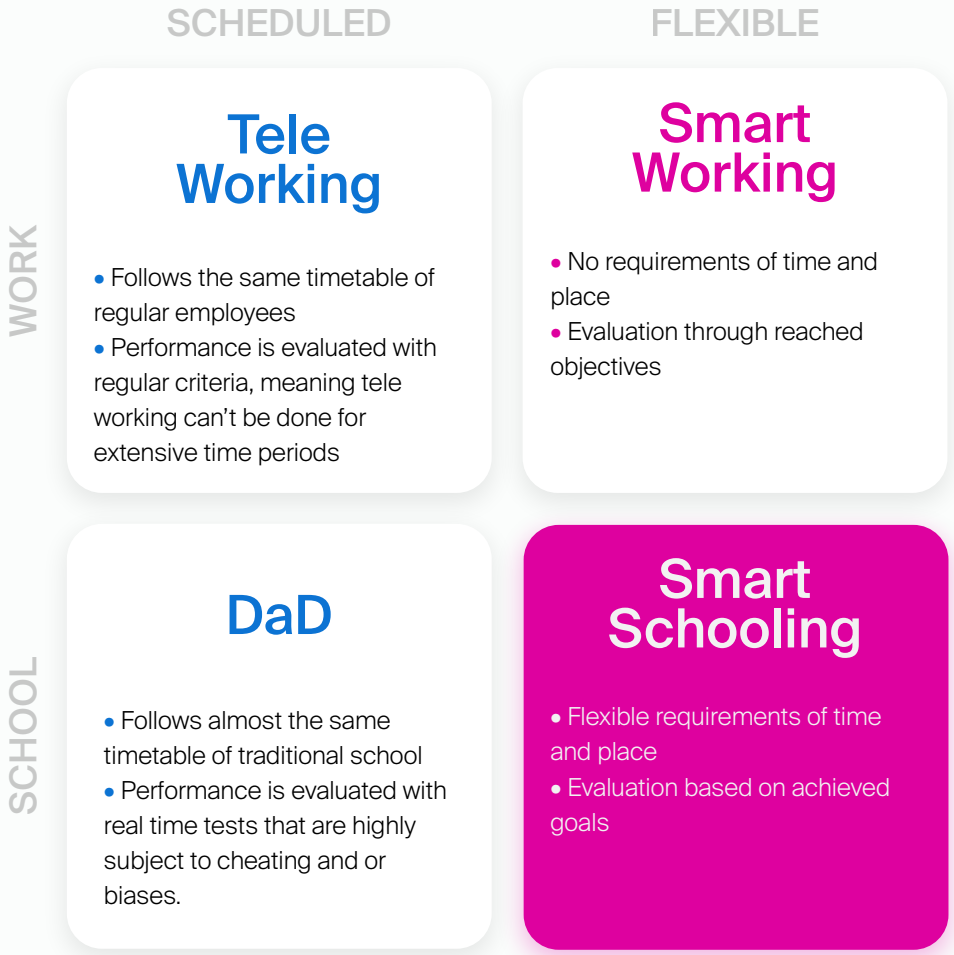
Tele Working

This model doesn't require a system overhaul for managers and employees in order to be adopted, but it isn't flexible and it doesn't always address the unique challenges of working at home, such as the narrowing of the border between work environment and home environment.

3.5

Defining the characteristics of a Smart School scenario

Using the term “smart working” to define the DaD would be logical as there is much less confusion on the meaning and the expectation of this name. On the other side, the way DaD was conducted (precise class hours, homework and tests over video conference softwares), makes the DaD experience similar to the tele work model. From now on, this research will be referring to school done by simply transposing the school experience over video conference as tele-schooling. The scenario in which the service design will take place will constitute the missing tile between distance “School” and applying a “flexible method”.



Graph 4. Matrix of comparison of school and work environments showing how similar the current school method is when compared to tele work, and forecastig what the characteristics of a smart school might be

3.6

Why do we need this distinction

It might seem useless to find another way to call the action of going to school while staying at home at the computer. Why do we even have to spend time thinking about the proper way to call it? Isn't it enough to call it distance learning (or DaD in italian)?
Education has changed over time: it is awidespread conception that about a century ago, it was normal for teachers to beat bad students with a stick, or even students that were just writing with the "wrong hand". When speaking with high school professors now, it is believed that the last big change happened with the spread of the mobile phones and smartphones among young students[9].
Teachers understood that it was necessary to create new rules to manage the use of these technologies during classes. These changes in lifestyle and power of consumer technology were surely impactful, but not as impactful compared to the change that the COVID-19 lockdown has brought to the schools. An entire dimension was lost when the physical became digital. Eye contact, spatial awareness and privacy are simply not possible to be conveyed with online classes right now. Teachers are not walking around the desks and there is not a blackboard anymore. With tele schooling there is the will to describe exactly this kind of utopical online school that is not able to change and adapt to the necessities of its users, both students and teachers. Smart schooling is instead what it will be referred to when speaking about a school model designed to work smoothly online. Throughout this publication, there will sometimes beroom for names like "distance learning" when describing the simple fact of studying online, without underlining whether we are talking about smart school or tele school.

9. See interview report with professor Letizia Pagliarino at page 71

4

Quantitative research: Surveys

4.1

Survey among students from different schools

Over three weeks, a Google form has been submitted to 113 Italian students from different schools. The goal of the questionnaire was to validate the data found in literature about the effectiveness of tele-schooling; understand the perception of students towards smart schooling; and find insights of what the future of Italian school might be. The composition of the participants was: 82.8% from high school, 10.9% from University, 6.3% from middle school. 81.3% of participants studies in Lombardy, 15.6% from Friuli-Venezia Giulia, 3.1% from other Regions. The questionnaire was divided in 4 main sections: teaching methods, tools, benefits of smart schooling, disadvantages of smart schooling.

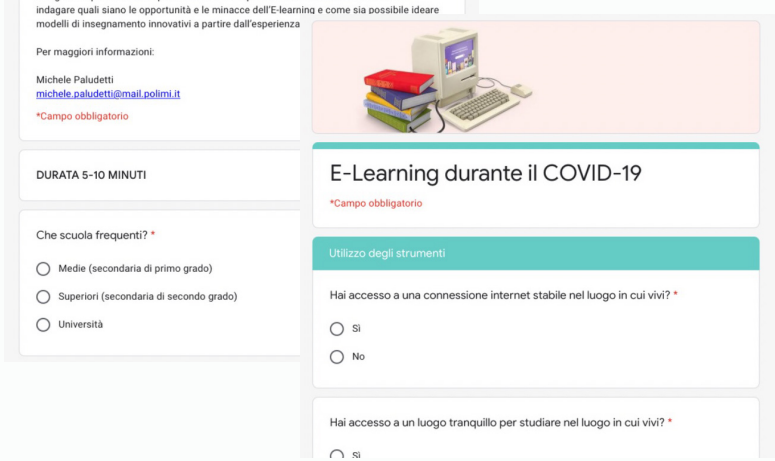


Fig 2 and 3. Survey on E-learnig (screen capture)

Teaching methods

The section's aim was to find the level of organization of schools when facing the COVID-19 emergency.

Tools

The section's aim was to find which platforms were used the most, with how much effort, and what kind of issues were faced.

The benefits of Smart schooling

The benefits of smart schooling. The section's aim was to verify whether the smart schooling experience had proper smart working features or if it was more properly a tele schooling experience.

The downsides of Smart schooling

The disadvantages of smart schooling. The section's aim was to study if the stress level of students changed and how, and in general verify the downsides of smart-schooling.

Full questionnaire available at https://docs.google.com/forms/d/1t3mcHOA72H1bCreV3mDjSerFe5qZNx46B_CJ1RBgbsY/viewanalytics

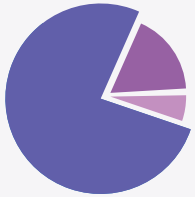
DATA FROM THE QUESTIONNAIRE

5
Effectiveness of school management and organization

65.5% The school used a systematic teaching method

34.5% Every teacher used their own methods and platforms

6
Effectiveness of online classes

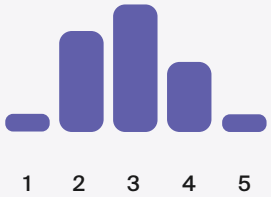


77% Less effective

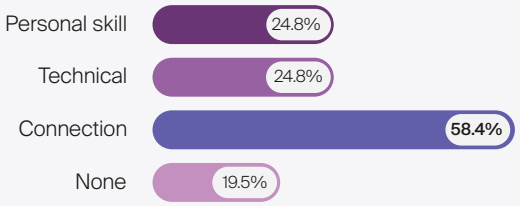
15% Did not change

8% More effective

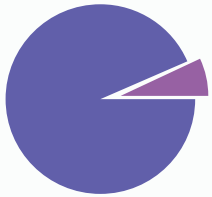
7
1-5 Evaluation of tele schooling



8
Most frequent problems when using video call platforms.



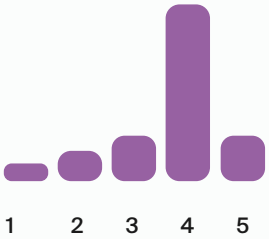
9
Students that have a reliable internet connection at home



90.3% Has a reliable internet connection.

9.7% Does not have a reliable internet connection

10
1-5 Evaluation of traditional school

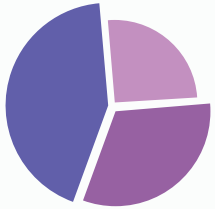


11
Overall judgement of tele schooling

61.1% Positive

38.9% Negative

12
How the study management changed during tele schooling



37.2% Got better

36.3% Got worse

26.5% Did not change

4.2

Liceo Classico Paolo Sarpi, Bergamo, Italy

First established in 1506 and named Paolo Sarpi in 1803, it is one of the oldest schools in the region. It is a renown public school that has grammar and humanities as core subjects. Being a Liceo Classico, it has the peculiarity to teach Latin and Greek literature. This aspect gives it unique challenges when it comes down to face distance learning.

One of the things that students are tested on is in fact the ability to translate ancient documents and pieces of literature written in Greek or Latin (version). Because of the unique challenges of this kind of school, the research is going to focus on it.

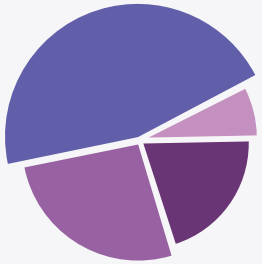
Fig 4. Liceo Classico Paolo Sarpi | Google Maps

4.3

Survey among students from Liceo Sarpi

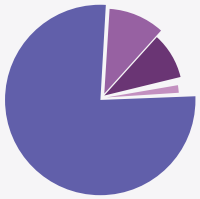
Thanks to prof. Letizia Pagliarino, teacher at Liceo Classico Paolo Sarpi of Bergamo (Italy), I got access to a survey made among 262 students of the school. As liceo classico faced a great challenge regarding the written test evaluation (core part of the teaching program for subjects like greek and latin), the survey offers the perspective of a large sample about the perception of tele schooling among students.

13 Most missed aspect of traditional school



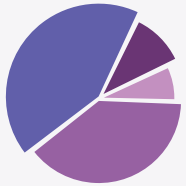
43.8% In-class debates
27.9% Classmates collaboration
20.9% In person class
7.4% Other

14 Best evaluation method



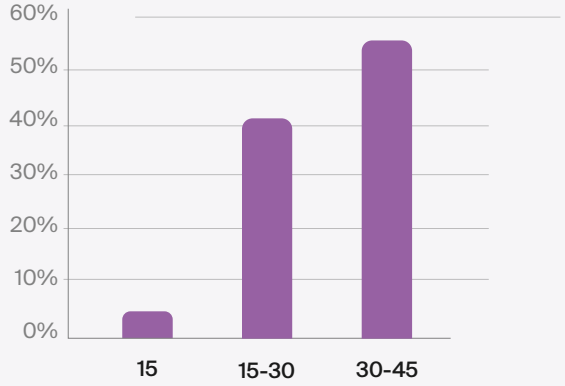
76.4% Oral test
11.6% Individual essays
10.4% Questionnaires
1.6% Other

15 Activities that could be done without the teacher



44.2% Exercises
38.2% Content available on books
10.8% Book supported teaching
6.8% Other

16 Attention spawn during tele schooling (minutes)



4.4

Insights from quantitative research

1. Almost 3/4 of schools were able to organize a systematic plan to deliver classes consistently.

2. Even if almost the totality of participants had a connection suitable to solve the daily tasks, many of these connections weren't suitable to sustain the kind of effort that video conference services demand.

3. There is a need of making homework assignment more systematic and integrated with the resources needed to study.

4. The fact that in a smart working context there are issues with study planning and management shows that a higher level of individual autonomy is needed. This reinforces the fact that what schools did was not smart-schooling, but more properly tele-schooling.

5. The oral test has been a spreaded solution to overcome the issue with examinating the students and the most appreciated one by the students.

6. There is a debate component and opinion exchange component that is somehow made weaker during tele schooling.

7. Students are willing to work more independently on those tasks that require less participation by the teacher, such as the exercises and notions easily found on the textbook.

5

Qualitative research: interviews

5.1

Ada (4th year)

How was the experience of distance learning compared to traditional class?
We didn't do video lessons immediately. At first professors started lightly, but when they got used to the situation, they increased the study load a lot, like scheduling tests in the afternoon. Spending 4 to 5 hours at the PC makes me nervous and the lack of real contact made everything boring. I must say that it has been the year that I studied the most, even if I had generally lower grades.

Do you believe your school could have done things differently?
I don't believe they could do differently. The written tests made with Google forms were problematic and they should have been avoided.

What elements of distance learning would you keep in traditional school?
If a student was sick and has to stay home, teachers are already providing recordings of the lecture. The problem is that there is a lot of bureaucracy underneath that makes it difficult to request this kind of service.

Are there tools of distance learning that you found being not efficient?
I think it would have been better if every test was oral. Also professors had the problem of avoiding cheating and the solution for one of mine was to create a brand new latin version impossible to find online.

What are the challenges of the Liceo Classico?
It depends a lot on the subject. My Latin teacher would never record her class because she has an interactive approach with the class. I choose to study in a Liceo Classico because of the subjects that require a dialogue and debate. I believe that this school wouldn't appeal to me any more if it was lacking this interaction. My professor calls it "the erotics of the teacher", which describes all the body language and non-verbal communication that takes place in the education process.

What do you think about the technology involved in distance learning?
With Google Classroom it became impossible not to do the homeworks. I actually used my mobile phone more than my PC because I couldn't use the webcam on it. I know some of my classmates used their phone also to do homeworks, but I couldn't do it with everything: I think I would only do the less important homework on my phone.

5.2

Federica (3rd year)

How was the experience of distance learning compared to traditional class?
At the beginning I was grateful for waking up later and being more comfortable, but after a while I started missing chatting with my classmates. One of the things that distance learning was lacking was the possibility to go at the blackboard to visualize and solve problems together. When we were online it was clear that some people had better tools like tablets and pencils or large monitors. And the connection issues happened all the time and it happened that we lost up to 40 minutes because of that.

Do you believe your school could have done things differently?
Sometimes it happened that professors were too rigid when using Google forms to test us. The problem with it is that it will give zero points also to answers where the only mistake was a typo. I would expect professors to weigh more objectively these kinds of mistakes but sometimes it just didn't happen.

What elements of distance learning would you keep in traditional school?
The webcam in every class is a positive thing. Also my Latin and greek professor let us use a website to practice which is somehow useful because you can immediately see your mistakes. The problem with that is that it doesn't really work on mobile. Nonetheless it's useful when I am not at home, so I don't need my books to review and practice.

What are the challenges of the Liceo Classico?
Greek and Latin. When you just need to study the grammar, distance learning is fine. The problem is the version, because I work a lot on the original text underlining and taking notes. This makes it difficult to do it online with a Word document for instance. There is a general problem with written examinations because they are too closed, so the choice was to do almost only oral tests. But the problem with that is that they require me to study everyday, while with written tests it was easier to schedule my study and prepare for the test when there was one. It is a problem because I actually prefer the written tests as they give me more time to think and I get too anxious with orals.

5.3

Beatrice (4th year)

How was the experience of distance learning compared to traditional class?
I liked it at first because it looked innovative to me,
I believe that it helped professors become more tech friendly. But very soon the problem for students became doing written tests. When you are there in person you can ask clarification to questions if you have any doubt, while now it's completely impossible to have a one-to-one discussion with the professor within the class time.
I actually have a blind professor and it's interesting to notice that his classes barely changed when we went online. He has always used a lot of youtube videos in his classes. With another professor it happened that he didn't have a pc at home, so there has been a long vacant period which has been difficult also when he got it, because he didn't know how to use it.

Do you believe your school could have done things differently?
I think it's already surprising that everybody managed to go online eventually. I think some professors somehow abused our time because they thought that since we were at home, we had more time to study their subject, so they were giving us extra work.

What elements of distance learning would you keep in traditional school?
I like that now if you are unable to go to school for some reason, you can follow the lecture remotely. It would be nice to have a record of the lecture to review at home but professors don't like to do it. They do send their notes on Classroom along with the photos of the blackboard which is sometimes useful.

What are the challenges of the Liceo Classico?
Evaluations are a big obstacle. Some professors asked us to show our shoulders to the camera when we were doing tests, so that they could see if we were cheating. Another time, a professor asked to have a mirror behind us. For greek and latin we completely skipped the version evaluation. This is rather worrying because next year we will have the Maturità test. It's important to notice that when speaking about these subjects, oral and written contents and evaluation can be extremely different and it is common that students have good grades in one and very bad grades in the

other one. Some professors tried to turn the translation of ancient texts into an oral test but it was way too time consuming. A solution could be to divide the class in two and do the test on different days, and maybe ask to put two cameras. At the end of the day, the risk of cheating is the only real problem there.

5.4

Ilaria (2nd year)

How was the experience of distance learning compared to traditional class?

Last year was my first year, so we didn't even have the time to get used to high school. At first it was a vacation, but I believe that the professors managed the situation pretty well and took the time to ask us how we were feeling and how the experience was so far. We didn't manage to finish the academic plan and we barely did any translation of ancient texts. In fact this year started with a big hole in our formation because by now we should already be translating a lot, and it looks like it might get even worse. It seems to me that 45 minutes of distance learning are more effective than one hour of traditional lecture: there are many little things that allow the professor to save time like recording the presence of students. For sure professors go faster when explaining because they feel like they might fall behind with the academic plan.

Do you believe your school could have done things differently?
I don't think that we could have done translation of ancient texts differently, but I do believe that the headmaster should have been more strict with the professors. There were many professors that weren't even trying to use the pc properly or understand our situation. Some professors refused to learn how to share the screen and they were just going on with the lecture like if we were in the classroom. For us everything was new and the visualization of the content of the lecture was fundamental. We are trying to learn a new alphabet and the teacher wouldn't even provide visual material. I believe the headmaster should have worried more that every professor was on the same page.

What elements of distance learning would you keep in traditional school?
For sure the possibility of following the lecture from home when you are sick. I noticed that in general professors now are more expert in the use of technology. Now they rarely ask us to print material and they send us things on Classroom; all of this makes things a bit smoother.

What are the challenges of the Liceo Classico?
The visual component is damaged a lot especially for greek where it is difficult to follow the lecture if you can't read and write effectively. When professors show power points as a support to the lecture, it's 10 times better and I wish they did it more and for more subjects. It helps a lot by increasing my attention spawn and also when reviewing and studying. My Greek professor always records the lectures so we can listen to them at home and this is very helpful. Doing more oral tests damaged our experience with translation of ancient texts. Professors have to rely on us hoping that we practice independently. My teacher monitored this by evaluating all of our translation exercises in order to see if we were on track. From my point of view it is demotivating that professors don't trust us when translating ancient texts, but I can understand them. There should be a way that allows professors to trust us more when we do tests.

5.5

Prof Maria Nardone (Latin, Greek)

What were the obstacles of using the distance learning platforms?
For us humanities professors it is harder because we never had a basic informatic education. When we first started with distance education we had no clue how to do it and what we achieved in terms of experience is only thanks to our individual and private effort. I see a big difference with my younger colleagues that have more experience with internet technologies. The biggest obstacle was for sure the emotional distance. I tried to involve the students more by giving them group assignments that they had to share with the rest of the class. When we were having in person lectures the participation is easier to achieve and even just the use of the blackboard is enough to create a connection. I bought a drawing tablet that was difficult to use, but it helped me when I had to write in greek.

Did something change in the way you perceived work and personal life?
I think being at home increased the work I do and the work organization. Many times per day I have to reschedule my plans. I also have more duties now: such as calling meetings, sending emails and giving precise instructions about web links.

Do you have any suggestions on how mixed education could be done?
We are using webcams now, but it is very difficult to maintain a balance between an enjoyable lecture for both students that are in the classroom and students that are home. There has been a positive aspect for material waste: we don't touch almost any more paper and we send homework online.

How have school and students changed in the past 10 years and how will they change in the next 10 years?
The school system has to be able to be on the same track as its students. Learning is a slow and difficult process and nowadays everything tries to go faster. I feel that students need to be guided also in the way they use resources as the internet, or they will get lost. They need

to learn how to navigate it. The new generations have been criticized a lot but at the end of the day they still are young people seeking a safe place that has to be the school.

5.6

Prof Letizia Pagliarino (Italian, Latin)

What were the obstacles of using the distance learning platforms?
I used the G Suite to share documents and do some tests. I found out that Google forms were not effective to do tests and I had to think of another way to evaluate students. My solution was to give them short essays to write about the topics that they had to study and give them the chance to use all the resources that they needed. But for latin it was just impossible to evaluate the translation of ancient texts so I just did oral tests.

Did you notice an improvement in the work management?
The problem is that professors need to go to school also to exchange

information and discuss about our students. This was the part that I missed the most, because it is difficult to exchange ideas online.
What did you appreciate the most about distance education?
Everybody had to learn how to use these technologies, which hundreds of update course failed to do.

How do you feel about the use of these technologies in the school?
The last update I followed was in the 80s. I have always felt that they were trying to give us new tools as a solution to the problem. Technology is a tool that shouldn't be used if you don't need it. I have always believed that media are not a tool for school.
I do believe that emails helped students and teachers to stay connected. Some student would often sent me an email at the end of the lecture for clarifications or questions, and I believe that this helped.

How have school and students changed in the past 10 years and how will they change in the next 10 years?
I think the capability of students to focus has changed a lot. Until ten years ago if a student was bored during a lecture they had no other choice but to look outside the window. Now students have always a phone in their hands. They have this multitasking tendency that makes it difficult for the professor that knows that some classes require focus. In the Liceo Classico students might even lose the skill to focus when translating, which is very important. I believe that students will really need to self restrict their abuse of distraction. Especially because in the job market extreme specialization is what they are looking for, so we need to drop some of this multitasking.

Imagine a scenario where it is normal to study from home, what would be the new role of the school as a gathering place?
School might become a cultural center where students can go to do research, maybe in a group work or workshop fashion.

5.7

Prof Elena Mazzacchera (Italian, Latin, Greek)

What were the obstacles of using the distance learning platforms?
Last year I started a teaching method experiment called Nature method. It is an approach to the greek and latin languages that considers them as they were still spoken. It requires the students to learn them in a more active way. This method somehow helped the transition to distance education because students at first didn't need external supports to translate (vocabulary). Of course when we had to switch to authorial ancient texts it has been more difficult. I invested a lot of time to find and arrange versions impossible to find online, simply because they have never been used for scholastic purposes. The downside was that they weren't very relevant content wise. Another obstacle was the non verbal communication because it didn't allow to have a direct conversation with the class and with the single students.

What approach did you take towards the students' evaluation?
I mostly did oral tests as they are more interactive and can involve somehow the whole classroom. I also tried some alternative methods to engage the students more. For instance, I organized a group research assignment on different topics, with the goal to create a booklet. The students liked the project until they knew that they had to study it. It is difficult to involve students when they have a very utilitaristic mindset. I believe that technology and visual language helps. I used Google forms to test students in a continuous way, without always evaluating them though. In fact a big problem with Google forms is that the evaluations they make are never reliable, and that's why I rather use my own website.

Tell me more about your educational platform.
I created a platform online to help students practice on greek and latin grammar and syntax. It is a tool for individual review. It is structured with checkbox

answers but the level of difficulty of them is fairly high. Every possible option is designed to look plausible so it really requires the student to know the answer. It has a point system so it can tell you which questions you got wrong so that you can try again. The idea is that students would use it as a review tool before a test.
The problem with the tool is that it's very time consuming to come up with good questions and stimulating answers, which are needed to make it useful. I found very little support from my fellow professors. The reason is that the effort and time required is high and many colleagues prefer to just use the exercises and questions from the textbook. I believe that each professor should create and be proactive in the community, but as the time being, this is not the case, unfortunately.

Did students find the tool useful?
They did, but they rarely use it autonomously, they will do it only if I ask them to (and I can check if they did it or not, so they usually do it).

5.8

Insights from qualitative research

1. The greatest and overall shared problem with tele school is the written examination, and core subjects of Liceo Classico can not simply avoid it.

2. Assuring the fairness of the witten examinations and prevent cheating is a major challenge for professors of Liceo Classico.

3. The Greek and Latin texts translations are a unique challenge of Liceo Classico and can't be easily transformed into oral tests.

4. There is agreement over that fact that recording the lectures and making them available for review or for sick students is a positive aspect of mixed education.

5. Not doing Latin and Greek translations is an even greater problem for students of the 1st and 2nd year because lack of practice can lead to further problems in the next years.

6. Tele schooling makes it difficult to illustrate content dynamically and easily.

7. The blackboard is a hotspot in the classroom because it conveys important concepts visually and create a place for discussion and problem solving.

6
Case studies

6.1

Unibg e-Learning, Latin and Greek exercise platform

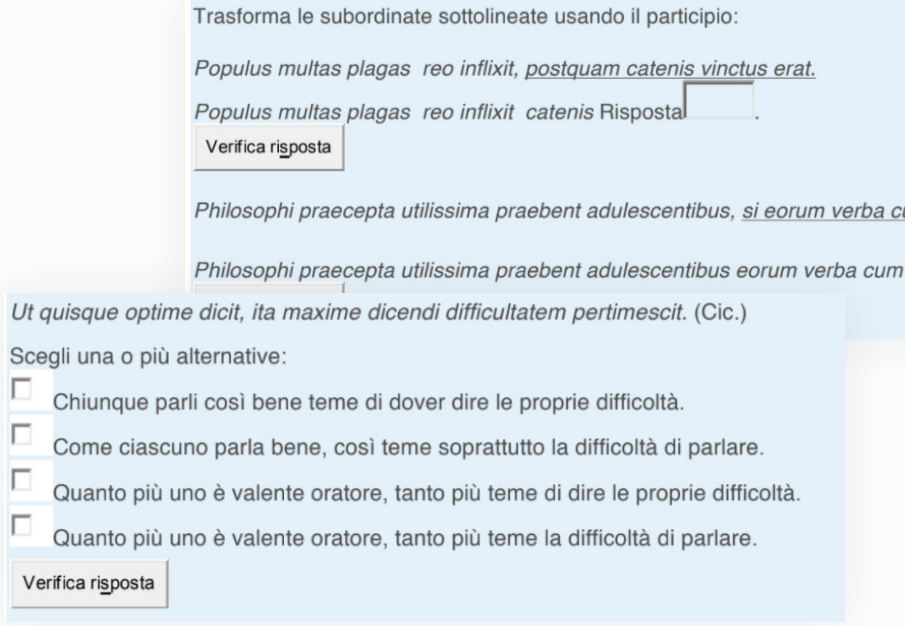


Fig 5 and 6. Exercises from Unibg e-Learning | Nuova Secondaria Ricerca, 2

Platform for reviewing and self evaluating students on Latin and Greek syntax and grammar. It is structured with checkbox answers but the level of difficulty of them is fairly high. Every possible option is designed to look plausible so it really requires the student to know the answer. It has a point system so it can tell you which questions you got wrong so that you can try again. The idea is that students would use it as a review tool before a test. The problem with the tool is that it's very time consuming to come up with good questions and stimulating answers, which are needed to make it useful.

CHALLENGE FACED

Provide advanced internet based homework for Greek and Latin

WHAT CAN WE LEARN

It is a tested method strictly related with Liceo Classico environment that addresses a challenge of smart schooling intuitively solvable with internet based technologies

WHAT ARE THE DOWNSIDES

At the time being, it requires a big human effort to create useful quizes. It is not mobile friendly.

6.2

Unesco distance learning solutions for COVID-19

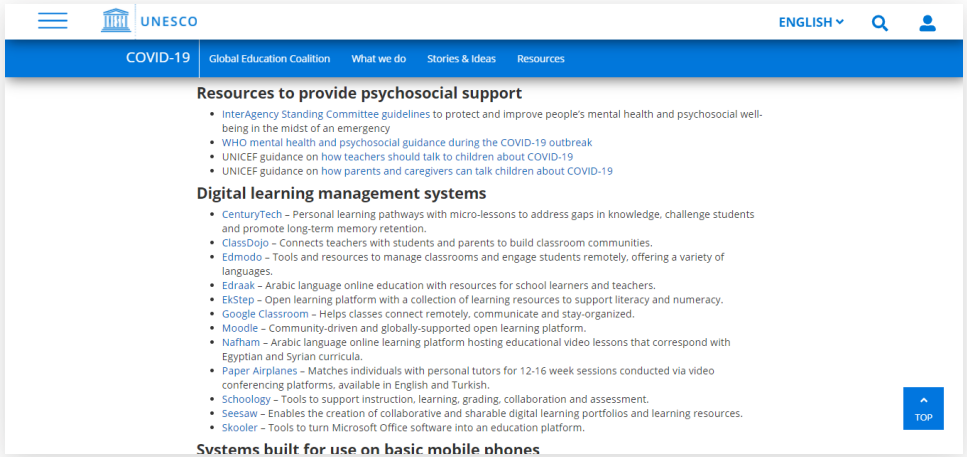


Fig 7. UNESCO distance learning solutions (screen capture) | UNESCO

Unesco created a list of resources to help schools entering the distance learning world. The website provides 103 digital platforms with the link to each website. The list has been broken down into categories such as resources for psychological support, mobile friendly, offline, self-directed, collaborative etc.

CHALLENGE FACED

Introducing schools with no experience in e-learning to a vast list of online and offline tools to get started with tele/smart schooling.

WHAT CAN WE LEARN

It is a first step towards school digitalization and the vast amount of choice gives opportunities to discover existing services without the need to invest in creating a new one.

WHAT ARE THE DOWNSIDES

It is a passive resource that doesn't take effective action and doesn't guide school after this first step of chosing a platform. Being a emergency solution for COVID-19, it's not certain that it will be kept updated in the future.

6.3

Proctorio, AI based proctoring service

Proctoring service that uses artificial intelligence to detect when a student is cheating on a test. It can conduct gaze detection through the webcam and it can track whether a student is looking away from their screens. Other services that proctorio and its competitors provide are student ID check and hunan proctors that check on students through the cameras and can ask to put away the phones, for instance. Of course, these kind of services have raised concerns about privacy, but despite this, Proctorio claims to have increased their sales by 900% compared to the same period last year.

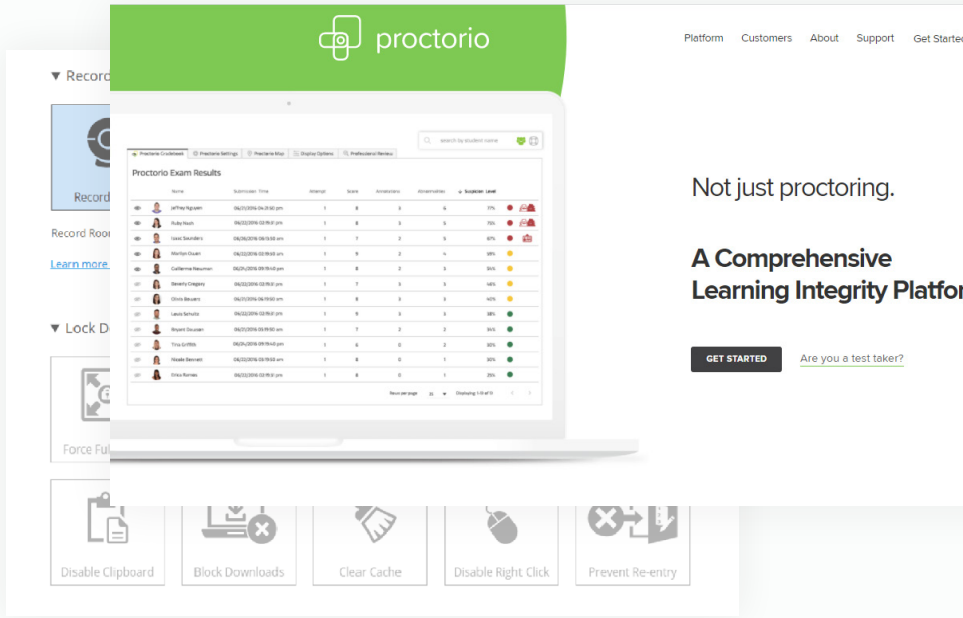


Fig 8 and 9. Proctorio landing page (screen capture) | Proctorio

CHALLENGE FACED

Preventing students from cheating during tests and exams, especially with big classes.

WHAT CAN WE LEARN

It gives a solution to one of the biggest challenges of Liceo Classico. It is a service that makes interesting use of new technologies like AI.

WHAT ARE THE DOWNSIDES

It can raise many privacy concerns, especially because most of High school students are under age. It doesn't prevent students from cheating but it only tries to understand who does it.

6.4

Universal Learning Programme

Created by The International School of Geneva's La Grande Boissière with UNESCO. During this COVID-19 academic year, the school has substituted examinations for collaborative deep understanding projects and live interviews. In philosophy, students designed their own personal philosophies, in the sciences they wrote their own examination paper, and in mathematics they created questions that were easy, medium and difficult, explaining why. The interviews involved 1:1 discussions between teachers and students to assess thinking skills much as one might find in a job interview.

Fig 10. Universal learning programme logo | UNESCO

CHALLENGE FACED

Re-imagine the whole evaluatin system to fit the challenges of this century, the online environment, and the information era.

WHAT CAN WE LEARN

It provides an highly innovative case study, that has already been tested. It tries to solve the challenge from the very roots of it.

WHAT ARE THE DOWNSIDES

It requires an overhaul that the Italian Liceo Classico and education system might not be ready to accept and implement yet.

6.5

Gamification in Corporate e-Learning

Fig 11 and 12. Prototype of gamified learning app | eLearning Industry

In this case study the author of the report was asked by a client to create an engaging online course. Therefore the team developed a game based learning program. The game is structured as a story that presents problems that the learner has to solve in game. Story sessions are alternated with practice sessions that are timed and give points for being answered correctly. The results from the user tests showed ancrease in completition rate to 67%, compared to the 32% average[10].

CHALLENGE FACED

The lack of engagement in online courses makes it common for learners to drop out. This case study introduces a gamification element to solve it.

WHAT CAN WE LEARN

Lack of interaction is one of the challenges for smart schooling and gamification could be a solution, considering also our younger target.

WHAT ARE THE DOWNSIDES

The case study refers to a professional environment and a practical learning. Moreover, it would require a lot of effort to develope a game for an entire school program.

10. Kumar, S., DN. (2018, September 18). A Case Study On Gamification In Corporate eLearning. eLearning Industry.

6.6

Coursera, learning platform

Coursera is an online learning platform that features thousands of online courses in many different subjects. In most cases courses are provided by established Universities and can be a couple of week long, up to a full semester. The students are provided with recorded video lectures, online material and exercises. It is required to pass a number of tests in order to finish the course and obtain a certificate diploma. The courses on the platform are generally free to audit, but in order to be assessed and receive a diploma, it's necessary to pay.

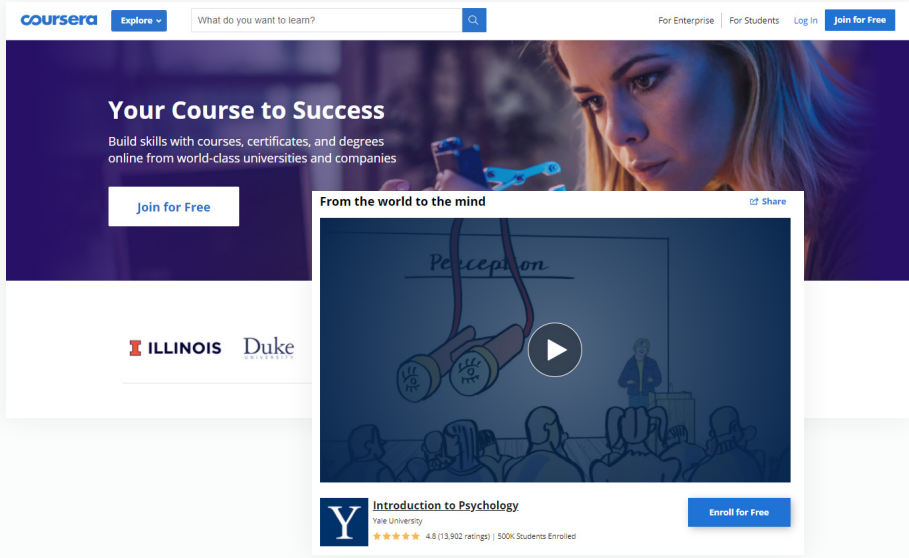


Fig 13 - Coursera landing page | Coursera
Fig 14. Lecture preview on Coursera | Coursera

CHALLENGE FACED

Provide an extensive resource of engaging online courses by renown Universities.

WHAT CAN WE LEARN

The way the courses are structured is often compelling and engaging, thanks to the use of videos, animated presentations and well staged lectures.

WHAT ARE THE DOWNSIDES

It requres a fairly high production budget. The platform right now offers only university courses as they are more flexible and independant.

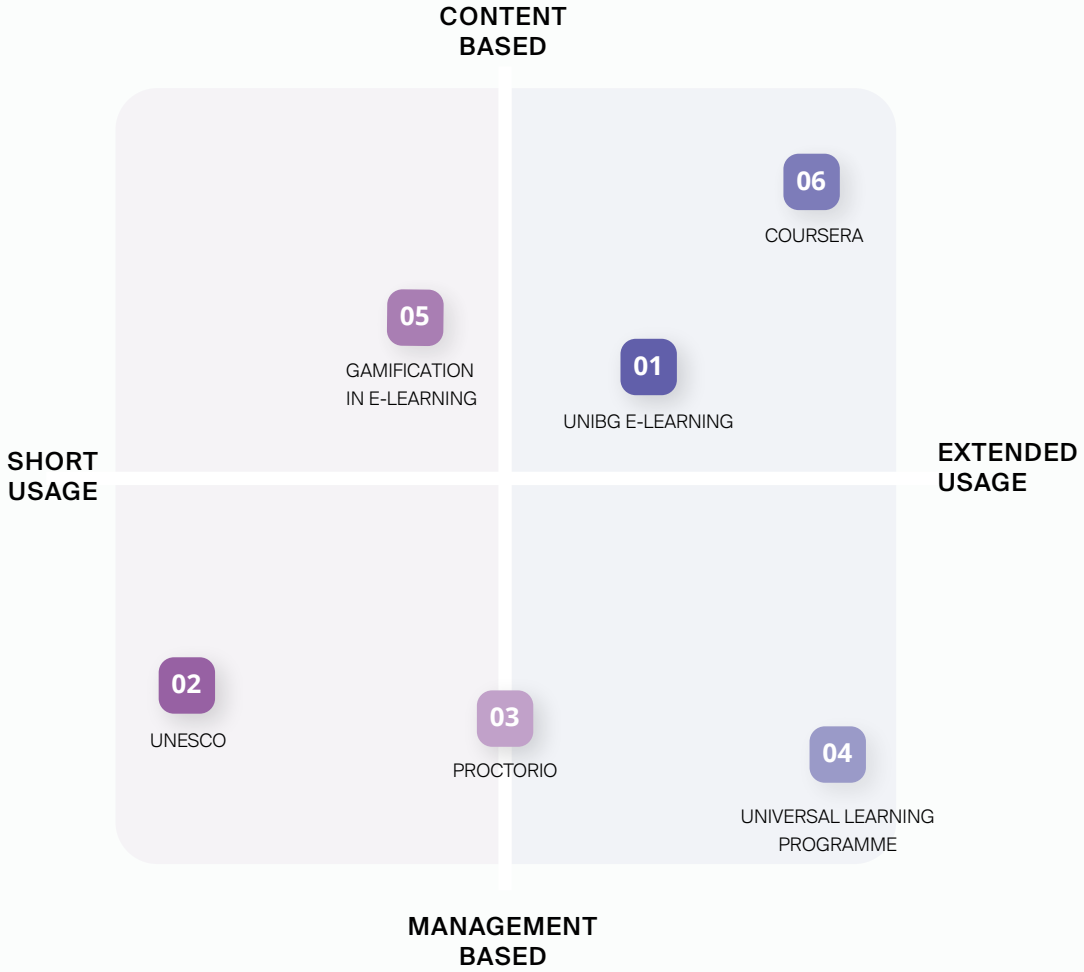
7

Defining the areas of opportunity

7.1

Market positioning

From the case studies research, different approach to eLearning were considered. The challenges that the services are addressing are different but they all have in common the search for more reliable methods of eLearning. I spotted two major drivers that allow us tovisualize the range of solutions. The first driver is the kind of support that the service gives: some exemples focus more on the content, by making it more engaging or more flexible, or by simply providing new learning sources; other services provide instead a planning or managing value without necessarely enabling education by themselves. The second driver is the time this tools are meant to be used and therefore defining if they have a plugin approach ora hovehaul approach; short usage solutions are used in specific situations and admit or rely also on a more traditional teaching method, while extended usage solutions tend to be the main learning source for the distance learner.



Graph 17. Case studies positioning map

7.2

Challenge definition

Based on the insight from quantitative and qualitative research, it has been found that the two major challenges for students and teachers were to have a more engaging learning evironment that allows discussion and recreates the rite of gathering around the chalkboard; and allowing teachers to trust their students during written tests, so that core tests like Greek and Latin versions could be done.

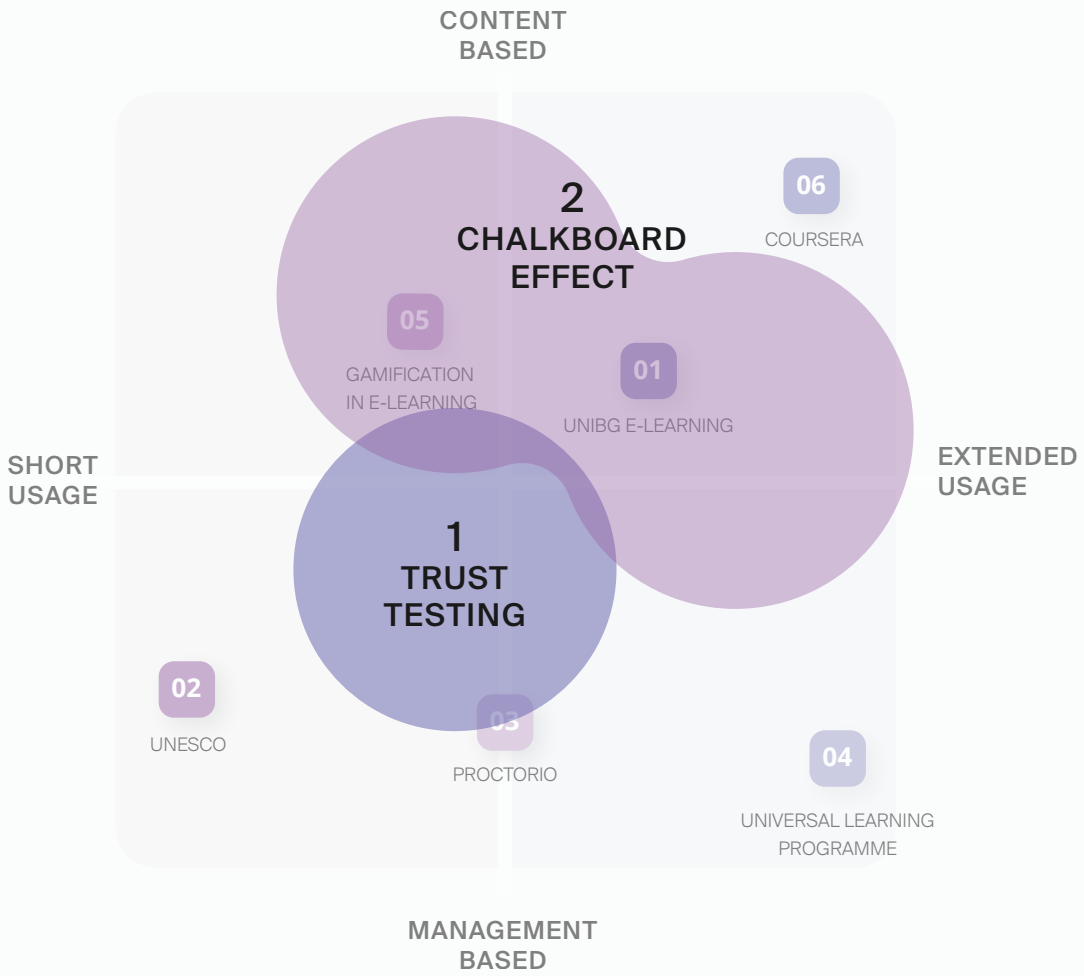
• **TRUST TESTING**
How might we provide **Liceo Classico teachers** with a **written testing method** that **discourage cheating** and promotes a **trustworthy learning environment**?

• **CHALKBOARD EFFECT**
How might we promote a **smart schooling approach** for **students** that **enhance interaction** and **engagement**?

7.3

HMW positioning

High school students are generally less authonomous than University students or adults, while on the other side, high school teachers follow learning programs that are tailored to the school they are in, and that they develope personally, based on their own teaching vision. It would be unfair to take away the teaching customization by adding standardized courses. For these reasons, our solutions will necessarely have to give teachers the chance to be used without taking away anything from the content they want to cover. The “Trust Testing” value is the possibility to give the students a good reason not to cheat and promote an environment where teachers are not suspicious of their own students. Yhe “Chalkboard effect” value is to recreate a physical experience in a virtual space, taking advantage of the environment and allowing the dialogue that is so important for Liceo Classico students and teachers.



Graph 18. Case studies positioning map with design opportunities

7.4

Learnings from the case studies

Finding relevant case studies was indeed a hard challenge. Innovation in the learning environment is certainly not a new practice: there are many platforms like Coursera that provide online education with similar goals, as well as other platforms like Masterclass or Skillshare that focus on soft skills. These platforms were not analyzed in the case studies simply because they position themself with other presented case studies -Coursera in this case- and have comparable pros and cons. Despite the abundance of online learning possibilities, the Italian Liceo Classico, as well as many other Italian high schools suffered because of the lack of preparation during the COVID-19 lockdown. Indeed most of the case studies presented are targeting a different environment than the high school. Universities' and employees updating courses' requirements are fundamentally different from the high school ones. As it shows from the interviews with the high school professors, there is a pedagogic component they are invested with that makes them responsible for the personal formation of the students, other than the knowledge formation. Another point is the fact that Italian high schools necessarily have to prepare the students for the final national examination (Maturità) that is identical across all the nation and it requires every teacher to achieve specific goals and to cover every listed topic. The impression is that having to achieve fixed goals gives teachers less flexibility to choose their own approach. This might constrain the teachers when experimenting with new methods or technologies as using an approach that might turn out being inefficient will result in a bad performance of the students in the final examination. It is expected that teachers will be reluctant in adopting long term disruptive or radical innovations in the teaching method. Therefore, in order to make an impact

it is necessary to either intervene in the whole primary education system nationwide, or to adopt an incremental innovation strategy. As the first option would be way too time consuming and would need to involve a higher level of intervention, the solutions proposed in this thesis will be incremental innovations that focus on slowly introducing new methods with a rooted background in what already exists and has been used by professors.

8

Co-design and fast prototyping

8.1

Co-design workshop with the students

After the definition of the challenge a co-design workshop was organized with the students of Liceo Classico Paolo Sarpi. The workshop methodologies were planned taking inspiration from some of the Design Sprint techniques and the goal was to present the two challenges to the students, define which one was the most needed by them, and work together in order to find solutions to the challenge.

The four students were invited on Skype and a Miro board was shown to them. With the help of some images, the students were illustrated on which were the findings of the research on distance learning and which are the two main challenges for students and teachers. The students discussed the challenges together and eventually agreed that the most important one to them was “How might we promote a smart schooling approach for students that enhance interaction and engagement?”. However the discussion kept going on and it was tisen the point that they might be linked, and solving one, might also facilitate the solution of the other one. This first part of the workshop ended up with the creation of a new challenge, resulting from the union of the previous two: “How might we promote a smart schooling approach for students that enhances interaction and engagement, and promotes a genuine interest independent from the evaluation?”

How might we promote a smart schooling approach for students that enhances interaction and engagement, and promotes a genuine interest independent from the evaluation?

After the definition of the challenge we wanted to solve, the students were asked to think of how to solve it.

The first task they were asked to do was to look back at the case studies and notice how they are different approaches to the solutions of similar problems related with tele schooling, and to take inspiration to think of 3 new ideas to solve our challenge. This task required to be done in 5 minutes, individually. At the end of the exercise, they were allowed to share some of the ideas with the others, if they were confident in doing so. All the participants shared one idea.

The second exercise required them to choose their favourite idea out of the three they had and to think of 4 variations of the same. This task required to be done in 10 minutes, individually. At the end of the 10 minutes, every participant shared their four variations with the rest of the team. During the last exercise, every participant was asked to choose the variations they liked the most, or to mix the variations she liked the most in order to create a single structured idea. This last exercise required 30 minutes and it was done together with the whole team.

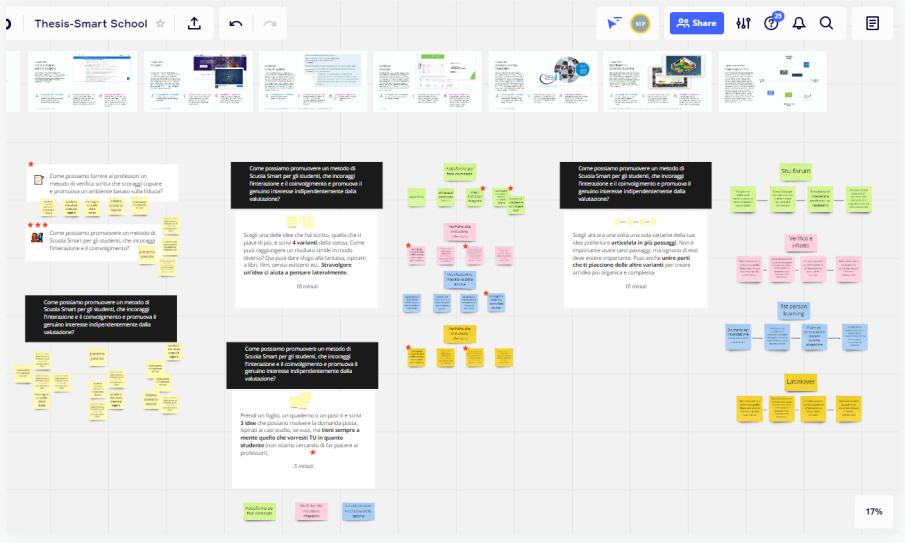


Fig 15. Results from the workshop with students (screen capture)

At the end of this two-hours-long workshop we had 4 interesting ideas coming from the students on how to solve the challenge “How might we promote a smart schooling approach for students that enhances interaction and engagement, and promotes a genuine interest independent from the evaluation?”

8.2

Low-fi prototype and test with professors

In order to test whether these ideas might actually be successful, it is necessary to test them with the users that will end up using them: the Liceo Sarpi professors. Four low-fi prototypes of the students' ideas were built using Figma. The prototypes were made so that they would convey the core features and modality of use.

The four students' ideas were slightly refined in order to be clearer and missing steps of the user flow were added if needed. For instance the idea "1st Person Learning" was tweaked by adding a Google Meet plugin feature that lets the professor launch the interactive elements of the lecture as if it was a remote controller. Other than the students' ideas, two more prototypes of existing case studies were made (Proctorio and Universal Learning Programme).

Five professors were invited one by one in a private discussion and asked to share their screen while exploring the low-fi prototypes of the services. In order to reduce biases, the professors were told that all of the presented services actually existed. Before exploring any new prototype, they were presented with a brief introduction of the service and it's goal. When necessary the professors were presented with a scenario and guided step by step through the prototype.

At the end of every prototype, they were asked their opinion on the service and if they might be interested in using it.

8.3

The four concept ideas

STU-FORUM

The first idea “Stu-forum” is an online platform where students can ask questions to other students when they have doubts about specific subjects, just like a forum. Every student can decide which subjects to follow. Every student can ask or answer questions, or request the intervention of a professor when it is difficult to find an answer. Professors can not answer questions unless they are called by the students, but professors can monitor the activity of their students to see if they are making good use of the platform. They have access also to an analytics page where they can see how many engaged the students are and use it as an evaluation help.

Fig 16-19. Screens of the prototype. From top: student dashboard, teacher notification center, teacher analytics, teacher reports student

FIRST PERSON LEARNING

The second idea “1st Person Learning” is a tool to help the professor make the online lectures more engaging for the students. It is an online platform that allows the teacher to access an archive of visual resources coming from documentaries and other media. The teacher can plan step by step the lecture and create quizzes to be asked to students during the lecture. These visual lectures will be archived and be available online to students to be watched again (including the quizzes).

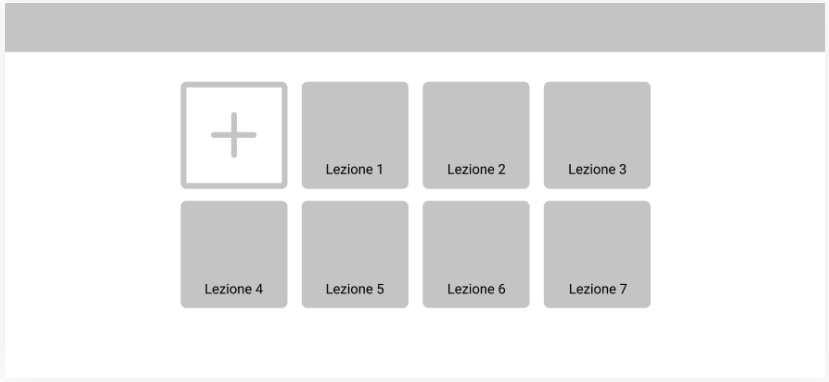


Fig 20. Screens of the prototype: dashboard

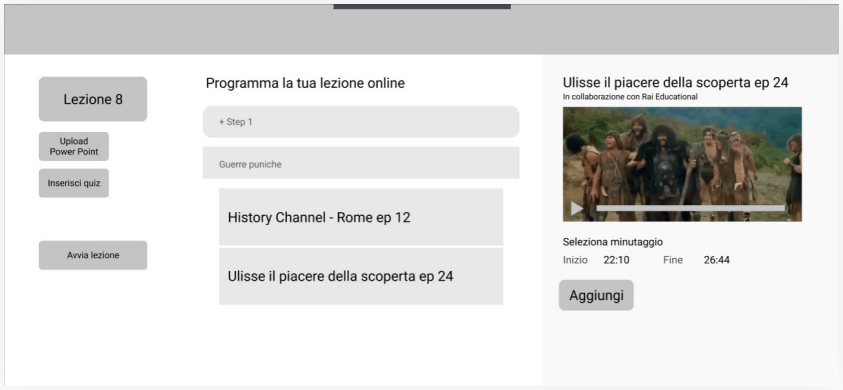


Fig 21-23. Screens of the prototype. From top: lecture editor, lecture remote, interactive quiz

VERIFICO E RIFLETTO

The third idea “Verifico e Rifletto” is a new method to make written tests. In this method every test is made of two sections: knowledge and reflection. In the knowledge section students are asked about the topics that they have to study and they are evaluated based on their knowledge of facts. In the reflection section they are asked to answer questions linked to their personal understanding of the subject. In this section the professor decides how many points of discussion they have to touch and they are evaluated based on how many of the requested points they actually reflect on. These kinds of tests should be done frequently and the two sections have a 50-50 weight on the final mark.

Fig 24 and 25. Screens of the prototype. From top: online test, instructions

LATIN-LOVER

The fourth idea “Latin-lover” is a tool for professors and students that allows a seamless process of online version testing. The professors are able to write the Latin or Greek version and to create a number of variants to prevent students from copying from each other. Students receive a link with the version and they can use specific tools to analyze the text, just like they were working on paper. When correcting, the professor can leave notes and see the text analysis, as well as compare documents and correct more than one test at once.

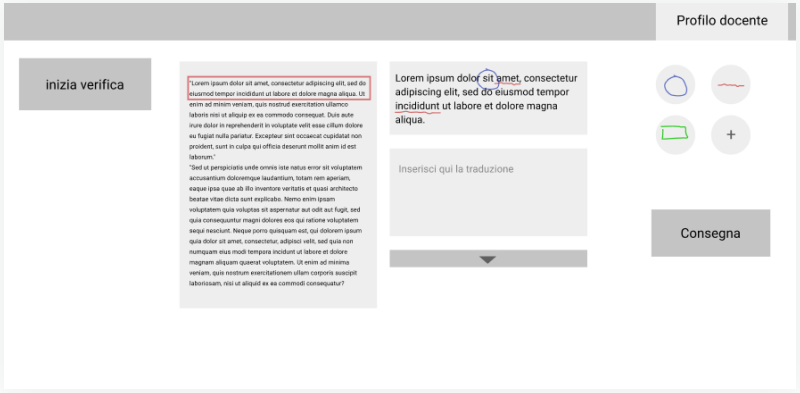
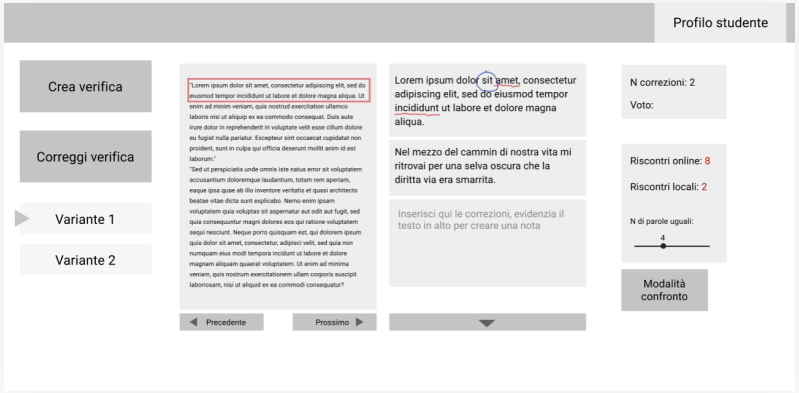


Fig 26. Screens of the prototype: test editor for student



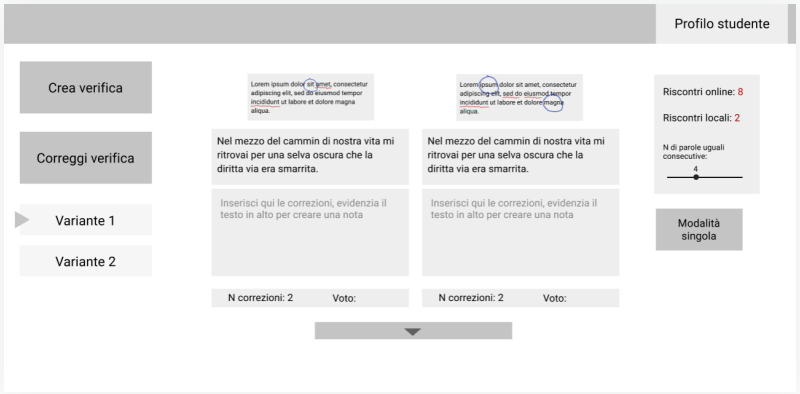


Fig 27-29. Screens of the prototype. From top: test creation, test review, test review comparison mode

8.4

Results of the test

In general, professors were not able to understand which service was already existing and which one was not. They all saw the problems with the concepts that involved a change in method such as “Verifico e Rifletto” and “Universal Learning Programme”.
There was high skepticism towards the idea of limiting the evaluation of knowledge in favour of assumptions based on unchecked sources. On the other side, some professor claimed that this method is somehow already used and there would be no real change other than the evaluation method, which is usually personal for each professor.

“Stu-forum” was generally welcomed by every professor, but every professor expressed some level of concern for the peer to peer method. Despite being claimed as a great method of education and growth for students, almost every professor claimed that it requires a lot of moderation of the students. Not only it is concerning that students might give wrong answers, but it would also give an extra workload for professors with the risk of becoming overwhelming. Students should also be trained to use the tool because there might be the risk of them ditching it for faster methods of communication.

By far the most welcomed concepts were “1st person learning” and “Latin-Lover”. The first one for being an intuitive tool that promises to do some work before, to save a lot of time later, and for making it simple to engage the class. Most teachers loved the quiz feature to test the level of attention, and also foreseeing a usage of it during oral tests.
The other most appreciated concept was “Latin-lover” because it gives a practical solution to a problem that is of utmost priority at the moment these interviews were done, which is creating and evaluating versions online. The professors appreciated the feature that allows them to correct more than one version

simultaneously. They liked the feature that allows them to check for plagiarism, but they were worried that as soon as students would have known, they would have just started paraphrasing.

At the end of the testing session, every professor had chosen either “Latin-lover” or “1st Person learner” as their favourite and most useful. As soon as this tendency was spotted, every professor was asked if they think they would keep using the two favourite platforms once distance learning won’t be mandatory any more. The answer was the same in every case. Every asked professor said that there would be no use of “Latin-lover” once students will be at school once again because the good old method would just be faster and more effective from every point of view.

Therefore, in order to maximise the impact of the solution, “1st person learner” would be the best concept with the potentiality to solve a core challenge of Italian high schools online, which is increase and retain the engagement, as well as the potentiality to permanently change the way interaction and engagement with students can be done also in the physical classroom. The unique value of the concept is to make engagement a new parameter that can be collected and used by professors to improve their lectures in real time.

9
Lectour

9.1

The final concept: Lectour

Starting from the first iteration of the concept "1st person learning" a series of adjustments and tunings were done in order to achieve a complete product-service experience for the final users. Lectour is an online platform that enhances the online learning experience for high school teachers and students while promoting participation and sharing of knowledge. It is a subscription based service that will be provided by the school and that teachers and students will access using their institutional e-mail. Teachers and students will have free access to an expanding archive of lectures from other schools, divided by subject, and a collection of documentaries licensed by the partner media publishers. The teacher, in particular, is invited to take inspiration and reuse educational material from this archive to make her lecture more engaging. She will be provided with a lecture editor that allows her to add specific clips from these resources to the lecture, as well as embedding links from other platforms such as YouTube and adding interactive quizzes. The goal is to promote a more dynamic approach to the online class, that takes advantage of the medium. All the selected resources are then added to a remote controller that activates when entering the video conference platform and gives the teacher immediate access to the multimedial material by clicking the respective remote button. This will save a lot of time, instead of switching the share screen function on and off or having to keep changing applications. In fact the browser extension links the teacher's remote controller to all the students and allows her to show them the selected material, such as video clips, recordings, documents or quizes. Speaking about quizzes, the teacher is also able to instantaneously send interactive questions to the students by using the very same remote controller. The quizzes are meant to keep the student's attention high and they are not necessarily an evaluation method. At the end of the lecture, students can provide feedback on the engagement of the lecture, while the teacher can review these feedbacks as well as the answers to the

quizzes. The lectures done using Lectour are recorded and re-experienceable by the students, including watching external material and taking quizzes. Moreover, the teacher can decide to make a lecture publicly available on the platform for other teachers to use it.

The name of the platform is Lectour, because it promotes lectures that are not just plain speeches, but immersive dives in the subjects, enjoyable and interactive learning tours, all set in an active teaching community.

9.2

About open access teaching

Open access teaching is the practice of making educational material available for everybody to use or cite. This material is referred to as Open educational resource (OER) and there are currently debates on if it might actually be a feasible teaching method. It is considered a new frontier of teaching that can enhance creativity and engage students more easily. There are downsides of it such as the selection itself of OERs that require work and analysis of the teachers in order to evaluate what to use and how. On the other side, students might be tempted to overestimate the resource and bypass the professor's guide, without being able to verify the information or to understand if it is up to date. This introduction is important to us because what we are going to create with this concept is a teaching community of professors that use external material as a way to enhance

the lectures and create engagement. The challenge of online learning makes this framework more feasible and almost a necessity in a context where low attention and engagement become an actual threat for the professors. As it has already been said, a new school model requires a smart school approach, not a tele school one. A smart school approach should have an optimized use of time, that balances in a more tailored way screen time and personal time, while considering the different setting and attention span of the teacher and the learner.

Fig 30. Woman studies at the computer | Pexels

9.3

Unique value proposition

Lectour is a community that shares original educational content and promotes the engagement during smart school. Lectour is a tool that helps teachers create and transition their lecture online, using a smart schooling approach.

VISION

Making distance learning even more engaging than traditional learning.

MISSION

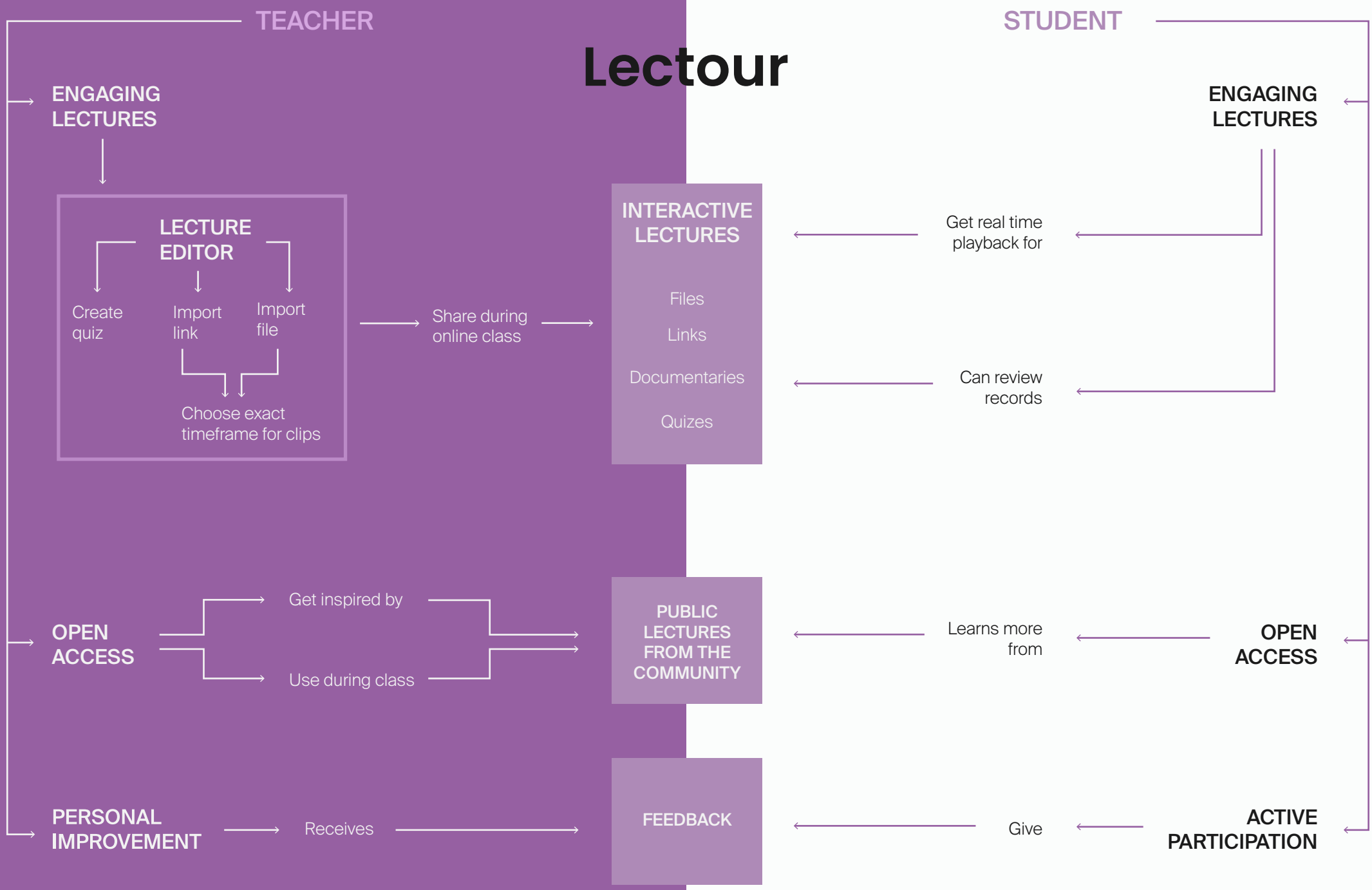
Helping teachers create the best and most engaging online lectures. Giving students the most interesting and flawless distance learning experience.

9.4

Service offering map

Next page: Graph 19. Lectour offerinng map

Lectour


TEACHER
STUDENT
ENGAGING LECTURES
LECTURE EDITOR
Create quiz
Import link
Import file
Choose exact timeframe for clips
Share during online class
INTERACTIVE LECTURES
Files
Links
Documentaries
Quizes
Get real time playback for
Can review records
ENGAGING LECTURES
OPEN ACCESS
Get inspired by
Use during class
PUBLIC LECTURES FROM THE COMMUNITY
Learns more from
OPEN ACCESS
PERSONAL IMPROVEMENT
Receives
FEEDBACK
Give
ACTIVE PARTICIPATION

9.5

The users journey

In the Lectour platform there are two main users: the teacher and the student. Their needs are connected meaning that if the student wants to have a less boring or distracting class, the teacher wants the students to be more focused and to use the time better. Their offer in the service system is different. The teacher has the tools to create interactive lectures (or lectours) and a browser extension that works as a presenter during the class. She can also review feedback and publish the lectours. The student has no direct control on the lectour but can leave feedback and review it whenever she wants, even if the lecture is not public. Both teacher and student have access to the full library of public lectures and educational content. Since the target is for now Liceo Classico, the tools are meant to be used without special equipment like drawing tablets and the experience of the remote controller has been imagined as an affordable visual tool. The user personae have been built based on the interviews with students and teachers from Liceo Classico.

9.6

Teacher persona and journey map

Annamaria Rossi

Fig 31. Avatar for Teacher persona | Pexels

Name: Annamaria
Age: 52
Teaches: Latin and Greek teacher in an Italian Liceo Classico

ABOUT HER

Annamaria is not a tech savvy and when school was in presence, she would sometimes use Powerpoints to show some pictures to the class as an analysis starter. Sometimes she shows pieces of classic movies to catch the interest of the students and start the lecture from the obsevations on the clip. When school moved online she noticed that students were even more easily distracted during the lectures.

DRIVERS

Annamaria is looking for a new way to engage with students. She is testing new approaches, like sending links and readings to the students. She wants to recreate the dynamic environment of the traditional classroom.

STRUGGLES

Annamaria is bothered by not being able to engage with every student in a personal way and being able to see the interest or boredom of students. She also noticed that she looses so much time during the lectures because of technical issues or during the inbetween moments when she is looking for a file to share.

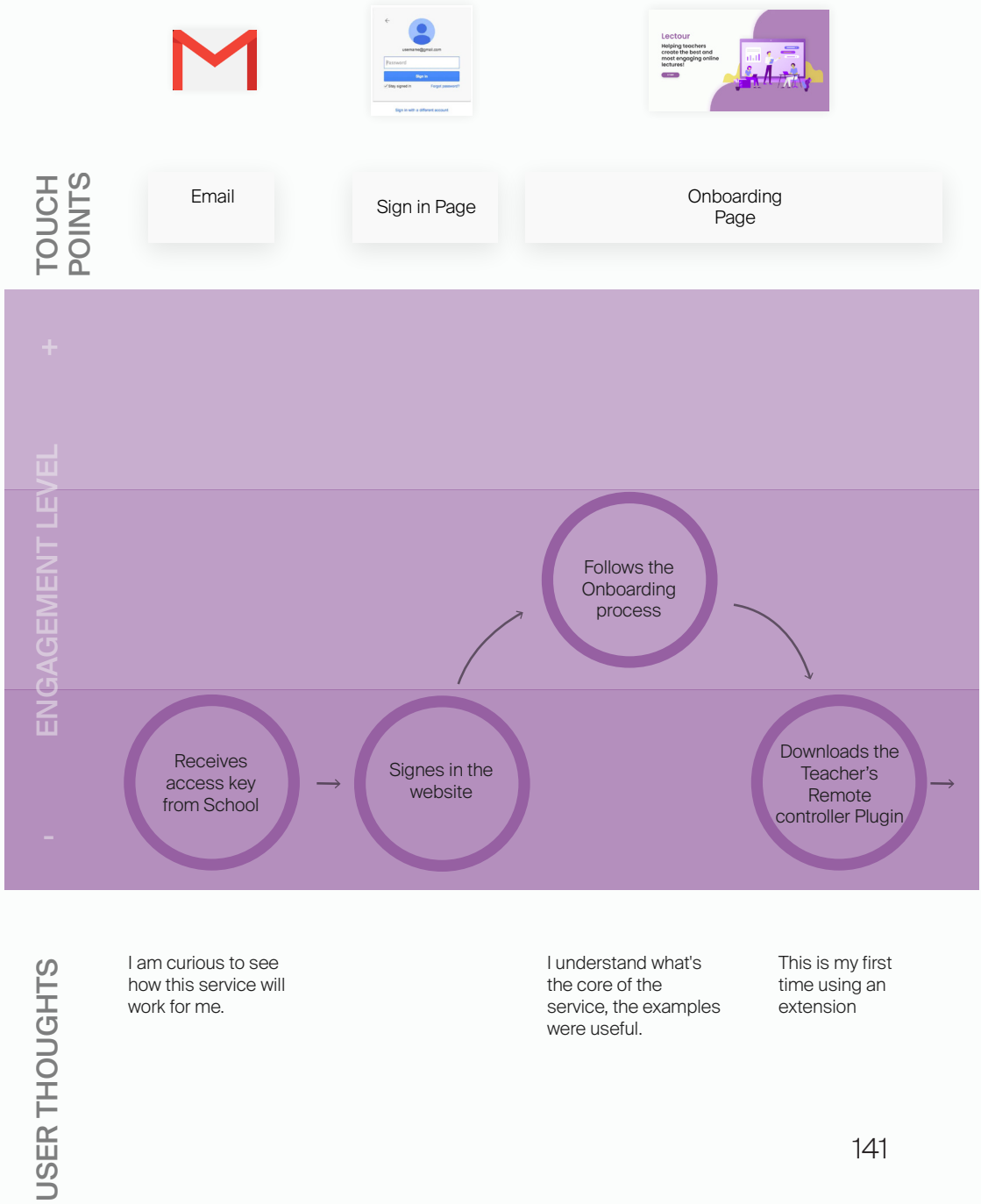
SKILLS

Annamaria can use the Office suite without issues. When school went online, she had to learn how to use Classroom, and the Google suite. It wasn't intuitive, but she had to learn the hard way. After a few months she is more confident with her skills and uses the share screen feature without many troubles.

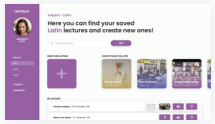
TECH SAVVINESS

Annamaria uses a 15 inches laptop to give all her lectures. She prefers to use the trackpad instead of the mouse because she likes to have room on her desk for notes and papers. She heard that it's possible to handwrite on the PC using a drawing tablet and she is evaluating the possibility of buying one but she is afraid that she won't be able to use it comfortably.

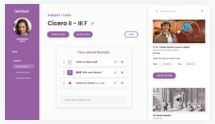
Pages 143-146 Graph 20. Teacher journey map



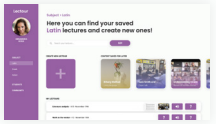
TOUCH POINTS



Lectures Dasboard

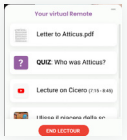


Lecture Editor



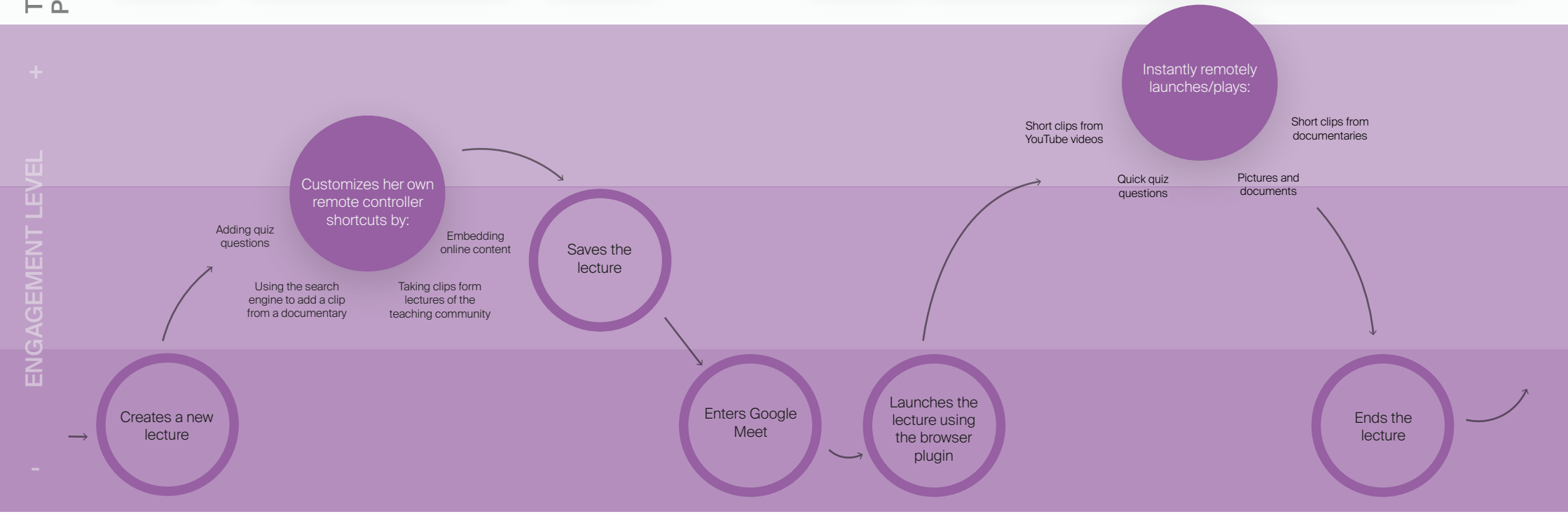
Lectures Dasboard

Browser Plugin



Remote Controller

ENGAGEMENT LEVEL



USER THOUGHTS

I see, it works similarly to other editor platforms.

I will start slow by adding a clip from yt that i usually show in this lecture.

The quiz feature looks very interesting, I wonder if I could use it also for interrogations.

I could tweak this lecture just slightly and use it with other classes too.

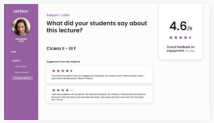
It's nice that i can browse the lecure that i want to start.

This is pretty intuitive, and I love that I can decide when and in which order to show my content, depending on how the lecture goes.

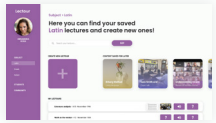
It saves so much time not having to share the screen, or look for the exact timeframe of a video and it doesn't break the flow of the lecture.

POST SERVICE

TOUCH POINTS



Feedback Page

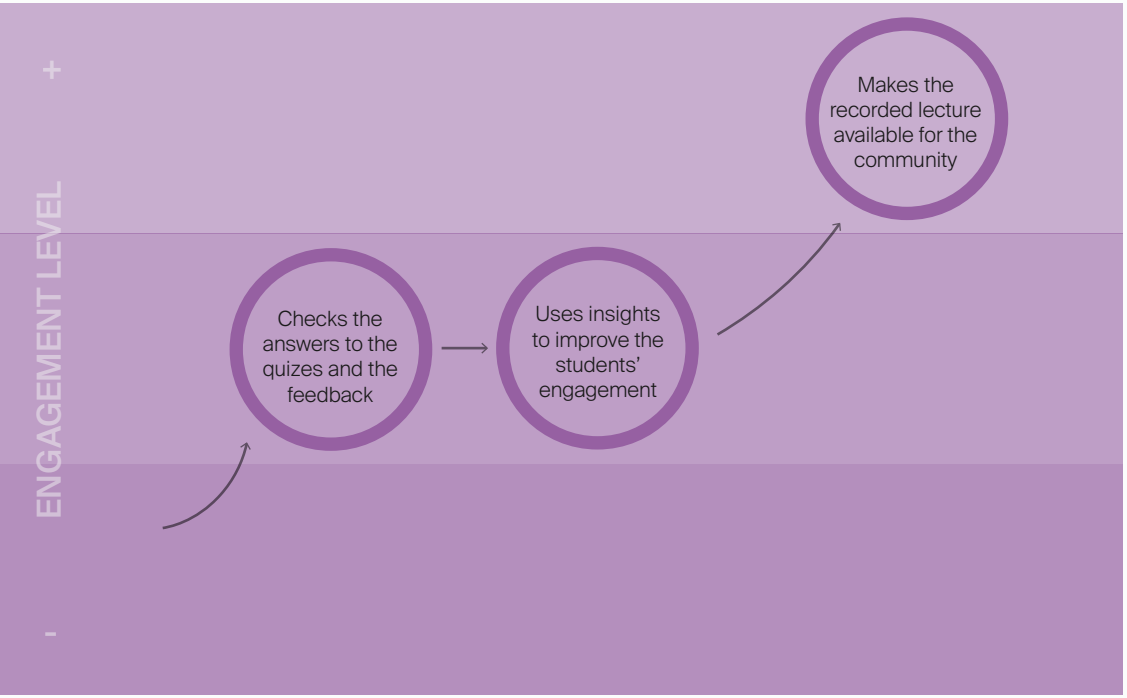


Dashboard

ENGAGEMENT LEVEL

+

-



USER THOUGHTS

I can have an overview of all the answers and understand how much they understood on the spot.

I can use data to make my lectures more engaging and makes it easier for students to study.

I spent a lot of time creating this lecture and making it engaging, I think it will be useful to other teachers too.

9.7

Student persona and journey map

Matilde Bianchi

Fig 32. Avatar for Student persona | Pexels

Name: Matilde
Age: 17
Studies: 3rd year student in an Italian Liceo Classico

ABOUT HER

Matilde has chosen to go to Liceo Classico because of her love for the humanities and the open dialogue that she has on the subjects. When the school moved online it was a mixture of good and bad things. She was now sleeping more and she wasn't wasting time commuting, but she soon realized how frustrating is to follow lectures on the PC. It is extremely tiring and it is so easy to get distracted with the computer or the mobile phone.

DRIVERS

Matilde enjoys some aspects of the online school, like the use of Classroom for homework delivery that is more immediate. She wishes that every professor would record the lectures and make them available for review because is an extra asset that often makes it easier to solve a doubt or integrate her notes.

STRUGGLES

Keeping a high attention level in front of the PC four to five hours a day every week-day is extremely difficult. It is even worse when there are technical problems and interruptions that break the flow of the lecture continuously.

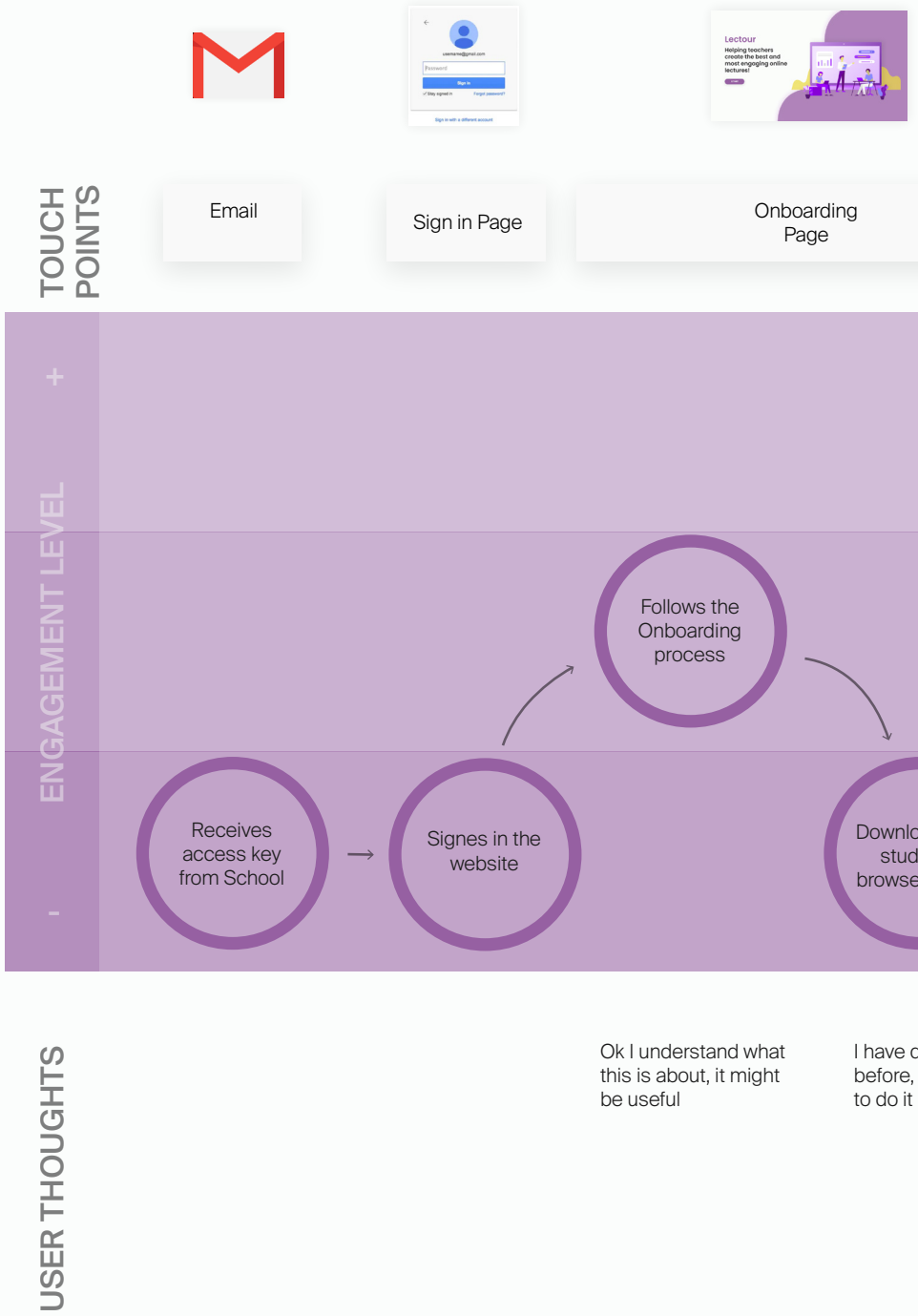
SKILLS

Matilde intuitively knows how to use every software needed for school, and if she doesn't, she is a fast learner anyway. She definitely knows more online resources now than she did before school went online, which she uses for homework and sometimes for tests too.

TECH SAVVINESS

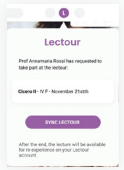
Matilde uses a 20 inches desktop computer. Since the PC is shared with the family, when someone else need it more than she does, she uses her tablet without problems.

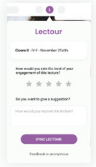
Pages 151 and 152 Graph 21. Student journey map



SERVICE

POST SERVICE





Browser Plugin

Lectour popups

Feedback Page

It's nice that i can browse the lecure that i want to start.

Hey this is so much more enjoyable.

I hope quizes don't get evaluated

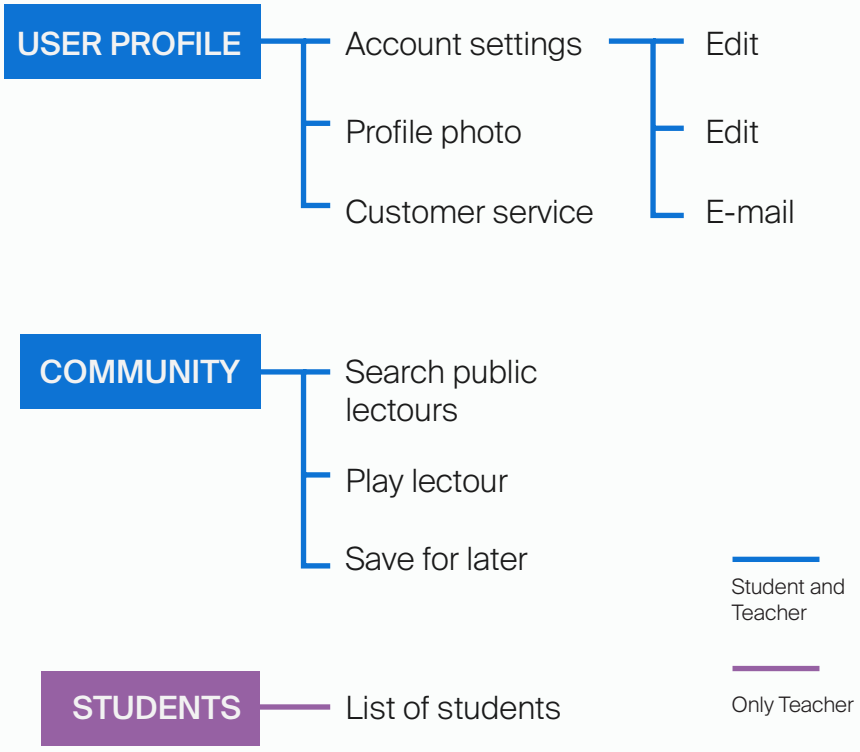
I feel that i can make this better if my feedback can have an impact.

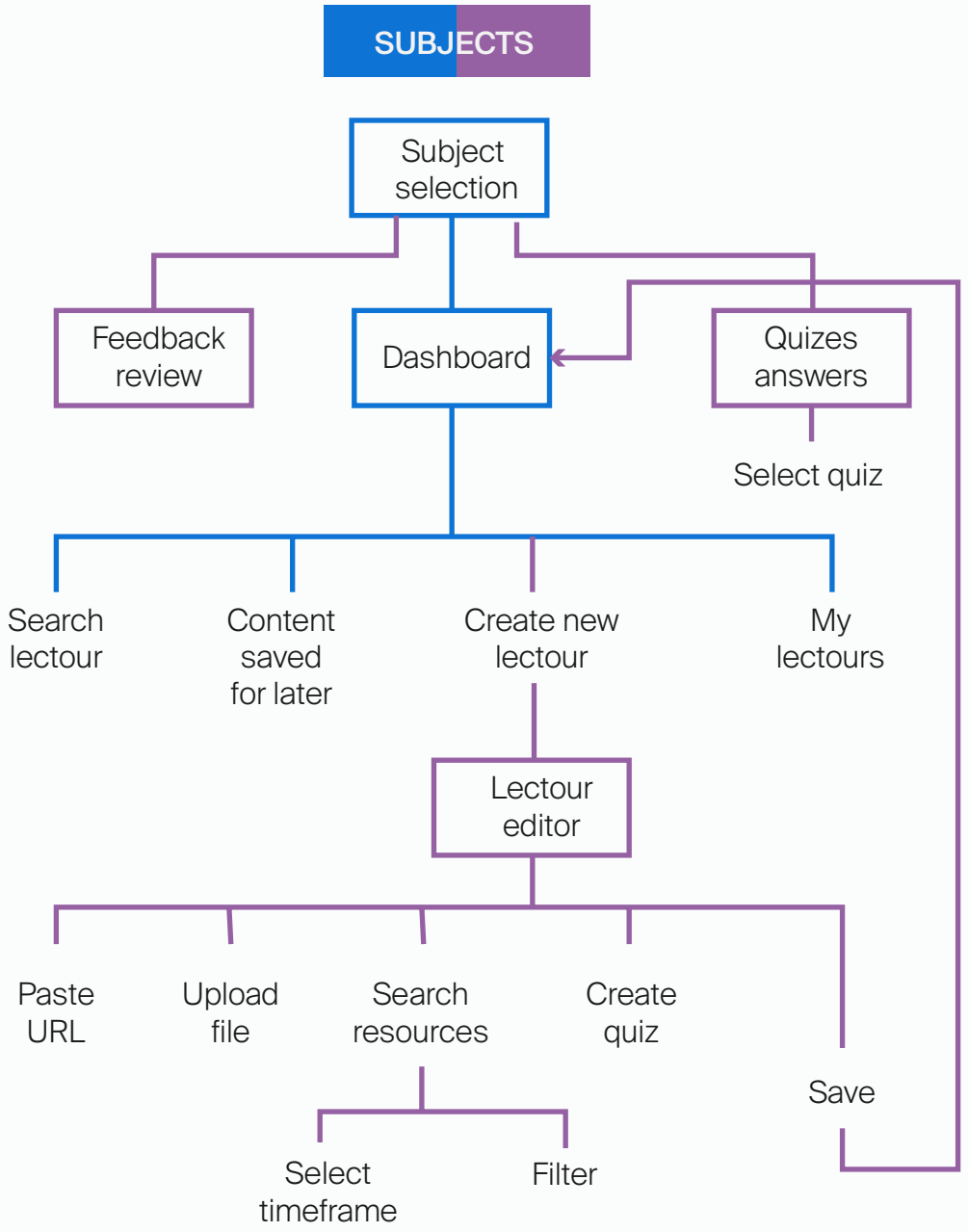
It is so useful that I can rewatch the lecture AND retake the quizes to practice

Architecture and wireframe

9.8

Website architecture

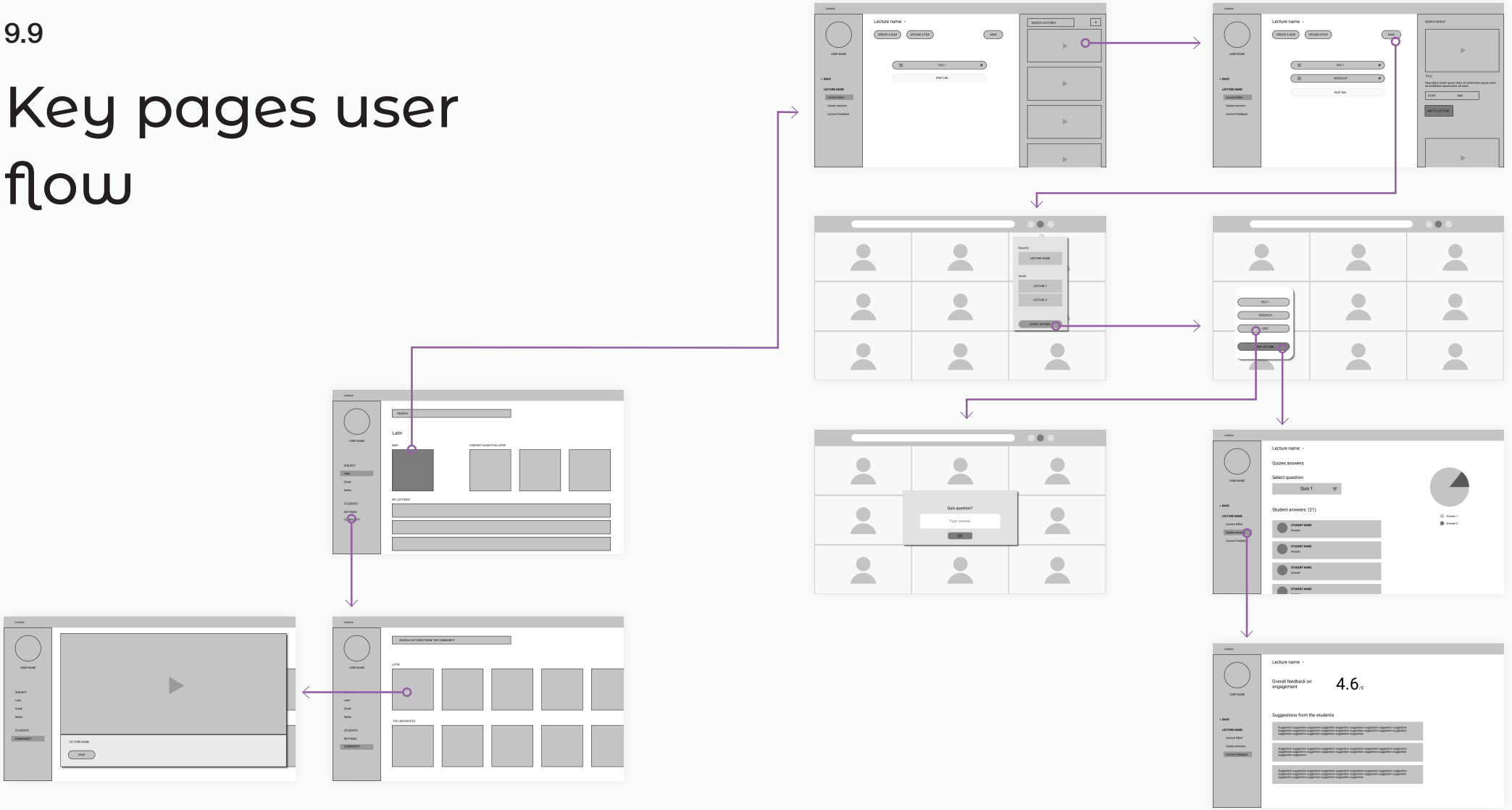




Graph 22. Lectour website architecture

9.9

Key pages user flow



Graph 23. Lectour user flow

9.10

UI design: Community

In the community screen, available for both students and teachers, the user can surf and filter a library of public resources. These resources include licensed content from partner publishers as well as all the lectures made public by the other members of the teaching community. Users are free to watch and listen to them, and save them for later (in the case of the teacher she will be able to use them in her own lecture). All the resources are tagged per topic and divided by subject. The content is displayed in gallery mode, similarly to what happens on popular video streaming platforms.

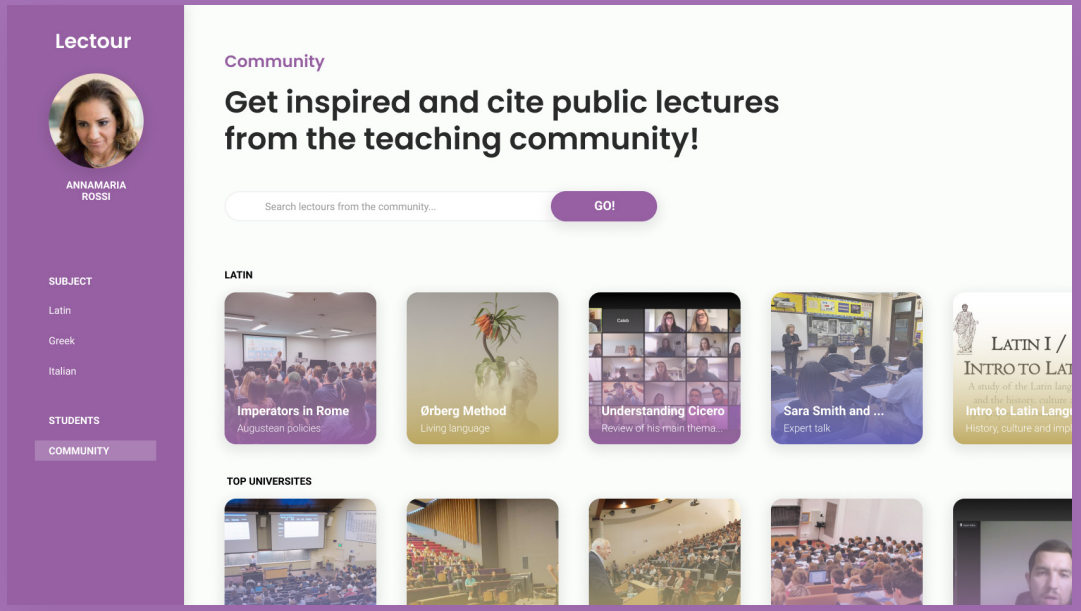
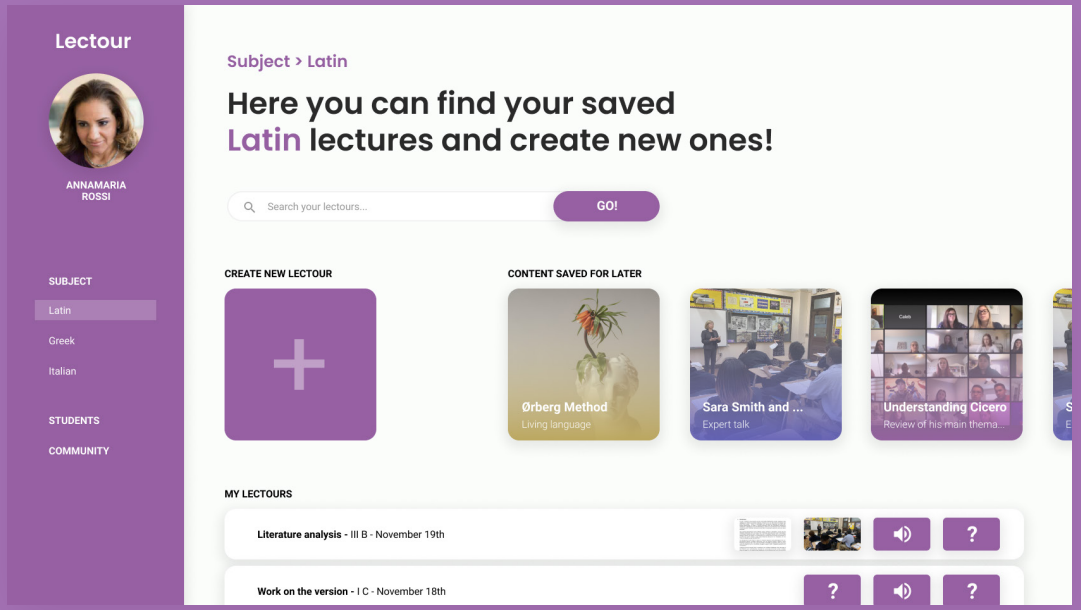


Fig 33. Lectour community screen

9.11

UI design: Dashboard

The dashboard is the starting point of the user flow for both students and teachers. It gives access to saved elements and previous lectours, and in the case of the teachers it allows them to create a new lectour. Users can use the search bar to search elements or lectures. It works like a cloud archive.



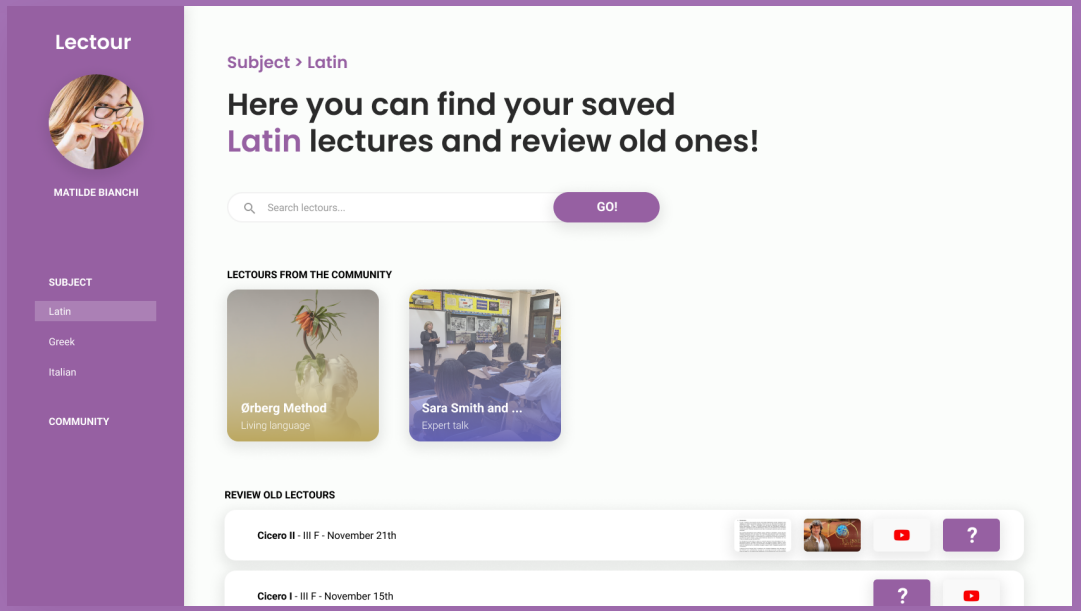
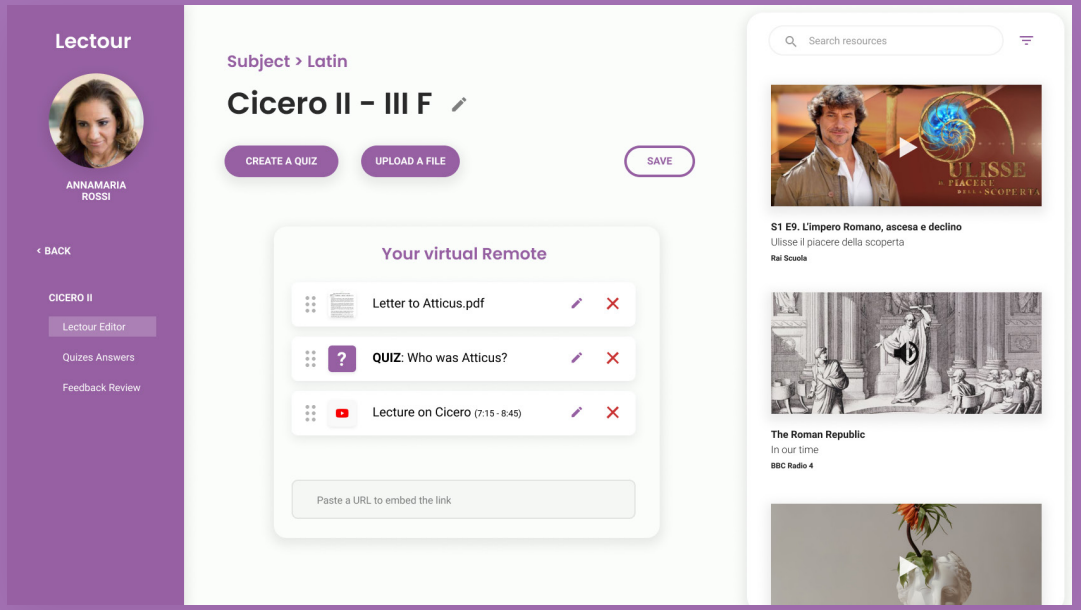


Fig 34 and 35. From top: Lectour teacher dashboard screen, Lectour student dashboard screen

9.12

UI design: Lecure editor

The lectour editor is exclusive to the teacher account. Here the teacher can plan and customize every lectour by selecting and adding multimedia content. It allows users to browse the public archive as well as easily find saved elements. Videos can be inserted selecting the exact timeframe that is interesting for the lecture so that it will playback only that specific clip. Also links and private files can be embedded. The preview shows a list of all the added content and the order can be arranged at pleasure. The list is also a means to preview what the teacher will see on the remote controller during the online class. By clicking save, the lectour will be added to the dashboard.



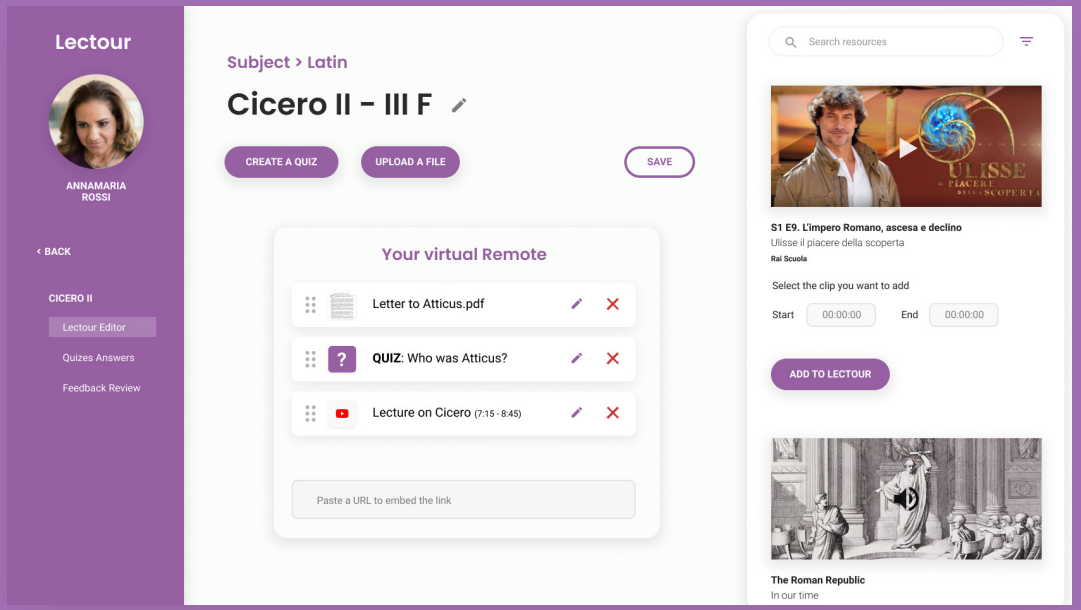
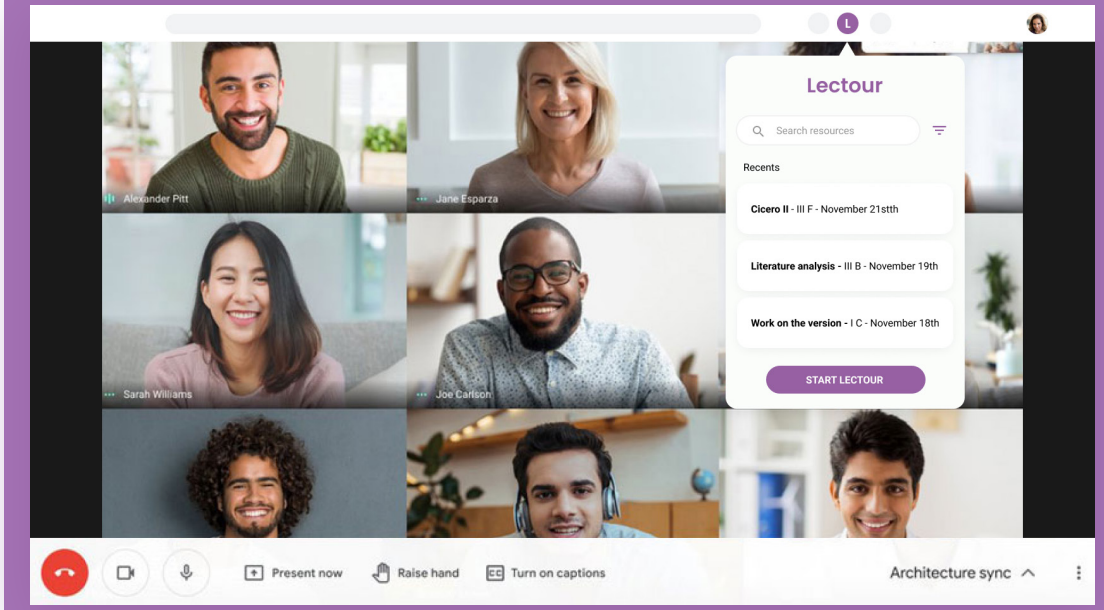


Fig 36 and 37. From top: Lectour lecture editor step 1. Lectour lecture editor step 2

9.13

UI design: Browser extension

The browser extension allows the platform to sync the ongoing lecture between teacher and students and it could virtually work with any video conference platform because it is an add on. After entering the video conference room, the teacher can start the Lectour plug in and select the lecture that she wants to show. At the same time, students connected to the same video conference link will receive a notification that the lecture is synced. Therefore the browser extension will actually work differently depending on the user account type.



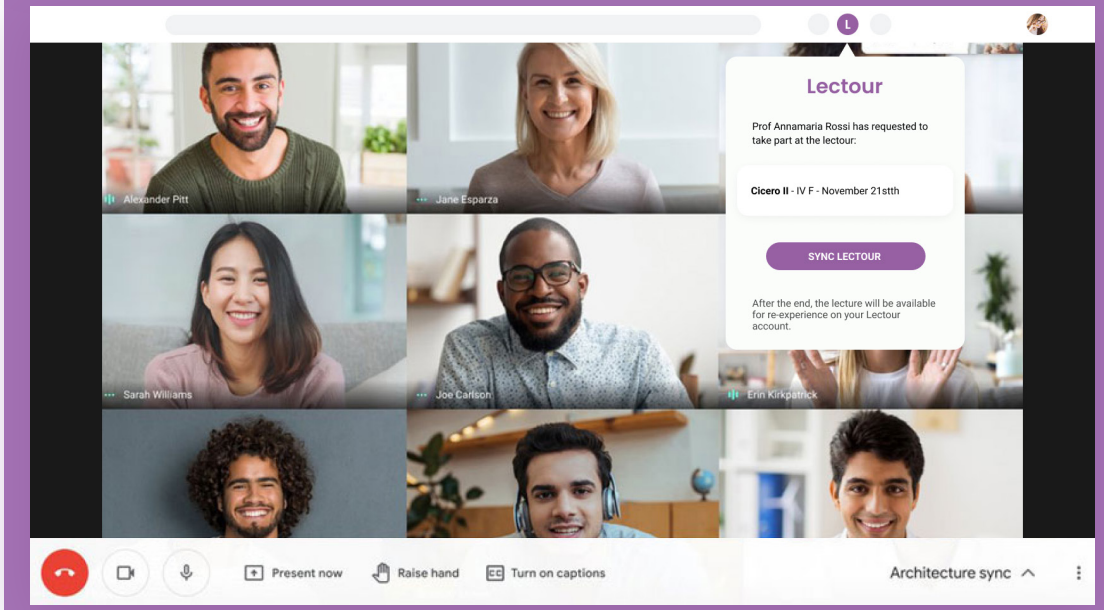


Fig 38 and 39. From top: Lectour teacher browser extension (teacher), Lectour teacher browser extension (student)

9.14

UI design: Remote controller

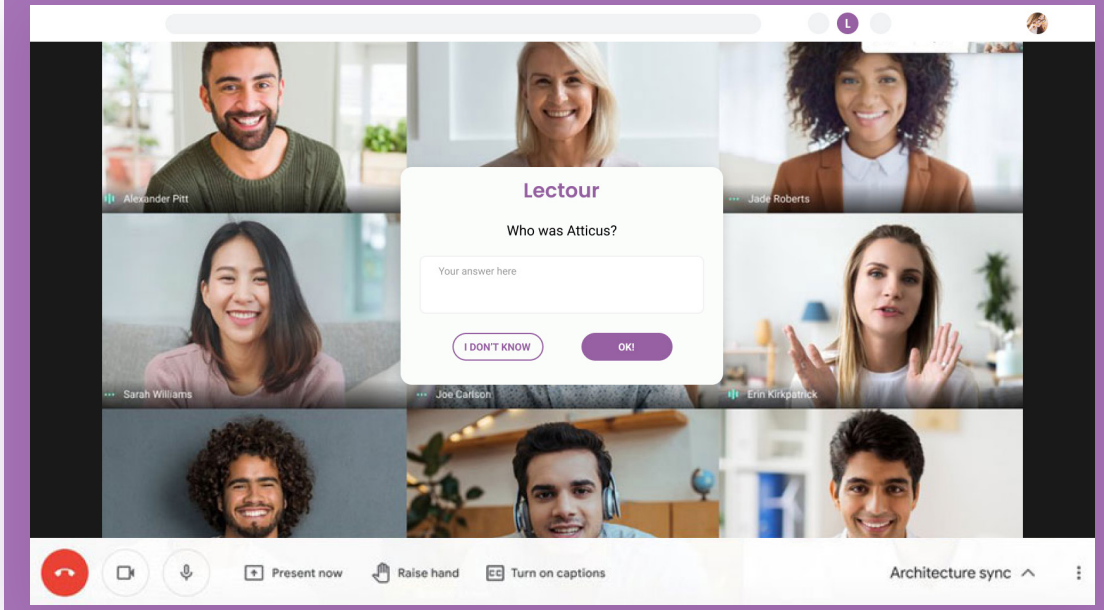
When the teacher starts the Lectour via browser extension, a floating remote controller will appear on the browser window. The remote controller shows a list of shortcuts to interactive content that reflects the lecture the teacher planned on the lectour editor. By pressing a link, the interactive content will be shown on all the synced devices. The teacher can choose to press the buttons in the order she prefers, skipping some, or pressing some more than once. The remote controller can be minimized when not in use. The remote controller feature is only available for the teacher and can not be seen by anybody else.

Fig 40. Lectour remote controller

9.15

UI design: Lectour popups

When the teacher clicks on one of the buttons of the remote controller, a frame with the respective content will pop up on every synced browser and it will play out immediately. In the case of a quiz, the window will require the student to click “Send” in order to send the answer. Any other window can be closed by the student when it is not needed anymore.



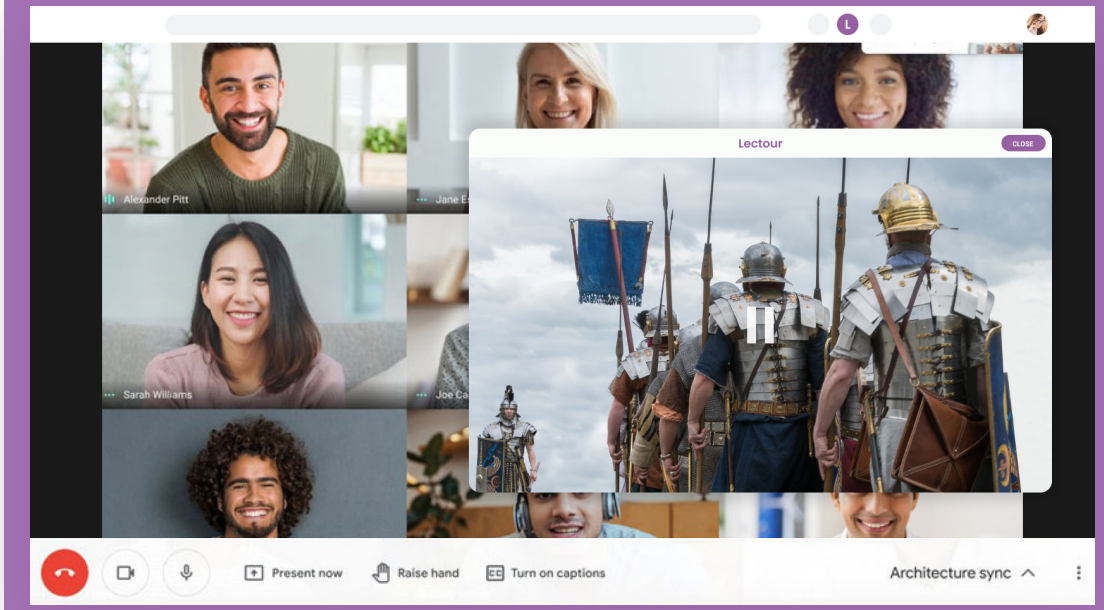


Fig 41 and 42. From top: Lectour student quiz. Lectour student multimedia visualization

9.16

UI design: Quiz review

When the teacher clicks on one of the buttons of the remote controller, a frame with the respective content will pop up on every synced browser and it will play out immediately. In the case of a quiz, the window will require the student to click “Send” in order to send the answer. Any other window can be closed by the student when it is not needed anymore.

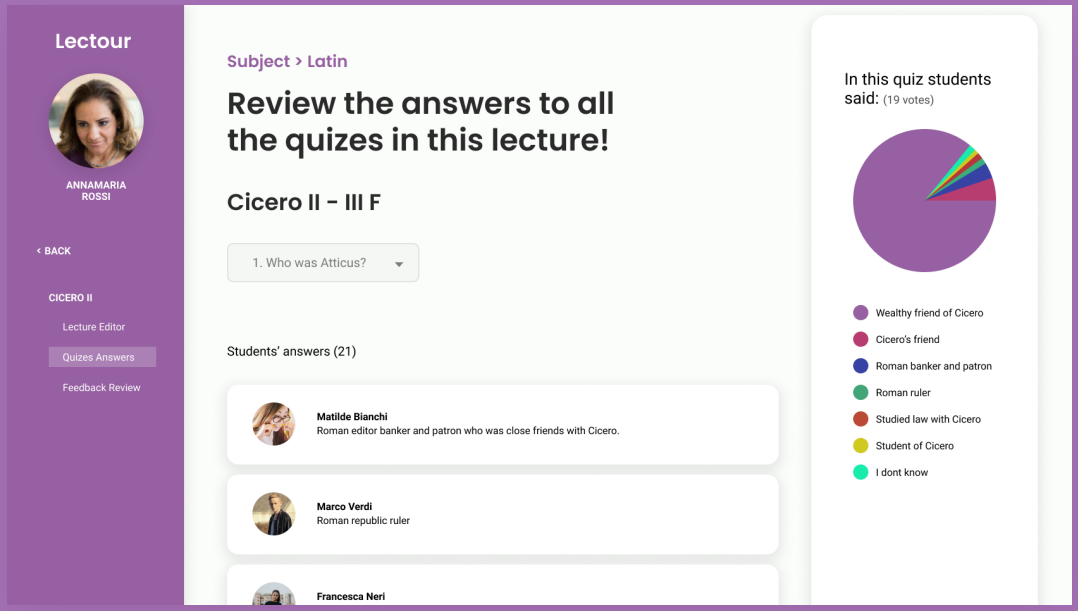
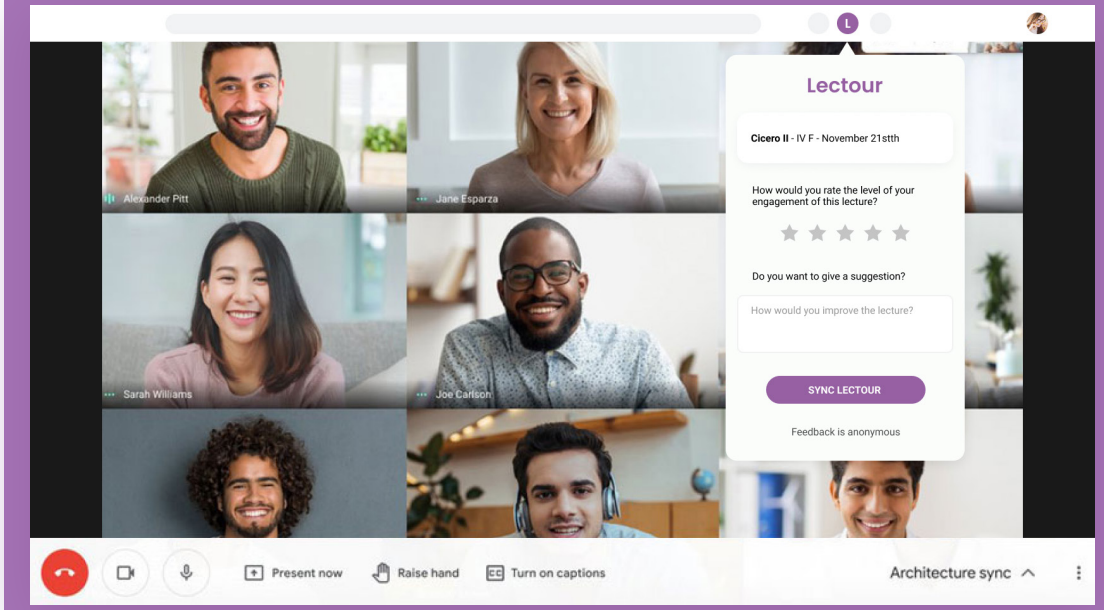


Fig 43. Lectour teacher quiz answer review

9.17

UI design: Feedback giving and review

When the teacher clicks on one of the buttons of the remote controller, a frame with the respective content will pop up on every synced browser and it will play out immediately. In the case of a quiz, the window will require the student to click “Send” in order to send the answer. Any other window can be closed by the student when it is not needed anymore.



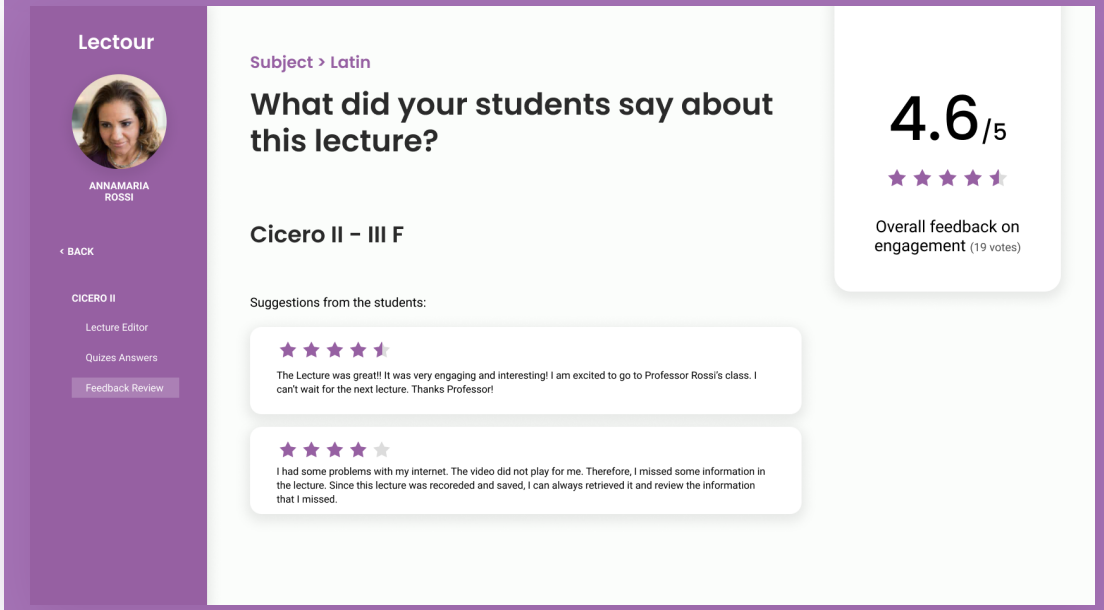
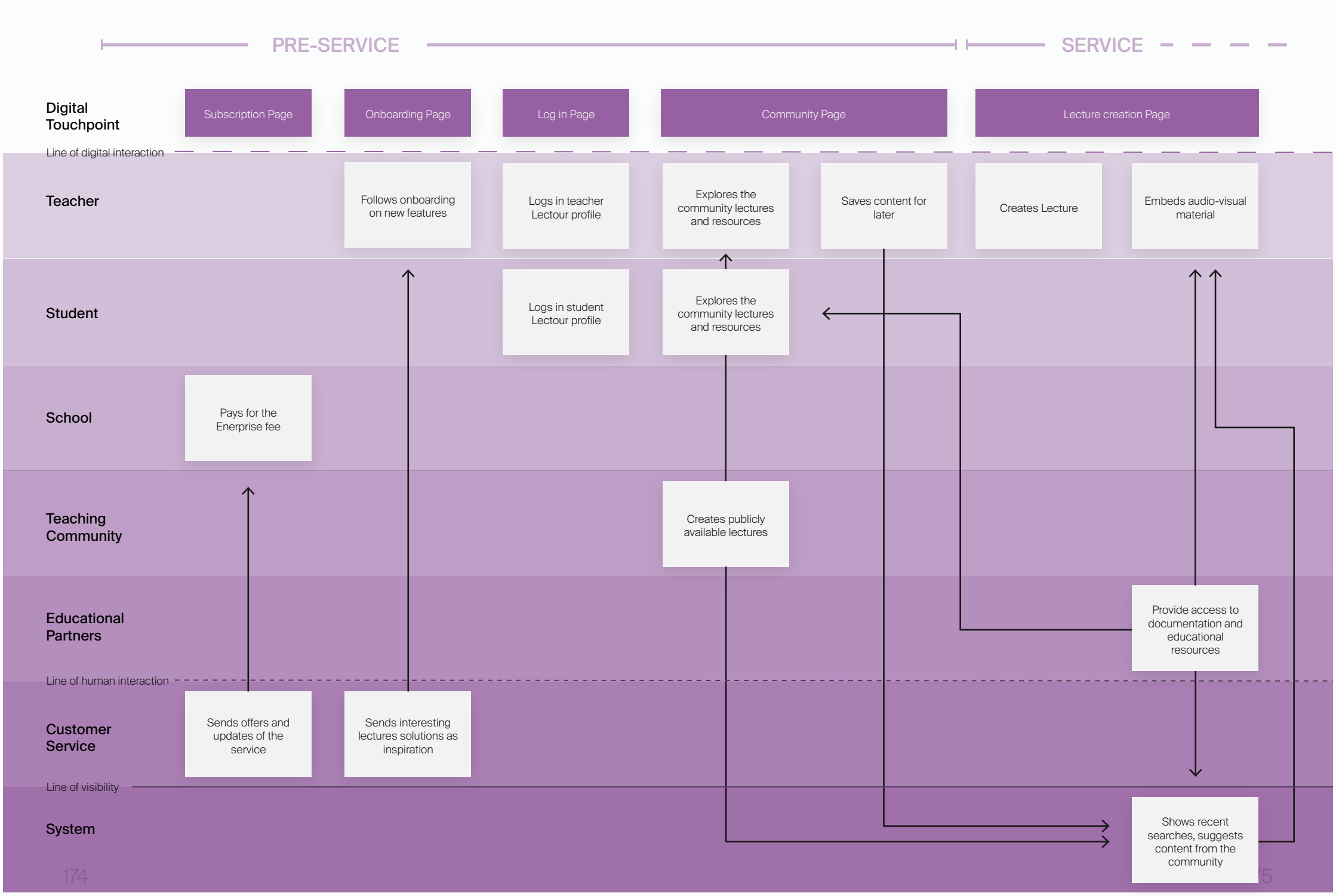


Fig 44 and 45. From top: Lectour student feedback giving, Lectour teacher feedback review

9.18

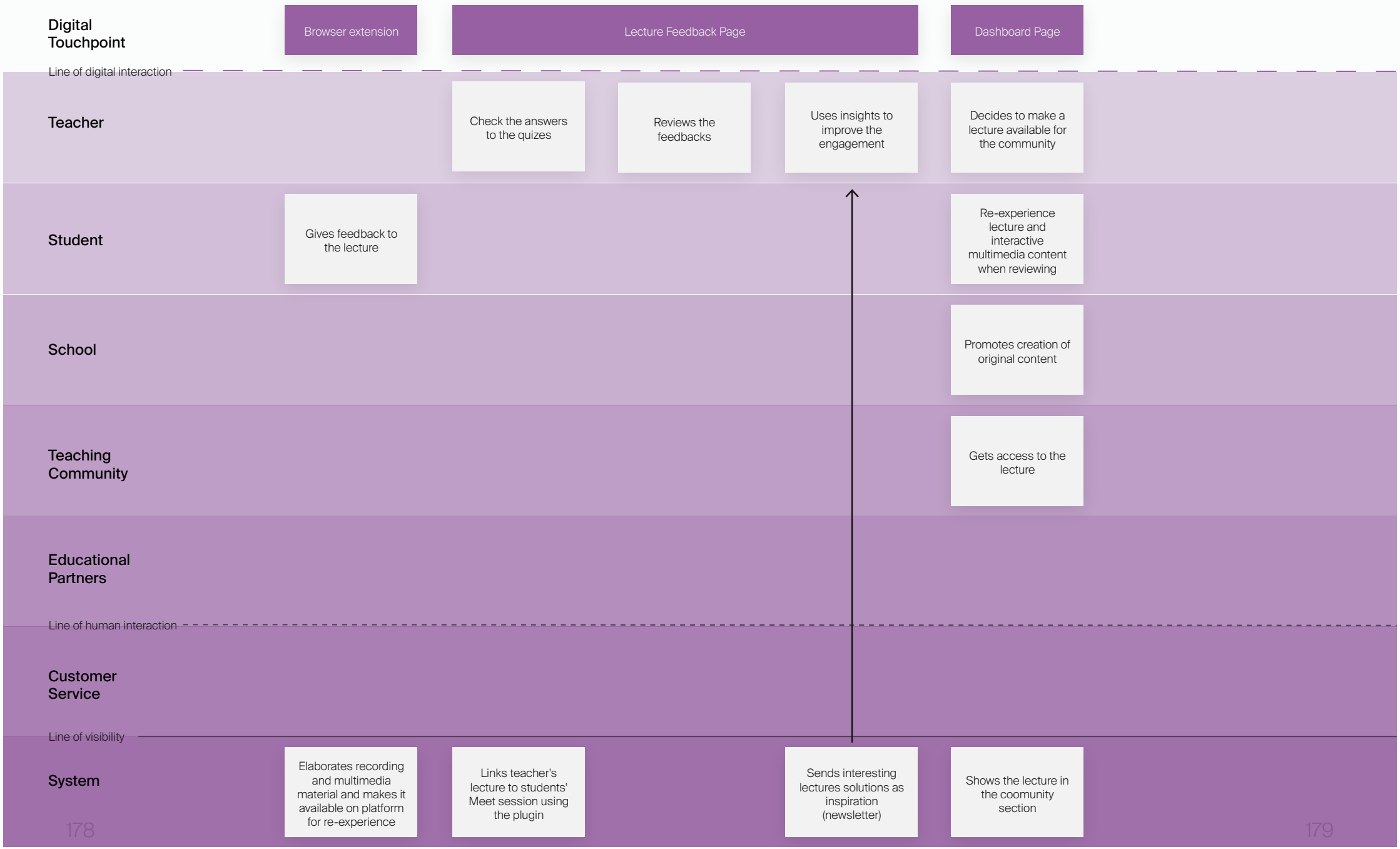
Service Blueprint

Page 176-181: Graph 24. Lectour service blueprint


PRE-SERVICE
SERVICE
Digital Touchpoint
Subscription Page
Onboarding Page
Log in Page
Community Page
Lecture creation Page
Line of digital interaction
Teacher
Follows onboarding on new features
Logs in teacher Lectour profile
Explores the community lectures and resources
Saves content for later
Creates Lecture
Embeds audio-visual material
Student
Logs in student Lectour profile
Explores the community lectures and resources
School
Pays for the Enerprise fee
Teaching Community
Creates publicly available lectures
Educational Partners
Provide access to documentation and educational resources
Line of human interaction
Customer Service
Sends offers and updates of the service
Sends interesting lectures solutions as inspiration
Line of visibility
System
Shows recent searches, suggests content from the community

Digital Touchpoint	Lecture Creation Page	Dashboard		Browser Extension	Remote Controller/Browser extension		
Line of digital interaction							
Teacher	Creates quiz questions	Saves the lecture	Enters the lecture in Google Meet	Launches the lecture from the plug-in	Clicks remote controller's button to launch audio-visual material	Clicks remote controller's button to launch a quiz question	Ends the lecture
Student			Enters the lecture in Google Meet	Receives confirm of lecture start	Watches/Listens to audio-visual material	Answers the quiz question	
School							
Teaching Community							
Educational Partners							
Line of human interaction							
Customer Service							
Line of visibility							
System		Links teacher's lecture to students' Meet session using the plugin		Puts teacher's and students' browsers in direct communication	Shares and plays content automatically on all connected browsers	Shares quizes automatically on all connected browsers and collects all the answers	Elaborates recording and multimedia material and makes it available on platform for re-experience

POST SERVICE



9.19

Business Strategy

The platform has been thought of as a paid subscription service. Since it would be used by schools, every school will have to purchase an enterprise account and ask teachers and students to sign in using the institutional email address. Even though the platform was born to answer a Liceo classico problem, it is completely usable also by other high schools. The teaching method of high schools is more direct and personal when compared to the Italian Universities' one which usually have a higher student-teacher ratio. Even though the service right now is addressing high schools only, a later expansion would include universities for sure which would actually benefit more from OER usage. Another point of the business strategy would be providing access to the community content also to users not enrolled in any school but simply wanting to learn as private users. Therefore an offer specific for single teachers will also be released, allowing them to experiment it with a class and potentially bring it up to the school. Even though the partnership with publishers to include original documentaries might be an extremely useful feature for many teachers, it is highly subjected to copyright and licensing partnerships that might be obtained slowly during time. For this reason the core of the service is actually the possibility to get inspired by the community and feature pieces of others' work. This said, especially in the first period, or when the community content is not much yet, the licensed material should provide a fair amount of content to compensate the lack of teachers-created lectures. As the platform builds up more content, a more intensive investment and use of AI will be done in order to better sort and suggest relevant material to the users. A future step and investment for the platform will be to create and produce original content, just like it happens for other streaming services. A major KPI for the service will be the number of subscriptions as well the n. of lectures published/n. of subscriptions. These values should give an indication of the engagement of the users and the effectiveness of the tools and resources.

Value Proposition

Lectour is a community that shares original educational content and promotes the engagement during smart school. Lectour is a tool that helps teachers create and transition their lectures online, using a smart school approach.

Key Partners

- Educational publishers: they are needed as they need to help updating the archive of resources and therefore generate more content. They are core especially during the first phase of the platform, when the community still needs to build up original content. They can be TV broadcasters, online streaming services or similar publishers that make their content available for use on the platform.
- Active teachers from the community: they need to co-create content for other teachers to be used and cited in their lectures

Key Activities

- Collecting and making available lectures and media resources.
- Develope a tool that helps saving time during lectures and makes it easier to make them more engaging.
- Engaging the community by encouraging them in using resources from the community

Key Resources

- Community involvement and active share of lectures and original contnet, therefore co-creation of content.
- Frontend to engage the community and suggests ways to use the platform at its best.
- Backend and development to keep the platform working

Customer Relationships

- Provide startup support during the onboarding phase and exaustive support.
- Provide suggestions of usage of the platform, tutorials and exemplified lectures.
- Ask for feedback and update the archive with the most needed resources.

Channels

- Main web application online.
- Newsletter.
- Tutorials and inspirational lectures on the platform and on YouTube.
- Ads online (Google ads and Facebook).

Customer Segments

- Main Customer: High school administrations that need to improve their distance learning offering with methods that are easy to adopt.
- Secondary: early adopter and experimental teachers that want to improve the quality of their lectures independently and are keen to pay for a service that allows them to do it.
- Tertiary: Self learners that enjoy learning by themselfs and are willing to pay for a platform that offers access to documentaries, educational material and lectures on subjects they are passionate about.

Costs

- Costs of licensing for educational material provided by third parties (variable)
- Costs of development and management of the platform (fixed)
- Human resources costs (fixed). Key profiles: developers, designers, legal, quality check and moderators, customer support.

Revenue

- Monthy or yearly subscription fee.
- Enterprise subscription for schools.
- Private subscription for teachers and self learners. Teachers that experiment for themselfes with this pakage should be given the chance to expand the subscription to their organisation.

10
Bibliography

10.1

Bibliography

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934. doi:10.1016/j.psychres.2020.112934

Conrad, H. (2020). The Universal Learning Programme: Educating future-ready citizens. *Current and Critical Issues in Curriculum, Learning and Assessment, 34.* doi:https://unesdoc.unesco.org/ark:/48223/pf0000372613

Hall, B. (1995). Return-on-Investment and Multimedia Training: a Research Study. *Multimedia Training Newsletter*

Hasan, N., & Bao, Y. (2020). Impact of “e-Learning crack-up” perception on psychological distress among college students during COVID-19 pandemic: A mediating role of “fear of academic year loss”. *Children and Youth Services Review, 118*, 105355. doi:10.1016/j.childyouth.2020.105355

Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: How to solve big problems and test new ideas in just five days*. New York, USA: Simon & Schuster.

Kruger, J. S., & Abramovich, S. (2019). Open Educational Resources: The New Frontier. *Pedagogy in Health Promotion, 5(2), 155–158*. https://doi.org/10.1177/2373379918799767

Mazzacchera, E., & Viscomi, A. (2019). La piattaforma e-learning di Latino dell’Università di Bergamo e del Liceo Classico “P. Sarpi”: Qualche proposta operativa. *Nuova Secondaria Ricerca, 2*. doi:http://www.edizionistudium.it/riviste/nuova-secondaria-ricerca-n-2-ottobre-2019

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). E-Learning, online learning, and distance learning environments: Are they the same? *The Internet and Higher Education, 14(2), 129-135*. doi:10.1016/j.iheduc.2010.10.001

OECD (2020), Coronavirus special edition: Back to school, *Trends Shaping Education Spotlights, No. 21, OECD Publishing, Paris*, doi:10.1787/339780fd-en

Roy, R., Potter, S., Yarrow, K., & Smith, M. (2005). Towards Sustainable Higher Education: Environmental impacts of campus-based and distance higher education systems. *Design Innovation Group, The Open University*. Retrieved from http://www3.open.ac.uk/events/3/2005331_47403_o1.pdf

Russo, M., Colombini, S., Pavone, P., Alboni, F., Sartori, L., Piscitelli, G., & Di Santo, E. (2020). Gli studenti EIDI al tempo del coronavirus. Risultati della rilevazione online del 21 marzo 2020. *Center for the Analysis of Public Policies (CAPP), Universita Di Modena E Reggio Emilia, Dipartimento Di Economia "Marco Biagi", 169.* Retrieved from http://155.185.68.2/campusone/web_dep/CappPaper/Capp_p169.pdf

Tripi, S. (2020). COVID-19 e Pubblica Amministrazione: Implicazioni dello smart working per il management e per la salute mentale dei lavoratori. *DEMB WORKING PAPER SERIES, Dipartimento Di Economia Marco Biagi - Università Di Modena E Reggio Emilia.* doi:10.25431/11380_1209334

10.2

Webliography

Chatterjee, S. (2020, April 29). Teaching With Digital Archives in the First-Year Writing Classroom. *Inside HIgher Ed*. Retrieved from https://www.insidehighered.com/blogs/gradhacker/teaching-digital-archives-first-year-writing-classroom

Chernev, B. (2020, June 30). 27 Astonishing E-learning Statistics For 2020. *Techjury*. Retrieved from https://techjury.net/blog/elearning-statistics/

Distance learning solutions. (2020, July 07). *UNESCO*. Retrieved from https://en.unesco.org/covid19/educationresponse/solutions

Education during COVID-19; moving towards e-learning. (2020, June 22). *European Data Portal.* Retrieved from https://www.europeandataportal.eu/en/impact-studies/covid-19/education-during-covid-19-moving-towards-e-learning

Gutierrez, K. (2016, April 07). Facts and Stats That Reveal The Power Of eLearning. *Shift.* Retrieved from https://www.shiftelearning.com/blog/bid/301248/15-facts-and-stats-that-reveal-the-power-of-elearning

Heilweil, R. (2020, May 04). Paranoia about cheating is making online education terrible for everyone. *Vox/Recode*. Retrieved from https://www.vox.com/recode/2020/5/4/21241062/schools-cheating-proctorio-artificial-intelligence

Hughes, C. (2020, June 23). Will COVID-19 spell the end for exams? *World Economic Forum.* Retrieved from https://www.weforum.org/agenda/2020/06/will-covid-19-spell-the-end-for-exams/

Kumar, S., DN. (2018, September 18). A Case Study On Gamification In Corporate eLearning. *eLearning Industry*. Retrieved from https://elearningindustry.com/a-case-study-on-gamification-in-corporate-elearning

Li, C., & Lalani, F. (2020, April 29). The COVID-19 pandemic has changed education forever. This is how. *World Economic Forum.* Retrieved from https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/

Liceo Classico Paolo Sarpi. (2020, October 30). *Wikipedia.* Retrieved from https://en.wikipedia.org/wiki/Liceo_Classico_Paolo_Sarpi

Lugo, J. (2019, August 14). Google Assignments, your new grading companion. *The Keyword.* Retrieved from https://blog.google/outreach-initiatives/education/introducing-assignments/

Online text correction with better feedback for students. *Revisely.* Retrieved from https://revise.ly/en/

The world's first Learning Integrity Platform. *Proctorio*. Retrieved from https://proctorio.com/

We envision a world where anyone, anywhere can transform their life by accessing the world's best learning experience. *Coursera*. Retrieved from https://about.coursera.org/