LUISS

Dipartimento di
Impresa e
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Consumer Behaviour

Luiss New Educational Model: Teaching meets Research.
Quantitative Analysis of the Impact of EBL on Students' Perceptions and Performance.

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Abstract

Universities in the post truth era are revolutionizing their CVs and teaching model to gain competitive advantage over other institutions, educate highly-skilled professionals, excel in rankings and attract new enrolees, while delivering precious pieces of new discoveries and advancing knowledge through research. Many faculties are implementing models of active learning which are enquiry-based, realizing a special union between two intertwined activities: teaching and research. EBL means that students should be active enquirers, engaged with current research that is pushing forward what is known in a particular field.

Drawing on the model of "powerful knowledge", Pilot research-based programmes have been introduced in 2020 in several Luiss' master's courses. A qualitative investigation based on students' interviews has been undertaken and a questionnaire has been developed to provide quantitative insights into the experiences of research integration according to master's students in Luiss (N = 105). Scales for students' performance and perceptions have been adopted, measuring satisfaction, engagement with courses and learning outcomes achieved. Attitudes (positive or negative) towards research and perception of research culture and integration in the faculty have been also considered. Self-esteem and gender of respondents have been treated as controlled variables.

The findings have shown that students of Pilot courses register significantly higher means for DVs satisfaction, learning outcomes (being these cognitive, social and self-growth outcomes) and engagement, providing evidences on the effectiveness of this mode of learning in Luiss' context. Students of EBL have reported more favourable attitudes towards research activities and perceived a deeper and beneficial research culture in their faculty, compared to those learners not attending the pilot programmes. When students acknowledge "benefits from the presence of research in the courses" and these research environment and values stimulate their learning, a culture of enquirers mediates the relationship between mode of learning (EBL vs traditional) and both engagement and (personal, social and cognitive) outcomes achieved by learners.

Higher students' engagement is also a mediator in the effect of teaching model on satisfaction. Pilot courses register greater satisfaction from those who have attended them, via higher degree of participation and involvement.

Implications for further research and educational design have been discussed, acknowledging the necessity to enlarge the sample and measure the effectiveness of EBL over time.

This research provides useful recommendations and insights for academia, to successfully employ enquiry-based curricula.

Chapter 1: Enquiry-Based Learning: What is it? Why is it relevant?

"Before any great things are accomplished, a memorable change must be made in the system of education…to raise the lower ranks of society nearer to the higher." – **John Adams**

"All the world is a laboratory to the inquiring mind." – **Martin H. Fischer**

1.1. Modern Challenges for Universities

The segment of higher education is engaged in a profound change in recent times on multiple levels and facets.

As multi-layered organisations, universities need on the one hand to achieve cultural and economic sustainability and on the other to maintain focus on multiple objectives. The volume, quality and reach of research remain key criteria for their success (Fung, 2017).

These challenges require a rethinking of what it means to be educated in today's world and to explore ways to provide a meaningful educational experience in the face of the turbulence, uncertainty, and fragmentation that characterize much of higher education.

According to Educause (2020), a non-profit association with the mission to advance higher education through information technology, four challenges will be faced by universities in 2021:

- Student success: retention and completion, as well as student engagement and overall learning outcomes.
- Financial health, with a focus on shrinking enrollment, rising costs, a lack of traditional forms of funding and "natural disasters".
- Reputation and relevance: it appears that the brand value of universities is becoming a more fundamental part of student choice (Ramaley, 2014)
- External competition of other colleges and universities.

A "series of deep and coordinated culture, workforce and technology shifts that enable new educational and operating models and transform an institution's operations, strategic directions and value proposition" are required.

Hence, educational and research institutions face a wide range of complex challenges spanning from the increased competition in the university field, the rise of new innovative and digital-driven modes of learning, increase in students drop out rates, impelling demands for expertise from employers, unavoidable interconnectedness with society's issues that request effort of diverse actors to find effective solutions.

Transformation of university courses models to meet the aforementioned requirements is, on one side, somewhat forced by recent circumstances and, on the other side, demanded to reach and maintain a competitive advantage. Many of the institutions ranked as world's best universities have adopted novel forms of education provision and related services.

The evolution is dominated by a steady increase and spread of online training. The rise of online education is not just related to Covid-19 times, but it can be considered a best practice already in place before lockdown forced its implementation. Therefore, it is a trend that has been boosted to its full potential during times of pandemic but that was already taking place. As it has been anticipated by a report commissioned by Laureate Education network to Zogby in 2014, according to a sample of students from different countries around the world, campuses of the future will have to evolve in four directions: telematics and accessible 24/7 (for 53% of interviewed students), with an educational offer primarily based on online products and services (43%), with more flexibility with respect to courses' schedules, tutorials and exam sessions (44%) and with greater attention and focus on continuing education, pursuing training also after graduation (41%). Zogby's study also reports that 43% of students believe that they will be able to access personalized instruction or tutoring online perhaps rendering the traditional classroom experience less important. 61% believe that most courses offered by future universities will be designed by industry experts, so future institutions would be very job focused. More than seven out of ten students interviewed think that career-oriented skills will be taught in future universities.

Since the mid-1980s, online universities exhibit measurably elevated numbers mostly due to those characteristics of educational offer, that allows students to attend courses in total autonomy and great flexibility, effectively reconciling study, work and leisure time.

In a world increasingly hyperconnected and hyper technologic, where digital natives develop an impressive ability to interact with new technologies since childhood and where Gen Z (born after the mid-nineties) has recently entered the world of university education, there is no room left for prejudices on the quality of online education offer. Young post-millennials, to whom everything is filtered through the Internet and for which it is absolutely natural to socialize, exchange opinions, go shopping, listen to music, get informed and study online via pc, tablet or smartphone, are the ones that strongly approve the possibility to access to higher education without the need of sitting in a classroom, by simply opening an app for electronic devices, without giving up a high quality education which, according to various international reports, is one of the major springboards to success for Generation Z. The online digital environment and interface is essential for them and such it must be for a university institution that aims at training young profiles that fit the labour market.

Advances in technology are contributing to the rapid growth and increasing effectiveness of online education. The rapidly expanding digital landscape is allowing online education to achieve equivalence with traditional learning, including by enhancing collaborative learning opportunities and by removing geographical and other barriers (Kamble, 2021).

It should not be ignored, although, that online learning poses challenges for students' engagement. According to a study of Knowels (2007) on student motivation after the experience of an online course from Park University (US), "the online platform allowed students to receive enough interaction with the instructor, […] but students did miss interaction with other students and they did experience stress. These two aspects may be overcome by providing more areas for discussion between students" (An Investigation of Students Attitude and Motivation toward Online Learning).

An ad hoc CV must be designed, that considers students difficulties to concentrate and participate with online education. By understanding the critical points and specificities of the digital learning environment, it is possible to build on its strengths and minimize weaknesses, achieving its full potential as an effective way to give equal voice and possibilities to each student and solve all the problems connected with numerous classes.

Even if it considers a younger sample of students, Ipsos' study (2020) conducted for Save The Children on 14-18 years old students' dropout intentions and feelings during the pandemic, can be a relevant insight for reflection. According to the findings, around 34 thousand high schoolers display dropout will. Online training was perceived by the majority as an obstacle to learning. For 28 % of surveyed students, since spring lockdown, at least one of their classmates has stopped to take classes. 7% reports that at least 3 or more classmates left school. 35% perceive the quality of education has worsened. For 38% of teenagers, distance learning was a negative experience, mainly due to inability to concentrate and technical problems of poor internet connection. Moreover, school dropout rate in Italy was one of the highest in Europe in 2020, with a special concern for southern regions and younger students (Istat).

Private higher education institutions as Luiss have the unique characteristic of being an institution of higher learning and a business entity at the same time. As a business entity, enrolment is the lifeblood of Luiss that supports all its other functions. True of any business, attracting customers and retaining them are the most important aspects that determine its profitability. In the case of Luiss, this means convincing prospective students to enrol and upon entering the institution, retain them until graduation. For this reason, it is important to craft a compelling value proposition to increase enrolments and retention rate among its clientele.

Looking Universities Worldwide Leagues which are rankings of institutions that result from a rigorous assessment of quality of provision on the base of very specific parameters, some of the most

important competitors in the sector of higher education have adopted or are starting to implement, a revolutionary form of teaching. This novel model of education consists in bringing together and strengthen the relationship and points of contact between traditional teaching and research activity.
It revolutionizes the learning provided by traditional education in which students cover the passive role of simple recipients of knowledge, transmitted through frontal mandatory theoretical classes of professors and notions of written books (Sugeng, 2020).
It turns education in a more self-regulated process of students, that eventually become actors and responsible for their learning outcomes on knowledge and skills acquired.
By looking at rankings, many of the most important names have adopted innovative CV design and structures. To cite some of them, according to the University League Tables 2021 for UK universities by The Complete University Guide Group, UCL which ranks #10th and University of Sheffield (#28th), which has climbed 5 positions of the chart since 2020, they both employ a mode of learning that connects teaching students and research departments. They have implemented what is defined an Inquiry-Based Learning (IBL). As it is depicted in the following figure (Figure 1), those institutions score high on each parameter, both on those concerning students and those concerning research outputs.

University ranking	University name	Overall score	Entry standards	Student satisfaction	Research quality	Graduate prospects
10	UCL (University College London) VIEW COURSES →	86%	82%	79%	80%	84%
28 ▲ 5	University of Sheffield VIEW COURSES →	74%	71%	82%	79%	84%

Figure 1. UK University League Tables 2021 by The Complete University Guide Group.

Other important examples of universities providing enquiry activities as a fundamental part of their cv are:

- MIT. Students have the chance to work with faculty on their own research, either on an established programme or pursuing autonomously their research ideas. They get to participate in all the various stages of research from proposal, planning to presenting the results.
- Princeton University. An independent work related to research is required in the junior year, for example, a research project or critique of a research paper.

- Sheffield University. Archaeology students are trained in the research skills necessary to conduct their final dissertation. The General Cemetery in Sheffield provides the starting-point for students to research into a topic. They freely select their question and assume responsibility for identifying the appropriate tools to investigate.

Whereas another University that is ranked as one of the tops in Europe and which is also a great partner for Luiss, Maastricht University (UM), for years now, has employed the so-called Problem Based Learning (PBL). In the 2020 Quality Score 'Top 50 Under 50' (best universities in the world under 50 years old), UM rose from 23rd to 19th place.

PBL offered by UM comprises a different way of learning from traditional university education, which involves working in small groups, engaging in hands-on training and attending fewer theory lectures. Under the supervision of a tutor, teams of fifteen students are organized to tackle real-life challenges. PBL is an active way of learning that has proven to give better retention of knowledge, enhanced motivation and encourages the development of skills that are essential for the labour market in the 21st century. In short: PBL is all about the student; tutors are very approachable, and learning happens in a relational, dynamic way, helping form assertive professionals.

PBL teaches to really understand the subject matter, rather just learning by rote, collaborate with partners and small teams, think critically with a view to solving problems, study and work independently, feel comfortable with public speaking.

UM PBL revolves around four learning principles: constructive education, learning in a relevant context, collective learning, and self-directed education. Learning should be an active process, in which knowledge gain comes from direct experiences and interactions with the environment. This helps to really understand the subject, form sound opinions, and acquire new knowledge, rather than just learning things by rote. Memory is also aided through this process.

Relevant cases to investigate are proposed, which have meaning in today's society; whether taken from current professional practice, debated topics within scientific communities, or other problems that require an academic approach.

Learning is not an individual process, but discussions with others are fostered and encouraged; it is something the group of students as a whole share responsibility for.

The learning process at UM is managed by students themselves by planning, monitoring, and evaluating. The tutors and lecturers are there to assist, but they are not the driving force.

PBL at UM as an umbrella term that includes multiple educational methods that are based on these four principles. Thus, in practice, PBL can take different shapes and forms like:

- Project-Centered Learning

- 7-Jump/Steps
- Research-Based Learning

The most typical one is Project-Centred Learning, in which students participate in one project per semester in which they apply, put into practice and integrate selected course content. This enables the development of a variety of skills such as project management, writing, presenting and teamworking. UM offers skill classes to further develop these competences, which are also important for future careers. Guidance is offered by professors during weekly project meetings, in which continuous feedback is provided. Projects are based on recent research, or on problems submitted by companies and institutes. At the end of each project, the group delivers a functional product and present findings to peers, the teachers and/or the client.

IBL or EBL and PBL are two faces of the same coin. In the next paragraph, definitions of each of these concepts would be provided and expanded. Inquiry and enquiry are used equally, so for simplicity sake, this study would refer to EBL.

1.2 Mode of Learning: Traditional vs EBL/IBL vs PBL (definitions).

EBL is an educational mode which assumes that learning happens most readily through active discovery of students, guided by mentoring/tutoring, rather than through unidirectional transmission of information from teachers to passive recipients. It has been fuelled by recent interest aimed at deepening the research input into teaching (Fung, 2017).

EBL creates a bridge between research and teaching: learners are encouraged to become researchers at an early stage of their academic career.

It is a complex concept: in the education literature, there is no univocal, universally accepted definition of it, but different conceptualizations were developed.

According to the Connected Curriculum framework (Fung, 2017), EBL is a 'research-based' mode of student learning, employed in contemporary degree programmes, in which educational activities reflect the active, critical, and analytic enquiry undertaken by researchers.

It encourages the formulation of questions with the final goal of expanding current knowledge on a specific topic, rather than giving students all the information in a conventional form such as a lecture. Lines of enquiry result that are proven to stimulate students' curiosity so that they construct by themselves the knowledge inputs they require. It is self-directed learning which encourages critical

thinking. Good information seeking skills are also an essential by-product of proper EBL functioning, which helps build information literacy skills.

Students, enrolled in those kinds of courses, should engage in research projects, and develop their skills as researchers, both in groups and independently. Activities include investigating scientifically, formulating founded arguments, creating new knowledge through data collection and analysis, disseminating findings, presenting to different audiences, receiving and providing feedback, and becoming engaged in public matters. Such approaches can apply at all levels of study and university cv.

EBL is often linked with the other form of active learning which is problem-based learning (PBL). The shared ground between the two is the approach to a topic through the formulation of a problem, which is then used to define issues, solutions and scope for further research.

EBL however is a broader term, more open ended, with a less structured approach; the aim of PBL is to solve a specific problem and learn about a discipline along the way, whereas EBL aims at fostering the spirit of enquiry.

Both depend on students posing questions, however there are a number of different aspects between PBL and PBL. EBL does not necessarily start with a problem: it can start with a question, or involve investigation of a particular topic via research, fieldwork, etc. PBL requires as starting point a particular problem which contains very specific instructions for the student to follow, so it is much more rigid as an approach, whereas EBL is more wide-ranging. Students can pursue their own interests and have also available a collection of approaches, not just a precise methodology.

Problem-based learning is one approach for implementing EBL, but it is not the only one.

EBL is similar to research activity flow: both starts with questioning and investigating, and require some sort of peer review and collaboration.

EBL strengthens the teaching–research link in universities, creating an environment where reward is based on research output rather than teaching skill.

1.2.1 Ratio of EBL

One of main reasons why to connect research and teaching is the realm of knowledge and wider society benefit from this encounter.

EBL finds legitimacy in Humboldtian concept of unity of research and teaching, on the basis of a shared ground of advancing knowledge boundaries and of aiming at contributing to the society's common good. Humboldt believed universities to be the concrete expression of this unity, and firmly affirmed the profound synergies that elapse between those two activities. In a university, if fact, he

reported ‘the teacher does not exist for the sake of the student; both teacher and student have their common justification in the common pursuit of knowledge’ (Humboldt, 1809).

Knowledge is potentially infinite: individuals should continuously push knowledge boundaries and expand the limits of what is already known, and by devoting this effort they should hold government and society to account. Research and teaching, or education, share this orientation towards perpetual discovery. Both the activities of learning and research are about considering and investigating where the boundaries of knowledge are, critiquing the potential weaknesses in our existing knowledge, and devoting effort to find better insights and understandings.

Moreover, research and education have also a goal in common, they aim at serving the same objective of empowering societies. Knowledge, and specifically, the ways in which knowledge is used and applied, become an ethical issue.

According to an European policy paper, research is ‘one of the best investments that can be made with public (and private) funds’, with high economic rates of return ‘in the order of 20–50 per cent’ (Georghiou, 2015). Despite this, the value of this activity is not only economic: a direct contribution to societal challenges can be achieved. Georghiou claims that research has a role in creating a critical and reflexive society (2015).

The potential to impact society at large, for the better, is a feature that can be related to the educational world as well, highlighting this important point of parity between teaching and research.

Education, in fact, has the power to forge better individuals, and this will result in open, competent, equal, informed, and fair communities. UNESCO refers to education as a ‘common good’ and a collective social endeavour characterised by ‘shared responsibility and commitment to solidarity’ (UNESCO, 2015). According to Irina Bokova, general director of UNESCO, “there is no more powerful transformative force than education to build a better future for all, founded on equal rights and social justice, respect for cultural diversity, and international solidarity and shared responsibility”. (UNESCO, 2015)

In the name of the common goals of widening knowledge realm and empowering communities, rather than seeing research and education as competing priorities for universities, synergies between the two activities should be exploited and reached to maximize results.

EBL realises the unity of research and teaching; however, it is not a short-term approach to cv design; it requires time and structures to create and promote spaces for genuine critical dialogue, within and across research actors and teaching departments. When students with diverse backgrounds and personal values are empowered to collaborate actively in enquiries at every level of the curriculum, engaging others with their ideas and findings, education and research, together in this virtuous match, can contribute to the global common good, effectively and efficiently.

The by-product of EBL is a heightened vibrancy and energy of the institution, due to which the university comes out of itself to participate actively to all the ecosystems in which it is involved. EBL leads to a university that is fully ecological, taking the responsibilities it has towards its ecological hinterland, students, knowledge (and the disciplines), learning, economy, and society in general terms. In an historic era of much turmoil and challenge, the university cannot neglect its social role and it must play its part in strengthening the various ecosystems of the world (Ronald Barnett, Professor of Higher Education, Institute of Education, London).

EBL is not only powerful and beneficial for actors and stakeholders outside the strict university domain, but also actors inside the faculty benefit from it.

Many advantages derive from the implementation of EBL both for the demand side (students) and the supply side (university's facilities) of education.

To understand this key point, it is important to note that similar with other private education institutions, Luiss generates its income mainly on the fees paid by the students. This income is largely dependent on the number of enrolees it attracts. The previously mentioned steady decline in the number of enrolees registered, in general by the higher education sector, is problematic in this sense. To manage such situations, factors influencing the choices of the university must be identified and addressed. Identified these antecedents of students' choices, the institution then examines ways of intervention by crafting the ideal offer.

According to Soutar (2002), some of the main factors, determining students' preference for a particular university, are: type of course (e.g. business, law, engineering); academic reputation of the institution (very good, sound or poor); campus atmosphere (quiet or lively); quality of teaching staff (average or above average); type of university (old or modern, traditional or technological).

Nowadays, more than before, it is an issue of key importance for universities globally to assure the quality of their offer. They are required to meet some internationally accepted standards for quality to enter specific rankings. Rankings aim at providing readers a comprehensive, and as simple as possible, overview of the strengths of the institutions on the basis of a preselected range of easily quantifiable characteristics, including measures of funding and endowment, research excellence and/or influence, specialization expertise, admissions, student options, awards, internationalization, graduate employment, industrial linkage, reputation, staff's competence and campus facilities, and others. The competitive scenario in a globalised world is even more complex: all universities, and of course Luiss itself, face competitors and institutions not only on a national level, but internationally. This trend of looking at rankings relates to the pervasive notion of quality management and quality judgements that are made regularly both internally and externally, leading to the ranking of institutions in league tables. In the UK, a Teaching Excellence Framework (TEF) has been introduced,

with the declared aim of incentivising universities to ‘devote as much attention to the quality of teaching as fee-paying students and prospective employers have a right to expect’ (Johnson, 2015).
Universities are judged on two main pillars: the quality of the education and expertise provided to students and the quality of new knowledge produced and created by research departments. This traditional approach of quality management has the negative outcome of putting research and educational departments in competition for resources and efforts allocation. The result is a mutually exclusive prioritization of one part (research or teaching) to the detriment of the other.
Problems with such an audit culture, in both education and research, have been highlighted extensively in academic literature (Morley 2003; Apple 2005). There is evidence that quality reviews are expensive, time-consuming, and they may have perverse consequences. As reported by Fung (2018), even in an era of learning analytics and big data, somethings are reliably evaluable through ‘metrics’, for example the number of times students attend class or access a virtual learning environment, but others such as the deeper impact of education on individuals and communities are not so easy and immediate to assess and quantify. They need more nuanced, qualitative assessment criteria and judgements to be evaluated.
Recently, quality review principles and processes have been doubted and discussed at length in literature (Bendermacher, 2016), and experts are now suggesting a promising movement away from ‘quality management’ towards the adoption of a shared ‘quality culture’ that does not consider research and education two opposing efforts but a unique force of knowledge expansion.
Quality culture is defined by the European University Association (EUA) as an organisational culture that enhances quality permanently and is characterized by two distinct elements: on one hand, a cultural/psychological element of shared values, beliefs, expectations and commitment towards quality and on the other hand, a structural/managerial element with defined processes that enhance quality and aim at coordinating individual efforts. (EUA 2006)
The exciting, promising but also challenging goal here is to set the premises and conditions for an institutional ecosystem that pair research and teaching efforts, enabling universities to offer a service of excellent quality both in educating students and in research outputs.
According to the “Connected Curriculum for Higher Education” framework (Fung, 2017), it is possible to improve the relationship between teaching and research and it is an efficient to do so: EBL is a plan of action for institutional transformation, enhancing students’ learning and their wider experience at university, on one hand, and research outputs, on the other.
This cultural shift in university, from quality judgements to quality culture and the implementation of EBL, benefits students offering them enhanced pedagogy, while also benefitting faculty, aligning research and teaching goals (Portillo, 2012).

Designing a curriculum, in which these diverse landscapes of enquiry, explicitly and creatively, link together, enhances the quality of teaching and research itself, and strengthens further the impact of research and education on society.

Students can contribute to the impact the institution's research has on practical and theoretical knowledge and engage local and wider communities directly with the findings of their investigations.

To frame the point and summarize, EBL has numerous advantages: it encourages active and deeper learning, critical thinking skills, and teamworking. Since these are all key employability skills, it therefore helps prepare students to work in a world where the ability to cope with a massive amount of information will be critical to survival. Compared to the modular university system of the traditional approach to education, which has the potential drawback of leading to fragmented knowledge, it enables students to make connections, and is particularly good for interdisciplinary work.

EBL is up to date with the post truth era and in line with modern workplace requirements, such as innovation, problem solving and critical thinking skills in candidates.

To score high on quality standards of their education provision, which include both graduates' employment and expertise aided, universities have a dual mission to prepare students for both scientific thinking and for working life. This is achievable through the integration of teaching and research and integration of theory, practice and self-regulative skills.

Boyer Commission (1998), in 'An Academic Bill of Rights', claims that students that have opportunities to learn through enquiry, develop excellent communication skills and result well prepared for future life and employment.

Being part of a research-rich environment, community and culture, benefits students: they experience intellectual depth, by engaging in cutting-edge investigations, and a range of skills associated with autonomous or collaborative enquiry (Fung, Besters-Dilger and van der Vaart, 2017).

Life, learning process and research all share two aspect: one is interpretation. Evidence is literally meaningless until someone assigns and recognizes meaning to it.

Moreover, each person has his/her own horizon and assumptions, at any given moment. It is only through dialogic encounters that personal interpretations can be tested and developed further. Through encounters with others one can start to share his/her vision, and personal views begin to broaden, even to merge between each other.

Knowledge advances and expands its boundaries through intersubjectivity. This is a point that higher education in the twenty-first century, so called 'post truth' era, in which, 'people have had enough of experts' (Gove, The Telegraph, 2016), should take in high consideration. The practice of remaining open to doubting and recalibrating one's understandings and positions in the light of new evidence,

or of new interpretations of existing evidence, needs to be scrutinised. Dialogic encounters are vital to test assumptions and extend knowledge and can be retraced in EBL approach when research findings are peer reviewed, when research papers cite the work of others, when teachers provide feedback to students.

The other basic aspect that learning, research and everyday working life have in common is approaching problems to find solutions. According to Biesta (2006) learning is like 'responding' to a question: learning does not occur when someone is able to copy and reproduce what already existed, but when he/she responds to what is unfamiliar and what challenges or even disturbs. It becomes a process of creation, of bringing something new into the world: one's own, unique response.

To become educated means to develop one's own unique response, but to do so via human interactions and relationships.

For universities this must result in devoting attention to structures and practices that promote and create spaces for open dialogue, peer review and collaborative learning.

Lastly, another compelling reason why it would be beneficial to transform the CV into a research-based one, is its effectiveness on students' formation and performance. This study will be focused and devoted to test, quantitatively, this precise assertion to prove it in the specific context of Luiss Masters.

Theories claim that through EBL students develop expertise, judgement and achieve independence. Research-based courses engage them in "deliberate practice", defined as "a common process required for developing expertise" (Wieman and Gilbert, 2016).

According to Wieman and Gilbert expertise in a field is developed by engaging in the following activities:

- Put theory concepts in practice and deciding when specific models are applicable via sophisticated selection criteria.
- Identifying relevant and irrelevant information for a certain issue to be solved.
- Evaluating whether a result makes sense.
- Moving competently among specialised representations (graphs, equations, diagrams).

Teachers must maximise the amount of "deliberate practice" by students in those areas by designing and assigning proper tasks to present students the opportunity to practice expert skills.

According to Blessinger and Carfora (2014), by shifting the traditional roles of teacher and student, learners are encouraged to "develop meaningful questions" and "determine what resources, actions,

knowledge and skills are needed to help answer those questions". Through these processes, they "learn to use logic, reasoning, and argumentation as well as creativity and judgment".

Spronken-Smith and Walker (2010) address the importance of operating a "scaffolding" students' learning, by providing structured support for them to build up their levels of independence as they investigate.

In research-based learning students have a great degree of autonomy in learning and working on a particular assignment: EBL is called a form of self-regulated learning.

The below diagram of Spronken-Smith and Walker (Figure 2) shows the relationship between the level of student independence and the input given by teachers through the scaffolding metaphor: more teacher guidance corresponds to the wider base at the bottom, while increased student independence is at the top. They distinguish three modes of enquiry:

- Structured – the teacher provides the topic (a research question or a topic) and explains how to address it.
- Guided – teacher provides the question, but students choose the point of view and method to explore it themselves.
- Open – students formulate the issue to be investigated and choose how to respond to questions themselves.

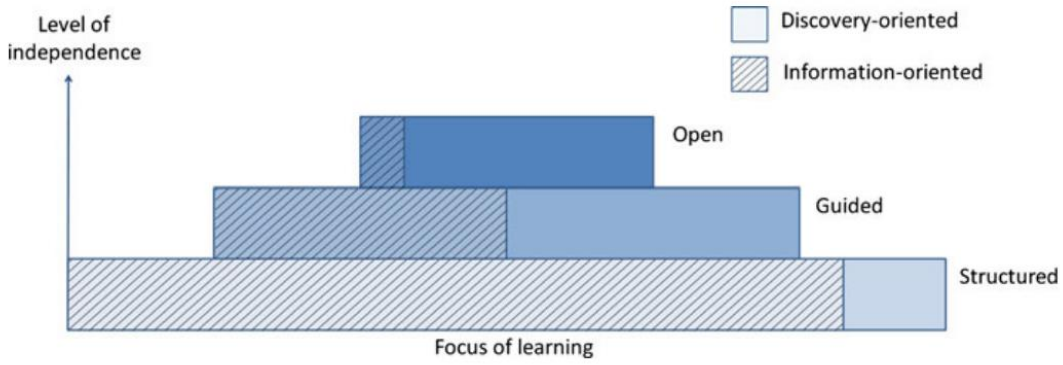

Figure 2. Spronken-Smith and Walker (2010). Relationship between students' independence and modes of enquiry proposed in the CV design. As the nuance of blue becomes darker, the teaching–research nexus becomes stronger and students perceive learning outcomes to be enhanced.

Using mixed methods of data collection to gather empirical evidence studying engineering students, they found that: if teachers are aiming at creating strong links between teaching and research, they should adopt an open, discovery-oriented approach, where students formulate their own questions as well as going through the full enquiry mode.

According to this and other examples of empirical research, there is evidence, developed applying various methodologies and focused on diverse disciplinary implementations of EBL, to suggest that educational value is reached across a wide set of contexts. There are indications that more engagement from students is derived from such mode of learning and they are more able to apply and put into practice concepts. To ensure at least a high probability of success of research-based model, it is fundamental to provide sufficient support through the levels of study and autonomy, from more guidance to more freedom, and to create regular peer interaction occasions into CV design.

Feedback on students' practice, peer learning and discussions are all seen to be critically important to improve students' performance. Their performance improves due to intersubjectivity nature of the education process and continual feedback provided.

On the effectiveness of EBL on students' performance, also Wieman and Gilbert cite several quantitative studies that demonstrate the significant learning gain that is achieved through devising methods of active enquiry and feedback. Evidences focus on four courses in computer science and show a dramatic decrease in the drop out and failure rates across all four subjects.

This paper has the purpose of quantitatively measuring the effects and outcomes of a practical implementation case of EBL experienced by Luiss students.

The specific context of application would be described in the following chapter, after a detail analysis and overview of the most reliable and eminent theoretical contributions and models existing in the field.

Next section will expand on EBL theory and offer sound arguments on the basic features of a research-based cv.

1.3 . EBL Theory and CV Design Models (Connected CV Framework by Fung 2017 and Powerful Knowledge by Harland and Wald 2018).

In the latest 90s, the Boyer Commission called for a more progressive understanding of higher education where enquiry- and research-based learning are the norm (Boyer Commission, 1998).

Since then, many different degrees have already implemented a research-based approach in the social sciences, natural sciences, engineering fields, however there are still few empirical studies focused on measuring the outcomes of such model and how students process this experiences.

Programmes with an EBL approach generally integrate two university missions by teaching on knowledge production and training students in that process (Bennet, 2010; Brakke, Crowe, &

Karukstis, 2009; Crowe & Brakke, 2008). The desired outcome of this practice is a holistic learning process.

In Luiss, during the academic year 2020/2021 some programmes have started to implement this approach, and from 2021 to 2024 the educational model offered by Luiss will be always more characterized by an approach oriented toward this mode of teaching and learning.

In particular, the CV design, chosen to be tested in Luiss, stems from the theoretical considerations of the Connected Curriculum framework by Fung (2017). Graphically this is summarised and represented in the following figure (Figure 3), by a core principle and a radial pattern of six associated dimensions deriving from the central assumption. The core principle or premise is that students at all levels of the curriculum can benefit in multiple ways by engaging actively in research and enquiry.

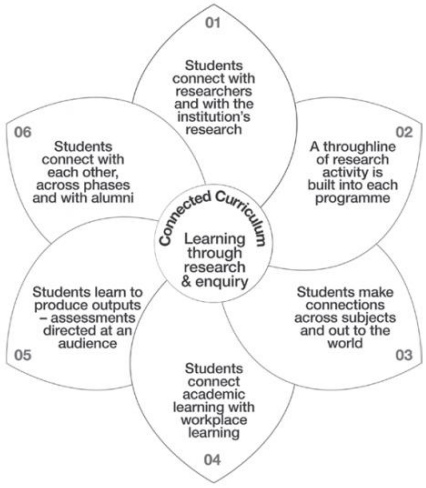

Figure 3. The Connected Curriculum Framework (Fung, 2017).

Pedagogically speaking, the emphasis of this model is on research-based education. In order to achieve and exploit EBL benefits, the process of CV design must take its first steps from the devising of structured opportunities for students to learn through research, reproducing faithfully the enquiry activities taken by scholars, at every level of the curriculum. The premise for Fung (2017) is that the predominant mode of learning should be active investigation and, where possible, engagement with current research in a particular field or discipline.

In designing courses' features, it is important to balance structured learning activities and spaces for autonomy and a certain degree of independence to develop, where students feel free to make choices and take risks.

Moving from the core to the six dimensions of the CV, another basic principle that drives the model is that education is relational.

There is growing evidence that students benefit from engaging in collaborative and dialogic enquiry, whereby everyone's prior assumptions are challenged through interaction with others and with the object of study.

In this way, the purpose of education itself, which is to create societies where dialogue, respect for others and openness to new ideas are promoted, is met.

At the heart of the concept of university of the twenty-first century lies connectedness.

There are twelve different dimensions of connectedness and they are all achieved through EBL. There is connectedness:

1) Between disciplines (interdisciplinary cv)
2) Between the academy and the wider world
3) Between research and teaching
4) Between theory and practice
5) Between the student and teacher/lecturer/professor
6) Between the student and the wider world
7) Between the student and other students
8) Between the student and disciplines
9) Between the various components of the curriculum
10) Between the student's own multiple understandings of and perspectives on the world
11) Between different areas of the complex organisation of the university
12) Between different aspects of the wider society.

The six dimensions contemplated by Fung (2017) show how these types of connections can be operationally attained. To briefly describe the framework and provide some practical examples, they involve:

Explicitly inviting students to connect with researchers and research as an integral part of their learning journey. Students need regular opportunities to learn about their institution's research. For example, becoming affiliated to research groups, or investigating the work of one researcher in depth. Through engaging with 'real world' research studies, students can be encouraged to start to formulate their own research questions and empowered to explore and critique the edge of knowledge.

Building a through line of research activity into each programme of study. Students need to experience a connected sequence of learning activities that empower them, step by step, to apply the skills and dispositions needed to undertake investigations. The right balance is needed between compulsory and optional modules, so that students can make critical, creative connections between apparently disparate elements of their learning. The pattern of assessment and feedback activities across the whole programme plays a key part.

Empowering students to make connections across subjects and out to the world. At appropriate points in the programme of study, students should ideally be able to step outside their home field, making conceptual connections between their own subjects and other disciplines, for example by studying

with students and scholars from different fields from their main one. They can be equipped to engage with some of the complex challenges of modern society, including its inequalities. Through connecting across disciplines and out to the world, students can be empowered to articulate their own values and consider their current and future contributions to society.

Connecting academic learning with workplace learning. Students need to be able to connect academic knowledge explicitly with the issues, skills and approaches needed both for professional work and for lifelong learning, in a world in which technological innovations are the norm, and in which needs change rapidly.

Educating students to produce outputs directed at an audience. Through some of the work they produce for the purpose of being assessed by faculty members, students can engage explicitly with different internal and external audiences. Their research 'outputs', which mirror those produced by researchers, enable them to develop the digital practices and communication skills needed to engage with diverse audiences.

Connecting students with each other, across phases and with alumni. This can be cultivated, for example, through designing collaborative assessment tasks (peer monitoring and evaluation) and by putting on departmental events (seminars). This is to ensure that students feel a sense of belonging and of being part of an inspirational learning and research community.

The EBL courses introduced in Luiss are mainly delivered as blended mode of learning. This was the case due to Covid-19 but also for the purpose of engaging students to experience digital technologies and participate more to discussions overcoming big numbers problems. In fact, it is not uncommon for research-based learning examples to take place using digital tools and platforms.

When considering this a problematic point to address is that of course, social, and economic inequalities mean that not all students globally have access to the digital world. Moreover 'information' can certainly be misinformation, in the so-called era of 'fake news'. However, solving these issues directly with students is a key part of developing their understanding of how knowledge is created and spread, how it is not always democratically available and of how it must be tested and critically interrogated.

All disciplines need to investigate the opportunities of a technology-rich world to move away from some of the traditional teaching methods that situated students, deliberately or inadvertently, as passive recipients of fixed knowledge towards a more participative enquiry-based model.

This study starts its scope of investigation from a qualitative assessment of outcomes of Luiss implementation of EBL pilot course in 2020.

The explorative approach that was helpful to decipher the constructs involved in research-based learning and the opinions of students who experienced it, culminated in a formal Report which will be summarized below. The CV structure, analysed by this qualitative enquiry, derives mainly from 'powerful knowledge' model of Harland and Wald (2018).

These authors argue that university curriculum should aim for powerful knowledge, which is specialised knowledge that becomes powerful when it serves a particular purpose.

To have knowledge which is "powerful" means to apply it in new contexts and in particular, engage in matters of public importance (Young and Muller 2013).

For Wheelahan (2007), those who have this knowledge, have access to the conversations and debates about society's values (social, cultural, political, or economic). For Wheelahan, students with powerful knowledge can also flourish in the workplace, as jobs become more complex and difficult, and knowledge that includes a high level of abstraction is likely to allow workers to better adapt to new contexts.

Powerful knowledge has structure/rigorous method of creation and is developed and disseminated in specialised institutions because students need access to the structuring principles of disciplinary knowledge (Wheelahan 2007).

For Young (2013), powerful knowledge has two key characteristics:

(1) it is specialised, rather than general and

(2) it is differentiated from the everyday experiences of learners.

Powerful knowledge is specialised knowledge that is disciplinary based but not confined to the discipline. It is differentiated knowledge that is distinguished from 'everyday' knowledge (gained from experience).

Wheelahan (2007) argues that everyday knowledge is segmented in the sense that it is usually understood in the specific context in which it was gained and harder to transfer to new situations.

According to Bernstein, this knowledge is context-based but not context specific, this can create what he terms a 'discursive gap' (Bernstein 1996). A discursive gap is essentially 'the site for the unthinkable', between empirical data and theory building that requires abstraction for new meanings to materialise. The most significant outcome of having context-independent theoretical knowledge is the potential to generalise and suggest explanations beyond specific circumstances through an ability to imagine alternatives (Young 2008). Powerful knowledge is powerful because it provides the best understanding of the natural and social worlds that we have and helps us go beyond our individual experiences (Young, 2013).

Accordingly, powerful knowledge enables those who have it to produce and evaluate knowledge and to do so beyond a specific context. The gain is the development of knowledge related skills of critical

ponderation and analysis of sources and insights, as well as communication and presentation competences and practical ability to adapt to diverse contexts in a versatile way.

It must be highlighted that not all forms of powerful knowledge are equal with respect to making judgements about knowledge. Deciding what is inferior or superior information is also something that students develop through EBL, since it requires a student to know how knowledge is produced. Students need to have access to the generative principles of disciplinary knowledge, to become able to flexibly transcend the context, to understand how different, complex bodies of knowledge fit together and to decide what knowledge is relevant for a particular objective (Wheelahan, 2007).

Valuable of a focused specification is the point of Young and Muller (2013), who argue that not all specialised knowledge is powerful. The difference is rooted in how that knowledge is produced. Academic disciplines have methodologically rigorous and systematic ways to produce and evaluate new knowledge, and this is typically regulated within a community of peers. Having insights into those methodological procedures is having epistemic access to knowledge, which is the premise for acquiring powerful knowledge.

Equipping students with powerful knowledge can be achieved through an authentic research-based undergraduate curriculum, even if there is no empirical evidence so far that this cannot be the case also for higher education levels (graduate students) and CVs (Wald and Harland 2017).

In order to master specialised theoretical knowledge and to address what is 'not known', students need to be exposed to the generative principles of disciplinary knowledge. They have to experience the process termed 'epistemic access', which helps the learner understand 'how' one might come to know something.

For this access to occur, students need to learn about research methodologies, tools and sources of data.

To conclude our theoretical framework, before entering in detail in the description of Luiss cases, powerful knowledge is:

1. disciplinary specific, specialised, theoretical context-independent knowledge;
2. produced and transmitted by subject specialists in educational institutions;
3. knowledge that goes beyond individuals' everyday experiences.

These characteristics allow those that have it to:

1. Evaluate arguments
2. Apply knowledge beyond specific contexts
3. Become responsible citizens who can engage in matters of public importance.

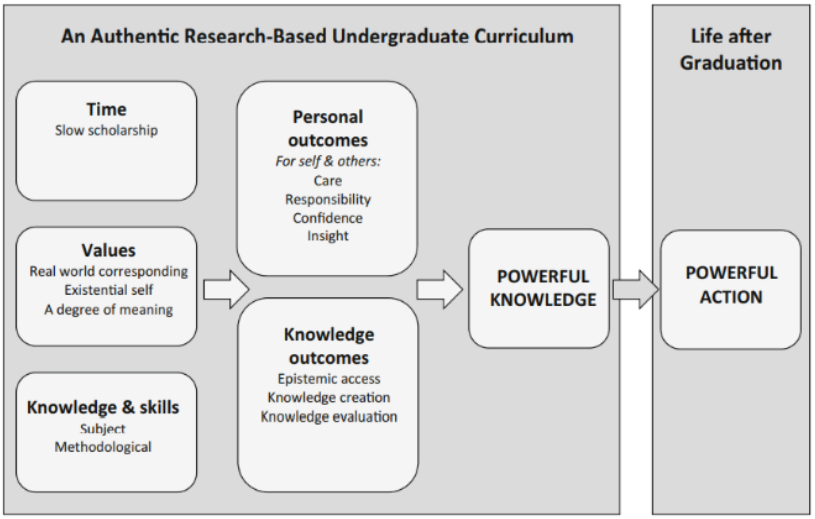

Figure 4. An authentic research-based curriculum for powerful knowledge (Harland and Wald, 2018).

This dissertation will follow with the specifics of the EBL pilot model applied in Luiss and will provide qualitative evidences and findings on the effects and performance of this programme.

Chapter 2: Luiss Enquiry-Based approach: Qualitative and Quantitative study

2.1 Context Studied: Luiss Pilot Model.

Starting from September 2021, Luiss University will begin the implementation of a new educational model: Luiss Uniqueness, planned to revolutionize the educational offer of its programmes.

Luiss' new educational model has been devised based on four main pillars and one enabler:

1) Strengthening synergies between research and learning, by actively involving students in research and enquiry processes.

2) Fostering interdisciplinarity and large learning at all levels of the curriculum.

3) Implementing innovative teaching and assessment's methodologies.

4) Developing network immersiveness, strengthening and ensuring continuous interactions with Luiss internal and external network.

5) Mastering templates and enabler design, by crafting the processes and provide resources, infrastructures, both physical and digital ones, required to implement the educational model.

In particular, substitution of theory books or manuals with papers as study material disposed by courses' syllabi.

Introduction of research method laboratories and classes using applications and softwares to handle data.

Development of a Luiss internal network (involving practitioners and alumni) and an external one with workplaces speeches and links.

Problem-based projects and group-based activities comprising oral and/or written presentations on the outcomes.

Blended courses of on campus and online (mainly) classes.

Innovative assessment methods of continual feedback and fragmented final evaluations, plus online tests and simulations provision.

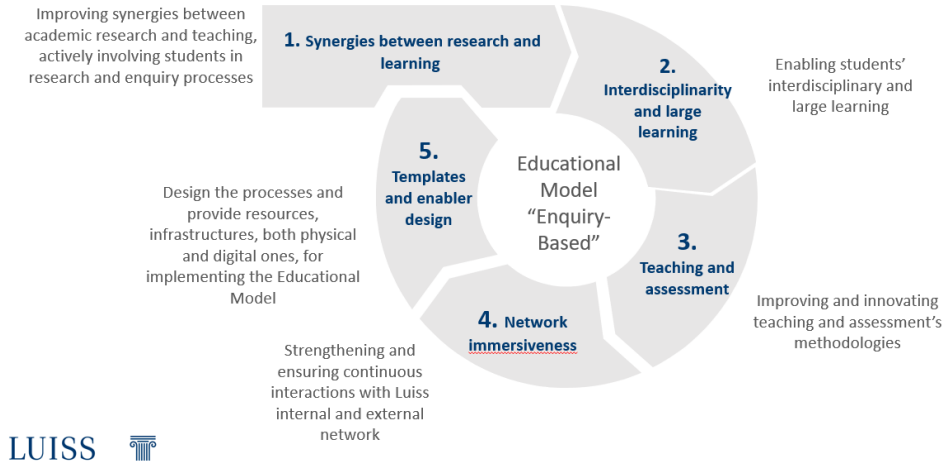

Figure 5. Luiss New Educational Model

Focusing on master programmes, these will be all characterized by specific characteristics aimed at fulfilling a fully-enquiry based approach.

Specifically, by 2024, as the implementation of the new educational model will be concluded, all the master programmes will display the following characteristics: they will be blended courses (providing a mixed teaching method of online and face-to-face classes), enquiry-based Freshers' Weeks will open the academic path and will provide the starting tools needed for research activities (these initial weeks will include a research method course to deepen the understanding and expertise of students towards investigation, data gathering and analysis, and presentation); at least one course within the first semester will require to hand in a research project delivered in teams, this research project could be accompanied or substituted by a problem-based project in the second and third semesters. Indee, during the 2nd and 3rd semester, initiatives such as Adoption Lab (AdLab) and xLab will be offered and will connect students with companies or other economic and social actors, enabling them to apply their knowledge to solve real challenges that industry, government and society are facing. Additionally, beyond giving students the chance to work on specific cases aimed at finding solutions for real-world problems, employers might offer them the opportunity to do a post-graduation internship in their companies.

Additionally, each programme will have in the first semester a research methodology course and a serial of they will feature in the first semester Academic Skills seminar to master students' researchers' abilities (review literature, identify problems and formulate a relevant research question, theoretical framework and study design to solve them). Moreover integrative activities to gain other soft and hard skills between semesters**;** and, they will offer, as evaluation model, a continuous assessment and one examination date along with retake sessions.
Specifically, Enquiry-Based Freshers' weeks will be aimed at enabling students to master personal branding techniques and to start meeting Luiss' research community through interviews to professors, practitioners and researchers.
With respect to integrative activities, these will be offered in gaps between semesters. In the first gap, hence between first and second semester, students will have the opportunity to choose among a pool of activities aimed at strengthening the skills they acquired as «Enquirers» during courses.

In 2021, other two master programmes will start following this path: Management and Data Science and Management.
For instance, students will have the chance to further explore data coding and analysis, mastering statistical programs like R, STATA, Envivo, Python, communication of findings also through multimedia tools (video making, graphic and web design courses are some examples), creative abilities with humanity or art laboratories.
In the second gap, will be provideda pool of activities that will prepare students to face the complexity and variety of both workplace and society: physical/virtual internship, volunteering programmes and study abroad opportunities.
The relative weight of the final exam on the overall mark is very limited in EBL programs: this is also the case for Luiss cv design, in which final exams on theory is worth no more than 30% of the final evaluation. The enquiry activities that students perform throughout the semester account for most of students' final evaluation. Considering this, teachers can freely choose the assessment criteria, however coordination with colleagues in the academic staff is needed on assessment steps, throughout the semester, to avoid high students' workload.

Importantly in 2020, a completely enquiry-based pilot curriculum has been put in practice by three different programmes: Marketing, Global Management and Politics, Law, Digital Innovation and Sustainability. These masters fully taught in English started to test an EBL approach with the beginning of the new academic year 20/21

For instance, looking at cv and syllabus design for the implementation of an enquiry-based mode of learning within each specific discipline, going through the syllabus of Consumer Behaviour course (Marketing Master's degree) is exemplar. This first semester course of marketing (activities and grading policy differ based on attendance to classes; so for the purpose of this dissertation, the focus is on attending students cv design, that is the one of students participating in the group project and courses activities) has an assessment method organised as follows: individual diary (which amounts for 10% of final grade), test about qualitative research videos (10%), three individual tests (30%), research project (accounting for half the final grade).

Going further in analysing each of these assessment components to understand the ratio of such choice: individual diary assignment requires students to exercise their writing and communication skills in a creative exercise: deliver weekly a short narrative about their experiences and feelings towards Artificial Intelligence. This activity is voluntary, anonymous and requires the engagement of the entire class to function properly: each student would be evaluated only if more than 80% of the whole class participates by submitting their diaries. This is done to foster shared responsibility, joint commitment, and mutual effort in students. To gain the 10% on their final mark, they have incentives to step out from their individual, egoistic perspectives and start to think the group of peers as an entity. It represents a strategy aimed at fostering a sense of belonging to a wider community, in which individual efforts merge and are required to reach a common goal.

Students have the chance to practice communication skills, but also theoretical knowledge acquired through individual tests via multiple choice or essay questions format.

Tests are provided online and are scheduled at intermediate points throughout the semester: there are no re-sists for them. The planning of those intermediate evaluations aims at developing time management and other fundamental organizational skills in students.

Lastly, the ultimate and major part of students' grade is based on the score on a group project that counts for both Consumer Behaviour and Research Methodology for Marketing courses' assessments (50% of grading in each course).

Starting with a team of seven people, chosen by the teacher, and an assigned topic or some academic readings, learners are required to develop a proper research paper, composed of: problem statement and relevance supported by qualitative evidence, literature review, scientific gap, conceptual model and hypotheses, research design, procedure and analysis, academic and managerial contribution of the project. Learning goals here are to teach how to: formulate one's own research problem, determine the relevance of the research topic, basing evidences on scientific proofs, conduct literature review and identify the potential for knowledge expansion within a research gap, draw a conceptual model and formulate a specific research question, plan and conduct data collection and analysis, interpret

and report findings, present theoretical contribution and implications, identify research limitations and propose directions for future research, and write a scientific report and communicate orally to different audiences.

Through this project, teamworking skills and relationship with peers would be developed.

During all steps of the research projects students are tutored and supervised by a professor. Each group attends 3 online compulsory meetings with the teacher to ask clarifications and get preliminary feedback.

Students are not only the recipient of this passive evaluation moment by teachers but also active evaluators of their peers. Hence, each group member is required to assess the contribution to project work of teammates. This is done to ensure engagement of every member in the group, avoiding free riding issues, and to elicit a sense of agency and responsibilities in students.

It is important to highlight that all the courses activities are rooted in real life and deal with up to date problems and topics, from papers subjects to group work investigated issues.

All the characteristics (interdisciplinarity, rigour, research-based activities etc.) outlined for the course of Consume Behaviour, are easily traceable in the syllabus of other pilot courses. The brief description of objectives and contents of the Global Organization Design and HRM course, held by Prof. Giustiniano, Schneider and Chesbrough, reports: "in modern times decisions about organization design and human resources management are interwoven. Informed by both research-driven and problem-solving oriented logics, the course will deal with some of the most modern trends and solutions in management, exploring fields and managerial experiments for which the unknown is larger than the known. The course will combine the transfer of academic knowledge with the acquisition of enquiry-based skills. In fact, students will engage in a Project Work, through which they will be asked to develop a research on a specific subject of Global Organization Design and HRM in synergy with the Lab Research Methods for Social Sciences. During the semester, students will be guided in turning their research project into a research paper. Through this activity students will also learn by experimenting research rigor."

A syllabus build on real-life cases is also the one crafted for Product and Brand Management course of Marketing master, held by Prof. Farace, Buonomo and Polverino. It states that the aim is providing "an interdisciplinary overview of brand management" and at enabling students "to carry scientific research on up-to-date topics in the branding field by using sophisticated qualitative (e.g., ZMET) and quantitative (e.g., factor analysis) research methods and techniques."

After the pilot implementation of the academic year of 2020/21, Luiss fostered a monitoring and analysis project directed at assessing, first only on qualitative basis, the effects and impact of this educational change on its community of learners. To follow a rigorous approach to evaluate an EBL

curriculum, a programme of qualitative research on students' perceptions and performance was grafted right after the first semester of study.

To gain a deeper understanding of responses to the new educational model, students were interviewed after finishing their first semester courses, to study their experiences, views, or beliefs.

2.2 Qualitative Study: overview

Thirteen personal semi-structured interviews (in Appendix 2) were carried out through the online platform Microsoft Teams and recorded with the usage of an automatic software. All interviews were later transcribed manually to check and rule out errors of any sort, and evaluated by three Luiss practitioners and the author of this thesis, to permit the holistic perspective sought through the method of analysis.

Students were interviewed by Luiss professor and Head of Marketing Department Simona Romani, with the support of a practitioner. The interviewer followed a basic set of questions for each interview session, accommodating then the flow of discussion, by deviating now and then to investigate in depth on some students' claims, as semi-structured interviews dictate.

Interviewees were selected among three different master courses (Marketing - Global Management and Politics - Law, Digital Innovation and Sustainability) by professors of such courses and listened for about 30-40 minutes each, on different topics, with the aim of gaining their overall sentiment about the new educational approach. Size restrictions on the informants' pool ensured in depth discussions about students' learning experiences, necessary for thick descriptions (Erlandson, 1993). Questions tried to tackle main courses characteristics and inputs and wanted to get a glimpse of knowledge and personal outcomes achieved by the model.

Starting by asking about each student specific personal background, the interview followed a spontaneous flow, by investigating specific aspects and courses' characteristics, such as students' perception of papers, teachers, peers, Luiss' community and environment in general terms, teamwork and research methods.

To prepare data for analysis, interviews transcripts were coded manually, to isolate different constructs and model variables, highlighting students' words in different colours. The choice of colours was instrumental to immediately visualize the most recurring topics and the interrelations between them.

After the coding, understanding students' sentiment towards EBL model employed by Luiss, at the level of felt experience, required two level of interpretation of the verbatim transcripts: idiographic and cross-cases analysis. Idiographic analysis started with an impressionistic reading of transcripts and identification of recurrent thoughts and feelings of students towards inputs and outputs of EBL programmes. Learners' stories were then summarised in short narratives to get the main sentiment of

each individual student, as the next extract of the story of Carla shows (other narratives about students' experiences in Appendix 1):

From Pescara, Carla has a very international cv starting from high school, bachelor in PPE and exchange in Singapore. During her bachelor, she understood she was interested also in economics, management, so she chose the multidisciplinary master of global management and politics. She is now very participative of university life and community, being enrolled in students' associations. She used to be focused on studying theory only but then she has acknowledged the power of going forward mere theory, by building a completer and more multifaceted cv. She was very impacted by the change in the educational approach due to the introduction of EBL. She acknowledged the fundamental role of teachers as also tutors guiding students in outlining a clear roadmap for courses' content. She felt stimulated by the notions based on real life cases, but for some courses she felt she needed more guidelines. According to her, two things motivate students: doing research and knowledge application to real life situations. Practical insights bring passion with them and having teachers explaining their own researchers' job creates engagement in the class. What she really appreciated in her research project, is the epistemic access: access to the process of knowledge creation, starting from the stimuli received by the environment, suggesting which problem to solve. She felt the need to implement a rigorous method to do research. Notwithstanding the difficult time schedule, she enjoyed her research project so much that she sees herself doing a PhD. The outcome was a satisfactory achievement for her, following small wins throughout the semester and actively adding their personal contribution to knowledge. She felt grown, more analytical and critical in knowledge evaluation and she developed an expertise even if partial.

The second level of interpretation involved a cross-person analysis, to find patterns across episodes and individual storylines that could help structure a complete understanding of research-based CV performance, outcomes and effectiveness. The objective was to identify the key aspects emerging horizontally across the interviews, to frame the general concepts into a broader model of analysis.

Through axial and selective coding, many input and output variables were isolated to describe educational model characteristics, relationships, processes by which relationships develop over time, factors facilitating the learning experience and obstacles to it, conditions under which knowledge and personal achievements were pronounced or minimised and major consequences of active engagement in enquiries in terms of performance and satisfaction.

Coding schemes were modified as analysis progressed and new recurring topics were uncovered, arriving at these final codes:

Personal Values and Background		
Expectations		
	Time	time to adjust- deadlines
	Values	real life cases
	Courses inputs	methodology and sources (papers), teamkork
	Actors	teachers - peers - practitioners (course specific)
Outcomes	**Personal Outcomes**	**care (active – passive) – responsibility – self-confidence - innovativeness**
		future aspirations
	Knowledge Outcomes	**epistemic access (methods, sources)**
		knowledge creation
		knowledge evaluation
		application of knowledge in other contexts
Environment	**Online Learning**	
	Insights	
	Community	

Figure 6. Colour coding scheme of interviews.

Several techniques were employed to increase trustworthiness of this discovery-oriented enquiry (Fournier, 1998). Five people reviewed interview transcripts and interpretative summaries in a peer debriefing process. This resulted in multiple analysis of the data toward the goals of mutual objectivity and recognizability in interpretation and to avoid any biased perspective. Moreover, purposive sampling of informants possessing different experiences and backgrounds allows for transferability judgements of the insights obtained as does the detailed description offered in their interviews.

2.2.1. Qualitative Evidence and Findings.

The model chosen to carry out this qualitative analysis was drawn from the "powerful knowledge" concepts illustrated by Harland and Wald (2018), made suitable, however, to the specific research context and to the notions that emerged from the interviews. To demonstrate the achievement of powerful knowledge through an enquiry-based approach, which is subsequently responsible for a powerful action towards society, as suggested in the literature review, the model identifies three main antecedents - core starting variables – characteristics of the courses, that lay the foundations for the outcomes both knowledge and personal related, as follows:

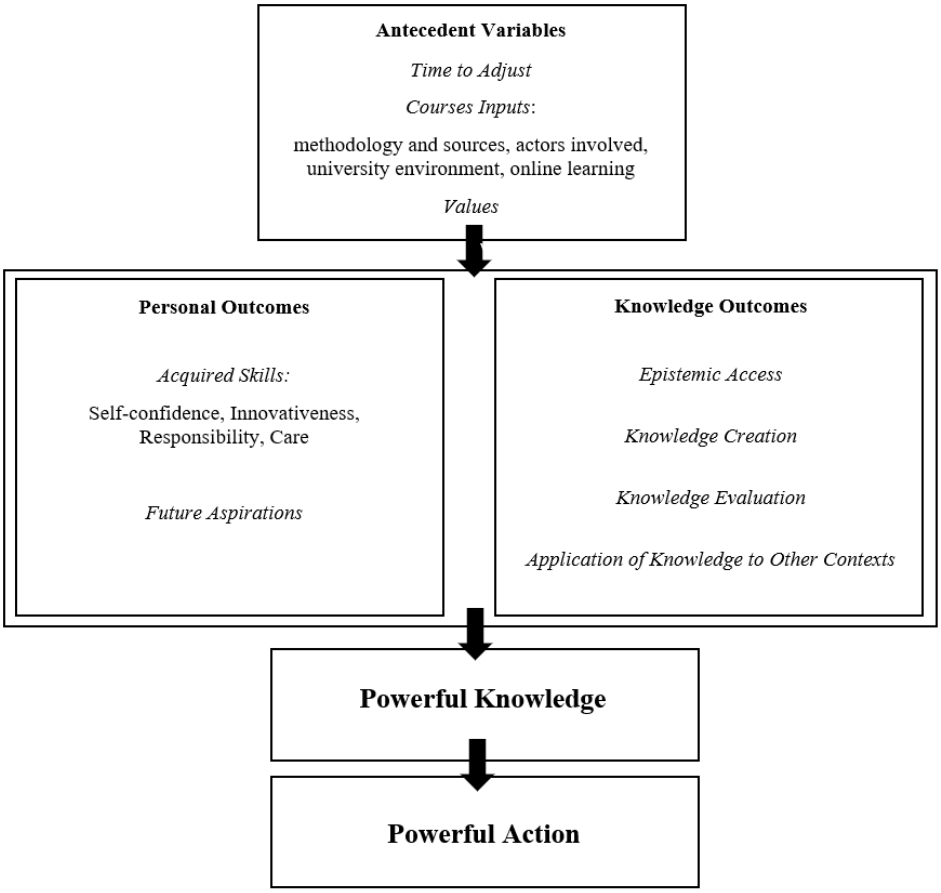

Figure 7. Model for cross-case analysis of interviews.

All these constructs leading to powerful knowledge, emerged from a precise interviews' analysis. From the words of students attending the EBL programme in Luiss, some antecedent variables, that are enabling factors for knowledge outcomes and personal growth, were identified. The first starting variable of the model, mentioned in many learners' stories, was time: specifically, time to adjust and adapt required by each student to integrate with the new method. Hence, time is a fundamental aspect to consider when designing and approaching a research-based course. It is a critical point to address: when organizing a shift from a traditional mode of teaching to EBL, one major change is the timing of activities and of learning experiences to occur properly and be effective. As stated by Harland (2016), learning to do research is a very complex process that requires deliberative spaces for thinking and knowledge adaptation. Students experience a radical change with EBL, that, by definition, involves some initial difficulties: a novice, indeed, needs more time to learn how to properly read a research paper, as well as absorbing all the information needed in order to carry out a project (Harland and Wald, 2018). For this reason, enquiry-based education is considered a process of academic practice that requires an active, persistent and focused effort over an extended period of time, which enables students to adjust to the new setting correctly (Morrow, 2009: 16). The majority of

interviewed students highlighted the main critical aspects in adapting to the new enquiry-based approach, underling its time-consuming (Harland and Wald, 2018) and destabilizing nature at first.

> *Sofia*: At the beginning, it was a bit destabilizing, but I must say that I've learned to appreciate these changes over time. […] Studying from a paper has never happened to me before: it's an alternative approach that in Italy is very unusual.

Notwithstanding the strong initial impact, the presence of multiple deadlines and simultaneous tasks was crucial for gradual and continuous learning. Students acknowledged their need of practice and time to get used to new methods, but from their words it's evident that the course's deadlines were fundamental for this step-by-step adjustment and good learning process.

> *Carmen:* The learning process was gradual and not concentrated at the end nor at the beginning of the course. I appreciated it more.
> *Julienne*: We had weekly deadlines, thus stages of the project to carry out. In my opinion, this was very interesting because it was a long-term team effort, and we had more defined objectives over time.

Meeting demanding deadlines emerged from the interviews as one of the greatest sources of students' satisfaction, after completing courses, as it is further investigated later on.
The second antecedent of powerful knowledge regards all the inputs coming from the classes attended, which are deconstructed in the following dimensions: methodology and sources, actors involved in the courses, university environment and finally online learning process.
According to Harland and Wald (2018), achieving a high standard research requires a combination of good subject, theoretical and methodological knowledge, that ultimately lead to the acquisition of epistemic access. These inputs can derive from many aspects: the most important one as isolated from the interviews, are presented below.

2.2.2 Methodology and sources.

An enquiry-based approach brings students closer to research by setting the learning process on the analysis of academic and scientific papers, which constitute the very first milestone in order to understand the language used among researchers. Clearly, understanding thoroughly a research paper increases the awareness towards the dynamics behind the knowledge creation of a given subject. Many interviewees stated that they gained the opportunity to discover the research world by attending research methodology classes and reading papers.

> *Adelaide:* Thanks to the research methodology course we understood how to read these measures, so little by little this world that was previously totally unknown has revealed itself.

> *Giuliana:* when our professors required us to read and analyse research papers, I really understood how they were supposed to be studied and at that point I was happy, because I understood which steps I needed to follow.

Furthermore, some students appreciated papers as study material since these sources of knowledge involve the contribution of different authors, differently from common theory books. This feature provides them a clearer and more complete vision of the phenomena investigated as a result, compared to having a textbook that presents only one point of view. In addition to the considerations that are more closely related to the study material, another programme input highlighted by students is the interdisciplinarity nature of courses. According to literature, it consists in solving issues by drawing on a range of expertise (Davies and Pachler, 2018) which may be more effective for solving large-scale problems. This characteristic can be found, for example, in Sofia's interview, who frequently mentions the relevance of having transversal knowledge in order to solve urgent problems.

> *Sofia*: [...] this course helped me understand that there is not just one way to tackle a problem. For example, Professor Iaione made us understand that to achieve the zero emissions target- which the EU aspires to do by 2050 - we must think about sustainability, but also about digital matters- which I did not take into consideration.

2.2.3 Actors involved in the courses.

An enquiry-based CV assumes that the processes of building knowledge and learning are not individual, but fed and forged by human interactions, peer-reviews and teamwork, capable of empowering students to speak out as engaged members of their educational and research community (Blessinger and Carfora, 2014). According to Fung (2017), collaborative learning improves critical thinking, by increasing also the sense of community-belonging, which constitutes the most relevant goal of education, that is sustaining productive human connections and collaborations towards a common good. Students frequently stressed the collaborative nature of the attended courses and activities, upholding that the continuous interactions were fundamental both to improve the relationships with those around them and to learn more deeply and effectively concepts.

> *Luca:* In the comprehension process there is a fifty percent of learning that comes from studying research papers, but the other half is based on the continuous interactions between students and professors. I find it essential.

> *Gianmarco:* I can say that - within the university - being able to discuss is fundamental, because you can waste time by working individually on things, while many minds that collaborate take half the time and probably arrive at a better solution.

Professors of EBL courses stimulate continuous dialogue by making students active actors during classes (Fung, 2017); they are available for explanations and confrontations. Enhancing dialogue can be beneficial also among academics, by fostering an intellectual energy that sparks new approaches to research and its application to the world (Fung, 2017). According to this perspective professors also question themselves, making dialogue a source of growth. Moreover, the dynamic exposure to multiple views of the world (by promoting also interdisciplinary activities), creates a culture open to diversity in terms of gender, maturity, culture and nationality (Welikala 2011). Internationalization is a common term among many students interviews.

> *Sofia:* the fact that our professors come from different parts of the world was stimulating as well: having various points of view from different experts - from US, to China and Holland - was very interesting. […] There were also many international students and the exchange between us was also interesting.

Furthermore, collaborative learning, thus working in teams while learning, has a long term result of preparing students for future challenges, faced in their everyday life: if students work together effectively when the stakes are relatively low, then they can work together effectively later when the stakes are high' according to Bruffee (1999). Peers' interactions are made concrete through the implementation of research projects.

> *Gianmarco*: The first thing that comes to mind while thinking about what this semester has truly left me is teamwork: […] when I say group, I really mean it, because there hasn't been a time that we have had a fight.

> *Giuliana*: We actually knew each other before, because we were all former Luiss students, but in any case, we had never shared so much time together. We have established such a strong relationship, because even the moments of general discouragement, sadness and nervousness, were shared within the group.

Experiencing teamwork at university increases students' relational skills and propensity of establishing new relationships, therefore breaking the initial barriers that can occur while starting a new journey. In the interviews, many stated that group projects were a major opportunity to socialize, not only a way of approaching the world of research, but above all, an incentive to interact with the community from the very beginning.

2.2.4 University Environment

The university environment comprises shared values-beliefs and a series of coordinated structural and managerial elements (EUA, 2006). It needs to build a social identity, by fostering collaboration among actors.

> *Gianmarco*: I am feeling the university environment more, despite the fact that we have a both online and presence teaching. There's a strong identity that in my opinion is present among professors, students and among all the actors within Luiss.

It is fundamental, to ensure good quality of education and research, to build a healthy, nonhostile environment. Students of enquiry-based courses perceive the environment as vibrant and dynamic, entangled with connections that operate on multiple levels, thus forming an institutional vibrancy made up of many institutional energies that interact and complement each other (Fung, 2017).

2.2.5 Online learning

An innovative element that has characterized the teaching of recent years is the online learning, formally used by universities to overcome the obstacles of social distancing, but also to enhance internationalization when the mobilization is not possible (O'Dowd, 2016). As an input for the formation of a powerful knowledge, the opinions towards online learning are predictably conflicting. Some students, like Luca, have suffered from the lack of face-to-face teaching and sharing moments typical of in-class interactions; while students like Giuliana affirm that establishing relationships wasn't hard despite these physical limitations. Likewise, some students admit to having encountered organizational problems related to connection and time management, as well as difficulties in being concentrated.

> *Nicoletta:* we experienced the online teamworking during the Freshers' weeks. It was the very first moment that we met and that was a bit of a difficult situation to manage at first, because everyone was having connection problems and maybe the schedules were difficult to match, so from that point of view it was not easy.

> *Julienne:* I have to be honest, I suffered that almost everything was online. This was difficult for me. I felt less concentrated using the computer at home, rather than attending classes in presence. I'm a person who loves being among people, so staying at home was difficult, both in terms of learning and in terms of exchanges with other students.

The last antecedent variable "values" is also course specific like the previous inputs analysed; it highlights whether programs involve students in a more real-life perspective, by providing them the possibility of analysing actual and practical cases.

2.2.6 Values

The possibility to perceive research as an authentic practice is pivotal in EBL programmes, to develop and improve a series of important personal skills (Harland and Wald, 2018), such as responsibility

and confidence, and this is achieved by making the courses' content more real-life based and tangible. Opportunities to conduct an actual research project don't only constitute a pedagogical orientation, but a real value-based approach that accustom students to continuously question what they know (Fung, 2017). This call for authenticity is mirrored in the courses' programs, which provide students with contemporary, modern, real-life topics that are considered fundamental for developing a global competence (Fung, 2017). Experiencing real-life cases through research is a frequent aspect highlighted by interviewers, as for Carla, who defines this practicality as engaging and stimulating.

> *Carla*: In my opinion the most engaging thing is the fact that everything is about real life. The professor made examples about things that are around us and that we can see concretely, which affect our daily life.

This aspect of concreteness is evident not only from the study of real cases, but also from teamwork with peers and colleagues that simulated the working world (Tynjälä, Välimaa and Sarja, 2003). Moreover, as Julienne and Sofia interviews report, many students positively valued the opportunity to interact with real experts in their field of competence, thus observing the real application of theoretical concepts studied.

> *Sofia*: A great thing about the project was that the professor got us in touch with experts in the field. It was very useful, […] a further step for the realization of the project: it's true that we've already done something concrete in responding to a call from the European Union, but then having a feedback from experts is even more important.

2.2.7 Outcomes

Deriving from this framework of enabling inputs and features of EBL courses, two different kind of outputs can be assessed throughout the interviews, which then, in turn, lead to the final result of powerful knowledge: personal outcomes and knowledge outcomes.

Personal outcomes can be factored and broken down in diverse dimensions: acquired skills and future aspirations.

According to Humboldt, education is expressed by the term Bildung which connotes self-formation or development, emphasising a sense of individual and collective 'becoming'. Following this theory, university provision must directly impact students' personalities. EBL is an effective educational approach for this purpose since it has direct effects on students of a personal level. Each student comes into higher education with his/her own personal story and identity: different cultural and educational backgrounds, ambitions, values, needs, personal circumstances merge in the community of university students.

Becoming educated and learning does not only mean to know more and expand existing personal knowledge, but it is also a matter of developing self-confidence, understanding one own self, and taking ownership of the ways in which one is changing as a person, through intellectual critique and interpersonal engagement. Education is a form of moving towards a new picture of oneself through critical dialogue with others: it is inherently about developing one's own identity, voice and story.
EBL has long term effects: by growing as people, students develop a range of soft skills that are useful in life after graduation. Everyday life benefits by fostering their sense of citizenship and their relational capital, but also their workplace life improves.
Asking students to take their own initiative to address challenges, investigate solutions and to collaborate effectively with their peers, prepares them for the unstructured demands of the workplace (Fung, 2017).
Students exposed to Pilot EBL Programmes in Luiss are aware of these pervasive impact of research, they acknowledged a growth both from an academic point of view, in terms of new specialized competencies, hard skills and pieces of knowledge acquired, and from an individual perspective, as unambiguously explained by Nicoletta:

> *Nicoletta:* I certainly consider this semester as very positive, because I feel I have grown both from an academic point of view, therefore in terms of knowledge, but at the same time, also from a personal and relational point of view, because despite the many difficulties in which we all found ourselves in, it was possible to make friends and at the same time to study and move forward.

They self-reported an unexpectedly profound personal change in terms of personality traits, interests, and soft skills.

> *Elena*: I certainly didn't expect a project to have such a positive impact on me.

Growth was enabled by experiencing this very novel approach of learning:

> *Elena:* by the end of the semester there is always growth and improvement because you have faced many challenges that in previous years and experiences, you did not encounter.

By experiencing knowledge creation process and epistemic access, they developed a new approach to manage things, which is more practical and pragmatic, as Giulia mentioned in the following extract. The rigorous method of research was employed to serve their academic and personal needs.

> *Giulia*: I have become more practical and pragmatic. I am more interested... also specifically to the economic part, which before I left out a little more. I am still a bit confused about the future, but I realize that I am beginning

> to understand the business context better, which I did not know before and that did not interest me. Now I know more, and I am starting to be interested much more. Studying in English and more practical things in general led me to have a different approach and to better understand how to deal with problems.

They have learnt through theory and practice. Teamwork and dialogue were major catalysts of growth:

> *Adelaide:* I had greatly underestimated this aspect of working in a group, also because I had never worked in this way in a group with other people. This exchange of ideas, these discussions really help you to better develop a personal view, a project or in any case it helps you grow, because you listen to what others say and understand better how to deal with certain situations. This allows us to grow both from a future employability point of view, and then from a personal point of view.

Challenging time management and required effort, by the end of the course left a sense of satisfaction and self-confidence and motivated students to go on with activities and progress.

> *Giulia:* thinking back to this semester, I could say that I understood that I can work hard, I enjoyed testing myself. I didn't find it easy to manage five courses and several group projects, but I still liked being able to challenge myself and do well anyway at the end.

Throughout the interviews, a path of personal evolution and progress can be found in the words of students. The overall sentiment is very positive, many have reported a feeling of contentedness. As a matter of fact, the programme posed not few difficulties, but because of these, the sense of achievement was greater.

> *Adelaide*: Surely for the first time I am really satisfied and happy with the choice I have made, both from the point of view of my university career [...] and for the satisfaction I had with the results of the projects, because these were perhaps the greatest joy, greater than the final grade of the exam itself. Obviously, the final grade of the exams is also satisfactory, but regardless of the grade it is precisely what the subjects transferred to me, because I loved them all, especially those more focused on marketing. They really left me something and professors too; in the end each professor left something positive, with respect to the subject and the relationship he/she held with us.

According to Levy and Petrulis (2012) students engaging in research develop critical and reflexive qualities needed in a profoundly uncertain, super complex world. They also highlight work by Baxter-Magolda (2004) on the importance of students having ‘self-authorship’, which includes ‘belief in oneself as possessing the capacity to create new knowledge’ and ‘the ability to play a part within knowledge-building communities’. EBL develops many competencies ranked as the most important ones to possess in the workplace: teamwork and co-operation, self-confidence, willingness to learn

are just some to mention. (Rainsbury, Hodges, Burchell & Lay, 2002). According on the definition of the University of South Florida, self-confidence is an attitude about one's own skills and abilities. It means accepting and trusting one's own self and have a sense of control in life. Being aware of strengths and weakness well and having a positive view of one's own self. Setting realistic expectations and goals, communicating assertively, handling criticism.

Self-confidence is developed through the taught programme, each time students face a challenge: is it time management between intermediate deadlines, projects, exams and assessments; is it managing different people in a group, is it using their voices when presenting to an audience, is it creating completely new outputs from scratch (Fung, 2017).

Self-efficacy has many beneficial effects in future job setting; beliefs about one's ability to accomplish specific tasks influences the tasks employees choose to learn and the goals they set for themselves. Self-efficacy also affects employees' level of effort and persistence when learning difficult tasks. (Lunenburg, 2011). As seeing oneself capable of overcoming challenging obstacles to reach ambitious objectives, Luiss students reported a confidence boost as Carmen explicitly declares in her interview:

> *Carmen:* I am certainly more confident, I have acquired greater self-confidence, which has also helped me to be willing to share my ideas with others. Before, if I had an idea, I hardly shared it, but now I feel more willing to communicate and to share my thoughts, and this may also happen with teachers.

For what concerns the development of a new, more open minded, curious mindset and innovativeness, inputs from courses gave students a new perspective and vision on specialised subjects, but also on future aspirations and the world around them in general terms.

> *Lucrezia:* from a mental point of view, a completely new world has opened to me. That is, within two or three months I have completely changed my vision of the future, I am also more self-confident and surer of what I want to do.

> *Giuliana:* my study method has surely changed, and I also feel "more open" compared to the bachelor's degree, because this master's is opening my mind and making me understand what I would like for my future. For example, in January I am starting an internship that I would have probably never been considering a year ago. This master's degree, in fact, is in the business management department but it is interdepartmental, so it opened me up to the world of economics. Now that I have studied the world of economics and all other subjects such as global management or research, many of those paths have opened for me, that I am now starting an internship in financial company. I am starting an internship in the HR unit, finding practically a combination of everything I like and that I probably would never have done a year ago. I would not even have applied to it.

> *Luca:* this was transmitted so much in what became my openness to discovering, my desire of learning and deepening knowledge. I spend my free time trying to deepen and articulate what I learn during classes at university.

Open, discovery-focused and team-based inquiry offers the greatest potential for enhancing students' skills in innovation (Acar and Tuncdogan, 2019).

As a report by the World Economic Forum on "The Future of Jobs" states, organizations in different industries have a need for innovative skills (WEF 2016) and this trend continually grows in importance given the disruptive nature of changes experienced daily. Given the growing emphasis on increasing graduate employability (e.g. Bridgstock 2009; Tomlinson 2012), higher education institutions have a strong interest in facilitating students development of such skills to enable them to innovate. (Acar and Tuncdogan, 2019).

EBL strongly resembles the actual processes of innovation in companies, which is often triggered by the recognition of a problem or opportunity (Kanter 1988). In both cases, there is heavy reliance on exploring information from diverse sources, generating multiple ideas to solve problems, assessing which ideas are viable and communicating effectively what the best solution might be. Such similarities allow students to gain essential practical experience of innovations' process spendable in job settings and this helps them to acquire transferable skills essential to perform better in innovation-related activities as well as in other contexts (Dokko, Wilk, and Rothbard 2009; Singley and Anderson 1989).

Students are conscious of the competitive advantages coming from this fostered innovativeness as clearly stated in Luca's interview:

> *Luca*: I think it is a huge advantage in terms of understanding the world and context in which the person or company works, to design a roadmap to position in the present moment and to create a strategy for the next movements.

Taking part in open enquiry activities equips learners with the critical thinking they need for living and working in such a 'post-truth' world. Such critical approach might mean moving away from treating populist opinions as facts, being able to question data sources, recognise bias and use these attributes to make judgements about knowledge claims. (Hughes, 2019)

The outcomes of having epistemic access and being able to produce and evaluate knowledge are all dependent on mastering critical thinking skills (Harland et Wald, 2018).

By approaching untackled issues to creatively find an effective solution, students developed problem solving skills, as reported by Gianmarco:

> *Gianmarco:* I am referring to problem solving, that is going to face cases never analysed before, and approaching them in such a way as to be able to solve them, without having the certain or effective solution at hand. This is something that has struck me. The fact that I was not even sure it was right as a solution, but I was happy with the reasoning I managed to do.

Not through infallible knowledge, but through uncertainty, exploration of new horizons and exchange with others, many students reported to have built up a personal opinion to critically judge the world around them.
According to students' words from the interviews courses inputs, via papers and dialogue with other actors, materially aided this process of critical thinking formation.

> *Gianmarco:* I was happy, because I was able, from the thoughts of others, to form my own thought.

Another group of outcomes of EBL relates to how students are changed as learners in a social setting. In the programme there is much emphasis on working collaboratively and helping, rather than competing against each other. The objective is to prepare students to use knowledge wisely and for the public good. Ideally, these personal and knowledge outcomes equip students with powerful knowledge, which entails not only knowledge and epistemic access but also socially desired attitudes and values: like care, prosociality, proactivity and responsibility.

> *Luca*: the word humility is part of this path, Humility is a word that I wish to quote in the answer to this question, and peers' collaboration is also a fact that I liked very much.

It should be no surprise that teamwork was identified as one of eleven essential learning outcomes in the seminal AACU report College Learning for the New Global Century (National Leadership Council for Liberal Education and America's Promise, 2007). Furthermore, teamwork also plays an important instrumental role in education. Kuh's research (2008) shows that collaborative assignments and projects are especially potent in having a positive impact on student development. In other words, working and solving problems actively with others is not just a desirable outcome of student development; it is also an educational practice that has demonstrably high developmental impact.
The Association of American Colleges and Universities (Rhodes, 2010) has published rubrics (scoring tool) to measure essential learning outcomes. In the case of the AACU's teamwork rubric, the standards of performance are (1) contributes to team meetings, (2) facilitation of the contributions of other team members, (3) fostering constructive team climate, and (4) responses to conflict.
All these dimensions of effective teamwork were found in the words if interviewed Luiss students.

They have developed a prosocial attitude toward peers to unleash full potential of each group member. Firstly, they acknowledge the importance of empathy and understanding the specific personality of each. By accommodating and getting to know each individual ambitions and propensities, they have learnt to manage conflict, mediate, coordinate peers' effort and maximize results for the whole group.

> *Elena:* being able to work with other people helped me learn to understand, first of all to whom I am relating to. So the first step, in a group, is to study your teammates and understand their ambitions, what character they have; because there are people with great potential, that could be a little fearful, that fail to assert themselves or do not have a predominant character and therefore you should help them to be more listened and heard in the group dynamic. Because if you have potential and you can't express it, it's a pity, isn't it? So, it is crucial to study the person in front of you, to maximize the result.

> *Giulia:* in my opinion, teamwork was very nice and very useful, because in any case you have to collaborate with others, you have to understand how to make the group function properly. My experience was positive, even if it was the first one for me.

They started to think as a single, unified entity: the group; not anymore as separate individuals employed on a task. They acknowledged the real power of good teamwork: synergies between group members made them achieve a performance that they would not be able to attain otherwise as working autonomously.

> *Lucrezia:* he enriched us with his experience, because he was older than us, so he already had work experience etc. and precisely for this topic, and therefore he was also able to teach us many things, about how the job setting works. So, I think that the best thing about teamwork is the exchange with others, because each member with his/her own experience can enrich the other.

They understand that differences are richness and opportunities to leverage everyone's potential to the fullest.

> *Lucrezia:* let's say we acknowledged the strengths and weaknesses of each other, so we started to divide tasks more.

> *Carmen:* with the group, I was very lucky because each of us had different ideas, non-destructive but constructive ideas, so we built on each other and we got the results. Each of us had different backgrounds and different abilities and luckily, we were able to reconcile these different aspects and find a fit, to work together.

They covered many different roles in the group dynamic, experiencing active and passive care towards other peers.

Gianmarco: the great thing was that we were eight leaders, each at a different time, because it is normal that not everyone gives their best all the time, but there is a time when one gives a little less and the others more. We all had, in those eight weeks, the time to be a leader and that was really a beautiful and useful thing.

In some cases, they were motivators or guides:

Elena: I tend to give advice, if I see that a person is not behaving well, I send warning signals.

Giuliana: being able to coordinate time and needs of different people in the group was not easy, especially with those who at first underestimated the project or perhaps were not even interested. But in my opinion the ability to manage a group also lies in encouraging this type of people and motivating them. In fact, in the end, we all worked assiduously and there were not differences in efforts.

In other cases, they were tutored by contact, confrontation, and exchange that resulted in a personal growth.

Lucrezia: it was certainly the biggest change I saw in myself and also students who worked with me, in the team, were able to notice it; they told me they noticed a certain difference compared to the beginning. At the beginning they made fun of me because I always wanted to double check the work of others, I wanted to see. I wanted to carry on 10 things at the same time. But then going on with the project, I realized that I would have to choose my mental health and to trust others. In the end, when we were able to finish the project, even if I had not been behind all the things, seeing the project had been appreciated and everything had gone well anyway, made me feel safe.

Sofia: especially because there are some very prepared students and this was a bit demoralizing at the beginning, but in the end, it became a stimulus to aspire to their preparation and it was something that encouraged others.

EBL programme emphasizes the central role and responsibility of students in education. Control of learning does not rest with the teacher, but students are considered to be active contributors in the process. EBL is founded on a student-centered and self-directed approach to learning (Spronken-Smith and Walker 2010). Self-directed learning has been described as a process in which individuals take the initiative in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles 1975, 18).

Julianne: it taught me to be more responsible and proactive. During the bachelor's years, I was more passive. […] now I feel more like an agent.

> *Adelaide*: this has helped us a lot to understand how we must manage everything, both study, workload and group project.

In teamwork projects, each member of the group assumes equal responsibility for ensuring that the project is completed on time and to a high standard. Learning to work effectively as a group and to manage many different tasks at a time.
As reported by Adelaide and Giuliana, organizational skills, time management, project management and leadership are just some of the competencies acquired via Luiss' research-based CV.

> *Adelaide:* surely, I managed to organize myself well, so this semester has helped me to understand how to organize things and how to manage time I have available. This was fundamental, because I didn't know how to do it before. During the bachelor's years, I evidently did not understand it well, for this reason I can say there is certainly a growth both in the organization of study, and I must also say a growth on a personal level, in the sense of knowing and also understanding how to deepen the topics.

> *Giuliana*: I became more mature because the master is teaching me to manage my time. There is not only study, but there can also be work experience, such as the one I will do if all goes well.

The second dimension of personal outcomes of EBL relates to students' aspirations about their future. EBL enables students to develop a clear picture of their learning journey, personal progress and future goals (Fung, 2017). Learners develop a sense of their own identity as researchers (Davies and Pachler, 2018), and in some cases they even consider the possibility of becoming researchers in the future. That is the case of Adelaide, who became extremely passionate about the research field after being exposed to it during the first semester.

> *Adelaide*: Doing research has fascinated me a lot and I must say that I would personally see myself working in this area, so I'm really considering it as an option.

Giuliana, likewise, has not only discovered a passion for this enquiry activity, but also acknowledged that research is a means of adapting to the changing world.

> *Giuliana:* I discovered a world that I did not know before, and in any case nowadays research is fundamental. We never stop learning, so research is what basically sums up the fact that we are always in constant evolution. I liked it and I really put my soul into it. So probably in the future, when I will approach and if I'll approach this type of activity, I will remember this project.

The second main class of outcomes of an enquiry-based cv, concerns the knowledge realm. Under the general category of knowledge-related results, four dimensions can be highlighted and separately

investigated deeper. The first one is to gain a rigorous method to tackle and solve problems: the understanding of knowledge creation process; the second dimension is knowledge creation, the ability of advancing what is known in a field with new information produced. A third dimension is knowledge evaluation and refers to gaining a critical point of view through which evidence is evaluated, while the fourth dimension is the application of skills acquired through research to different contexts. Starting from the creation of new insights in one field, students' acquired knowledge through education becomes "powerful", when discoveries are extended to serve other purposes.
According to Harvald and Wald (2018) to achieve powerful knowledge, students have to start from being exposed to research methods and experiencing processes of knowledge creation, in few words, they need to engage in epistemic access.
All the interviewees reported to have gained a deep understanding of what it means to research and how knowledge is produced. A strong awareness of the epistemic aspect related to research was achieved with practical modules and projects implemented during the first semester of pilot courses. Through Nicoletta's words there is evidence of having gained a complete and clear idea of all the steps involved in the process of knowledge creation and of how complex and difficult the entire procedure could be.

> *Nicoletta:* first, we identified our field of interest, then we looked for various academic papers, around that topic specifically, but also around related concepts, to understand relationships between variables at stake. Then we went deeper to identify the research gap that we actually wanted to study and therefore, from these papers found, we made some summaries with main points. We skimmed them and then came up with a theory in quotes. Based on this, we analysed data and from the data analysis, we created our thesis.

Students acknowledged the need of having to follow a rigorous method to research and create sound findings. As Giulia stressed, the methodology and procedure to follow as researchers is not easy and knowledge gain is not immediate, but that is the only way to achieve satisfactory outcomes:

> *Giulia:* it was not easy, nor could it be taken lightly, because it is a work that has to follow certain criteria. Some formal and methodological requirements had to be respected. It was not only about achieving the objectives and what you wanted to prove, but also about respecting certain specifications that had to be maintained, to be well evaluated. So, it was challenging, but it gave me a lot of satisfaction.

Students acknowledged that investigation proceeds through a trial/test and learn procedure. A long process of reading to gather information and spot a potential knowledge gap is required. There must be always room for doubts, improvements and questions around assumptions and hypotheses formulated as research activities go on.

Giulia: at first, we only developed a social problem. However, during the first meeting, we realized that the managerial problem was missing and therefore we decided to take a step forward and always keep the social problem but to develop also the managerial one and keep both.

Carla: this was one of the first steps of the design part: analysing the best practices in our field or the databases also to see through the data if actual objectives were achieved. We also had to analyse other initiatives, so we studied a bit.

Luca: I think that the research work we have done has also been rewarded by the fact that there is always room for contradiction and denial in it.

As Lucrezia highlighted in her interview research is something that starts from scratch and develops step by step, it requires continuous time and effort devoted to it.

Lucrezia: I didn't know all these things existed before I came to a result. Everyone reads "this analysis was done, it was seen that this product works better than this other", but knowing why, knowing how to arrive at this final result, really opened my eyes to many things.

Students understood that the proper research's process of knowledge creation is very specific compared to other projects.

Carmen: we have always done projects but they have never been research tasks; for example a business plan was assigned to us, but it was a different type of work; and in any case for the other projects we did, the topic was already assigned. Now I understand that doing research is completely different [...] I liked the research activity, in the sense that it was nice to be able to analyse topics, to understand what it could be a problem to analyse, starting from relatively common topics to understand which aspect of these topics was not covered and try to cover it.

Research makes it possible to go deeper in subjects and knowledge discoveries, and to put in practice theory concepts.

Adelaide: you go to broaden your horizons and therefore form a thought that is much more developed than what you might have gotten by reading a book. I think this is one of the advantages of research, because you can really deepen knowledge on a topic, achieving great level of detail.

Carla: it was very nice to practice theory concepts.

A great advantage of research activities is that students gain something of lasting value that empowers them, through epistemic access to the generative principles of knowledge creation. According to

Custers (2010) theoretical, discipline-specific knowledge tends to be forgotten over time if it is not rehearsed or used, instead, research skills, once attained, are more likely to be sustained throughout life. For Harland the second dimension of knowledge outcomes achieved by students is becoming skilled in producing one's own knowledge (2017).

From the interviews, students reported a sort feeling of astonishment and surprise towards the newness of knowledge they were able to produce through group works. Seeing a concrete output, by the end of a long process of study and production and perceiving to being contributing to important real-life issues and problems awarded students with major satisfaction and strengthened their self-confidence. Carla's Elena's interview is a fitting example of the creation process of a new piece of knowledge grounded in everyday life cases with the ultimate purpose of benefitting society at large.

> *Elena:* it was very interesting, because our topic was public health and we had the idea of setting the project on social addiction, which affects the psychological health of individuals, especially us students. We are the ones most involved in these social networks [...] We thought of a way to increase the information of the student or the individual on the opportunity costs of social networks and therefore we thought of developing an app together with the Luiss one [...] it was very nice, we enjoyed it.

The research project culminated in the formal production of a document, a written report. This was done to develop, in students, skills related to communicating and presenting new knowledge findings. Crafting this formal output was challenging since it required to follow a rigorous structure, language and guidelines which are proper of scientific research papers. However, due to this similarity to study materials students were getting used to, learners were proud of their efforts.

> *Lucrezia:* when we delivered the project, the last day was very satisfying, because we wrote a real paper, like one of the many papers that they made us read during the lessons. Also, to think that we wrote something from scratch, it was it was very nice.

> *Carmen:* the most beautiful and satisfying moment was the final one in which we understood that we were able to build something and we saw the beginning and the end of the model and all the efforts we have made.

The third dimension that lay the foundations for powerful knowledge is the ability to evaluate arguments and knowledge claims of teachers or peers (Harland and Wald, 2018). The Boyer Commission (1998), considers this skill as one of the hallmarks for a good education (Fung, 2017). The main objective is to prepare students to use wisely their knowledge for the public good, thus carrying out powerful actions able to change the world. Many students claim to have improved their knowledge-evaluation skills during the pilot semester, meaning that they now feel more confident in discriminating and identifying the quality of different sources.

> *Carla:* Now searching on Google Scholar or using Luiss Summon tool, I tell myself "this paper with these keywords is suitable for me, while this is not so let's go on". As for the quality of the papers, I think I can understand it better.

> *Elena:* I've also learned to read things faster, to understand what is more important, what is less important, to skim the information more effectively.

Interviewees report to have learned the differences between specialized, disciplinary-based and every day, "inferior" kind of knowledge (Harland and Wald 2018). EBL constitutes a tool that allows students to recognize not only the nature of information, but also the quality of the source that discloses it.

Being able to evaluate knowledge claims is an acquired skill that non only improves the overall understanding of a particular topic, but a fundamental reference on which students can build their own opinions and future analysis as well.

In addition to the knowledge dimensions that characterize the original powerful knowledge model elaborated by Harland and Wald (2018), a new dimension of knowledge has been inserted in this model. A variable that evaluates the extent to which students are able to apply what they have learned in contexts other than that of the specific subject or university. The choice is motivated by the nature of the powerful knowledge concept itself, since being able to apply knowledge in other contexts allows students to have access, to what Wheelahan (2007) defines as the conversations and debates about society's values. On one hand, this trait is extremely important for becoming better citizens and having a positive impact on society and the world we live in; on the other hand, it allows to flourish in the workplace, as jobs nowadays require a certain flexibility and a greater adaptability to unknown contexts (Harland and Wald 2018). Several students highlighted how, after attending the first semester of these pilot courses, they were able to apply knowledge acquired in a specific field, even in other different contexts.

> *Luca:* to approach papers in my opinion also helps a lot in life outside the university, teaching to sift and filter information.

> *Gianmarco*: This is something that I had never faced and that is useful in all everyday cases. For example, while listening to the news, now I am able to apply knowledge and the cases studied in class; this is something that struck me a lot and I'm really happy about it.

Learning to apply knowledge to contexts other than university can have an impact not only on the social sphere, but also on the private and personal one, teaching how to manage certain situations, as Carla pointed out in her interview.

> *Carla:* I can examine better and distance myself from situations. I say "ok this this must be done in this way; this can help me like this" … this is valid for everything! While facing a problem with my parents, or with a friend of mine, etc., I'm more able to distinguish the various phases, the various thoughts, the various moments, and the various things. It is a bit as if I had acquired a methodology for approaching situations. I think all situations can be divided into small parts and then put them back together; that is, this semester has helped me a lot.

To conclude the findings of this qualitative study, a university that provides an enquiry-based education and designs a CV with such antecedent variables (timely objectives and continuous assessment, papers substituting books, teachers as researchers, openness to dialogue, teamwork activities on research projects and online tools, real life cases and insights etc.) directly impacts students on both a personal level of soft skills and aspirations, and a knowledge gain level.

Eventually, by achieving better and more complete personal and knowledge outcomes, compared to a traditional mode of learning, the EBL model leads to powerful knowledge, which is rich knowledge, know-how and understanding of the real world dynamics at the service of a common good.

As Fung (2017) claims "the co-location of education and research in universities is a great strength. Research shows students and all scholars where the edges of knowledge are, as well as what is known." This is more than ever, a competitive advantage for an institution that provides such educational offer, in this politically volatile era of 'fake news', where managing with the right information is critical and can really impact society.

Engagement by higher education sector with society become stronger when students are empowered to participate actively in research that involves local and wider communities with their findings. Universities become "aware of its interconnectedness with society and [put] its resources towards the development of societal and personal well-being" (Barnett, 2011).

This kind of university curriculum does not just benefit individual students, enabling them to succeed personally in a competitive, skilled work environment and in the complex world of everyday lives, but benefits wider society as well. Strongly connecting education with research enable students to work to develop societal and global missions.

The model implemented by Luiss, aims, by the very end of this process of bringing knowledge to the service of the whole community, at powerful action.

It is although a possibility of action after graduation, and it remains in theoretical terms, since there is very little empirical evidence supporting such a hypothesis for students experiencing EBL. As Harland and Wald (2018) pointed out, the research-based curriculum is therefore designed to equip students with powerful knowledge but the evidences of effectiveness of it stop with graduation: there

is no way of knowing how powerful knowledge operates after this point and what it can produce. The limits of academic responsibility (of teachers and institutions) are questioned: the term 'powerful action' should be taken as the concept of Barnett (1997) about critical action and critical being. Harland and Wald (2018) are confident that the outcomes of authentic research can be sophisticated, but there would differences in student ability and not all will have the same degree or understanding of powerful knowledge. Furthermore, all students will attain some powerful knowledge but both strong and weak achievements will be taken out into society, according to their values. In the "powerful action" step, it is the student more than the teacher to take responsibility towards society's issues by using powerful knowledge.

Designing a curriculum that translates this concept into practice is challenging.

According to Locke (2005), engaging students meaningfully with research within and across disciplines, and enabling them to connect purposefully with one another, should not be underestimated as a task.

The university must provide the right balance of structured activities and freedom; a brief encounter with research would not be sufficient to develop meaningful epistemic access because of the variable "time to adjust" that must be considered properly, to develop knowledge and methodological research expertise.

Challenges posed by the EBL model to Institutions are:

- Providing the right amount of guidance and support to students: the active role they play with EBL, is more demanding than being passive receivers of knowledge. As Levy and Petrulis claim, they may find difficult to approach those areas: information literacy; personal beliefs about learning and knowledge; self-confidence; enquiry framing and direction setting; and peer collaboration (2012). Universities need to invest resources in offering structured student guidance by academics and professional staff.
- Support to students should also include help with online tools and time management, with developing soft skills and studying on papers.
- Instructing teachers and practitioners on the specificities of the research-based CV. They are used to their traditional methods to approach activities; they have carried on their education or research jobs for years using a completely different method. Therefore, they need support and guidelines as well to succeed.
- Creating structures and regulations at the institutional level that ensure research and education do not remain separated departments.

- Developing partnerships with students ensuring their new role of education actors is also reflected in an environment that hears and respect their voice; inclusion of student representatives on committees is not enough anymore.
- Establishing links with communities, especially with organisations and industry to promote opportunities for students to engage with the workplace through internships, for instance.
- Offering physical and virtual environments suited to research-based learning, which are flexible and can become spaces for collaboration and dialogue between various actors.

The goal of powerful knowledge is very realistic and achievable as findings show but requires a long-term plan of action for change; quick, short-term solutions are unlikely to sort effects in this case. To ensure that all involved with planning for change is reached, there needs to be time available. Time is also necessary to assess the effects of this educational model in the long run, also considering life after graduation of students exposed to it.

To develop a research-based curriculum is a complex task that cannot just be on individual faculty members and their professional colleagues (teachers, practitioners), but institutional leaders, structures, policies and funding need to support the mission.

Although the model of powerful knowledge has shown some empirical evidences, the qualitative approach employed to evaluate the effects of Luiss pilot courses on students' perceptions and performance is affected by some limitations. The use of the semi-structured interview requires a relatively small sample, therefore a limited data collection that prevents the generalization of the results. Furthermore, the sample of the qualitative enquiry is not perfectly homogeneous in terms of gender due to a greater presence of female respondents; future research is needed enrich the sampling involving a more male target. The qualitative exploration is also affected by self-report biases, meaning that the interviewees' responses could have been influenced by a series of elements, such as: the flow of questions, the preselection of the target and finally the fact that the interviewer was a teacher within the institution, therefore a source of possible pressure. Another limitation is constituted by the long-term effects that this type of model presupposes: it would be necessary, indeed, to evaluate to what extent the students exposed to an EBL model are able to apply what they have learned in a different and future moment in time. Moreover, another untacked point that could be investigated in more detail are the virtuous effects of the model by verifying any differences between degrees or types of students, therefore it would be necessary to investigate the moderators acting between inputs and outputs of EBL programs. In conclusion, to obtain a validation of the results, future research using a quantitative approach capable of confirming the causality of the relationships and, at the same time, providing the basis on which to set future investigations is needed.

2.3. Quantitative analysis

The aforementioned qualitative investigation was effective to study complex and contingent phenomena related to Luiss' students preliminary experiences of EBL and was instrumental to identify linkages and variables involved in this alternative learning process.

Providing a quantitative base to the previous explorative findings is required to justify all the efforts devoted to overcoming the challenges of EBL implementation.

This chapter is focused on the ambitious project of measuring quantitatively all the constructs and variables of the model of powerful knowledge and stemming from the words of students interviewed (see Figure 8).

Starting from the variables isolated from the exploratory research design, that gathered preliminary information to help define the problem and suggest hypotheses, a conclusive research was conducted and will be described in detail below.

2.3.1 Research Model: Constructs, Measurements and Relationships

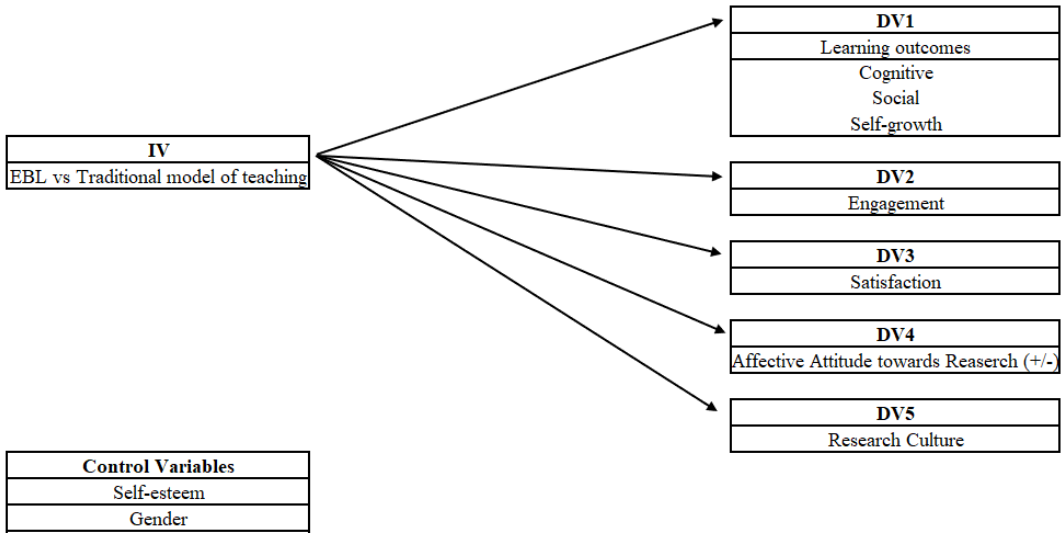

Figure 8. Model of quantitative moderation analysis.

The purpose of this study is to find, in Luiss context, empirical evidence of the improved effectiveness and better performance of EBL, compared to a traditional model of education, on students' perceptions; to ground in statistically sound and practical demonstrations the choice of continuing progressing the implementation of pilot programmes' new teaching method into other master courses. Hence a single factor two levels (Teaching model: Enquiry-Based Learning vs. Traditional) online quasi-experiment was conducted with Luiss Masters' students.

To measure the effects of the change of cv design towards a research-based one, participants were asked to rate their satisfaction with the programme, their level of engagement with courses activities and environment, their performances with respect to what they have achieved via education and what skills they have acquired at the end of this journey.

2.3.2 Research Hypotheses

As mentioned in the previous chapters, EBL is different from a traditional mode of teaching with respect to: type of activities, involvement of students in the learning process, weight assigned to exams, courses inputs, balances of theory and practice, relationships with teachers.

In the last decade, there has been the proliferation of enquiry-based CVs for universities: now, to maintain a competitive advantage in the academic world, it is no longer a matter of whether to integrate research into educational programmes, but more a question of 'How, and how far?'.

In the current age, the ability to interrogate received knowledge using robust evidence becomes increasingly important (Speed and Mannion 2017).

According to Hudges (2019), research-based learning in taught courses develops the skills needed to judge knowledge sources and think critically in a post-truth world.

Transforming a student cannot be a one-time event: research ability must build over a programme and this requires coherent and progressive research skill development and evaluation.

To do so, one option is establishing ongoing research skills support programmes which may be required or voluntary, along the master's degree. Another option is for research development to be embedded in the taught programme. Fung (2017) is a supporter of this second view, suggesting that a key dimension of research-based education is designing a 'throughline' of research activity that provides a structure so that research capability can be supported and assessed throughout a programme.

EBL addresses a range of contemporary issues within higher education. Kahn (2004) reports the strengths of EBL routing them in the contemporary context, in the first of the following tables (see Figure 9), whereas in the second one (see Figure 10), he shows what is the aim of different kind of activities usually designed for research-based CVs.

Contemporary issues in higher education		Advantages of EBL
Issues around goals for student learning	*Employability and the development of skills and personal qualities*	Allows the development of a wide range of abilities: knowledge-creation; team-working; presentation; information literacy; ICT; problem-solving; creativity; project management
	Gaps in students' knowledge, given variation in prior experiences	Incorporates a method by which students can identify and fill gaps in their knowledge base
	Disparity between theory and practice	Allows theory to be explored within realistic contexts
	Fragmented learning on modular programmes	Enquiries involve integration of knowledge
Issues around the learning process	*Traditional passive/transmission approaches foster surface learning*	Typically involves a deep approach to learning; students make their own connections between ideas
	Divergence between research and teaching	Draws on staff research interests and skills, and on the research infrastructure
	Mass higher education can lead to a sense of anonymity and social isolation	Enquiries conducted in small groups and supported by a facilitator foster peer relationships and relationships with staff
	Poor student motivation	Scope for students to choose the topic and lines of enquiry; open nature of an enquiry ensures learning is more realistic and relevant and peer interactions foster engagement
	Diversity of learner needs	Students able to work at their own pace and in their own way on issues of interest
	Awareness of the need for sensitivity in teaching methods to the subject and the institutional context	Scope to adapt the broad approach to a range of scales and using a variety of resources
	Competitive approaches to learning seen as less appropriate in professional contexts	Enquiries allow for both individual work on sub-tasks and common work on an overall task

Figure 9. Contemporary issues in higher education and advantages of EBL.

Assessment	Learning Outcomes
Examinations	Only likely to be able to assess a limited range of the relevant learning outcomes.
Group assessment	Directly addresses team-working skills. May either address the group process or a product created by the group as a whole.
Patchwork texts	Addresses reflective, synoptic abilities, as well as the ability to piece together an extended argument. These are key abilities for the conduct of an enquiry.
Peer assessment	Aligns with group-based processes, and allows students to understand marking criteria (and thus the criteria by which of the success of the enquiry will be judged).
Personal accounts	The ability to manage an enquiry is closely related to the ability to consider and evaluate its progress.
Portfolios	Evidence selected in order to demonstrate the required learning outcomes.
Presentations	Given both time constraints and the reliance on group process, presentations (either oral or using a poster) are typically made by a group of students. This provides an effective means to assess team working skills as well as other outcomes.
Reports	A report on the enquiry as a whole (e.g. project report or dissertation) or on one or more aspects of the enquiry (e.g. feasibility study or research proposal) provides a straightforward way to assess its outcomes.

Figure 10. Assessments and learning outcomes in EBL.

EBL has many advantages in terms of effects on students' knowledge and personal/self- development as highlighted by powerful knowledge framework of Harland and Wald (2018).

Focusing on learning outcomes, these relate to students' performance, they are the product of education and can be distinguished on various dimensions: cognitive, social and personal ones.

When starting EBL courses, students are usually presented with a scenario. They are required to identify issues, research and learn materials in a specific field. It is not necessary for the students to solve problems: many scenarios are deliberately designed not having a ready solution. The scenarios are intended to motivate the students to engage in learning and understand the underlying issues. Students research and return to class to share information and integrate new knowledge into the

scenario; this process is repeated many times. The reiterative nature of the process encourages students to practise effective communication and to learn how to criticize, in addition to learning and assimilating content.

At the end of every class meeting, time is devoted to group processing. This is a crucial part: each member of the group provides concise and precise feedback to peers, as well as engaging in self-assessment of their own performance. It is the opportunity for the students to enhance communication, critical thinking, and research skills.

According to Summerlee (2010), in a study on University of Guelph (US) courses, students do perform at a significantly higher level compared with members of the control group who did not experience an EBL course. EBL students change the way they access information, preferentially using more sophisticated resources. At the same time, they report greater engagement in the community, and student engagement is known to contribute to increased academic performance. In this study, students reported they not only learned content, but also processing and reasoning skills that enhanced their learning experiences in other disciplines and gave them the confidence to believe they were more effective and responsible learners (Murray & Summerlee, 2007).

> **H1.** Students attending EBL courses are more likely to achieve greater learning outcomes compared to students following traditionally taught courses.

EBL students have more opportunities, due to the nature of the courses CV, to engage in investigation of untacked problems and take initiative to solve them: they have more chances to practice innovation skills or creative thinking. Since they must research a lot of information to design their projects, they learn to study topics in depth and from multidisciplinary points of view. According to this, they are likely to score higher on scales measuring cognitive achievements, compared to students not attending EBL.

> **H1a**: EBL students achieve better cognitive outcomes compared to students attending traditional courses.

In the interviews, Luiss students mentioned a personal growth, especially considering their sense of responsibility and proactiveness, leadership skills, time management, effective communication, and empathy with peers.

EBL programmes, by engaging students in group works, foster and facilitate the development of students interpersonal skills: social outcomes are more likely to be achieved for students of research-

based courses compared to learners in traditional programmes, who do not have the chance to practice people management.

> **H1b:** EBL students achieve greater social outcomes compared to students attending traditional courses.

The timing of courses modules, activities and evaluations for EBL are much more segmented, so due dates are frequently encountered throughout the learning journey. This results in students' perceptions of urgency to organize workload and meet deadlines, leading them to learn effective time management and autonomy.
Moreover, having to deal with evaluation of both knowledge sources and peers, EBL students are more likely to develop critical and reflexive thinking.

> **H1c**: EBL students report a greater self-growth compared to students attending traditional courses.

To measure learning outcomes construct, a 15-items 7-points likert scale was chosen: the Student Learning Outcome Scale (SLOS) designed to measure students' self-perception on the achievement of different educational outcomes, which in turn could be categorised into the cognitive, social and self-growth outcomes (by Zhoc, 2019). These items were perfectly in line with concepts stemming from interviews.

Moreover, as suggested by prior research, EBL is an example of active learning models that offers academics the flexibility to support students in their development, while still engaging them in the process of learning (Kahn, 2004). As many students mentioned in the interviews, teachers of Luiss pilot courses encouraged them to participate actively to their education process, by getting involved in discussions in class and by taking a step-in community's issues.
There is plenty of literature on engagement (Ahlfeldt et al., 2005; Kuh, 2003; Kuh & Hayek, 2004) that highlighted the complexity and multidimensional nature of this construct. The measure of engagement is usually judged by asking students to rate how many times they participate in class discussion, work in small groups, and challenge each other's theories and ideas. In an EBL course, students are expected to score highly on these types of surveys, compared to students of traditionally taught programmes in which they are much less involved by teachers and they don't feel ownership of their learning.

Engagement is a very valuable aspect to foster as expressed by Kuh (2009): “engaging in a variety of educationally productive activities builds the foundation of skills and dispositions people need to live a productive, satisfying life after college. It creates habits of the mind and heart that enlarge their capacity for continuous learning and personal development”.

Many studies have shown the positive relationship between student engagement and improved learning outcomes and student satisfaction (Bandura et al. 2000; Carini et al. 2006; Kuh et al. 2005, 2008; Lam et al. 2012; Pascarella et al. 2010).

There is a body of evidence that demonstrates that students’ active engagement in their university path is one of the key drivers for academic success (Kuh, 2003).

To make students more employable and more active members of the community, UK universities have adopted “Research-led teaching” (another name for EBL) strategies that explicitly reconfigure the relationship between academic staff and students, particularly concerning the role of the student as an active learner. A broader re-conceptualization of the role of the student as stakeholders who do not just pay to be taught, but to benefit from a university’s research, is achieved. Students should be empowered to act as partners in their education. This demand for inclusion reflects the willingness and desires of students: in the UK in 2015, the National Union of Students conducted a survey which showed 80% of students would like to be more involved in curriculum design (Havergal, 2017; Turner et al., 2017).

Excellent teaching engages students in course content while providing a chance for them to develop a broader set of soft skills (Andrew and Higson 2008). Educators do not create robots for graduate recruitment schemes as Williams (2016) argued; and they do not produce erudite but hopelessly unemployable knowledge seekers. There is a balance between these two goals, and EBL is one way to achieve this (Charles, 2017).

Fostering students’ participation and contribution is beneficial for their own learning, work and personal journey, for university research outcomes and for the wider community.

Research reports a reciprocal relationship between engagement in the classroom and effective learning (Kuh, 2003), and between active learning and engagement in the university or wider community (Kuh, 2005a).

Previous studies have explored whether students who became engaged in learning through an EBL course might also show a greater level of community engagement. Findings showed that students after completing a first-year experience that truly engages them in learning register superior academic performance. Such experience builds their self-confidence and changes their approach to problems, spreading a general attitude of being more proactive also to other context of their lives.

H2: EBL students show greater engagement compared to students attending traditional courses.

To measure students' engagement, the Higher Education Student Engagement Scale (HESES by Zhoc, 2019, 28-items 7-points likert scale) was chosen. Engagement is defined as students' psychological investment in and effort directed towards learning and educationally purposeful activities. There are five main components of student engagement: (1) Academic Engagement, (2) Cognitive Engagement, (3) Social Engagement with Peers, (4) Social Engagement with Teachers and (5) Affective Engagement.

Academic Engagement refers to behaviours related directly to the learning process, which are essential to achieve the minimal 'threshold' level of learning. Since technologies have become part of lives of college students today, in general, and of Luiss students in the academic year 2020, the factor of engagement included the additional aspect of Online Engagement, which refers to students' use of information technologies to support learning. There is research evidence showing that students who exhibit academic learning behaviours, such as class attendance, coming to class prepared, showing effort and persistence in study, achieve at higher levels than those who are less academically engaged (Finn and Zimmer 2012). EBL courses foster more these kinds of behaviours compared to traditional programmes.

Research studies have affirmed the values of information technologies in promoting student learning outcomes (Nelson Laird and Kuh 2005; Robinson and Hullinger 2008). Chen et al. (2010) reported a positive relationship between the use of web technologies with learning, including higher gains in general education and practical competence as well as personal and social development.

Cognitive Engagement involves the expenditure of thoughtful energy to comprehend complex ideas and go beyond the minimal requirements. It is the psychological investment in learning, understanding and mastering knowledge (Newmann et al. 1992), which is greater for students attending EBL courses. Students who are cognitively engaged exhibit a desire to go beyond the requirement and a preference for challenge, which facilitate students to extend frontiers of knowledge and to form meaningful and enduring commitments to their study (Fredricks et al. 2004; Krause and Coates 2008).

With respect to the Social Engagement, 'a large part of the impact of college is determined by the extent and content of one's interactions with major agents of socialization on campus, namely faculty members and student peers" (Pascarella and Terenzini 1991, p. 620). To better reflect the situation, Social Engagement is refined to be distinguished into two dimensions of Social Engagement with Peers and Social Engagement with Teachers.

Interactions with both students and academic staff members are expected to be much more frequent and deeper in EBL courses.

There is an abundance of research evidence supporting that student-faculty relationships are critical to the improvement of student learning and development (Astin 1993; Pascarella and Teren zini 2005). Amelink (2005) found that positive interactions with faculty was linked with academic performance (i.e., GPA) and more satisfied academic experience. To promote student engagement, faculty must make themselves more available and being more supportive. Apart from giving feedback, they must show a willingness to discuss a broad range of topics that facilitate their intellectual and individual growth (Guenther and Miller 2011; Pascarella and Terenzini 1991).

The fact that exchanges with teachers has an impact on educational outcomes is intuitive; what is more surprising is the weight that EBL puts on interactions between students.

Peers have the potential to positively impact academic development, knowledge acquisition, analytical and problem-solving skills and self-esteem (Kuh 1995). Beyond-Class Engagement involves students connecting with each other and participating in activities beyond the classroom. The importance of peer connection is related to the fact that when students have friends and feel socially connected and supported, they tend to feel more positive towards academic work and other activities (Juvonen et al. 2012). Out-of-class activities were found to help students develop skills and competencies for college success, e.g., leadership, decision making skills, interpersonal skills and self-confdence (Kuh 1995; Pascarella and Terenzini 2005). Participation in out-of-class activities is also related to increased student commitment to the institutions (Kuh et al. 2006).

Affective Engagement is a level of emotional response characterised by feelings of involvement in the institution as a place and a set of activities worth pursuing (Finn and Zimmer 2012). Many studies have examined students' sense of belonging, identification and sense of relatedness, which are factors influential to student motivation and participatory behaviours (Appleton et al. 2008). As reported by Goodenow (1993), students with higher levels of belonging or identification were found to have higher levels of motivation and effort. Moreover, it was found by Voelkl (1997) that identification with the institution was strongly correlated with student participation. In a large-scale study of students using data from the National Longitudinal Study of Adolescent Health, McNeely et al. (2002) even found the significant relationship between student connectedness with school and GPA.

Many papers have dealt with the relationships between active learning models and students' satisfaction, reporting evidences on the direct positive impact of EBL on satisfaction.

Participative learning programs or courses designed to assign students an active role and ownership of the learning process, have been linked frequently to increased measures of student's satisfaction, compared to more traditional, non-participative educational models.

According to Giner (2016), student satisfaction is the subjective assessment that him/herself make of the experience and results with education and university life. In reviewing the literature, several authors stress the positive and direct relationship between co-creation of the learning experience and satisfaction.

This participative design of a learning journey comprises the relationships and exchange that students have with teachers and peers.

With EBL courses, the aim is to strengthen the relationship students-professors opening it to dialogue and sharing of points of view. Comparing the effect of simple theory lecture and discussion methods on students' learning and satisfaction, a study on nursing bachelor students in Yasouj University of Medical Sciences in 2004, measured a students' satisfaction mean in lecture method significantly lower than the one of the discussion method. Students' learning increased during discussion method. It resulted recommendable to increase students' participation and exchanges with different actors involved in the learning process, by applying active teaching methods which provide the opportunity for more learning and satisfaction (Safari et. al, 2006).

Same outcomes of higher students' satisfaction were found analysing quantitative data on collaborative learning models, in which peers are involved in open exchanges and teamwork. Collaboration as a learning tool had statistically positive relationships with satisfaction (Hyo-Jeong So et. al, 2008).

There are also evidences from a sample of 312 undergraduates, on the positive relationship between self-efficacy (i.e., college, social, and general) and student satisfaction (DeWitz et. al, 2002).

Luiss' students reported a feeling of self-efficacy resulting in great satisfaction, when talking about their group work and dynamics. Acknowledging their ability to manage different people in a team and looking at the concrete output of their efforts, the report and presentation material produced, they mentioned high degree of satisfaction during interviews.

Moreover, as a study (Zaheer Butt, 2010) on the antecedents of students' satisfaction for 350 learners belonging to different private and public sector universities reports, factors like teachers' expertise, courses offered, learning environment and classroom facilities have all significant and positive impact on students' satisfaction, though with varying degree of strength. Teachers' expertise is the most influential factor among all the variables. Students perception of teachers' expertise is greater when they have proof of their academic experience and their research studies and publications, like it is the case in an EBL course. Luiss' pilot programs aim at highlighting the researcher role of professors and

increase awareness in students about their interests and experiences. Due to this fact, a higher perception of teachers' expertise in EBL courses, was expected to have a positive impact on students' satisfaction.
According to these evidences, the third hypothesis to be tested was formulated.

H3: EBL students are more satisfied compared to students attending traditional courses.

Satisfaction was measured based on a 3-items 7-points likert scale derived by Giner (2016).
Independent t-tests were run to compare means of the two groups of learners, those who attended Luiss' EBL pilot and those who did not (in the case of H1, H2, H3, investigating main effects).

Further, when evaluating the effectiveness of teaching models, on the basis of students' perceptions it is crucial to consider the impact of educational mode on learners' attitudes. Students' attitudes towards research integration into their educational paths have an impact on their satisfaction, motivation and, as a direct effect, on learning outcomes.
In literature, only a few instruments have been developed to measure attitudinal variables related to research integration into university CVs. Attitude variables, such as perception, conception, and self-efficacy of research are important because they can influence the behaviour of students. The Theory of Reasoned Action (Ajzen and Fishbein 2010) proposes that an individual's behavioural intentions depend on his or her perceptions of self-efficacy and the function of the tools provided.
Griffioen (2019b) designed the Research Acceptance in Vocational Education Questionnaire (RAVEQ) instrument to measure students' attitudes towards research. The RAVE-Q includes the following scales: perceptions of research in profession, cognitive attitude towards research, positive affective attitude towards research, negative affective attitude towards research, self-efficacy towards research, importance of research, and intention to show research-related behaviour. Cognitive attitude relates to 'thoughts and views', where affective attitudes relate to 'feelings and moods' (Van der Linden et al. 2015).
Positive feelings have been proven to improve working-memory and the ability to deal with complex decisions (Carpenter, 2011), thus, enhancing learners' performances in their tasks.
Engagement is also affected by affective attitudes: based on a study of Froiland (2018) percentage of classes attended, thus, involvement and participation in learning activities, was positively associated with positive emotions, indicating also that students with higher attendance were more likely to experience greater personal growth.
According to Ahmad (2010), attitude towards work has a strong positive relation with satisfaction.

Based on these argumentations on the positive outcomes of having developed affective attitudes towards research in the community of university enrolees, this study has provided evidences of greater level of positive attitudes towards research in EBL programmes compared to traditional ones.
According to a study of Griffioen (2020) aimed at comparing students and lecturers' perceptions after the integration of research activities into taught programmes, learners' have reported higher scores on positive attitudes, as well as lower scores on negative attitudes showing that students enjoy research activities more than lecturers think they do.
Wood (2010) claims that students' attitudes towards learning and towards their disciplines improve through engaging in enquiry-based learning. He also emphasises the need for appropriate levels of support during their investigations, to provide them more positive experiences, especially when undertaking group work and at the earlier levels of study.
Several other papers (Spronken-Smith, Mirosa, and Darrou 2014; Verburgh and Elen 2011) based on the original work designed by Healey et al. (2010), combined, present the current dominant line of reasoning, that students are motivated and stimulated by being involved in research activities.
For measurements, two factors of the Research Attitudes in Vocational Education Questionnaire (RAVE-Q) were applied to the student survey: positive vs negative affective research attitudes.
Positive affective attitudes towards research are rated on a 6-items 7-points likert scale, whereas negative affective attitudes are measured with a 3-items 7-points likert scale (Griffioen, 2020).

> **H4:** EBL students develop a more favourable attitude towards research compared to students of traditional courses who do not experience research integration in their educational path.

> **H5:** Conversely, greater negative attitudes towards research are more likely to be experience by students of traditional courses, not research based.

For the purposes of this test, a new variable "learning outcomes" was coded to summarize in a mean value all the scales of cognitive, social and self-growth educational outcomes.

EBL aims at creating the most effective and harmonious integration of learning and research activities.
The aim is to generate a different "atmosphere" in the faculty – a space outside of formal hierarchical relationships of teaching, marking, and learning, where staff and students could engage with each other's work on peer terms, as could be expected at any academic research conference (Barnfield, 2016; Bissell, 2010; McCormack, 2008).

Students' involvement with investigated topics and researchers' community is encouraged in multiple points and modules of the research-based courses.
Feeling a sense of belonging to a wider community of researchers and getting a glimpse of a bigger picture, fosters in students proactiveness since their work does not stand alone, but has a greater purpose. Their efforts are perceived not only to improve their learning journey and outcomes but also to contribute to other issues, interesting diverse stakeholders.
The thought of taking part and making an impact on general, real life topics, on which different actors work collaboratively, gives students a sense of proudness and identity.
A study by Ahmad (2010) shows that this organizational commitment has strong positive relation with performance.
Spronken-Smith et. al. (2014) explored undergraduates' experiences of the research culture at a research-intensive university in New Zealand. In 2009, 1281 students responded to a survey that probed aspects of the research culture. There was increased awareness and experience of research in more advanced years of study. Overall, undergraduates reported mainly positive experiences of the research culture, such as increased understanding of the topic, greater motivation and inspiration, as well as learning research skills and practical applications of theory.
Following these evidence, the following hypothesis has been tested:

> **H6**: EBL students experience a greater and deeper research culture compared to learners in traditional courses.

The degree of research integration in the learning context of students was measured by the application of the scale 'Research Culture', derived from the combined work of Verburgh and Elen (2011) and Visser-Wijnveen, Van der Rijst, and Van Driel (2016).
Independent t-tests were run to compare means of the two groups of learners, those who attended Luiss' EBL pilot and those who did not (in the case of H4, H5 and H6).
The quantitative model comprises as controlled variables, to rule out any potential source of biases in results, the following ones: level of students' self-esteem and gender of respondents.

EBL is designed in such a way to foster a sense of self-confidence and efficacy in students.
Presenting them with challenging tasks, students are tested and pushed further in their development process. By the end of activities, the feature of handing in a piece of work, of new knowledge created from scratch aims at making learners aware of the progress made and their abilities.

Studies show that such confidence building activities are an effective tool for promoting positive feelings and supporting students' basic psychological needs which are necessary to thrive and maintain motivation for sustained learning.
However, enhanced self-esteem is not only a product of this mode of learning, it is also a trait that pertains students' personality when entering the course and approaching activities, that can impact outcomes and performance.
According to Bandura's social cognitive theory, increased levels of self-efficacy contribute to a person's ability to complete a task; so high self-esteem could have an effect on learning achievements.
It is not clear whether high self-esteem would have a positive influence on performance or not: in fact, students that show higher scores on self-efficacy could show an over-reliability in their own research abilities and an unfruitful overconfidence.
A high degree of self-esteem surely affects self-reported measures, so it could impact as well reported measures of satisfaction or engagement, not only learning outcomes.
The construct was measured in the survey with the RSE scale of Rosenberg (10-items 7-points likert scale), with reverse items reconverted into regular ones.

According to Fung, Besters-Dilger and van der Vaart (2017), experiencing a research-rich culture benefits students by providing them a range of approaches to knowledge notions and knowledge production. These relate to the learning that occurs when undertaking the thematic interdisciplinary investigations. Benefits for students arise from the intellectual depth associated with engaging in any cutting-edge enquiries, and from the range of skills associated with independent and collaborative research.
Umbach and Wawrzynski (2005) found that the more faculty interacted with the students, the more students were challenged and engaged in meaningful activities. Also, students reported increased gains in personal/social development and general knowledge.
Students' of pilot courses are expected to score higher on personal and knowledge outcomes achieved throughout courses and feel more engaged in the activities and with the community, via developing a greater and more positive perception of research culture in their faculty.

According to a study of Gao et al. (2020) engagement is a mediator between the perceptions of blended learning courses (mixture of online and offline teaching methods and activities) and satisfaction.

Moreover, it has been proved that active learning pedagogy activities, and EBL is one of them, are significant factors that increase students' satisfaction with their individual and group learning processes (Hyun, Ediger and Lee, 2017) (see Figure 11).
Hence, I hypothesize the followings:

H7: Research culture mediates the relationship between teaching model (Enquiry-Based Learning vs. Traditional) and students' learning outcomes.

H8: Research culture mediates the relationship between teaching model (Enquiry-Based Learning vs. Traditional) and students' engagement.

H9: Engagement mediates the relationship between teaching model (Enquiry-Based Learning vs. Traditional) and students' satisfaction.

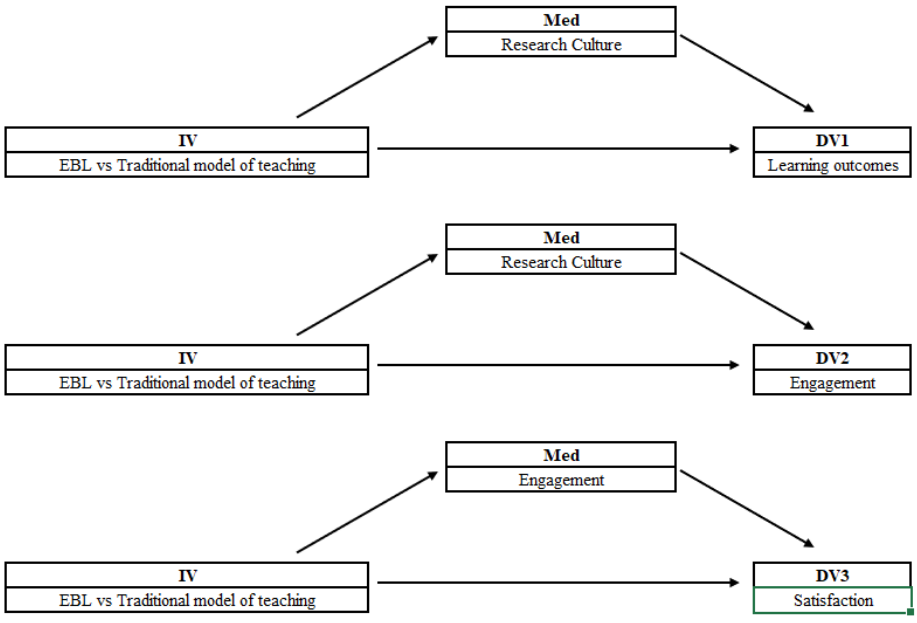

Figure 11. Mediation models.

2.3.3 Method and Design

Research Design implemented is conclusive to use statistics and research methodologies to increase the reliability of the information collected via interviews. It was a causal research aimed at inferring causality between EBL inputs and outcomes of students' perceptions and performances: that are learning outcomes, satisfaction and engagement level.

As suggested above a single factor two levels (EBL vs. Traditional) between-subject online quasi-experiment (students self-selected the experimental condition) was conducted with Luiss students from some Master programmes. Analyses of differences between groups of participants from two different scenarios were carried out. The two conditions were attending a enquiry-based learning master vs traditional master. Two surveys of 19 questions each, differing only on the language of content, have been designed and distributed to Luiss students on their first year of Luiss masters. Questions have been translated into Italian and English since students surveyed attended the following courses of study: English taught programmes of Marketing, Global Management and Politics, Law, Digital Innovation and Sustainability, Italian taught degrees of Gestione di Impresa, Marketing and Amministrazione, Finanza e Controllo. The sample of English courses comprised also Erasmus students. Students belonging to Marketing, Global Management and Politics, Law, Digital Innovation and Sustainability were those representing the enquiry-based learning group.

Surveys were distributed online via link, published on Luiss learn platform of some specific masters' courses: students were asked to answer in the first two weeks of May, after completing classes of the second semester of their first academic year.
The complete set of questions proposed, and measurement scales can be read in the Appendix 3.
In the Traditional mode of teaching, 105 responses have been recorded in total. After cleaning data from partial responses of who completed less than 50% of the questionnaire, 60 answers have been isolated. The complete set of constructs measured by the questionnaire have been registered and rated by these 60 responses.
In the EBL group , 85 responses have been recorded totally. Excluding partially completed sessions (completion < 50%), 42 responses have been isolated, with a completion rate higher than 50%. Of these, only 41 surveys have been highlighted to be considered in analysis, since 1 response was not comprising the complete set of measurement scales for the variables of the model.
To describe the sample and consider socio-demographics, another cleaning of registered responses have been implemented (keeping only 100% completed surveys), arriving at unique dataset of 98 observations (M_{age} = 24, SD =10.3; 53% Females).
36 students have been surveyed from AFC and Gestione d'Impresa courses (18 males, 14 females and 4 "Prefer not to say"), 10 from Global Management and Politics (3 males, 7 females), 12 from Law, Digital Innovation and Sustainability (5 males, 6 females and 1 not specified), 22 from Italian Marketing degree (6 males, 15 females, 1 not specified), 18 from English course of Marketing (6 males, 10 females, 2 not specified).

The Italian master's in marketing is characterized by both elements of pilot courses like research activities and projects in team for some subjects and elements of traditional education. To get clear cut differences and comparisons between EBL and traditional education methods, those 22 responses were excluded when running statistical tests of hypotheses.

Hence, in the analysis, the binary independent variable teaching mode comprised altogether students of non-pilot courses (36 observations) in the level "Traditional", and students in EBL programme (40 observations) in the level "EBL".

The survey (Italian and English version) has opened by asking respondents to complete a self-esteem measurement ($\alpha = 0.92$, Rosenberg 2004), to control the effects of this variable on the relationships between the IVs and DVs of the model. This procedure of controlling for sense of self-efficacy has been followed to rule out potential biases stemming from self-reported measures.

Students in both groups have been exposed by an initial priming writing task, consisting in presenting a brief description of the main activities in which they participated during the current academic year (2020/21) (100 characters minimum).

The following questions, asked participants to complete a series of measurements of their attitudes towards research, distinguishing positive attitudes ($\alpha = 0.95$; Griffioen 2020) from negative ones ($\alpha = 0.83$; Griffioen 2020); perceived research culture in the university ($\alpha = 0.90$; Griffioen 2020), general satisfaction with courses ($\alpha = 0.95$; Giner 2016); engagement ($\alpha = 0.93$; Zhoc 2019), separating ratings on cognitive, online, social engagement with teachers, social engagement with peers, beyond class, academic and affective engagement; learning outcomes ($\alpha = 0.96$; Zhoc 2019), differentiating between cognitive, social and self-growth outcomes. The measurement scales with the complete list of items are provided in Appendix 4. To check the manipulation of teaching model (Enquiry-Based Learning vs. Traditional), participates have been asked to indicate both their course of study and the language in which they were responding to the questionnaire.

2.3.4 Results and Findings

Test of the hypotheses

To test whether the groups of the IV (teaching model: EBL vs Traditional) differ on the DVs, a six independent samples t-tests were conducted (see Appendix 5) on the six main constructs measured in the survey (satisfaction, engagement, learning outcomes, positive attitude towards research, negative attitude towards research and research culture's perception).

EBL students ($M = 5.85$, $SD = 0.94$) compared to the participants in the Traditional courses ($M = 5.07$, $SD = 1.24$) have demonstrated significantly higher learning outcomes, $t(73) = -3.04$, $p = .003$. H1 considered in this study has been met (SPSS output in Appendix 5.1).

Students of the EBL course (M = 5.48, SD = 1.21) compared to respondents who did not attend an EBL CV (M = 4.81, SD = 1.66) have registered significantly higher satisfaction scores, t(74) = -2.02, p = .047, meeting H2 (SPSS output in Appendix 5.2).

H3 has also been met since students from the EBL programmes (M = 5.70, SD = 0.83) compared to those from the more traditional teaching modes programme (M = 5.00, SD = 0.96) have self-reported significantly higher engagement, t(74) = -3.33, p = .001 (SPSS output in Appendix 5.3).

Significantly higher means for perception of research culture in the university, have been registered for participants in the EBL programme (M = 4.83, SD = 1.71) compared to the participants in the Traditional courses (M = 3.89, SD = 1.75; t(74) = -2.36, p = .022), meeting H6 (SPSS output in Appendix 5.4).

Focusing on attitudes towards research, no significant statistical differences emerged between students from EBL and traditional teaching mode courses. Positive attitudes towards research: EBL students M = 4.92, SD = 1.64 vs learners of Traditional courses M = 4.29, SD = 1.41, t(74) = -1.77, p = .08 (SPSS output in Appendix 5.5). Negative attitudes towards research: EBL students M = 3.93, SD = 1.75 vs participants in Traditional courses M = 3.98, SD = 1.42, t(74) = 0.13, p = .90 (SPSS output in Appendix 5.6).

Breaking down constructs the following t-tests have been run.

Students of the EBL courses (M = 5.94, SD = 0.97) compared to respondents in Traditional courses (M = 5.13, SD = 1.32) have registered significantly higher cognitive learning outcomes, t(73) = -2.92, p = .005 (H1a has been met; SPSS output in Appendix 5.7).

Students of EBL (M = 5.83, SD = 0.98) compared to learners of Traditional programmes (M = 5.05, SD = 1.32) have reported significantly higher social learning outcomes, t(73) = -3.07, p = .003 (H1b has been met; SPSS output in Appendix 5.7).

Participants in the EBL condition (M = 5.76, SD = 1.05) compared to respondents of Traditional courses (M = 5.05, SD = 1.25) have demonstrated significantly higher self-growth learning outcomes, t(73) = -2.65, p = .010 (H1c has been met; SPSS output in Appendinx 5.7).

Since learning outcomes have been assessed based on self-reported measures, analysis of covariance has been implemented to control for high levels of self-esteem that could have influenced how students perceived to have performed on learning outcomes.

A one-way ANCOVA has been conducted to compare learning outcomes mean scores between groups of students attending pilot (vs traditional courses), controlling for self-esteem and gender variables. A binary gender variable has been coded for this purpose, registering values ‘0’ for males and ‘1’ for female respondents.

Normality checks and Levene’s test have been carried out and the assumptions have been met.

There has been found a significant (SPSS output in Appendix 5.9) main effect of the teaching model (EBL vs. Traditional) with students in enquiry-based learning having higher learning outcomes than students in traditional courses (M_{EBL} = 5.91, SD = ; $M_{traditional}$ = 5.18, SD = ; F(1,70)=8.57, p = 0.005). The covariate self-esteem has extremely little, although positive, effect in explaining the DV learning outcomes (p = 0.01). The factor "gender" has a non-significant effect on the DV (p=0.56).

The estimated marginal means table expresses the adjusted means (controlling for the covariate "self-esteem" and the factor "gender" of respondents) for each type of course, so that the effects of self-esteem and gender have been statistically removed.

The same ANCOVA test has been run to control the effect of self-esteem and gender on the DVs satisfaction (Appendix 5.11) and engagement (Appendix 5.13).

Levene's test equal variances assumption has been met also for satisfaction scores.

There has been found significant main effect of the type of programme on satisfaction with students in enquiry-based learning being more satisfied than those in traditional teaching mode (M_{EBL} = 5.42, SD = 1.21 vs. $M_{traditional}$ = 4.73, SD = 1.66; F(1,71)=3.97, p = 0.05), after controlling for self-esteem and gender.

The covariate "self-esteem" and the factor "gender" have a non-significant effect on the DV (p=0.66 and p=0.75, respectively).

ANCOVA has been processed to control self-esteem and gender effects on the relationship between type of course and engagement mean score. Levene's test equal variances assumption has been met also for engagement mean variable.

There has been demonstrated a significant main effect of type of programme on students' engagement with enquiry-based learning students being more engaged than those attending a traditional teaching mode (M_{EBL} = 5.67, SD = 0.83 vs. $M_{traditional}$ = 5.02, SD = 0.96 ; F(1, 71)= 11.3, p = 0.001), after controlling for self-esteem and gender.

The covariate "self-esteem" has a significant (p=0.000), although small positive effect in explaining the DV engagement. The factor "gender" has a non-significant effect on the DV (p=0.886).

Higher means have been registered by students of EBL on each subconstruct of the scale chosen to measure engagement, although mean differences (EBL vs. Traditional teaching model) are not significant for social engagement with peers measure, t(74)= -1.01, p=.31 (see Appendix 5.14).

Significant mean differences, between the EBL learners and the group of students in Traditional courses, have been found for academic engagement construct, t(74)= -2.02 p=.047, online engagement, t(74)= -3.76 p=.000, cognitive engagement, t(74)= -3.26 p=.002, social engagement with teachers, t(74)= - 3.55 p=.001, beyond class engagement, t(74)= - 2.07 p=.041, affective engagement, t(74)= - 2.08 p=.04.

Higher pilot group means compared to the non-pilot group, for each of the aforementioned constructs are reported in Appendix 5.14.

To compare means for the DVs between students attending different courses of study and spot differences between programmes, three different tests using one-way ANOVA procedure have been run on SPSS, using "Course of Study" as the IV and learning outcomes, satisfaction and engagement measures as DV each time.

A one-way ANOVA has been performed to compare the effects of five different studying courses on learning outcomes achieved. The test has revealed that there is a statistically significant difference in mean learning outcomes between groups ($F(4, 92) = 3.434$, $p = 0.012$; Appendix 5.15).

Planned comparisons showed that the mean value of learning outcomes is significantly different between the English course of Marketing (M=6.01, SD=0.91), who has tested the pilot programme, and AFC and Gestione d'Impresa students who have attended the most traditional type of CV between the master's degree considered (M=5.07, SD= 1.24)p = 0.032,]). This finding is perfectly in line with the result of the previous independent t-test run for the "pilot" binary variable, who ruled out the Italian Marketing course, since it is considered a mixed programme.

There has been no statistically significant difference in mean learning outcomes between AFC/Gestione d'Impresa and Global Management and Politics (p=0.951), between AFC/Gestione d'Impresa and Law, Digital Innovation and Sustainability (p=0.100), between AFC/Gestione d'Impresa and Italian course of Marketing (p=0.075).

There has been no statistically significant difference in mean learning outcomes between Marketing in English and Global Management and Politics (p=1.000), between Marketing in English and Law, Digital Innovation and Sustainability (p=1.000), between Marketing in English and the Italian course of Marketing (p=1.000).

There has been no statistically significant difference in mean learning outcomes between Global Management and Politics and LDIS (p=0.663), between Italian course of Marketing and LDIS (p=1.000), between GMP and the Italian course of Marketing (p=1.000).

A one-way ANOVA has been performed to compare the effects of five different master courses on students' satisfaction (Appendix 5.17). The test has revealed that there is no statistically significant difference in mean satisfaction between groups ($F(4, 93) = 1.258$, $p = 0.292$).

To test effects of the five disciplines on students' engagement, the last one-way ANOVA has been run (Appendix 5.18). The test has revealed that there is a statistically significant difference in mean engagement between groups ($F(4, 93) = 1.258$, $p = 0.292$).

The mean value of engagement is significantly different between the English course of Marketing (M=5.88, SD=0.76), who has tested the pilot programme, and AFC and Gestione d'Impresa students

who have attended the most traditional type of CV between the master's degree considered (M=5.00, SD= 0.96) (p = 0.008, 95% C.I. = [-1.58, -0.16]). Again, this finding follows the result of the previous independent t-test run for the "pilot" binary variable.

There has been found also significant difference in average engagement between AFC/Gestione d'Impresa and Law, Digital Innovation and Sustainability (p=0.049).

No statistically significant difference in mean engagement has been registered between AFC/Gestione d'Impresa and Global Management and Politics (p=0.97), between AFC/Gestione d'Impresa and Italian course of Marketing (p=0.22), or between GMP and LDIS (p=0.46), between GMP and English Marketing course (p=0.29).

There has been no statistically significant difference in mean engagement also between LDIS and Italian or English course of Marketing (p =0.85 and 1.000 respectively).

Process Model 4 has been launched in SPSS (see Appendices 5.20/21/22), to test H7 and H8, investigating whether research culture acts as a mediator in the relationship between type of course and the DVs students' total learning outcomes and engagement, respectively.

In both cases, a significant result has been registered in SPSS outcome.

For H7, the indirect effect of the predictor variable teaching model (EBL vs. Traditional) on total learning outcomes, via research culture, has been found to be statistically significant [Effect size given by coefficient B= 0.3070, 95% C.I. (0.03;0.68)]

The indirect (mediated) effect of type of teaching model (EBL vs. Traditional) via research culture on engagement of students has been found significant, B = 0.26, CI = 0.04 to 0.53. H8 has been confirmed.

To close the analysis and test (H9) whether engagement mediated the effect of type of course on satisfaction, a series of bootstrap mediation analyses has been conducted (Hayes, 2013, model 4) with 5,000 re-samples and bias-corrected 95% confidence intervals (CIs).

The indirect effect of the predictor variable teaching model (EBL vs. Traditional) on students' satisfaction, via engagement, has been found to be statistically significant [Effect= 0.61, 95% C.I. (0.23;1.10)]. H9 has been confirmed.

3. Conclusion

3.1. Contributions.

This study contributes to research on Enquiry-based learning and proves, both qualitatively and quantitatively, the effectiveness of the research-based model as implemented in Luiss for the Pilot courses of the academic year 2020/21.

Two constructs of the RAVE-Q scale have been used to compare students' perceptions of research integration in higher education between those who attended a research-based CV and those who took part in traditional courses. Substantial differences between these groups were found in research attitudes (although non-significant) and research context (statistically significant results), displaying pilot students reporting higher means of positive attitudes towards research, lower means for negative attitudes towards research and higher score for perception of research culture at university, compared to learners in non-pilot (Traditional) courses.

Interesting results have been found looking at the research culture scale: students in EBL courses appear to value a lot and more compared to the group of learners attending traditional courses, for their learning experiences, the presence of research in their faculty ("I experience benefits from the presence of research in the courses of my university" $M_{EBL} = 5.00$, $SD_{EBL} = 1.78$ vs. $M_{traditional} = 3.83$, $SD_{traditional} = 2.07$, $t(74)= -2.63$, $p=0.01$; "the research culture at my university stimulates my learning", $M_{EBL} =5.28$ $SD_{EBL} =1.72$, $M_{traditional} =3.89$ $SD_{traditional} = 2.02$, $t(74)= -3.22$, $p=0.002$).

Students of research-based courses have registered significantly higher means for satisfaction towards courses. This insight has important operative implications for the management bodies of the institution, responsible for the choice of implementing a specific type of teaching model to courses. Students are the first stakeholders and customers in the market of private higher education.

Since private universities are businesses, having a satisfied and pleased customer base is a priority. It lowers attrition and abandonment rate and has the potential to create a virtuous cycle of positive WOM, attracting novel students

Satisfied customers become a source of good and (partially) free advertisement, helping build reputation for the institution in the market for education.

This is true now more than ever: in today's world, the new trend that almost everyone is using to make a decision on whether or not to buy a service/product is reviews and recommendations.

The simple reason for this to occur is that there is so much advertising and options that the customer gets overwhelmed and delays his or her decision making. Reputation management is fundamental to be implemented nowadays and must be a focus point in marketing efforts.

"One customer, well taken care of, could be more valuable than the 10,000$ worth of advertising."

~ **Jim Rohn, Entrepreneur Author**

"Courteous treatment will make a customer a walking advertisement."

~ **James Cash Penney, Founder J.C. Penney Stores**

Since Pilot students appear to be more satisfied than other learners, the decision-making bodies for curricula design should implement such type of courses, in which research activities lead the way for positive and effective learning experiences.

Students in the enquiry-based programmes registered also higher means for engagement and learning outcomes compared to learners of traditional masters.

According to Barnett and Coate (2005), learning is part of a deeper sense of self, made up of knowing, acting and being. This perspective should help departments orientate themselves even more actively towards creating courses in which personal engagement is cultivated. Curriculum is more than subject content, intended learning outcomes and taught classes. It is "curriculum-in-action, which is the interplay of all those involved" and active engagement helps to prepare students to have agency in the world.

By achieving learning outcomes that are both personal, of self-growth, social and cognitive, and goals of knowledge advancement, evaluation and application to multiple contexts, students of Luiss' pilot courses have registered to be more prepared to gain powerful knowledge.

According to Harland and Wald (2018), this would allow them to: evaluate arguments critically as requested in the modern society of exponential speed of change and threatened by misinformation, apply knowledge beyond specific fields proving a creative, innovative and multidisciplinary approach to problems, become responsible citizens who are able to get involved and participate actively to matters of public importance. Findings suggest that EBL students are better trained for a future job setting and for making an impact with their community and society issues at large.

Luiss' case has proven to be effective in developing stronger creative and critical thinking, deeper subject knowledge (higher means for cognitive outcomes' scale), better people management, communication (higher means for social outcomes' measure), time management, leadership, collaboration skills and higher level of autonomy, compared to students of traditional courses.

It is still not clear, however, what variables, if any, moderate the relationship between type of teaching model (EBL vs traditional) and students' satisfaction, learning outcomes and engagement.

The empirical results point out that in order for EBL courses to be successful, the university should foster a research-rich culture. It has been proved that research-based masters have a positive effect on learning outcomes and engagement via a strongly perceived research culture by students attending such programmes.

A profound and genuine culture of research values can be created by introducing students to the research department and its topics of investigation, enhancing dialogue and exchange opportunities with teachers and practitioners, continuously expose students to multiple views of the world by promoting interdisciplinary activities, seek to build a democratic meeting place where the encounter of diverse insights creates opportunities to develop new competencies, knowledge and understandings, increase opportunities for collaborative learning, introduce students to current research and involving them in its practices and findings, as part of the overall design of the programme.

Students' satisfaction also benefits from the implementation of enquiry-based courses via the increased engagement fostered in active learning activities, like group projects, laboratories, and discussions.

The findings contribute to the literature on academic change and are relevant for those concerned with the design and implementation of such change in universities and higher education organizations in general terms.

3.2 Limitations

With its diverse student population, the setting of this study has provided a large and interesting sample of respondents, comprising six different master's courses. However, even this large sample has registered a small response ratio, compared to total numbers of learners enrolled. Therefore, this study does represent a precious informative base, but it cannot really be generalised to a larger student body: size of the sample has been a major limitation, since only 105 students participated to the survey. Moreover, groups of learners for each specific course of study have not been balanced in numerosity, to provide sounded statistical comparisons between disciplines and master courses.

Furthermore, some restrictions should be considered when interpreting these results. The instruments used to measure students' experiences, performance and perceptions were self-reported scales. Although controlling for the variable "self-esteem", other potential sources of biases have not been taken into account in statistical tests.

It must also be noted that the implementation of research activities is still a recent development in many universities and diverse modalities can be implemented with different effectiveness' ratios on

the basis on the specific context and community of students. This study has not differentiated between research-based activities to test their different degree of effectiveness on students' performance, learning outcomes and satisfaction level with the courses.

3.3 Implications for Further Research.

Following the model of Powerful Knowledge of Harland and Wald (2018), research-based CVs, by creating the foundations and inputs for students exposed to this mode of learning to develop knowledge that can be extended to infinite contexts and put at the service of society's issues, have the potential to be fruitful and virtuous also considering a wide time span. Beneficial effects of this "ethical" perspective on university and knowledge creation process are likely to be protracted in the long run. Further research should focus on measuring and comparing effects of EBL over time, to see whether this is the case.

Further investigation should also go deeper in analysing whether and how the efficacy of this active learning mode based on research activities is specific and more related to some disciplines compared to others. This study, since it has considered the Luiss' application, has focused on social sciences. It could be interesting to analyse other fields of study like scientific sciences or engineering courses.

Future studies should aim to include also a focus on specific research-based activities to test if there is any difference in the effects of type of research project/task implemented on students' satisfaction or learning outcomes achieved.

Finally, further investigations should deeper the actual understanding of causal relationships between the IV and DVs of this model: since there is no clear answer on what variables, if any, moderate the relationship between type of teaching model (EBL vs traditional) and students' satisfaction, learning outcomes and engagement or whether other inputs (not considered in this paper) are involved in the link between pilot courses and learning outcomes achieved, research should address and cover such grey area.

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Appendices**:**

Appendix 1: Example of Idiographic Analysis of Interviews.

Interview #8.

Giulia, with a bachelor's in political science at Luiss (Italian course), did not want to limit herself to politics since she was still uncertain about future aspirations. She wanted to stay grounded on real business dynamics and this program was appreciated giving her an eye of reality. She liked when notions where recent and rooted in the actual organizational and economic context. She started her master loving the traditional approach of theory and manuals, but she acknowledged that a change was useful and needed to be more prepared for the future work environment. According to her, potential threats posed by IBL were lack basic knowledge, giving for granted many concepts or feeling lost without a clear outline. This could be overcome by following a logic sequence of notions and papers. She acknowledged the need to follow a rigorous method in doing research: this was challenging but satisfactory as a process. Although she is not very interested in becoming a researcher, she thinks it is fundamental to apply knowledge created by research to understand other contexts. The engagement in class was a major part of the program, she felt incentivized to participate by teachers and involved in the dialogue with them and peers. She found it useful to learn to collaborate and make people function well in a team. By the end of this first semester she feels more pragmatic, concise, inductive and engaged in real-life discussions.

Keywords: participation, engagement, basic knowledge, theory, organizational and economic context, logic sequence, outline, rigorous method, satisfactory, dialogue, collaborate, pragmatic, inductive, real-life discussions.

Appendix 2: Example of Coded Interview Transcript.

Interview #8.

S: Giulia io mi sto occupando di questo progetto di innovazione didattica. Il corso a cui tu sei scritta è un corso che appartiene ad un Pilot, che stiamo conducendo su alcune metodologie didattiche innovative. Il tuo nome l'ho ricevuto dal professor Giustiniano, che è uno tra i docenti di questo corso di Global Management and Politics, che ha fornito delle indicazioni di persone da sentire riguardo al vostro corso di studi. Quindi l'idea è un po' di raccogliere qualche feedback ed opinione in merito a questo semestre che si è appena concluso. Allora la prima cosa che ti chiederei è un po' di fare un inquadramento di te, tipo un po' del tuo background e perché sei arrivata a questo corso.

G: io ho studiato scienze politiche in triennale e volevo fare, in magistrale, una facoltà che non mi chiudesse troppo sulle relazioni internazionali, perché non ero ancora, e non sono ancora sicura, di quello che voglio fare dopo e quindi non sapevo se, e non so, se andare nel pubblico o nel privato. Volevo fare una cosa che mi permettesse di avere più porte possibili aperte e volevo un background anche un po' più economico, per essere anche più preparata da un punto di vista lavorativo, per un'eventuale azienda in caso.

S: l'hai fatta alla Luiss?

G: sì, scienze politiche l'ho fatta alla Luiss.

S: ok, in italiano o in inglese?

G: l'ho fatta in italiano.

S: quindi poi alla fine piuttosto che continuare su un insegnamento di scienze politiche, hai deciso di andare in questo campo più ibrido insomma, che unisce i due dipartimenti. Raccontami un po' qualcosa di questo semestre, quindi in riferimento ai corsi. Come hai lavorato sui vari corsi, come ti sei trovata. Un po' una sintesi del semestre.

G: per quanto riguarda le quattro materie fondamentali… partendo da quella del professor Giustiniano, è stata molto interessante. Nel senso che è molto molto, almeno da quello che ho visto io, attenta alle dinamiche che sono presenti e future nel breve termine. Quindi dà un po' un punto di vista che serve in questo momento secondo me, per quanto riguarda appunto il contesto aziendale e dell'innovazione, in generale dell'economia e delle organizzazioni. Quindi quella è stata fondamentale ed è stata comunque anche molto, non dico facile da studiare, però comunque una volta che eri inserito nel contesto, andavi a lezione, riuscivi a seguire e prendere appunti, dal punto di vista nozionistico era facile apprendere. Quindi ho apprezzato molto questo metodo, perché comunque non sentire troppo troppa fatica. All'inizio i papers mi sembrano tanti e pensavo di magari essere un po' sopraffatta dalle cose, però mi sono resa conto che una volta che li avevo letti e che insomma a casa riguardavo gli appunti, effettivamente riuscivo ad apprendere a capire quale fosse il fulcro di quello che professore voleva comunicare insomma.

S: in triennale avevi già ha avuto uno studio di questo tipo? Cioè sui papers, oppure avrei avuto uno studio più tradizionale?

G: no, per niente. Molto nozionistico, molto sul manuale, che tra l'altro io apprezzavo, quindi è stato un po' un cambio. Ho avuto anche un po' paura di non riuscire a sapermi muovere con questo nuovo metodo. Per adesso mi mancano ancora due esami, quindi ancora non parlo, però sembra funzionare. Mi sto insomma approcciando abbastanza bene, per ora.

S: ok e le altre materie?

G: allora, per quanto riguarda Political Economy o Globalisation, più o meno simili diciamo come papers da leggere, non mi sono trovata tanto bene. L'esame fortunatamente è andato bene comunque, però secondo me i papers erano un po' datati, rispetto alla situazione economica e della globalizzazione attuale. Anche i termini che erano utilizzati nei papers, erano un po' antiquati, non parlo di anni 80, parlo già di dieci anni fa che comunque il mondo era un posto diverso. questo a mio avviso. Quindi lì non mi è piaciuto tanto il corso e secondo me è stato poco utile poi per le finalità che possono derivarne. Principalmente appunto per questo fatto dei materiali.
Per quanto riguarda le argomentazioni, poi può essere utile nello studio dell'ambiente, del rapporto tra ambiente ed economia e delle esternalità. Quindi da quel punto di vista, può essere, cioè è importante studiarlo secondo me. Però forse è stato mancato un po' l'obiettivo. Per quanto riguarda Managerial Economics, a me serviva una base di questo tipo, perché avevo fatto micro e macro in triennale e quindi mi serviva un approccio più diretto nei contesti insomma aziendali ed economici globali. Quindi è stato molto utile, perché comunque la sto tuttora studiando, quindi ancora in realtà non ho completato il tutto, però mi sono trovata a capire delle dinamiche che prima non conoscevo, perché magari a scienze politiche avevo studiato anche bene macro e micro, però proprio il contesto delle relazioni, di come appunto le aziende si influenzano e il rapporto appunto tra Stato e aziende in un contesto più internazionale, globale, mi mancava. Quindi è un po' l'approccio poi al concreto che magari in triennale mancava e che ha posto giusto le basi

S: ok, spiegami un po' questo passaggio. La prima cosa che mi interesserebbe capire è, al di là di quello che poi potevano essere un po' i tuoi timori, come tu percepisci diversamente il metodo di lavoro e di studio tra triennale e magistrale e soprattutto questa cosa a cui hai fatto riferimento in questo momento, cioè dell'aspetto più pratico verso meno pratico. Apparentemente da questa prima parte dell'intervista sono un po' degli elementi che caratterizzano il passaggio no? Che discriminano tra i due percorsi. Come li hai vissuti e quali sono secondo te i vantaggi e gli svantaggi di questi?

G:io ero diciamo preparata a questo cambiamento, quindi sapevo insomma che avrei dovuto cambiare approccio diciamo e metodo. Io amo i manuali, mi piace studiare sul libro di diritto, e pagina dopo pagina.
Mi rendo conto che però non serve solo quello, cioè secondo me una triennale di base fatta in questo modo e poi una magistrale, in cui effettivamente c'è un approccio molto più pratico che ti inserisce poi nel contesto reale, del mondo reale, è molto utile. Quindi una triennale in questo modo ti dà la base per poter affrontare poi i contesti che servono. Quindi secondo me, pro e contro, dipende da quello che stai affrontando in quel momento. Se ti servono basi nozionistiche, perché non conosci ancora quello che stai studiando è meglio un approccio più da manuale, se invece poi, dopo che ha maturato diciamo delle nozioni di base e sei pronto poi per entrare in un futuro in un contesto

lavorativo, è molto meglio l'approccio più didattico come quello attuale di Global Management and Politics. Quindi io personalmente lo apprezzo. Poi è difficile magari a stare dietro a tutti papers. A volte uno può sentirsi veramente sopraffatto. Però mi sono resa conto che comunque la mole di studio riesco a gestirla meglio in questo caso.

S: come ti sei trovata, ad esempio, in termini di engagement? Cioè il tipo di approccio della triennale era un approccio che ti coinvolgeva come studente? Oppure ti coinvolge più questo tipo di approccio? Cioè come ti ponevi con queste diverse modalità?

G: diciamo che in triennale in teoria potevo essere meno coinvolta, nella pratica era un gruppo molto, almeno nel canale, che si interveniva insomma, si partecipava molto. Quindi si cercava comunque di avere quell'approccio che si ha in Global Management e chiaramente adesso c'è un coinvolgimento maggiore, sia perché siamo di meno sia perché comunque siamo spronati di più da alcuni professori, ad intervenire di più e quindi adesso il coinvolgimento è ovviamente maggiore.

S: quale potrebbe essere il rischio, quali potrebbero essere i vantaggi di lavorare così modello magistrale sin dalla triennale?

G: secondo me il rischio è che, dipende poi dal tipo di facoltà, almeno parlando di scienze politiche, che è quella che ho fatto io, non studiare su un manuale o comunque non avere un approccio un po' didattico, all'antica, su per esempio diritti e studio proprio di libri e di lettura di libri, che sono fondamentali, anche di storia della politica o proprio di storia contemporanea, possono portare magari a una mancanza poi di effettive conoscenze. Perché comunque si possono dare per scontate alcune cose. Invece comunque sul manuale uno ha una base. Soprattutto se è uno studente appunto che è appena arrivato, magari in triennale, e non ha un metodo di studio troppo completo, senza il manuale ci si può sentire persi. Mentre il manuale ti dà le nozioni che puoi andare a ricercare e l'approccio secondo me nozionistico è apprezzabile in tal senso.

S: Come ti sei trovata con i papers nelle varie materie, quanto li hai apprezzati, quanto non ti sono piaciuti e quindi un po' il tuo rapporto con i papers e con la conoscenza scientifica che viene dalle riviste insomma

G: secondo me, dipende un po' dalle materie, appunto quelli di Managerial Economics e di Global Design sono stati maggiormente apprezzati da me, almeno perché avevano effettivamente una sequenza logica importante, che ti permetteva di capire bene nel complesso quale fosse l'obiettivo del corso. Dell'altra materia meno, ho notato meno diciamo concisione nei contenuti secondo me. Quindi dipende…

S: in generale a te come studente, prescindendo anche un po' dalle questioni delle singole materie, quanto ti piace leggere papers, cioè trovi che sia un'attività stimolante? Ti piace vedere come si fa ricerca; è positivo questo rapporto, indipendentemente dalle materie, oppure è più neutro e quindi in un qualche modo non è che hai celebrato diciamo così l'abbandono dei manuali?

G: secondo me è comunque molto utile, perché ti permette appunto di entrare nel vivo poi delle dinamiche che esistono quindi a me piace. È un po' difficile stargli dietro perché comunque ogni settimana ce ne sono di nuovi, alcuni dei quali sono lunghi, l'inglese è magari in alcuni più difficile, quindi non è facile, nel senso che non sempre sono riuscita ad apprezzarli. Però mi rendo conto comunque della loro utilità e alla fine sforzandomi un po' di più effettivamente ho capito nel complesso gli obiettivi

S: Rispetto ai docenti. Similarità, differenze rispetto a quelli della triennale, la loro vicinanza alla ricerca. Come ti sentiresti di sintetizzare questo primo semestre?

G: dunque molta vicinanza agli studenti, pronti al dialogo, in qualche modo. Sarà che io poi, avendo diviso in due gruppi comunque la classe, diciamo il canale, effettivamente eravamo proprio più spronati ad intervenire, a parlare con loro e anche loro effettivamente si prodigavano morto nel chiederci come stessimo, come stesse andando, come a fare domande. Ci incentivavano a fare domande. Quindi a differenza della triennale, molta più attenzione appunto ai feedback degli studenti e a farci capire effettivamente bene ciascuno appunto se avevamo un problema. Molta attenzione, molta vicinanza… questo posso aver notato. Quindi, da parte mia appunto, valutazione positiva in questo senso. Per quanto riguarda il loro inserimento nella ricerca…

S: hai percepito un ambiente dal punto di vista della ricerca vivace? Ad avere a che fare con docenti, che in qualche modo sono come dire attivi nella ricerca, nei settori in cui si trovano, che sensazione hai avuto?

G: questo sì, molto. Perché comunque ci parlano direttamente di quello che poi loro hanno magari studiato negli anni. E quindi a me è stato trasmesso un po' di questo e ne sono stata contenta

S: parliamo invece di te come ricercatore. Quindi tu, il tuo lavoro di ricerca, il tuo lavoro in team. Quindi questa parte del semestre, dove tu non sei stata soltanto, come dire, uno studente e quindi hai letto la ricerca di altri diciamo così, ma la ricerca l'hai anche fatta, ok? Cosa puoi dirci di questa esperienza?

G: molto impegnativa, perché comunque almeno con il gruppo si parla appunto di laboratori di ricerca sociale, di metodi di ricerca sociale. Non è stato semplice, né poteva essere preso con leggerezza, perché comunque è un lavoro da fare appunto con un certo criterio. Cioè con certi criteri che andavano rispettati. Quindi non solo di raggiungimento degli obiettivi e quello che si voleva dimostrare, ma anche di rispetto di certe specifiche che dovevano essere mantenute, per essere ben valutato. Quindi faticoso, però a me ha dato molta soddisfazione. Almeno il nostro oggetto si è incentrato sull'organizzazione strutturale di Enel e il fatto delle interviste ci ha permesso di conoscere bene anche appunto i dipendenti di questa azienda. Quindi siamo stati, almeno il mio gruppo, inseriti proprio in un contesto che avevamo interesse a vedere e che ci ha aiutato a conoscere come funziona almeno questa azienda. E secondo me è fondamentale appunto per una facoltà del genere, in cui appunto uno vorrebbe essere spronato a entrare nel vivo delle cose, di questi contesti quindi questo è stato il nostro. Poi del rapporto con il team appunto anche lì un po'… con otto persone, eravamo nove anzi, è un po' più, non dico difficile da gestire, ma comunque nuove persone, che devono prendere decisioni… a un certo punto può essere complicato. Però, nel complesso, positivo ecco. Ha tolto forse tanto tempo anche alle altre materie, quindi un po' ci deve essere forse un bilanciamento, però comunque è stato un laboratorio utile per quanto mi riguarda.

S: qual è la parte che più ti è piaciuta di questo progetto e qual è la parte che fino a questo momento, in base alla tua esperienza, più ti piace della ricerca?

G: l'intervista mi è piaciuta più di tutto. O almeno l'intervista e quello che ne esce fuori, quindi raccoglimento dei dati e poi l'analisi di quelli, i risultati che si possono trarre da quelli

S: questo laboratorio, quindi al di là del fatto che è stato faticoso, sicuramente molto impegnativo, quali sono i messaggi più importanti che ti lascia?

G: beh, quello. Il fatto che appunto una volta che uno decide di fare una ricerca qualitativa, bisogna approfondire molto il tema che si sta scegliendo. E quindi mi ha insegnato almeno come affrontare un certo tema di ricerca, come andare in profondità e come affrontare lo studio. Tutte le caratteristiche appunto che deve avere una ricerca sociale e qualitativa. È stato utile perché comunque abbiamo capito quali sono i punti da dimostrare, quando si ha un obiettivo, e come dimostrarli. Quindi molto pratico ecco.

S: quanto ti piacerebbe un lavoro di ricerca in futuro? Quanto pensi che la ricerca, sia tu che in qualche modo produci ricerca che tu che leggi ricerca, cioè quanto la vorresti centrare nel tuo futuro?
,
G: allora, ora come ora, non penso di farlo. Non mi interessa troppo, però mi lascio comunque…dipende insomma dal tipo di ricerca. Perché se dovessi approfondire la ricerca, io passerei un po' più invece alla ricerca, quella più incentrata sulle scienze politiche, piuttosto che quelle economiche e del management quindi

S: quindi potrebbe pure essere ricerca ma in un altro contesto. D'altro lato quanto pensi che, in qualsiasi contesto, sia questo delle scienze politiche, sia questo del management, quanto pensi che ad esempio leggere ricerca, quindi in un qualche modo, leggere papers, quindi continuare sempre ad avere sotto controllo le riviste e così via, possa essere importante nelle professioni?

G: secondo me è fondamentale, perché uno conosce anche il punto di vista degli altri e di quello che sta accadendo appunto intorno a noi, per non focalizzare soltanto la ricerca su sé stessi o su qualche tema che può interessare alla singola persona. Se uno deve conoscere bene il contesto, può farlo soltanto attraverso lo studio, la ricerca, anche basata su altri testi e quindi…

S: ti è capitato, durante questo semestre, di voler personalmente approfondire qualche tema o qualcosa oltre, diciamo così, quello che era richiesto dalle attività che facevi?

G: a me è capitato, ho cercato di farlo, Purtroppo non sono riuscita quanto vorrei. Però è una cosa che vorrei incrementare, nel secondo semestre, se riuscissi ad avere un po' più di tempo. Mi piacerebbe approfondire o comunque dedicarmi proprio alla lettura, a un approfondimento, oltre i papers che ci sono…

S: quali sono i topics, in questo momento, di tuo maggiore interesse?

G: in generale?

S: sì, tu a cosa sei interessata? Cioè le tue passioni legate ovviamente allo studio e le cose che stai facendo nel programma. Dove si collocano le tue passioni in questo programma?

G: in questo programma, visto che comunque è interdisciplinare, posso menzionare sia la parte diciamo più economica e dello studio dei rapporti internazionali economici tra Stati, però anche tra aziende, in particolare questi nuovi colossi che stanno un po' nascendo, che vanno… la parte diciamo della regolamentazione dell'innovazione con queste nuove aziende come Amazon, Google, Youtube, Twitch. Siamo secondo me in un momento di transizione e va capito in che modo incanalare questa regolamentazione e dal punto di vista della politica a me interessano sempre insomma le relazioni internazionali e il contesto più storico e geopolitico.

S: ok, perfetto. Venendo a te, come ti senti cambiata, trasformata o comunque influenzata da questo semestre e dalle attività che hai fatto?

G: sono diventata un po' più pratica e pragmatica. Mi interesso di più, perché comunque… anche appunto della parte economica, che prima tralasciavo un po' di più. Sono ancora un po' confusa sul futuro, però mi rendo conto che sto cominciando a capire meglio il contesto aziendale, che prima non conoscevo e quindi non mi interessava. Adesso invece conosco e comincio a interessarmi molto di più.

S: ok, questo sempre legato alla tua professione, alla ipotetica professione o comunque allo studio. Invece da un punto di vista personale, di disposizioni personali, di skills personali, questo semestre ti ha aiutato in quale direzione?

G: lo studio in inglese e di cose più pratiche in generale mi ha portato ad avere un approccio diverso e a capire meglio come affrontare i singoli problemi nello studio. Cioè non studio più in maniera troppo nozionistica, cercando di capire generalmente quello che succede ma vado direttamente al punto. Qual è l'obiettivo che vuole trasmettermi questo paper o questa lezione del professore Giustiniano e quindi vado direttamente a quello. Poi utilizzo insomma un metodo più induttivo che deduttivo ecco, quindi molta più praticità e pragmaticità sulle cose.

S: ok, teamwork! Eri già abituata a fare lavori di quel tipo, cioè è stato per te nuovo lavorare in team con i colleghi, avevi già fatto esperienze di questo tipo di lavoro in team?

G: poco, perché a scienze politiche si fa meno. Secondo me è stato molto bello cioè anche molto utile, perché comunque devi collaborare con gli altri, devi capire come far funzionare il gruppo. Positivo, però non avevo esperienze in tal senso.

S: rispetto a quando sei arrivata a questo corso e lo hai scelto, questo primo semestre, c'è un fit delle tue aspettative con la realtà? Ti aspettavi qualcosa di diverso? Come si pone rispetto al mindset con cui sei arrivata al corso?

G: ma, in realtà, non esattamente quello che mi aspettavo, ma molto vicino. Effettivamente leggendo poi la descrizione del corso prima di sceglierlo, mi sembra che rispecchi effettivamente quello che c'è scritto e quello che mi aspettavo.

S: quali sono gli elementi di differenza che hai notato?

G: rispetto a quello che mi aspettavo, forse giusto qualche contenuto degli esami.

S: non so se c'è qualcosa, giusto per chiudere questa chiacchierata, che possa secondo te, sintetizzare questo semestre. E che faccia una sintesi della tua situazione con riferimento a questo semestre. Una storia, un evento, qualcosa che in qualche modo possa essere usato un po' in maniera conclusiva

G: un evento, per esempio un incontro?

S: una cosa che ti viene in mente che, secondo te, può sintetizzare bene, cosa è successo a te, durante questo semestre.

G: io menzionerei l'incontro con il professor Cesbro organizzato dal professor Giustiniano. Quello secondo me sintetizza un po', perché da un lato ci ha portato a conoscere appunto un professore comunque di rilievo di un'università appunto negli Stati Uniti che poi appunto è l'inventore dell'open innovation, e quindi due cose: da un punto di vista accademico, molto apprezzabile, perché ci porta appunto conoscere i personaggi di rilievo in tal senso e, dal punto di vista pragmatico, proprio conoscere e capire quello che stavamo studiando, attraverso la persona che appunto l'aveva ideato. Quindi questo può sintetizzare diciamo l'apprezzamento del corso e quello che lo ha caratterizzato principalmente. Quindi pragmaticità e anche un poterci mettere effettivamente in contatto con i contrasti reali.

S: perfetto, grazie mille.

Appendix 3: Survey Questions (English version).

INTRO

Dear participant,
We are part of Luiss new Education Development Unit, a unit interested in studying teaching and learning.

We would be grateful if you could take few minutes of your time to complete this survey. Your responses will remain COMPLETELY ANONYMOUS and will be used only for the scope of the research.

Please, remember that there are no right or wrong answeres, what counts for the study's success is only your opinion.

intro_control

Before we start, we would like to know something about you

Control_personaltrait

Please indicate on a scale from 1 (strongly disagree) to 7 (Strongly agree) to what extent do you agree with the following statements about yourself:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I am able to do things as well as most other people	○	○	○	○	○	○	○
On the whole, I am satisfied with myself	○	○	○	○	○	○	○
I feel that I have a number of good qualities	○	○	○	○	○	○	○
I never think I am no good at all	○	○	○	○	○	○	○
I never feel useless	○	○	○	○	○	○	○
All in all, I am inclined to think that I am a success	○	○	○	○	○	○	○
I feel that I'm a person of worth	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I feel I have a lot to be proud of	○	○	○	○	○	○	○
I have respect for myself	○	○	○	○	○	○	○
I take a positive attitude toward myself	○	○	○	○	○	○	○

Thanks for answering about yourself, now let's go to the object of this study

Priming

Considering the current academic year (2020/2021), can you please describe in few words the main activities you took part in? (minimum 100 characters)

Learning outcomes

After this first academic year, please rate on a scale from 1 (not at all) to 7 (very much) how much you belive to have developed the following skills:

	1 (not at all)	2	3	4	5	6	7 (very much)
Communicating effectively with others	○	○	○	○	○	○	○
Viewing things from a global perspective	○	○	○	○	○	○	○
Ability to have critical self-reflection	○	○	○	○	○	○	○
Dealing with unfamiliar problems	○	○	○	○	○	○	○
Effective time management	○	○	○	○	○	○	○
Life-long learning	○	○	○	○	○	○	○
Thinking creatively	○	○	○	○	○	○	○

	1 (not at all)	2	3	4	5	6	7 (very much)
Developing in-depth knowledge in my area of study	○	○	○	○	○	○	○
Getting along with people of different backgrounds	○	○	○	○	○	○	○
Understanding of others	○	○	○	○	○	○	○
Learning a new skill or knowledge autonomously	○	○	○	○	○	○	○
Working collaboratively with others	○	○	○	○	○	○	○
Upholding personal and professional ethics	○	○	○	○	○	○	○
Leadership skills	○	○	○	○	○	○	○
Thinking analytically and critically	○	○	○	○	○	○	○

Attitudes toward research

Please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I find research for professionals fits me	○	○	○	○	○	○	○
I find research for professionals appealing to me because I can discover things myself	○	○	○	○	○	○	○
I find research for professionals an exciting way to learn something	○	○	○	○	○	○	○
I find research for professionals appealing to me beacuse I can develop new ideas/projects/designs	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I find research for professionals appealing to me, since it provides something reliable	○	○	○	○	○	○	○
I find research for professionals fascinating because I can decide on the topic	○	○	○	○	○	○	○

Please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
Research gives me doubt, because I do not know if I can do it properly	○	○	○	○	○	○	○
Research makes me insecure, because I do not know in advance what the result would be	○	○	○	○	○	○	○
Research mainly gives me stress	○	○	○	○	○	○	○

Research culture

Please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
The research reputation of my university played a role in my choice of education	○	○	○	○	○	○	○
The research culture at my university stimulates my learning	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I experience benefits from the presence of research in the courses of my university	○	○	○	○	○	○	○
I experience a research culture through the courses of my university	○	○	○	○	○	○	○

Satisfaction

Thinking about your overall experience with Luiss' courses during this academic year, please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I think I did the right thing when I enrolled in this university	○	○	○	○	○	○	○
Overall, I am pleased with the courses offered by this university	○	○	○	○	○	○	○
The courses offered by my university met my expectations	○	○	○	○	○	○	○

Engagement

Now please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I regularly use web-based resources and information designed specifically for the course	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I usually come to class having completed readings or assignments	○	○	○	○	○	○	○
Online resources (ex. course notes, free software and materials) are very useful for me	○	○	○	○	○	○	○
I rarely skip classes	○	○	○	○	○	○	○
I spend a lot of time to study on my own	○	○	○	○	○	○	○
I regularly use email and/or other electronic means (like social media) to contact friends in my course	○	○	○	○	○	○	○
I regularly study on the weekends	○	○	○	○	○	○	○
I regularly use the internet for study purpose	○	○	○	○	○	○	○

Please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
Academic staff take an interest in my progresses	○	○	○	○	○	○	○
Teachers put a real effort to understand difficulties in my work	○	○	○	○	○	○	○
I find my courses intellectually stimulating	○	○	○	○	○	○	○
Teachers give helpful feedback on my progresses	○	○	○	○	○	○	○
Teachers are usually available to discuss my work	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I get a lot of satisfaction from studying	○	○	○	○	○	○	○
I am usually motivated to study	○	○	○	○	○	○	○
I enjoy the intellectual challenge of courses studying	○	○	○	○	○	○	○

Please indicate on a scale from 1 (strongly disagree) to 7 (strongly agree) the extent to which you agree with the following statements:

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I tend to stay together with other students at university	○	○	○	○	○	○	○
I am interested in the extra-curricular activities or facilities provided by university	○	○	○	○	○	○	○
I regularly work with other students on course areas I have problem in	○	○	○	○	○	○	○
I regularly study with other students	○	○	○	○	○	○	○
I have made at least one or two close friends at university	○	○	○	○	○	○	○
I am actively involved in university extra-curricular activities	○	○	○	○	○	○	○
I feel part of a group of students committed to learning	○	○	○	○	○	○	○
I regularly get together with other students to discuss courses	○	○	○	○	○	○	○

	1 (Strongly disagree)	2	3	4	5	6	7 (Strongly agree)
I really like being on my campus	○	○	○	○	○	○	○
I feel belong to the university community	○	○	○	○	○	○	○
I really like being a university student	○	○	○	○	○	○	○
University has lived up to my expectations	○	○	○	○	○	○	○

Socio-Demo

Please indicare YOUR course of study

- ○ Marketing
- ○ Global Management and Politics
- ○ Law, Digital Innovation and Sustainability
- ○ Other

Please indicate your age

Please specify your gender

- ○ F
- ○ M
- ○ Prefer not to say

Indicate the language in which you took this survey

- ○ English
- ○ Italian

Thank you for your time! the survey finished

Appendix 4: Measurement scales.

Construct	Sub-constructs	Items	Type of scale	Source
Learning outcomes	**Cognitive outcomes**	Dealing with unfamiliar problems Thinking creatively Thinking analytically and critically Viewing things from a global perspective Developing in-depth knowledge in my areas of study	Interval. 15-items 7-points likert	Zhoc (2019)
	Social outcomes	Communicating effectively with others Greater understanding of others Getting along with people of different cultural and ethnic backgrounds Working collaboratively with others Leadership skills		
	Self-growth	Managing time more effectively Learning a new skill or knowledge by yourself Ability to have critical self-reflection Life-long learning Upholding personal and professional ethics'		
Satisfaction		I think I did the right thing when I enrolled in this university Overall, I am pleased with the courses offered by this university The courses offered by my university met my expectations	Interval. 3-items 7-points likert	Giner (2016)

Engagement	**Cognitive engagement**	I am usually motivated to study I enjoy the intellectual challenge of courses studying I get a lot of satisfaction from studying I enjoy the intellectual challenge of courses studying	Interval 28-items 7-points likert	Zhoc (2019)
	Online engagement	I regularly use web based resources and information designed specifically for the course I regularly use email and/or other electronic means (like social media) to contact friends in my course I regularly use the internet for study purpose Online resources (ex. course notes, free software and materials) are very useful for me		
	Social engagement	Teachers are usually available to discuss my work Teachers give helpful feedback on my progresses Academic staff take an interest in my progresses Teachers put a real effort to understand difficulties in my work		
		I regularly work with other students on course areas I have problem in I regularly study with other students I feel part of a group of students committed to learning I regularly get together with other students to discuss courses		
	Beyond class engagement	I am interested in the extra-curricular activities or facilities provided by university I tend to stay together with other students at university I have made at least one or two close friends at university I am actively involved in university extra curricular activities		
	Academic engagament	I regularly study on the weekends I rarely skip classes I usually come to class having completed readings or assignments I spend a lot of time to study on my own		
	Affective engagement	I really like being on my campus I feel belong to the university community I really like being a university student University has lived up to my expectations		

Affective attitudes towards research	**Positive attitudes towards research**	I find research for professionals fits me I find research for professionals appealing to me because I can discover things myself I find research for professionals an exciting way to learn something I find research for professionals appealing to me beacuse I can develop new ideas/projects/designs I find research for professionals appealing to me, since it provides something reliable I find research for professionals fascinating because I can decide on the topic	Interval 6-items 7-points likert	Griffioen (2020)
	Negative attitudes towards research	Research gives me doubt, because I do not know if I can do it properly Research makes me insecure, because I do not know in advance what the result would be Research mainly gives me stress	Interval 3-items 7-points likert	Griffioen (2020)

Research Culture		I experience a research culture through the courses of my university I experience benefits from the presence of research in the courses of my university The research reputation of my university played a role in my choice of education The research culture at my university stimulates my learning	Interval 4-items 7-points liker	Griffioen (2020)
Self-esteem		I am able to do things as well as most other people On the whole, I am satisfied with myself I feel that I have a number of good qualities I never think I am no good at all I never feel useless All in all, I am inclined to think that I am a success I feel that I'm a person of worth I feel I have a lot to be proud of I have respect for myself I take a positive attitude toward myself	Interval 10-items 7-points likert	Rosenberg (2004)

Appendix 5: Output of SPSS analysis.

5.1. SPSS output for independent t-test comparing learning outcomes' means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
tot_learning_outcomes	nopilot	35	5,0781	1,24591	,21060
	pilot	40	5,8471	,93689	,14814

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
tot_learning_outcomes	Varianze uguali presunte	,458	,501	-3,043	73	,003	-,76899	,25269	-1,27260	-,26537
	Varianze uguali non presunte			-2,987	62,607	,004	-,76899	,25748	-1,28358	-,25440

5.2. SPSS output for independent t-test comparing satisfaction with courses means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
sat	nopilot	36	4,8148	1,66275	,27712
	pilot	40	5,4833	1,21235	,19169

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
sat	Varianze uguali presunte	2,117	,150	-2,017	74	,047	-,66852	,33151	-1,32906	-,00798
	Varianze uguali non presunte			-1,984	63,466	,052	-,66852	,33696	-1,34179	,00475

5.3. SPSS output for independent t-test comparing general engagement means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
engagement	nopilot	36	5,0089	,96828	,16138
	pilot	40	5,6973	,83146	,13147

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
engagement	Varianze uguali presunte	,252	,617	-3,334	74	,001	-,68839	,20648	-1,09981	-,27698
	Varianze uguali non presunte			-3,307	69,428	,001	-,68839	,20815	-1,10360	-,27319

5.4. SPSS output for independent t-test comparing perception of research culture means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
research_culture	nopilot	36	3,8958	1,75903	,29317
	pilot	40	4,8313	1,71381	,27098

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
research_culture	Varianze uguali presunte	,077	,782	-2,346	74	,022	-,93542	,39867	-1,72978	-,14105
	Varianze uguali non presunte			-2,343	72,717	,022	-,93542	,39922	-1,73112	-,13972

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
Research_culture_1	Varianze uguali presunte	,081	,777	-1,132	74	,261	-,528	,466	-1,457	,401
	Varianze uguali non presunte			-1,132	73,050	,261	-,528	,466	-1,457	,402
Research_culture_2	Varianze uguali presunte	3,626	,061	-2,634	74	,010	-1,167	,443	-2,049	-,284
	Varianze uguali non presunte			-2,613	69,419	,011	-1,167	,446	-2,057	-,276
Research_culture_3	Varianze uguali presunte	,003	,957	-1,423	74	,159	-,661	,465	-1,587	,265
	Varianze uguali non presunte			-1,424	73,433	,159	-,661	,464	-1,586	,264
Research_culture_4	Varianze uguali presunte	2,257	,137	-3,222	74	,002	-1,386	,430	-2,243	-,529
	Varianze uguali non presunte			-3,194	69,154	,002	-1,386	,434	-2,252	-,521

5.5. SPSS output for independent t-test comparing positive attitude towards research means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
Research_culture_1	nopilot	36	3,72	2,037	,339
	pilot	40	4,25	2,022	,320
Research_culture_2	nopilot	36	3,83	2,077	,346
	pilot	40	5,00	1,783	,282
Research_culture_3	nopilot	36	4,14	2,002	,334
	pilot	40	4,80	2,041	,323
Research_culture_4	nopilot	36	3,89	2,025	,338
	pilot	40	5,28	1,724	,273

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
attpost	nopilot	36	4,2963	1,41652	,23609
	pilot	40	4,9250	1,64557	,26019

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
attpost	Varianze uguali presunte	,845	,361	-1,775	74	,080	-,62870	,35413	-1,33433	,07692
	Varianze uguali non presunte			-1,789	73,864	,078	-,62870	,35133	-1,32877	,07136

5.6. SPSS output for independent t-test comparing negative attitude towards research means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
attneg	nopilot	36	3,9815	1,42304	,23717
	pilot	40	3,9333	1,74956	,27663

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
attneg	Varianze uguali presunte	1,360	,247	,131	74	,896	,04815	,36836	-,68583	,78213
	Varianze uguali non presunte			,132	73,285	,895	,04815	,36438	-,67802	,77432

5.7. SPSS output for independent t-test comparing sub-constructs of learning outcomes means between EBL vs traditional courses.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
cognitive_outcomes	nopilot	35	5,0514	1,32251	,22355
	pilot	40	5,8338	,98784	,15619
social_outcomes	nopilot	35	5,1314	1,32127	,22333
	pilot	40	5,9475	,97217	,15371
selfgrowth_outcomes	nopilot	35	5,0514	1,25870	,21276
	pilot	40	5,7600	1,05364	,16659

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
cognitive_outcomes	Varianze uguali presunte	1,185	,280	-2,924	73	,005	-,78232	,26752	-1,31549	-,24915
	Varianze uguali non presunte			-2,869	62,346	,006	-,78232	,27271	-1,32739	-,23725
social_outcomes	Varianze uguali presunte	1,491	,226	-3,071	73	,003	-,81607	,26572	-1,34565	-,28649
	Varianze uguali non presunte			-3,010	61,760	,004	-,81607	,27112	-1,35808	-,27407
selfgrowth_outcomes	Varianze uguali presunte	,041	,841	-2,654	73	,010	-,70857	,26703	-1,24076	-,17639
	Varianze uguali non presunte			-2,622	66,635	,011	-,70857	,27022	-1,24799	-,16915

5.8. Levene's test for equal variances for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of learning outcomes.

Test di Levene di eguaglianza delle varianze dell'errore[a]

Variabile dipendente: tot_learning_outcomes

F	gl1	gl2	Sign.
,577	5	69	,717

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

a. Disegno: Intercetta + pilot + gend + selfesteem

5.9. SPSS output for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of learning outcomes.

Statistiche descrittive

Variabile dipendente: tot_learning_outcomes

pilot	gend	Media	Deviazione std.	N
nopilot		5,3111	1,07978	3
	,00	5,1185	1,23109	18
	1,00	4,9762	1,36841	14
	Totale	5,0781	1,24591	35
pilot		6,2667	1,27017	3
	,00	5,4071	,92396	14
	1,00	6,0601	,84278	23
	Totale	5,8471	,93689	40
Totale		5,7889	1,17713	6
	,00	5,2448	1,10013	32
	1,00	5,6500	1,18080	37
	Totale	5,4882	1,15108	75

Test di effetti tra soggetti

Variabile dipendente: tot_learning_outcomes

Origine	Somma dei quadrati di tipo III	gl	Media quadratica	F	Sign.	Eta quadrato parziale
Modello corretto	20,543[a]	4	5,136	4,638	,002	,210
Intercetta	43,252	1	43,252	39,063	,000	,358
pilot	9,492	1	9,492	8,573	,005	,109
gend	1,310	2	,655	,591	,556	,017
selfesteem	7,586	1	7,586	6,851	,011	,089
Errore	77,505	70	1,107			
Totale	2357,092	75				
Totale corretto	98,049	74				

a. R-quadrato = ,210 (R-quadrato adattato = ,164)

Stime

Variabile dipendente: tot_learning_outcomes

pilot	Media	Errore std.	Intervallo di confidenza 95%	
			Limite inferiore	Limite superiore
nopilot	5,182[a]	,210	4,763	5,602
pilot	5,907[a]	,204	5,499	6,315

a. Le covariate presenti nel modello vengono valutate sui seguenti valori: selfesteem = 5,1347.

5.10. Levene's test output for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of satisfaction with courses.

Test di Levene di eguaglianza delle varianze dell'errore[a]

Variabile dipendente: sat

F	gl1	gl2	Sign.
1,518	5	70	,195

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

a. Disegno: Intercetta + gend + pilot + selfesteem

5.11. SPSS output for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of satisfaction with courses.

Statistiche descrittive

Variabile dipendente: sat

pilot	gend	Media	Deviazione std.	N
nopilot		4,0833	2,54406	4
	,00	5,1852	1,46069	18
	1,00	4,5476	1,65176	14
	Totale	4,8148	1,66275	36
pilot		5,7778	2,11695	3
	,00	5,2857	1,10056	14
	1,00	5,5652	1,19947	23
	Totale	5,4833	1,21235	40
Totale		4,8095	2,35590	7
	,00	5,2292	1,29636	32
	1,00	5,1802	1,45423	37
	Totale	5,1667	1,47221	76

Test di effetti tra soggetti

Variabile dipendente: sat

Origine	Somma dei quadrati di tipo III	gl	Media quadratica	F	Sign.	Eta quadrato parziale
Modello corretto	10,052[a]	4	2,513	1,170	,331	,062
Intercetta	64,385	1	64,385	29,975	,000	,297
pilot	8,544	1	8,544	3,978	,050	,053
gend	1,226	2	,613	,285	,753	,008
selfesteem	,414	1	,414	,193	,662	,003
Errore	152,503	71	2,148			
Totale	2191,333	76				
Totale corretto	162,556	75				

a. R-quadrato = ,062 (R-quadrato adattato = ,009)

Stime

Variabile dipendente: sat

pilot	Media	Errore std.	Intervallo di confidenza 95% Limite inferiore	Intervallo di confidenza 95% Limite superiore
nopilot	4,737[a]	,277	4,183	5,290
pilot	5,420[a]	,279	4,864	5,977

a. Le covariate presenti nel modello vengono valutate sui seguenti valori: selfesteem = 5,1184.

5.12. Levene's test output for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of students' engagement.

Test di Levene di eguaglianza delle varianze dell'errore[a]

Variabile dipendente: engagement

F	gl1	gl2	Sign.
1,297	5	70	,275

Verifica l'ipotesi nulla che la varianza dell'errore della variabile dipendente sia uguale tra i gruppi.

a. Disegno: Intercetta + pilot + gend + selfesteem

5.13. SPSS output for one-way ANCOVA to control self-esteem and gender effects on the relationship between teaching model and self-reported measures of students' engagement.

Statistiche descrittive

Variabile dipendente: engagement

pilot	gend	Media	Deviazione std.	N
nopilot		4,4107	,85739	4
	,00	5,1071	1,02365	18
	1,00	5,0536	,92664	14
	Totale	5,0089	,96828	36
pilot		6,3452	1,13408	3
	,00	5,3724	,81762	14
	1,00	5,8106	,75879	23
	Totale	5,6973	,83146	40
Totale		5,2398	1,36584	7
	,00	5,2232	,93427	32
	1,00	5,5241	,89468	37
	Totale	5,3712	,95746	76

Test di effetti tra soggetti

Variabile dipendente: engagement

Origine	Somma dei quadrati di tipo III	gl	Media quadratica	F	Sign.	Eta quadrato parziale
Modello corretto	21,492[a]	4	5,373	8,071	,000	,313
Intercetta	32,954	1	32,954	49,504	,000	,411
pilot	7,521	1	7,521	11,299	,001	,137
gend	,161	2	,081	,121	,886	,003
selfesteem	11,941	1	11,941	17,938	,000	,202
Errore	47,264	71	,666			
Totale	2261,372	76				
Totale corretto	68,755	75				

a. R-quadrato = ,313 (R-quadrato adattato = ,274)

Stime

Variabile dipendente: engagement

pilot	Media	Errore std.	Intervallo di confidenza 95% Limite inferiore	Intervallo di confidenza 95% Limite superiore
nopilot	5,025[a]	,154	4,717	5,333
pilot	5,667[a]	,155	5,357	5,976

a. Le covariate presenti nel modello vengono valutate sui seguenti valori: selfesteem = 5,1184.

5.14. SPSS output for the independent t-test comparing means for subconstructs of students' engagement.

Statistiche gruppo

	pilot	N	Media	Deviazione std.	Media errore standard
academic_eng	nopilot	36	5,4236	1,15545	,19258
	pilot	40	5,8938	,86396	,13660
online_eng	nopilot	36	5,6389	1,01673	,16945
	pilot	40	6,3875	,65767	,10399
cognitive_eng	nopilot	36	4,7847	1,39662	,23277
	pilot	40	5,7000	,98580	,15587
teach_social_eng	nopilot	36	4,0417	1,53122	,25520
	pilot	40	5,2125	1,33679	,21137
peers_social_eng	nopilot	36	5,0069	1,60856	,26809
	pilot	40	5,3500	1,34546	,21274
beyond_class_eng	nopilot	36	4,9097	1,43944	,23991
	pilot	40	5,5313	1,16738	,18458
affective_eng	nopilot	36	5,2569	1,23561	,20594
	pilot	40	5,8063	1,06291	,16806

Test campioni indipendenti

		Test di Levene per l'eguaglianza delle varianze		Test t per l'eguaglianza delle medie						
									Intervallo di confidenza della differenza di 95%	
		F	Sign.	t	gl	Sign. (a due code)	Differenza della media	Differenza errore standard	Inferiore	Superiore
academic_eng	Varianze uguali presunte	1,152	,287	-2,021	74	,047	-,47014	,23257	-,93355	-,00673
	Varianze uguali non presunte			-1,991	64,442	,051	-,47014	,23611	-,94175	,00148
online_eng	Varianze uguali presunte	6,267	,015	-3,849	74	,000	-,74861	,19451	-1,13619	-,36103
	Varianze uguali non presunte			-3,765	58,836	,000	-,74861	,19882	-1,14647	-,35076
cognitive_eng	Varianze uguali presunte	5,087	,027	-3,326	74	,001	-,91528	,27517	-1,46358	-,36698
	Varianze uguali non presunte			-3,267	62,201	,002	-,91528	,28014	-1,47523	-,35533
teach_social_eng	Varianze uguali presunte	,206	,652	-3,559	74	,001	-1,17083	,32899	-1,82636	-,51531
	Varianze uguali non presunte			-3,533	69,948	,001	-1,17083	,33137	-1,83173	-,50993
peers_social_eng	Varianze uguali presunte	,913	,342	-1,012	74	,315	-,34306	,33903	-1,01859	,33248
	Varianze uguali non presunte			-1,002	68,559	,320	-,34306	,34224	-1,02589	,33978
beyond_class_eng	Varianze uguali presunte	1,775	,187	-2,076	74	,041	-,62153	,29938	-1,21805	-,02500
	Varianze uguali non presunte			-2,053	67,480	,044	-,62153	,30270	-1,22563	-,01742
affective_eng	Varianze uguali presunte	,562	,456	-2,083	74	,041	-,54931	,26370	-1,07473	-,02388
	Varianze uguali non presunte			-2,067	69,485	,043	-,54931	,26581	-1,07951	-,01910

5.15. SPSS output for one-way ANOVA procedure, using "Course of Study" as the IV and "learning outcomes" as DV.

Descrittive

tot_learning_outcomes

	N	Media	Deviazione std.	Errore std.	95% di intervallo di confidenza per la media		Minimo	Massimo
					Limite inferiore	Limite superiore		
afcgestione	35	5,0781	1,24591	,21060	4,6501	5,5061	1,00	6,67
gmap	10	5,3617	,96865	,30631	4,6687	6,0546	3,97	7,00
ldis	12	5,9944	,87176	,25166	5,4406	6,5483	4,20	7,00
mktging	18	6,0185	,91660	,21605	5,5627	6,4743	4,47	7,00
mktgita	22	5,8606	1,13248	,24144	5,3585	6,3627	1,80	7,00
Totale	97	5,5727	1,15172	,11694	5,3406	5,8048	1,00	7,00

ANOVA

tot_learning_outcomes

	Somma dei quadrati	gl	Media quadratica	F	Sign.
Tra gruppi	16,543	4	4,136	3,434	,012
Entro i gruppi	110,797	92	1,204		
Totale	127,340	96			

5.16. SPSS output for one-way ANOVA procedure, using "CoS" as the IV and learning outcomes as DV.

Confronti multipli

Variabile dipendente: tot_learning_outcomes

	(I) CoS	(J) CoS	Differenza della media (I-J)	Errore std.	Sign.	Intervallo di confidenza 95% Limite inferiore	Intervallo di confidenza 95% Limite superiore
HSD di Tukey	afcgestione	gmap	-,28357	,39350	,951	-1,3785	,8114
		ldis	-,91635	,36711	,100	-1,9379	,1052
		mktging	-,94042*	,31830	,032	-1,8261	-,0547
		mktgita	-,78251	,29858	,075	-1,6133	,0483
	gmap	afcgestione	,28357	,39350	,951	-,8114	1,3785
		ldis	-,63278	,46988	,663	-1,9403	,6747
		mktging	-,65685	,43283	,554	-1,8612	,5475
		mktgita	-,49894	,41854	,756	-1,6636	,6657
	ldis	afcgestione	,91635	,36711	,100	-,1052	1,9379
		gmap	,63278	,46988	,663	-,6747	1,9403
		mktging	-,02407	,40898	1,000	-1,1621	1,1140
		mktgita	,13384	,39383	,997	-,9620	1,2297
	mktging	afcgestione	,94042*	,31830	,032	,0547	1,8261
		gmap	,65685	,43283	,554	-,5475	1,8612
		ldis	,02407	,40898	1,000	-1,1140	1,1621
		mktgita	,15791	,34878	,991	-,8126	1,1284
	mktgita	afcgestione	,78251	,29858	,075	-,0483	1,6133
		gmap	,49894	,41854	,756	-,6657	1,6636
		ldis	-,13384	,39383	,997	-1,2297	,9620
		mktging	-,15791	,34878	,991	-1,1284	,8126
Bonferroni	afcgestione	gmap	-,28357	,39350	1,000	-1,4154	,8482
		ldis	-,91635	,36711	,143	-1,9723	,1396
		mktging	-,94042*	,31830	,040	-1,8560	-,0249
		mktgita	-,78251	,29858	,103	-1,6413	,0763
	gmap	afcgestione	,28357	,39350	1,000	-,8482	1,4154
		ldis	-,63278	,46988	1,000	-1,9843	,7188
		mktging	-,65685	,43283	1,000	-1,9018	,5881
		mktgita	-,49894	,41854	1,000	-1,7028	,7049
	ldis	afcgestione	,91635	,36711	,143	-,1396	1,9723
		gmap	,63278	,46988	1,000	-,7188	1,9843
		mktging	-,02407	,40898	1,000	-1,2004	1,1523
		mktgita	,13384	,39383	1,000	-,9989	1,2666
	mktging	afcgestione	,94042*	,31830	,040	,0249	1,8560
		gmap	,65685	,43283	1,000	-,5881	1,9018
		ldis	,02407	,40898	1,000	-1,1523	1,2004
		mktgita	,15791	,34878	1,000	-,8453	1,1611
	mktgita	afcgestione	,78251	,29858	,103	-,0763	1,6413
		gmap	,49894	,41854	1,000	-,7049	1,7028
		ldis	-,13384	,39383	1,000	-1,2666	,9989
		mktging	-,15791	,34878	1,000	-1,1611	,8453

*. La differenza della media è significativa al livello 0.05.

5.17. SPSS output for one-way ANOVA procedure, using "CoS" as the IV and satisfaction as DV.

Descrittive

sat

	N	Media	Deviazione std.	Errore std.	95% di intervallo di confidenza per la media		Minimo	Massimo
					Limite inferiore	Limite superiore		
afcgestione	36	4,8148	1,66275	,27712	4,2522	5,3774	1,00	7,00
gmap	10	5,2000	,94542	,29897	4,5237	5,8763	4,33	7,00
ldis	12	5,6944	1,16739	,33700	4,9527	6,4362	3,67	7,00
mktging	18	5,5000	1,39209	,32812	4,8077	6,1923	3,00	7,00
mktgita	22	5,4394	1,57489	,33577	4,7411	6,1377	1,00	7,00
Totale	98	5,2279	1,49194	,15071	4,9288	5,5270	1,00	7,00

ANOVA

sat

	Somma dei quadrati	gl	Media quadratica	F	Sign.
Tra gruppi	11,080	4	2,770	1,258	,292
Entro i gruppi	204,831	93	2,202		
Totale	215,910	97			

5.18. SPSS output for one-way ANOVA procedure, using "CoS" as the IV and engagement as DV.

Descrittive

engagement

	N	Media	Deviazione std.	Errore std.	95% di intervallo di confidenza per la media		Minimo	Massimo
					Limite inferiore	Limite superiore		
afcgestione	36	5,0089	,96828	,16138	4,6813	5,3365	2,21	6,64
gmap	10	5,2000	,81844	,25881	4,6145	5,7855	4,39	6,68
ldis	12	5,8333	,82899	,23931	5,3066	6,3601	4,50	7,00
mktging	18	5,8829	,76919	,18130	5,5004	6,2654	4,46	7,00
mktgita	22	5,5179	,89464	,19074	5,1212	5,9145	3,57	7,00
Totale	98	5,4042	,94121	,09508	5,2155	5,5929	2,21	7,00

ANOVA

engagement

	Somma dei quadrati	gl	Media quadratica	F	Sign.
Tra gruppi	12,661	4	3,165	4,018	,005
Entro i gruppi	73,269	93	,788		
Totale	85,930	97			

5.19. SPSS output for one-way ANOVA procedure, using "CoS" as the IV and engagement as DV.

Confronti multipli

Variabile dipendente: engagement

HSD di Tukey

(I) CoS	(J) CoS	Differenza della media (I-J)	Errore std.	Sign.	Intervallo di confidenza 95% Limite inferiore	Intervallo di confidenza 95% Limite superiore
afcgestione	gmap	-,19107	,31728	,974	-1,0738	,6916
	ldis	-,82440*	,29587	,049	-1,6475	-,0013
	mktging	-,87401*	,25623	,008	-1,5868	-,1612
	mktgita	-,50893	,24020	,221	-1,1772	,1593
gmap	afcgestione	,19107	,31728	,974	-,6916	1,0738
	ldis	-,63333	,38005	,460	-1,6906	,4240
	mktging	-,68294	,35008	,298	-1,6569	,2910
	mktgita	-,31786	,33852	,881	-1,2596	,6239
ldis	afcgestione	,82440*	,29587	,049	,0013	1,6475
	gmap	,63333	,38005	,460	-,4240	1,6906
	mktging	-,04960	,33079	1,000	-,9699	,8707
	mktgita	,31548	,31853	,859	-,5707	1,2016
mktging	afcgestione	,87401*	,25623	,008	,1612	1,5868
	gmap	,68294	,35008	,298	-,2910	1,6569
	ldis	,04960	,33079	1,000	-,8707	,9699
	mktgita	,36508	,28210	,695	-,4197	1,1499
mktgita	afcgestione	,50893	,24020	,221	-,1593	1,1772
	gmap	,31786	,33852	,881	-,6239	1,2596
	ldis	-,31548	,31853	,859	-1,2016	,5707
	mktging	-,36508	,28210	,695	-1,1499	,4197

*. La differenza della media è significativa al livello 0.05.

5.20. SPSS Model 4 to test whether research culture is the mediator in the relationship teaching model-learning outcomes.

```
Model  : 4
    Y  : tot_lear
    X  : pilot
    M  : research

Sample
Size:  75

**************************************************************************
OUTCOME VARIABLE:
 research
```

```
Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,2585      ,0668     3,0505     5,2257     1,0000    73,0000      ,0252

Model
              coeff         se          t          p       LLCI       ULCI
constant     3,9071      ,2952    13,2346      ,0000     3,3188     4,4955
pilot         ,9241      ,4042     2,2860      ,0252      ,1184     1,7298

**************************************************************************
OUTCOME VARIABLE:
 tot_lear

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,6027      ,3633      ,8671    20,5394     2,0000    72,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3,7800      ,2902    13,0255      ,0000     3,2015     4,3585
pilot         ,4620      ,2231     2,0706      ,0420      ,0172      ,9067
research      ,3322      ,0624     5,3243      ,0000      ,2078      ,4566

************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 tot_lear

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,3355      ,1126     1,1919     9,2610     1,0000    73,0000      ,0033

Model
              coeff         se          t          p       LLCI       ULCI
constant     5,0781      ,1845    27,5176      ,0000     4,7103     5,4459
pilot         ,7690      ,2527     3,0432      ,0033      ,2654     1,2726

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_ps
      ,7690      ,2527     3,0432      ,0033      ,2654     1,2726      ,6681

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_ps
      ,4620      ,2231     2,0706      ,0420      ,0172      ,9067      ,4013

Indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
research     ,3070      ,1648      ,0309      ,6856

Partially standardized indirect effect(s) of X on Y:
            Effect     BootSE   BootLLCI   BootULCI
research     ,2667      ,1341      ,0303      ,5666

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000
```

```
NOTE: Variables names longer than eight characters can produce incorrect output.
      Shorter variable names are recommended.
```

5.21. SPSS Model 4 to test whether research culture is the mediator in the relationship teaching model-Students' engagement.

```
Model  : 4
    Y  : engageme
    X  : pilot
    M  : research

Sample
Size:  76

**************************************************************************
OUTCOME VARIABLE:
 research

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,2631      ,0692     3,0114     5,5054     1,0000    74,0000      ,0216

Model
              coeff         se          t          p       LLCI       ULCI
constant     3,8958      ,2892    13,4699      ,0000     3,3195     4,4721
pilot         ,9354      ,3987     2,3464      ,0216      ,1411     1,7298

**************************************************************************
OUTCOME VARIABLE:
 engageme

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,6171      ,3808      ,5832    22,4490     2,0000    73,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     3,9264      ,2365    16,6044      ,0000     3,4552     4,3977
pilot         ,4285      ,1818     2,3563      ,0211      ,0661      ,7909
research      ,2779      ,0512     5,4315      ,0000      ,1759      ,3798

************************ TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 engageme

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,3614      ,1306      ,8078    11,1154     1,0000    74,0000      ,0013

Model
              coeff         se          t          p       LLCI       ULCI
constant     5,0089      ,1498    33,4385      ,0000     4,7105     5,3074
pilot         ,6884      ,2065     3,3340      ,0013      ,2770     1,0998

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_ps
      ,6884      ,2065     3,3340      ,0013      ,2770     1,0998      ,7190
```

```
Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_ps
      ,4285      ,1818     2,3563      ,0211      ,0661      ,7909      ,4475

Indirect effect(s) of X on Y:
             Effect     BootSE   BootLLCI   BootULCI
research      ,2599      ,1287      ,0405      ,5355

Partially standardized indirect effect(s) of X on Y:
             Effect     BootSE   BootLLCI   BootULCI
research      ,2715      ,1282      ,0439      ,5457

************************ ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

NOTE: Variables names longer than eight characters can produce incorrect output.
      Shorter variable names are recommended.
```

5.22. SPSS Model 4 to test whether engagement is the mediator in the relationship teaching model-Students' satisfaction with courses.

```
Model  : 4
    Y  : sat
    X  : pilot
    M  : engageme

Sample
Size:  76

**************************************************************************
OUTCOME VARIABLE:
 engageme

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,3614      ,1306      ,8078    11,1154     1,0000    74,0000      ,0013

Model
              coeff         se          t          p       LLCI       ULCI
constant     5,0089      ,1498    33,4385      ,0000     4,7105     5,3074
pilot         ,6884      ,2065     3,3340      ,0013      ,2770     1,0998

**************************************************************************
OUTCOME VARIABLE:
 sat

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,5874      ,3450     1,4585    19,2272     2,0000    73,0000      ,0000

Model
              coeff         se          t          p       LLCI       ULCI
constant      ,3442      ,8079      ,4261      ,6713    -1,2659     1,9543
pilot         ,0541      ,2976      ,1819      ,8562     -,5389      ,6471
engageme      ,8925      ,1562     5,7139      ,0000      ,5812     1,2038
```

```
************************** TOTAL EFFECT MODEL ****************************
OUTCOME VARIABLE:
 sat

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      ,2282      ,0521     2,0823     4,0667     1,0000    74,0000      ,0474

Model
              coeff         se          t          p       LLCI       ULCI
constant     4,8148      ,2405    20,0199      ,0000     4,3356     5,2940
pilot         ,6685      ,3315     2,0166      ,0474      ,0080     1,3291

************** TOTAL, DIRECT, AND INDIRECT EFFECTS OF X ON Y **************

Total effect of X on Y
     Effect         se          t          p       LLCI       ULCI       c_ps
      ,6685      ,3315     2,0166      ,0474      ,0080     1,3291      ,4541

Direct effect of X on Y
     Effect         se          t          p       LLCI       ULCI      c'_ps
      ,0541      ,2976      ,1819      ,8562     -,5389      ,6471      ,0368

Indirect effect(s) of X on Y:
             Effect     BootSE   BootLLCI   BootULCI
engageme      ,6144      ,2230      ,2382     1,1020

Partially standardized indirect effect(s) of X on Y:
             Effect     BootSE   BootLLCI   BootULCI
engageme      ,4173      ,1335      ,1775      ,7022

*********************** ANALYSIS NOTES AND ERRORS ************************

Level of confidence for all confidence intervals in output:
  95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
  5000

NOTE: Variables names longer than eight characters can produce incorrect output.
      Shorter variable names are recommended.
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Summary

Chapter 1: Enquiry-Based Learning: What is it? Why is it relevant?

This research contributes to academic knowledge in the field of higher education and provides operative insights for universities to achieve a widespread quality culture. Nowadays universities face diverse complexities to address the requests of stakeholders. Students ask for self-formation as well as discipline specific knowledge; employers are interested in talent acquisition after graduation, searching for highly skilled candidates; many institutions monitor research outcomes stemming from the university departments; local communities and society at large demand solutions to their issues. Private universities add the necessity to ensure a profitable business model, addressing the alarming trend of education drop out. Transformation of university models is happening, and the pandemic is contributing to it, by also fastening the process of digitalization. Many of the institutions ranked as world's best universities have adopted novel forms of education, integrating teaching and research. Debates about this union of research and teaching seem to have shifted from 'Should we?', to 'How, and how far?', as confirmed by the increasing amount of studies considering research integration practices. This study analyses the implementation of a research-based CV in Luiss master's degree courses. Designing an enquiry-based CV, in which students are empowered to collaborate actively in research activities, engaging others with their ideas, education and research will be able to contribute more effectively to the global common good. Traditional courses in which students cover the passive role of simple recipients of knowledge are revolutionized. Education becomes a self-regulated process of students, that become actors and responsible for their learning outcomes. Many are the tools and activities available to implement an enquiry-based education: problem-based learning, enquiry/inquiry-based learning are all faces of the same coin, active learning models. This study is focused on EBL, in which learning happens through active discovery of students, guided by mentoring/tutoring. Learners are encouraged to become researchers and formulate questions to expand current knowledge on a specific topic. Lines of enquiry stimulate curiosity, critical thinking and information literacy skills. Activities include investigating scientifically, formulating sounded arguments, creating new knowledge through data collection and analysis, disseminating findings, presenting to different audiences, receiving and providing feedback, and becoming engaged in public matters. Both realm of knowledge and wider society benefit from the encounter of research and teaching. EBL finds legitimacy in Humboldtian concept of unity of research and teaching, in the name of a shared ground of advancing knowledge boundaries and contributing to the society's common good. Education has power to impact society, forging better individuals and resulting in open, competent, equal, informed, and fair communities. Rather than seeing research and education as competing priorities, synergies between the two should be exploited. The by-product of EBL is a

heightened vibrancy of the institution, due to which the university participates actively to all its ecosystems. Of key importance for universities globally is to assure the quality of their offer, judged on two main pillars: the quality of the education provided to students and the quality of new knowledge created by research departments. This traditional approach of "quality management" has the adverse outcome of putting research and educational departments in competition for resources allocation. Designing a curriculum in which these activities link together, enhances the quality of both. Students can contribute to the institution's research and engage communities directly with their findings. EBL has numerous advantages: it encourages active and deeper learning, critical thinking skills, and teamworking. It helps prepare students to work in contexts where the ability to manage a massive amount of information is critical. Compared to the traditional approach to education, which could lead to fragmented knowledge, EBL enables students to make connections, thanks to its interdisciplinary nature. It is up to date with the post truth era and in line with modern workplace requirements (Boyer Commission, 1998). Knowledge expands its boundaries through intersubjectivity. Dialogic encounters are vital to test assumptions, remain open to doubts and recalibrate one's understandings in the light of new evidence and can be retraced in EBL in teachers' feedback, peer evaluations and papers' references. A research-based CV is effective at improving students' performance, through feedback, peer learning and discussions.

The CV design, chosen to be tested in Luiss, stems from the Connected Curriculum framework by Fung (2017). The premise for Fung (2017) is that the predominant mode of learning should be active investigation and engagement with current research. Another basic principle is that education is relational. There is growing evidence that students benefit from engaging in collaborative and dialogic enquiry, whereby everyone's prior assumptions are challenged through interactions. Via dialogue learning occurs and the purpose of education is met: create societies where respect for others and openness to new ideas are promoted.

This study starts with a qualitative assessment of Luiss implementation of EBL. The model of this qualitative enquiry derives from 'powerful knowledge' model of Harland and Wald (2018). University CV should aim for powerful knowledge, which is specialised knowledge that becomes powerful when it serves a particular purpose. To have knowledge which is "powerful" means to apply it in new contexts and engage in matters of public importance (Young and Muller 2013). Academic disciplines have rigorous ways to produce and evaluate new knowledge and having insights into those methodological procedures is having epistemic access, which is the premise for acquiring powerful knowledge. Students need to be exposed to the generative principles of disciplinary knowledge, learning about research methodologies, tools and sources of data. Powerful knowledge is disciplinary

specific, theoretical context-independent knowledge; produced and transmitted by academics; beyond individuals' everyday experiences.

These characteristics allow those that have it to evaluate arguments, apply knowledge beyond specific contexts, become responsible citizens who can engage in matters of public importance.

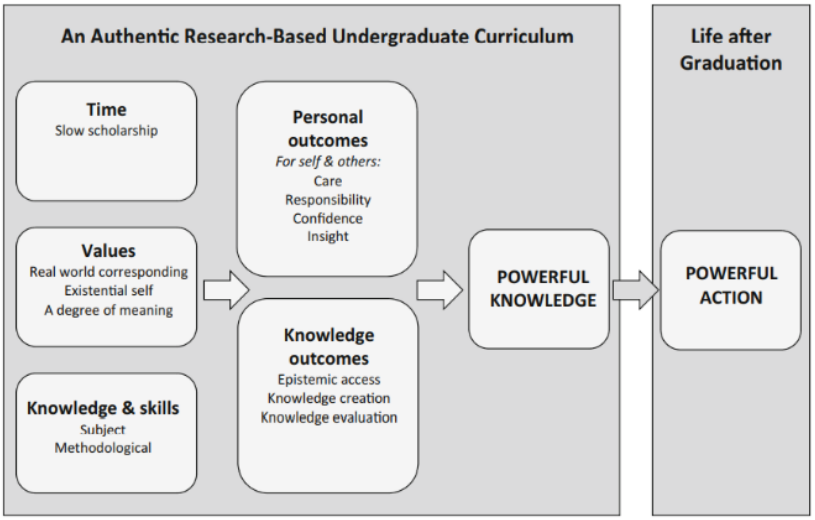

Figure 1. Research-based curriculum for powerful knowledge (Harland and Wald, 2018).

From September 2020, Luiss has begun the implementation phase of an innovative project of evolving teaching mode towards the EBL model. A Pilot program of four-years has been devised; in 2020 the change started with three programmes: Marketing, Global Management and Politics, Law, Digital Innovation and Sustainability. Active and enquiry-based learning features have been progressively introduced, such as: substitution of theory books or manuals with papers, introduction of research method laboratories, development of an internal network (with practitioners and alumni) and an external one with workplaces, problem-based projects and group-based activities comprising oral and/or written presentations, blended courses of on campus and online classes, innovative assessment methods of continual feedback. Luiss' new educational model has been devised based on five pillars: building on synergies between research and learning, involving students in research; fostering interdisciplinarity and large learning at all levels of the CV; implementing innovative teaching and assessment's methodologies; developing networks, ensuring continuous interactions internally and externally; mastering templates and enabler design, crafting processes and resources, infrastructures, both physical and digital ones, required to implement the model.

Following Pilot implementation, a group of students were selected to be interviewed after their first semester. Thirteen personal semi-structured interviews via Microsoft Teams were recorded. All interviews were transcribed manually and evaluated by three Luiss practitioners and the author of this thesis. Students were interviewed by Luiss professor and Head of Marketing Department Simona Romani. Questions tackled courses characteristics and wanted to get a glimpse of knowledge and

personal outcomes achieved. Transcripts were coded manually in different colours, to isolate model variables. Then two level of interpretation of the verbatim transcripts were employed: idiographic and cross-cases analysis. Through axial and selective coding, many input and output variables were isolated.

Chapter 2: Luiss Enquiry-Based approach: Qualitative and Quantitative study

The model for the qualitative analysis identifies three main antecedents, characteristics of the courses, that lay the foundations for knowledge and personal outcomes, as follows:

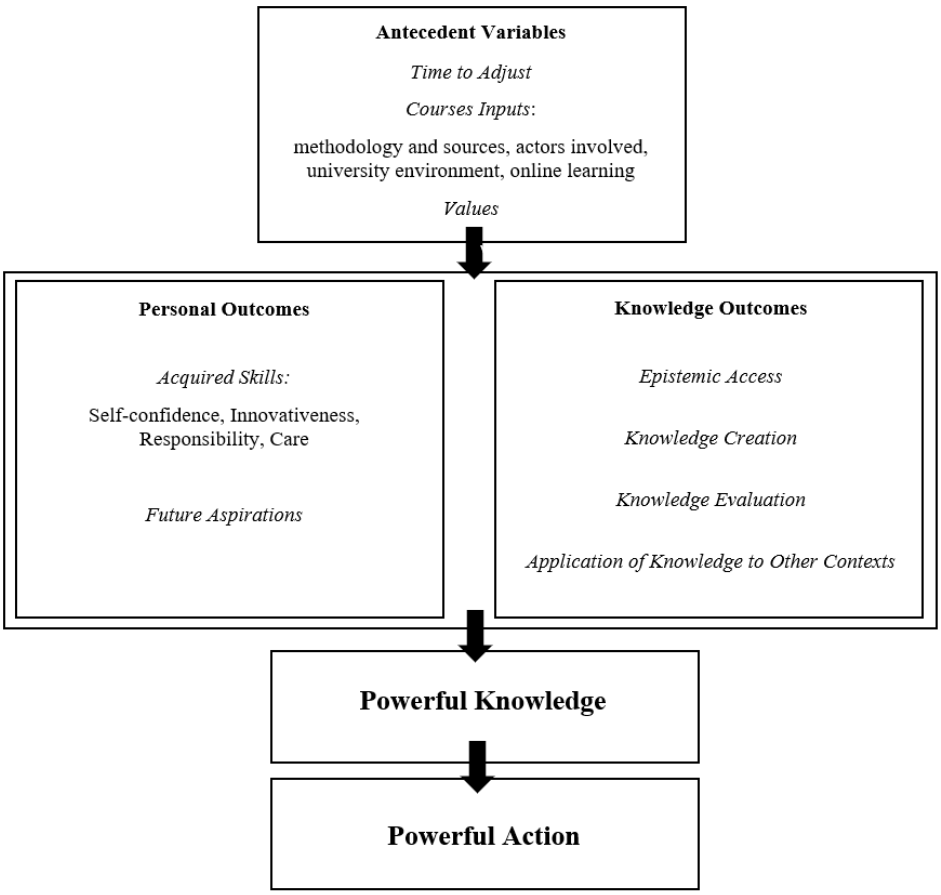

Figure 2. Model for cross-case analysis of interviews.

Time to adjust.

The first starting variable, mentioned in many learners' stories, was time to adjust to the new method. Learning to do research is a very complex and requires spaces for thinking and knowledge adaptation (Harland, 2016). Students experience a radical change that, by definition, involves some initial difficulties: a novice needs more time to learn how to read a research paper, or absorb the information needed for the project (Harland and Wald, 2018). Notwithstanding the strong initial impact, the presence of multiple deadlines and simultaneous tasks was crucial for continuous learning. Students acknowledged deadlines were fundamental for good, gradual learning process. The second antecedent of powerful knowledge regards all the inputs coming from classes.

Methodology and sources.

An enquiry-based approach brings students closer to research by setting the learning process on the analysis of academic and scientific papers. These increase the awareness towards knowledge creation and are appreciated as study material since they involve the contribution of many authors, differently from theory books presenting only one point of view.

Actors involved in the courses.

EBL assumes that building knowledge and learning are not individual, but forged by human interactions, peer-reviews and teamwork (Blessinger and Carfora, 2014). Students frequently stressed the collaborative nature of the attended courses, upholding that the continuous interactions were fundamental both to socialize and to learn more deeply concepts. Professors of EBL courses stimulate continuous dialogue by making students actors during classes (Fung, 2017). Collaborative learning has a long-term result of preparing students for future challenges. Experiencing teamwork at university increases students' relational skills. In the interviews, many stated that group projects were a major opportunity to socialize.

University Environment.

The university environment comprises shared values-beliefs and it needs to build a social identity. Students of enquiry-based courses perceive the environment as vibrant and dynamic, entangled with connections that operate on multiple levels (Fung, 2017).

Online learning.

The opinions of learners towards online learning are conflicting. Some students have suffered from the lack of face-to-face teaching and typical of in-class interactions; while others affirm that establishing relationships wasn't hard despite these physical limitations.

Values.

EBL programs involve students in a more real-life perspective, by providing them the possibility of analysing actual and practical cases. This improves personal skills (Harland and Wald, 2018), such as responsibility and confidence. Courses' syllabi provide contemporary, real-life topics, fundamental for developing a global competence (Fung, 2017). Experiencing real-life cases through research has been defined by interviewees as engaging and stimulating. Teamwork simulated the working world (Tynjälä, Välimaa and Sarja, 2003) and students positively valued the opportunity to interact with experts in their field of competence.

Outcomes.

Two different kind of outputs can be assessed throughout the interviews: personal and knowledge outcomes. According to Humboldt, education is "Bildung", self-formation or development. University must directly impact students' personalities. EBL is effective for this purpose since it

influences students on a personal level. EBL has long term effects: by growing as people, students develop a range of soft skills that are useful in life after graduation. Everyday life benefits by fostering their sense of citizenship and their relational capital, but also their workplace life improves. Students exposed to Pilot acknowledged a growth both from an academic point of view, in terms of hard skills and pieces of knowledge acquired, and from an individual perspective, in terms of personality traits, interests, and soft skills. By experiencing epistemic access, they developed a more pragmatic approach to things. Teamwork and dialogue were major catalysts of growth. Challenging time management and effort, by the end of the course left a sense of satisfaction and motivated students to progress. Students' overall sentiment is very positive: the programme was challenging, but because of this, the sense of achievement was greater. EBL develops many competencies ranked as the most important ones to possess in the workplace: teamwork and co-operation, self-confidence, willingness to learn. (Rainsbury, Hodges, Burchell & Lay, 2002). Self-confidence is developed each time students face a challenge: time management between deadlines, teamwork with different people, presenting to an audience, creating knowledge from scratch (Fung, 2017). It has many beneficial effects in future job setting. For what concerns the development of an open mindset and innovation skills, courses gave students a new perspective on disciplines, but also on future aspirations and the world. EBL resembles the processes of innovation in companies (Kanter 1988), allowing students to gain essential practical experience spendable in job settings (Dokko, Wilk, and Rothbard 2009; Singley and Anderson 1989). Luiss' students interviewed are conscious of the competitive advantages coming from this. By approaching unsolved issues to find an effective solution, students developed problem solving skills. Not through infallible knowledge, but through uncertainty, exploration of new horizons and exchange with others, many students reported to have built up a personal opinion to critically judge the world. Another group of outcomes of EBL relates to students as learners in a social setting. There is much emphasis on working collaboratively, rather than competing against each other, to prepare students to use knowledge for the public good. Ideally, these personal and knowledge outcomes equip students with socially desired attitudes and values: like care, prosociality, proactivity and responsibility. The Association of American Colleges and Universities (Rhodes, 2010) has published scoring tools to measure essential learning outcomes like teamwork: the standards of performance are (1) contributes to team meetings, (2) facilitation of the contributions of other team members, (3) fostering constructive team climate, and (4) responses to conflict. All these dimensions of effective teamwork were found in the words if interviewed students. By getting to know each individual ambitions and propensities, they have learnt to manage conflict, mediate, coordinate peers' effort and maximize results for the whole group. They acknowledged the real power of good teamwork: synergies between group members achieve a performance that they would not be able to

attain autonomously. They covered many different roles in the group dynamic, experiencing active and passive care towards other peers. In some cases, they were motivators or guides; in others, they were tutored by contact, confrontation, and exchange that resulted in a personal growth. In teamwork, each member assumes equal responsibility for ensuring that the project is completed on time and to a high standard. As reported by students, organizational skills, time management, project management and leadership are just some of the competencies acquired via Luiss' research-based CV. The second dimension of personal outcomes of EBL relates to students' aspirations about their future. EBL enables students to develop a clear picture of their learning journey, personal progress and future goals (Fung, 2017). Learners develop a sense of their own identity as researchers (Davies and Pachler, 2018), and in some cases they even consider the possibility of becoming researchers in the future. The second main class of outcomes of an enquiry-based cv, concerns the knowledge realm. One is to gain a rigorous method to tackle problems; the second is knowledge creation; the third is knowledge evaluation, while the fourth is the application of knowledge and skills to different contexts. All the interviewees gained a deep understanding of what it means to research. Students acknowledged the need to follow a rigorous method to create sound findings and that investigation proceeds through a trial/test and learn procedure. A long process of reading to gather information and spot a potential knowledge gap is required. Students understood that the proper research's process of knowledge creation is very specific compared to other projects. Research makes it possible to go deeper in subjects and knowledge discoveries, and to put in practice theory concepts. Students reported a sort feeling of astonishment towards the newness of knowledge they were able to produce through group works. Seeing a concrete output, by the end of a long process of study and production and perceiving to being contributing to important real-life issues awarded them with satisfaction and strengthened their self-confidence. The research project culminated in the formal production of a document, a written report to develop communication and presentation skills. The third outcome that lay the foundations for powerful knowledge is the ability to evaluate arguments (Harland and Wald, 2018). Many students claim to have improved their knowledge-evaluation skills during the pilot semester, meaning that they now feel more confident in discriminating the quality of different sources. Interviewees report to have learned the differences between specialized, disciplinary-based and every day, "inferior" kind of knowledge (Harland and Wald 2018). In addition to model elaborated by Harland and Wald (2018), a new dimension of knowledge outcomes has been inserted in this analysis: students' ability to apply what they have learned in contexts other than that of the specific subject or university. Several students highlighted how they were able to apply knowledge acquired in a specific field, even in other different contexts. This can have an impact also on the private sphere, teaching how to manage certain situations.

The qualitative investigation has been instrumental to identify linkages and variables involved in this alternative learning process. Providing a quantitative base to the previous explorative findings was required to justify all the efforts devoted to overcoming the challenges of EBL implementation.

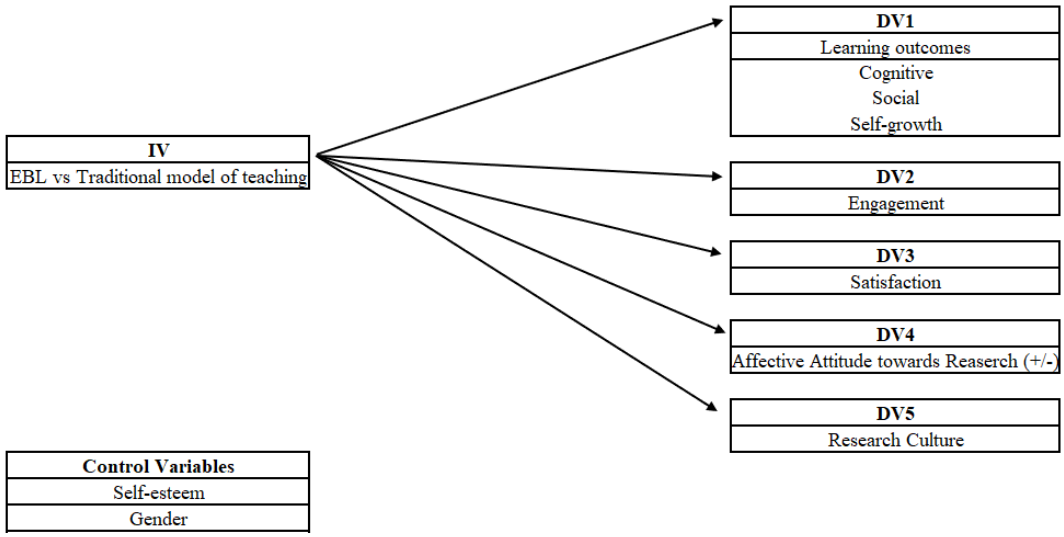

Figure 3. Model of quantitative analysis.

The purpose has been to find empirical evidences of the improved effectiveness and better performance of EBL, compared to a traditional model of teaching, on students' perceptions; to justify the choice of the pilot programme and to continue the implementation. The independent variable manipulated is the different teaching model (EBL vs Traditional), to which students have been exposed during the first academic year. Five dependent variables were rated: students' satisfaction, learners' level of engagement with courses activities and environment, students' performances in terms of knowledge and skills, perception of research culture, affective attitudes towards research activities, being these positive or negative ones.

Learning outcomes relate to students' performance and can be distinguished in cognitive, social and personal ones. According to Summerlee (2010), EBL students do perform at a significantly higher level and they report greater engagement in the community: student engagement contributes to increased academic performance.

H1. Students attending EBL courses are more likely to achieve greater learning outcomes compared to students following traditionally taught courses.

EBL students have more opportunities to engage in investigation of untacked problems and take initiative to solve them: they have more chances to practice innovation skills or creative thinking. Since they must research a lot of information to design projects, they learn to study topics in depth. According to this, they are likely to score higher on scales measuring cognitive achievements.

H1a: EBL students achieve better cognitive outcomes compared to students attending traditional courses.

In the interviews, Luiss students mentioned a personal growth, especially considering their sense of responsibility and proactiveness, leadership skills, time management, effective communication, and empathy with peers. EBL programmes, by engaging students in group works, foster and facilitate the development of students' interpersonal skills.

H1b: EBL students achieve greater social outcomes compared to students attending traditional courses.

H1c: EBL students report a greater self-growth compared to students attending traditional courses.

To measure learning outcomes, the Student Learning Outcome Scale (SLOS) was chosen (Zhoc, 2019). These items were perfectly in line with concepts stemming from interviews.

EBL is an example of active learning models that offers academics the flexibility to support students in their development, while still engaging them in the process of learning (Kahn, 2004). As many students mentioned in the interviews, teachers of Luiss pilot courses encouraged them to participate actively, by getting involved in class discussions and by taking a step-in community's issues. Engagement is usually judged by asking students to rate how many times they participate in class discussion, work in small groups, and challenge each other's theories and ideas. EBL students are expected to score higher on these types of surveys, compared to students of traditionally taught programmes. Many studies have shown the positive relationship between engagement and improved learning outcomes and student satisfaction (Bandura et al. 2000; Carini et al. 2006; Kuh et al. 2005, 2008; Lam et al. 2012; Pascarella et al. 2010).

H2: EBL students show greater engagement compared to students attending traditional courses.

To measure students' engagement, the Higher Education Student Engagement Scale (HESES by Zhoc, 2019, 28-items 7-points likert scale) was chosen, with five components: (1) Academic Engagement, (2) Cognitive Engagement, (3) Social Engagement with Peers, (4) Social Engagement with Teachers and (5) Affective Engagement.

Participative learning programs assign students an active role and ownership of the learning process, and have been linked to increased student's satisfaction, compared to non-participative educational models. Collaboration had statistically positive relationships with satisfaction (Hyo-Jeong So et. al, 2008). Acknowledging their ability to manage different people in a team and looking at the concrete output of their efforts, students mentioned high degree of satisfaction during interviews. According to a study (Zaheer Butt, 2010) on the antecedents of students' satisfaction for 350 learners, teachers' expertise is the most influential factor. Students perception of teachers' expertise is greater when they have proof of their academic experience and their research studies. Due to this, higher perception of

teachers' expertise in EBL courses was expected to have a positive impact on students' satisfaction. Satisfaction was measured based on a 3-items 7-points likert scale derived by Giner (2016).

H3: EBL students are more satisfied compared to students attending traditional courses.

Students' attitudes towards research have an impact on their satisfaction, motivation and, as a direct effect, on learning outcomes. Griffioen (2019b) designed the Research Acceptance in Vocational Education Questionnaire (RAVEQ) instrument to measure students' attitudes towards research, that includes: perceptions of research in profession, cognitive attitude towards research, positive affective attitude towards research, negative affective attitude towards research, self-efficacy towards research, importance of research, and intention to show research-related behaviour. Affective attitudes relate to 'feelings and moods' (Van der Linden et al. 2015). Positive feelings improve working-memory and the ability to deal with complex decisions (Carpenter, 2011), enhancing learners' performances. Engagement is also affected by affective attitudes: based on a study of Froiland (2018) percentage of classes attended was positively associated with positive emotions, indicating also that students with higher attendance were more likely to experience greater personal growth. According to Ahmad (2010), attitude towards work has a strong positive relation with satisfaction. According to a study of Griffioen (2020) aimed at comparing students and lecturers' perceptions after the integration of research activities into taught programmes, learners' have reported higher scores on positive attitudes, as well as lower scores on negative attitudes showing that students enjoy research activities more than lecturers think they do. For measurements, two factors of RAVE-Q were applied to the student survey: positive vs negative affective research attitudes.

H4: EBL students develop a more favourable attitude towards research compared to students of traditional courses who do not experience research integration in their educational path.

H5: Conversely, greater negative attitudes towards research are more likely to be experience by students of traditional courses.

EBL aims at creating a different "atmosphere" in the faculty, where staff and students could engage with each other's work on peer terms (Barnfield, 2016; Bissell, 2010; McCormack, 2008). Feeling a sense of belonging to a community of researchers and getting a glimpse of a bigger picture, fosters in students proactiveness since their efforts are perceived as contributing to other real-life issues. Spronken-Smith et. al. (2014) explored undergraduates' experiences of the research culture at a research-intensive university in New Zealand and these were mainly positive experiences, such as increased understanding of the topic, greater motivation, as well as learning research skills and practical applications of theory. The scale 'Research Culture' was chosen, derived from Visser-Wijnveen, Van der Rijst, and Van Driel (2016). The quantitative model comprises as controlled variables students' self-esteem and gender.

H6: EBL students experience a greater and deeper research culture compared to learners in traditional courses.

EBL fosters a sense of self-confidence in students, by challenging them. Handing in a piece of work of new knowledge created from scratch makes learners aware of the progress made and their abilities. However, self-esteem is also a personality trait that can impact performance. A high self-esteem may affect self-reported measures of DVs. The construct was measured with the RSE scale of Rosenberg. According to Fung, Besters-Dilger and van der Vaart (2017), experiencing a research-rich culture benefits students. Umbach and Wawrzynski (2005) found that the more faculty interacted with the students, the more students were challenged and engaged in meaningful activities. Also, students reported increased gains in personal/social development and general knowledge.

H7: Research culture mediates the relationship between teaching model (EBL vs Traditional) and students' learning outcomes.

H8: Research culture mediates the relationship between teaching model (EBL vs Traditional) and students' engagement.

According to a study of Gao et al. (2020) engagement is a mediator between the perceptions of blended learning courses (mixture of online and offline activities) and satisfaction.

H9: Engagement mediates the relationship between teaching model (EBL vs Traditional) and students' satisfaction.

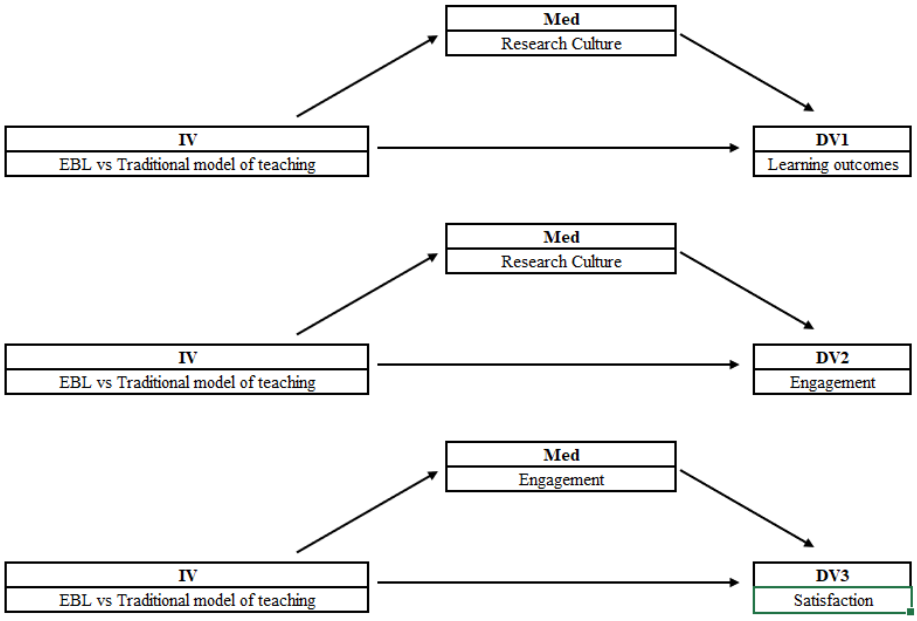

Figure 4. Model of quantitative mediation analysis.

A causal research was designed to infer causality between EBL inputs and outcomes: learning outcomes, satisfaction, engagement level, affective attitudes towards research and perception of research culture. A single factor two levels (EBL vs. Traditional) between-subject online quasi-

experiment (students self-selected the experimental condition) was conducted. Analyses of differences between groups of participants from two different scenarios were carried out. The two conditions were attending EBL vs traditional master. Two surveys of 19 questions, differing only on the language, have been distributed to Luiss' students on their first year of masters, attending the following courses: English taught programmes (EBL group) of Marketing, Global Management and Politics, Law, Digital Innovation and Sustainability, Italian taught degrees (traditional courses) of Gestione di Impresa, Marketing and Amministrazione, Finanza e Controllo. Surveys were distributed online, published on Luiss learn platform in May 2021. Cleaning the data collected, a dataset of 98 observations has been created (M_{age} = 24, SD =10.3; 53% Females). The Italian master in Marketing, characterized by both elements of pilot courses and of traditional education, was excluded (22 observations) when running statistical tests of hypotheses. A binary independent variable teaching model comprised altogether students of non-pilot courses (36 observations) in the level "Traditional", and students in EBL programme (40 observations) in the level "EBL".

The survey has opened by a self-esteem measurement (α = 0.92, Rosenberg 2004), to control this variable, followed by a priming writing task of describing the main activities participated during the academic year (2020/21). Then questions asked to complete a series of measurements of positive attitudes towards research (α = 0.95; Griffioen 2020) and negative ones (α = 0.83; Griffioen 2020); perceived research culture (α = 0.90; Griffioen 2020), satisfaction with courses (α = 0.95; Giner 2016); engagement (α = 0.93; Zhoc 2019); learning outcomes (α = 0.96; Zhoc 2019). To test whether the groups of the IV (teaching model: EBL vs traditional) differ on the DVs, six independent sample t-tests have been run. Participants in EBL courses (M = 5.85, SD = 0.94) compared to traditional courses (M = 5.07, SD = 1.24) have demonstrated significantly higher means for learning outcomes, t(73) = -3.04, p = .003. H1 considered in this study has been met. EBL students (M = 5.48, SD = 1.21) compared to the other group (M = 4.81, SD = 1.66) have registered significantly higher means for satisfaction scores, t(74) = -2.02, p = .047, meeting H2. H3 has also been met since Pilot students reported significantly higher means for engagement, t(74) = -3.33, p = .001. Significantly higher means for perception of research culture in the university, t(74) = -2.36, p = .022 have been registered for participants in the pilot (M = 4.83, SD = 1.71) compared to the participants in traditional courses (M = 3.89, SD = 1.75), meeting H6. There has been no significant effect for positive attitudes towards research, t(74) = -1.77, p = .08, despite pilot students (M = 4.92, SD = 1.64) attaining higher mean scores than non-pilot learners (M = 4.29, SD = 1.41). Same non-significant result has been found for negative attitudes towards research, t(74) = 0.13, p = .90, despite pilot students (M = 3.93, SD = 1.75) attaining higher mean scores than non-pilot learners (M = 3.98, SD =

1.42). EBL students have registered significantly higher means for cognitive, social and self-growth learning outcomes (H1a,b,c have been met).

One-way ANCOVA have been conducted to compare learning outcomes, satisfaction and engagement mean scores between groups of students attending EBL (vs traditional courses), controlling for self-esteem and gender variables. Students of EBL have registered on average significantly [$F(1,70)=8.57$, $p = 0.005$] higher levels of learning outcomes achieved, after adjusting for self-esteem and gender. There has been found a significant difference in mean satisfaction [$F(1,71)=3.97$, $p = 0.05$] between teaching model (EBL vs traditional), after controlling for self-esteem and gender. There has been demonstrated a significant difference in students' engagement mean [$F(1, 71)= 11.3$, $p = 0.001$] between teaching model (EBL vs traditional).

A one-way ANOVA has been performed to compare the effects of five studying courses on learning outcomes achieved. The test has revealed that there is a statistically significant difference in mean learning outcomes between groups ($F(4, 92) = 3.434$, $p = 0.012$). The mean value of learning outcomes is significantly different between the English course of Marketing ($M=6.01$, $SD=0.91$), who has tested the pilot programme, and AFC and Gestione d'Impresa students who have attended a traditional courses ($M=5.07$, $SD= 1.24$) ($p = 0.032$, 95% C.I. = [-1.82, -0.05]). A one-way ANOVA has been performed to compare the effects of five different master courses on students' satisfaction. The test has revealed that there is no statistically significant difference in mean satisfaction between groups ($F(4, 93) = 1.258$, $p = 0.292$). To test effects of the five disciplines on students' engagement, the last one-way ANOVA has been run and has revealed a statistically significant difference in mean engagement between groups ($F(4, 93) = 1.258$, $p = 0.292$). The mean value of engagement is significantly different between the English course of Marketing ($M=5.88$, $SD=0.76$), who has tested the pilot programme, and AFC and Gestione d'Impresa students ($M=5.00$, $SD= 0.96$) ($p = 0.008$, 95% C.I. = [-1.58, -0.16]). There has been found also significant difference in average engagement between AFC/Gestione d'Impresa and Law, Digital Innovation and Sustainability ($p=0.049$).

Process Model 4 has been run, to test whether research culture acts as a mediator. For H7, the indirect effect of the variable teaching model on total learning outcomes, via research culture, has been found to be statistically significant [$B= 0.3070$, 95% C.I. (0.03;0.68)]. The indirect effect of teaching model via research culture on engagement has been found significant, $B = 0.26$, $CI = 0.04$ to 0.53. Testing (H9), the indirect effect of the predictor variable teaching model on students' satisfaction, via engagement, has been found to be statistically significant [Effect= 0.61, 95% C.I. (0.23;1.10)].

Chapter 3: Conclusions

This study contributes to research on Enquiry-based learning and proves, both qualitatively and quantitatively, the effectiveness of the research-based model as implemented in Luiss. Differences

between groups of students from EBL programmes vs traditional ones were found in research attitudes (although non-significant) and research context (statistically significant results), with pilot students reporting higher means of positive attitudes towards research, lower means for negative attitudes towards research and higher score for perception of research culture at university. Students of EBL have registered significantly higher means for satisfaction towards courses. Students are the first stakeholders and customers in the market of private higher education. The decision-making bodies for curricula design should implement such type of courses. EBL students also higher means for engagement and learning outcomes compared to learners of traditional masters. By achieving learning outcomes that are both personal, of self-growth, social and cognitive, and goals of knowledge advancement, evaluation and application to multiple contexts, students of Luiss' pilot courses have registered to be more prepared to gain powerful knowledge. Findings suggest that EBL students are better trained for a future job setting and for making an impact with their community and society issues at large.

Luiss' case has proven to be effective in developing stronger creative and critical thinking, deeper subject knowledge (higher means for cognitive outcomes' scale), better people management, communication (higher means for social outcomes' measure), time management, leadership, collaboration skills and higher level of autonomy, compared to students of traditional courses.

The empirical results point out that for EBL courses to be successful, the university should foster a research-rich culture. It has been proved that research-based masters have a positive effect on learning outcomes and engagement via a strongly perceived research culture by students attending such programmes. A rooted culture of research values can be created by introducing students to the research department and its topics of investigation, enhancing dialogue and exchange opportunities, continuously expose students to multiple views of the world by promoting interdisciplinary activities, increase opportunities for collaborative learning. Students' satisfaction also benefits via the increased engagement fostered in active learning activities.

The study has provided a large sample of respondents, comprising six different master's courses. However, it has registered a small response ratio. Groups for each specific course of study have not been balanced in numerosity. Some limitations concern interpretation: instruments used to measure students' experiences, performance and perceptions were self-reported scales. Although controlling for the variable "self-esteem", other potential sources of biases have not been considered.

Research-based CVs have the potential to inspire "powerful action", protracting benefits in the long run (Harland and Wald, 2018). Further research should attempt to measure effects of EBL over time, analyse whether its efficacy is more related to some disciplines compared to others, if type of project

affects students' satisfaction or learning outcomes differently, and investigate what variables, if any, moderate or are involved in the model.