# Digital Learning Transformation: suggesting a framework for Digital Learning in Laurea UAS

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**Laurea University of Applied Sciences** **Abstract**

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The main goal of the thesis development work was to investigate what topics, areas and processes need to be taken into consideration to develop digital learning at Laura University of Applied Sciences (UAS), and to provide recommendations for developments to the university's digital learning framework. Laurea UAS is a Finnish institution of higher education located in the metropolitan area of Helsinki, Finland, and that offers bachelor's and master's degree level education to more than seven thousand (7000) students.

The onset of the COVID-19 pandemic in late 2019 forced the world to shift from contact interactions to distance interactions. Laurea UAS was no different and rose to the occasion by quickly developing digital learning tools and processes to avoid the interruption of Finnish higher education. With the end of the COVID-19 pandemic in sight and the "new digital normal" forced by the pandemic, Laurea UAS faces significant challenges, not only to remain relevant in the Finnish higher education scenario, but also to become a pioneer and incumbent in global digital education.

The key concepts of this development drew from the Theory of Disruptive Innovation by Christensen. This theoretical framework, when applied to higher education, provides the baseline for defining the change process universities should implement to become disruptive innovators in the higher education market. Furthermore, it highlights the imminent opportunity for disruption created by the pandemic and consequential need for more digitized, student-centric higher education.

By applying the main concepts of disruptive innovation theory, this thesis aimed to provide the necessary change framework to Laurea's digital learning. This was done through use of a mixed method research that combined qualitative and quantitative data collection and analysis. The qualitative research used semi-structured interviews with Laurea UAS teachers and dCell personnel (digital learning specialized team at Laurea UAS) and carried out a thematic analysis to identify key ideas, obstacles and improvements from the interviewees' perspective. The quantitative research utilized a structured survey to collect Laurea's students' opinions and experiences with the university's digital learning in predefined topics and used cross-tabulation analysis to summarize findings.

As a result, the development work produced a digital learning change framework applied to Laurea UAS. The change framework highlights four (4) main areas of development in Laurea's digital learning - teachers' capabilities, students' experiences, digital learning design and digital learning strategy. Each area of development encompasses multiple dimensions of recommended change and target tasks proposed to Laurea UAS leadership. Due to the extension of the topic, limited timeframe and resources, the thesis work did not include topics related to Laurea leadership and management structure, Finnish national educational policies or students' wellbeing.

Keywords: Digital learning, digital education, disruptive innovation

Contents

# 1 Introduction

The birth of the internet in the late 1950's United States (US) was driven by military motivations during the Cold War between US and Soviet Union. In its early phase, the internet was only a seed of the currently widespread globalized network (Leiner et al. 1997). In the late 1960's, the internet rehearsed its first educational applications in selected American universities such as Massachusetts Institute of Technology (MIT), Harvard University and University of California at Los Angeles (UCLA). Through the 1970's, the network expanded geographically and capabilities-wise. In 1980's, the internet reached its commercial phase (Cohen-Almagor 2011) until finally, in 1984, the University of Toronto (Sarkar 2020) became the first university to offer a fully online course. Since then, online teaching has widely spread across global higher education.

The onset of COVID-19 pandemic in late 2019, caused by the widespread of the SARS-CoV-2 virus, forced the world to shift from contact interactions to distance interactions (WHO 2021). Extensive and globalized lockdowns driven by the World Health Organization (WHO) recommendations and government's concerns (Finnish Government 2022) with overloading national health systems caused a disruption across global higher education. Face-to-face learning was halted and higher education institutions campuses across the world were completely or partially closed. This forced many universities and schools to shift teaching to nearly full-time distance learning and expand their digital learning capabilities to limit the impact of pandemic restrictions on students' learning (Lockee 2021; Fullan et al. 2020).

Laurea University of Applied Science (UAS) was no exception to the global trends imposed by the COVID-19 pandemic (Laurea UAS 2020a, Laurea UAS 2020d, Laurea UAS 2020e). The UAS had standard, but not extensive, digital study offerings and distance learning capabilities before COVID-19. The pandemic propelled Laurea UAS to boost digital learning processes and platforms in order to continue its operations. Initiatives such as Project SotePeda 24/7 (Laurea UAS 2020c), CREAR digital service need indicator (Kesurinen et al. 2020), aimed at strengthening students' and professors' competences and position when using digital services, signaled positive developments towards a new digital reality.

Nonetheless, Laurea UAS has extensive room for improvements in lesson design, digital experimental learning (a.k.a. labs), assessment of students' learning progress, digital networking, distance group-work and in ensuring students' connection with the institution, professors and colleagues. This thesis aims to develop a framework for changes required to

further develop digital higher education teaching and learning at Laurea University of Applied Sciences in the post-COVID-19 era.

According to the Cambridge dictionary (Cambridge Dictionary 2022), a framework is defined as “a system of rules, ideas, beliefs that is used to plan or decide something”. In this context, this research work provides a framework of proposed changes to Laurea UAS digital learning, in order to enable the institution to achieve the forefront of digital learning in the Finnish and global higher education scenarios.

To achieve its proposed objective, the thesis initiates with a review of the subject organization - Laurea UAS - and its digital learning structure. In sequence, the thesis defines the research questions based on the review of the UAS digital learning structure. Subsequently, the thesis analyzes theories of Disruptive Innovation, which provide valuable insight into development of organizational changes and distance learning. Through abduction logic and a mixed method research, the research work provides conclusive recommendations to improve Laurea’s digital learning framework.

### 1.1 Case Organization

Laurea University of Applied Sciences (formerly Vantaa University of Applied Sciences and Espoo-Vantaa University of Applied Sciences) is a Finnish higher education institution that began its operations in 1991, in the metropolitan area of Helsinki, Finland (Laurea UAS 2020a). The university has approximately 7800 students, 600 staff members and over 30 000 alumni, spread across 5 campi (Hyvinkää, Leppävaara, Lohja, Otaniemi, Porvoo and Tikkurila). In 2020, the institution offered 18 degree programmes in the fields of Business Management, Social Services and Health Care and Hospitality Management, 6 of which are lectured in English (Laurea UAS 2020a).

Furthermore, Laurea UAS has positioned itself as one of the most attractive universities of applied sciences in Finland for the past 4 years. And in spring 2022, it reached once again the position of most sought after university in Finland, with over 10 000 applicants (Finnish National Agency for Education 2022). The university’s attractiveness is due in part to its service promise and delivered numbers. Laurea commits to providing flexible, cooperative, high quality education to ensure students succeed in the “real world” post graduation. As a result, Laurea’s graduates have reached a 96.4% employability rate in 2019 (Finnish National Agency for Education 2019).

Despite the positive statistics, Laurea’s leadership is seeking efficient, innovative and sustainable changes to continue providing quality learning amidst the drastically shifted

global learning trends. As part of this effort, the institution has identified the need to expand its “range of high-quality open digital studies and access to them” as one of its critical steps to achieve its strategic mission of becoming the “main international developer of working life competency and vitality” in its region by 2030 (Laurea UAS 2022b).

The onset of COVID-19 in Finland in early 2020 pushed Laurea to react to the global scenario by implementing immediate measures to ensure the continuation of operations via digital learning. With the end of the pandemic in sight, the world now attempts to return to normality. However, that “normalcy” has been shifted, forcing all organizations and people to transform and adapt to a reality that is more digitized than ever before (Fleming 2021; Walker 2021). The future of Laurea as a leader in higher education in Finland and globally, hence, will depend on the university’s strategy for digital learning.

### 1.2 Higher Education and Digital Learning

In the context of this thesis work, “digital learning” is defined as a method of effectively applying a broad range of educational strategies based on use of innovative technologies to enhance learning. Digital learning is a broader concept than online learning or e-learning. Whilst online learning or e-learning is one of the pedagogical strategies used in digital learning, digital learning itself comprehends the process of digitization of the learning experience through multiple pedagogical schemes (Van der Merwe & Wolfson 2019; Davis 2020).

The pace of digital learning in higher education worldwide had been significantly lagging behind global adoption of technological advancements until the digital transformation imposed by the global COVID-19 pandemic (Hilz & Turoff 2005; Walker 2021; Fullan et al. 2020). It is important to highlight that this development work defines “higher education” as higher learning or tertiary education after upper secondary education provided by a growing variety of institutions with a high level of complexity and specialization (UNESCO 2022; OECD 2021; OECD 2022). “Higher education”, therefore, comprises International Standard Classification of Education (ISCED) levels 5, 6, 7 and 8 equivalent to short-cycle tertiary education, Bachelor’s or equivalent level, Master’s or equivalent level, and doctoral or equivalent level, respectively (UNESCO 2022).

The traditional university model based on classroom education and research had only shyly rehearsed its first steps into digitalization of operations until 2020. In the US, in 2018, less than 5% of universities budgets were dedicated to improving the institutions’ digital capabilities (Gallagher & Palmer 2020) and only a third of students attended online courses (NCES 2020).

Furthermore, in the pre-pandemic years, the European Union (EU) received an overall weighted score of 40 (on a scale between 0 and 100) in the 2018 Digital Economy and Society Index (DESI), as visible in Figure 1. DESI assesses European countries digital performance in 4 main dimensions: human capital, connectivity, integration of digital technology and digital public services (European Commission 2022b).

| | | European Union | | | Finland | | | |
|---|---|---|---|---|---|---|---|---|
| | Years | DESI overall index | Annual Growth | Average annual growth | DESI overall index | Annual Growth | Average annual growth | Ranking in EU |
| Before | 2016 | 35.3 | | 6.88% | 49.5 | | 5.49% | 2nd |
| | 2017 | 37.9 | 7.37% | | 52.1 | 5.25% | | 2nd |
| | 2018 | 40.6 | 7.12% | | 55 | 5.57% | | 2nd |
| | 2019 | 43.1 | 6.16% | | 58.1 | 5.64% | | 2nd |
| After | 2020 | 46.3 | 7.42% | 8.46% | 62.8 | 8.09% | 7.47% | 1st |
| | 2021 | 50.7 | 9.50% | | 67.1 | 6.85% | | 2nd |

COVID-19 EU Outbreak Timeline

Figure 1: DESI overall index progression 2016-2021. Own elaboration (European Commission 2022a)

Finland was spearheading European digital performance already then, with a DESI score of 55, only second to Sweden (European Commission 2022a). However, even in Finland, the development of digital learning in universities was lagging behind other areas, such as the private sector (Mikkelä 2001). Digital learning in higher education institutions was taking small steps towards closing that gap. Universities largely offered very few fully-online degrees, limited to a relatively shallow pool of distance/online courses, applied in a “multi-form education”, combining face-to-face lessons with limited virtual learning, or incorporating digital platforms/tools into teaching whilst still maintaining the traditional in-classroom learning (UNESCO 2015).

The Finnish Ministry of Education and Culture's attempts to close the gap started with the launch of the Finnish Virtual University project, in 1999, as part of the Education, Training and Research in the Information Society: a National Strategy for 2000-2004 (Ministry of Education and Culture 1999, Moonen et al. 2004). Those attempts further progressed with the Vision 2030 proposal, published in 2017. The Finnish Virtual University project identified the digital opportunities and challenges to the development of e-learning in Finnish Higher education. The Vision 2030 proposal defined the main goals for Finnish higher education, including improving digitalization and openness of learning and R&D (Ministry of Education and Culture 2017c). Since then, the Finnish Ministry of Education and Culture also has driven digital learning improvement strategies and funded multiple projects focused on developing

the digital capabilities of Finnish universities (Ministry of Education and Culture 2017a, Ministry of Education and Culture 2017b; Ministry of Education and Culture 2018).

Laurea UAS has also led and cooperated with many such projects which focused on developing Finnish higher education digital learning capabilities. One of these projects was the eAMK Project, with cooperation from Laurea, which received 3 million Euros from the Finnish Ministry of Education and Culture to create new e-learning ecosystems and successfully resulted in Campus.Online.fi, a platform where fully online courses from multiple Finnish higher education institutions are accessible to any students (Campus Online 2022; Jyväskylä University of Applied Sciences 2017). A second project - Sote-Peda 24/7 - was led by Laurea UAS and received 3 million Euros from the Finnish Ministry of Education and Culture in 2018. The aim of this project was to develop shared digital learning in the social and health services field whilst also developing teachers' and students' digital competence (Sotepeda 24/7 2019, Ministry of Education and Culture 2017b, Ministry of Education and Culture 2018).

The COVID-19 pandemic caused an international disruption of education and forced the overdue digital learning transformation in higher education (Unesco 2021; Li & Lalani 2020; Fullan et al. 2020). The closure of educational institutions in most countries coerced schools in all educational levels to shift to distance learning, adopt digital learning technologies and equip teachers with IT skills. It was no different for the higher education sector, which had to change its approach towards digital learning transformation in order to continue operating.

The pandemic amplified the significance of technology and digital innovations in the sustainability of higher education learning models and in the development of the future of higher education and learning. The concomitant boom in IT industry investments on digital learning platforms further strengthened this trend and accelerated the endorsement of the growing digital learning opportunities (Unesco 2021). In 2019, for example, investments by companies in digital education technologies surpassed USD 18 billion dollars, more than the combined sum of all investments done in the 20 years preceding the pandemic (Markets Insider 2020). The mobilization of resources pouring into developing innovations to improve digital learning resilience worldwide has possibly caused a permanent break from previous higher education classroom-based education and research.

The outbreak of the COVID-19 pandemic, greatly affecting EU countries as of early 2020, remarkably increased the pace of European and Finnish digitalization, whilst also highlighting the gaps in existing digital education structure (UNCTAD 2020). As seen in Figure 1, the EU DESI increased 6.88% per year on average prior to the pandemic. In Finland, the average annual increase was slightly shier, at 5.49% per year. After the wave of transformations imposed by COVID-19 restrictions, the pace of annual growth increased both in Europe and in

Finland to an average annual DESI growth of 8.46% and 7.47% per year, respectively. This demonstrates how the digital transformation was accelerated by the onset of the pandemic.

Regionally, the European Commission (2020) developed the Digital Education Action Plan (2021-2027), which sets targets to define common policies and objectives for digital learning in the European Union. Furthermore, the action plan is considered one of the pillars for European development, not only in education, but also socially, economically and sustainability-wise (European Commission 2020, Røe et al. 2022). This initiative demonstrates the impact the COVID-19 pandemic triggered in higher education globally.

In Finland, in March 2020, the Finnish government established the closure of educational institutions and the move to distance learning for almost 2 months. In universities, this caused contact lessons to be replaced with full online education, which, in some cases, extended for longer than the 2 month period (Ministry of Education and Culture 2020). Furthermore, the Finnish National Agency for Education carried out a study to identify the impacts of COVID-19 on Finnish education and to begin developments in digital learning post-pandemic (Finnish National Agency for Education 2020).

Laurea UAS also responded to the challenge quickly and replaced contact studies for online offerings and ensured online supporting services to students and staff. In addition to that, the UAS implemented Massive Open Online Courses (MOOCs), which are flexible online courses open to anyone, introduced the Canvas learning environment, boosted international cooperation in digital learning, applied Laurea's Learning by Development (LbD) model to digital education, and provided digital library services and guidance (Laurea UAS 2020b). However, the university is still catching up with the pace of the global changes. Laurea, as all universities around the world, are challenged with surfing the wave of the disruption caused by the pandemic or being washed over by the transformations of the new digital era.

## 2 Theoretical Framework

This thesis development work drew on the established Disruptive Innovation Theory of Christensen (n.d.; 1997) for key concepts. The Disruptive Innovation Theory, which initially applied the concept of "disruptive technology" to technologies in business, has greatly evolved to explain phenomena in other types of business models, including public higher education (Christensen 1997; Christensen & Overdorf 2000; Christensen & Raynor 2003; Christensen et al. 2015; Christensen et al. 2018). Hence, the Disruptive Innovation Theory provides a foundation for the understanding of the impact of digital learning in higher

education. Consequently, the theory can be applied to provide a framework for how Laurea UAS can leverage disruptive innovations to lead the path for digital learning in Finland.

## 2.1 Disruptive Innovation Theory

The study of innovation and its creative force is not recent. In 1942, Schumpeter (1942) coined the phrase “creative destruction” to describe innovative technologies that could displace traditional products, making it the driving force of a dynamic capitalism (Yu & Hang 2010). Since then, the analysis of innovative technologies has expanded and their disruptive force on the economy has been extended to areas beyond the technological impact on the private sector economy. The Disruptive Innovation Theory has played an important role in explaining how innovations can cause disruption in different areas of society and economy (Christensen 1997; Christensen & Overdorf 2000; Christensen & Raynor 2003; Christensen et al. 2015; Christensen et al. 2018).

In 1995, Joseph L. Bower and Clayton M. Christensen (1995) coined the term “disruptive innovation”, originally linked to “disruptive technologies”, to distinguish such innovations from “sustaining” innovations. According to the authors, “sustaining technologies” are incremental innovations to existing products, with focus on existing markets, and sustain existing business performance trajectories. On the other hand, “disruptive technologies” break from standard trajectories, catering to new markets that are typically non-consumers of such technology and often providing lower performance technology than mainstream offering.

The introduction of disruptive technologies could be used by entrant firms to challenge incumbents, especially as such disruptive technologies’ develop and their hold on new markets grows (Christensen 1997; Bower & Christensen 1995; Christensen et al. 2015). If an entrant successfully challenges incumbents, a “disruption” occurs in the market structure (Christensen 1997, Christensen et al. 2015). In this scenario, Christensen, Raynor and Mc Donald (2015, 45) define “disruption” as “a process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses.”

Incumbent companies tend to focus on higher profitability, certain returns, and keeping their share of the consumer market. This behavior drives them to take a conservative approach on innovations, choosing to improve existing products to continue catering to their share of profitable customers. Entrant companies, on the other hand, are limited in resources, have no strong foothold on existing markets and, therefore, do not face the same constraints of profitability margins nor face the potential risk of losing large market shares. Such entrants introduce disruptive technologies either by: (1) offering new technologies of relatively lower

quality or performance - low-end foothold -, (2) or by targeting non-consumers - new-market foothold. By doing so, entrants find a foothold in the market and begin their move upwards, often substantially improving technology performance and their share in the market (Christensen 1997; Bower & Christensen 1995; Christensen et al. 2015).

It is important to highlight that disruptive innovation is a process. Under normal conditions, successful disruptive innovations may take years to disrupt the market. This is often because incumbents tend to overlook entrants due to their different business models or consumer market entrants (Christensen et al. 2015; Rasool et al. 2018).

Nevertheless, the theory of disruptive innovation has expanded its application since its inception in 1995. The Disruptive innovation theory is currently applied beyond innovative products to also include innovative services and business models (Christensen & Raynor 2003; Yu & Hang 2010). As a result of the expansion of its theoretical application, the disruptive innovation theoretical framework has also been utilized to examine and explain the potential impact of disruptive technologies on education, especially higher education (Christensen et al. 2008; Christensen & Eyring 2011; Christensen et al. 2011).

## 2.2 Disruptive Innovation in Higher Education

Christensen's concept of disruptive innovation can be applied to investigate the potential impact of disruptive technologies on education, especially higher education (Christensen et al. 2008; Christensen & Eyring 2011; Christensen et al. 2011). According to Christensen and Eyring (2011, 49), the intrinsic principles of disruptive innovation theory can be applied to the higher education business model, an "industry" that has historically resisted "the forces of disruption".

Similarly to how disruptive technologies can drive entrant companies to disrupt incumbent firms by implementing new products, services and business models, disruptive technology in education can drive universities and institutions of higher education to disrupt incumbent learning models by implementing new learning models.(Christensen & Eyring 2011; Christensen et al. 2011).

The key disruptive innovation in higher education is digital learning. As mentioned previously, digital learning is a method of effectively applying a broad range of educational strategies based on use of innovative technologies to enhance learning. Digital learning is different from online learning. Digital learning is the foundation upon which digitization of the learning experience occurs and online learning is simply one of the pedagogical methods used in the digital learning framework (Van der Merwe & Wolfson 2019).

Digital learning is a disruptive innovation with potential to change how higher education operates (Choo et al. 2021). Christensen identified digital learning as a disruptive innovation that could shift higher education learning trajectory towards a “student-centric” model, with higher accessibility to quality higher education, more flexibility for students and professors, and lower cost for higher education institutions (Christensen et al. 2008; Christensen & Eyring 2011; Christensen et al. 2011).

When applying disruptive innovation theory to higher education, the digital learning-focused institutions act as the “entrants” in the education market, offering an initially prototypic digital learning technology - low-end foothold. Or they begin catering to an entirely new market of students that did not have access to the traditional university - new market foothold. In this context, digital learning disrupts higher education by driving new educational strategies to improve digital technologies, enhance digital learning and reach new and more students. This process is not abrupt and takes time (Christensen et al. 2008; Christensen & Eyring 2011; Christensen et al. 2011).

In Finland, access to quality higher education is subsidized by the government. Therefore, the cost of acquiring a higher degree is relatively low for Finnish students and comparatively low for foreign students who enroll in Finnish universities. However, the traditional higher education model is still largely based on contact-learning, which drastically reduces the pool of students who can attend the courses. Furthermore, traditional contact learning, despite the shy implementation of online learning, also eliminates access to education for working students or adult students.

In addition to that, traditional educational models heavily rely on universities’ unscalable resources, such as facilities and teaching staff, significantly reducing the “consumer market” of higher education, even in Finland. A course based on contact learning requires a classroom, and mobilizes a professor for a certain period of time to deliver a one-size-fits-all lesson to a selected group of students with different learning abilities. By implementing the disruptive innovation of digital learning, physical space constraints are virtually eliminated, teaching becomes scalable, learning becomes more accessible to those who could not take advantage of it and education is made flexible and more suitable to students' individual needs, learning abilities and schedule (Christensen et al. 2008; Christensen & Eyring 2011; Christensen et al. 2011).

## 2.3 Summary of Theoretical Framework

The disruptive innovation theory applied to higher education offers the basis of Laurea UAS digital learning strategy in the near future. The institution's position as an “incumbent” in the

higher education market is strongly dependent on how it successfully identifies and implements innovations to shift the current educational model from a traditional contact-model, to a student-centric model.

As highlighted by Chirstensen's (2008, 2011), this transformation caused by disruptive innovation is a long process. And processes are a series of defined actions taken actively to achieve a particular goal. Therefore, reacting to global currents cannot be defined as disruptive innovation. It is necessary to have intentional planning and strategizing of the transformation process.

Laurea UAS, as many universities, institutions and businesses around the world, reacted quickly to the changes demanded by the pandemic. The next decisions and actions in the years after the pandemic can and will be decisive to set apart the innovative university from the university of the past. This development work focused on developing a change framework to support Laurea UAS in identifying the key actions and focus areas to succeed in the disruptive innovation of digital higher education.

# 3 Development work

This thesis development work consists of carefully considered activities, often overlapping with each other, required to ensure the success of the research and the impartiality of the results and recommendations being provided at the end of the research. The development work started with the formulation of the research problem, which delimited the investigated theme to a general topic, and later, to specific research questions applicable to the research objective (Kothari 2004; Franklin 2012), as detailed in Figure 2.

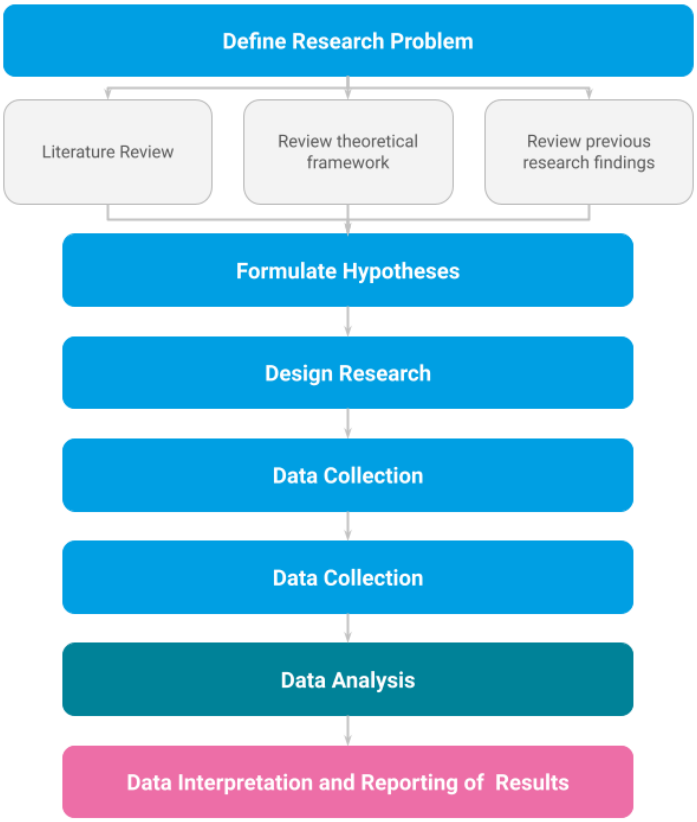


Figure 2: Thesis research process

Once the research questions were defined, the thesis executed a literature review of applicable academic publications, books, journals, academic articles, online publications, etc., concerning the research topic. The literature review is an important step to gather data on existing results available from previous similar research and to gain insight on important concepts that built the research theoretical framework.

After the literature review and theoretical framework were built, the thesis work formulated tentative assumptions which were used as focal points in the following steps of the research. These assumptions or hypotheses delimited the researched area and contributed to the selection of the appropriate research design and methods. A clear research design facilitates and maximizes the research efficiency by seething the most valuable information from minimum effort (Kothari 2004; Franklin 2012). This research work followed a convergent parallel design, which is further detailed in the following sections.

Once the research design was developed, the research methods and techniques, as well as data collection sources, were detailed. In this development work, besides literature review, a field research was carried out utilizing a mix of qualitative and quantitative research methods

from primary data sources to validate the thesis hypotheses. The thesis research method is further explained in the following sections.

Following the definition of the research methods, the thesis entered its data collection phase, which includes applying the methodology defined on the previous steps to gather the information necessary to test the proposed hypothesis. This thesis relied on primary data sources - i.e., first-hand information - and the data collection methodology mixed both qualitative and quantitative research.

Finally, the research work applied abduction logic, merging and comparing results from the previous phase to analyze the collected data, interpret the findings and draw final conclusions. This final step resulted in the testing of the proposed hypotheses and in a set of recommendations to address research problems defined at first. Each research step is further elaborated in the next sections of this thesis work.

## 3.1 Research Objective and Research Problem

The first step in this thesis development work was the definition of the research problem. At first, the research work identified a large research area - learning at Laurea UAS - which was then delimited to the general topic of “digital learning” at Laurea UAS. Finally, the research problem was further delimited to specific research questions applicable to the research goals.

The main objective of this thesis development work is to investigate what are the topics, areas and processes that need to be taken into consideration to develop digital learning at Laura UAS and to provide recommendations for the university’s digital learning enhancements. In order to carry out the investigation, the research work analyzed the theoretical framework on digital learning and identified the theory of disruptive innovation applied to higher education. This theory provided the pillar for the analysis of the data collected.

In addition to that, the research sought input from Laurea UAS students of all degree levels and study modes, professors and dCell team members. The combination of perspectives from both users of digital learning and lectures or developers enriched the research and provided a more comprehensive understanding of Laurea’s current digital learning framework. Consequently, the focus research question was defined as ‘What does an efficient and high quality digital learning framework consist of from the students’ and professors’ perspective?’

Moreover, the research work seeks to answer the following sub-topics:

- What improvements and changes can Laurea UAS make to its digital learning portfolio, strategies and design in order to support students and teachers in achieving high quality higher education?
- What special requirements and limitations must be considered when expanding digital learning in the university?

The investigation of Laurea UAS digital learning provided valuable and extensive data. Due to the restricted timeframe, resources and scope of this research, the thesis work does not provide a comprehensive assessment of Laurea's digital services and available platforms. Digital learning tools, softwares and programmes are, therefore, excluded from the scope of this study.

Furthemore, this research work acknowledges that a strategic focus on enhanced digital learning is greatly dependent on the university's leadership, financing and technical capabilities to support such a strategy. However, the impact of the thesis work on the institution's organizational and technical structure are not assessed in this research and must be examined separately from this thesis development work.

## 3.2 Research Design

The second step of the thesis development work included the design of the research structure. A well-structured research design facilitates and maximizes the research efficiency by seething the most valuable information from minimum mobilization of efforts (Kothari 2004; Franklin 2012). This research work followed a convergent parallel design. A convergent parallel research design consists of using multiple data collection methods, leading to convergence of results, combined analysis and presentation of final observations.

As visible in Figure 3, this thesis convergent parallel design included a mixed method research design, where the qualitative and qualitative data research methods were both implemented concurrently in the early stages of the research, in parallel to each other (Tashakkori & Teddlie 1998; Teddlie & Tashakkori 2006; Schoonenboom & Johnson 2017).

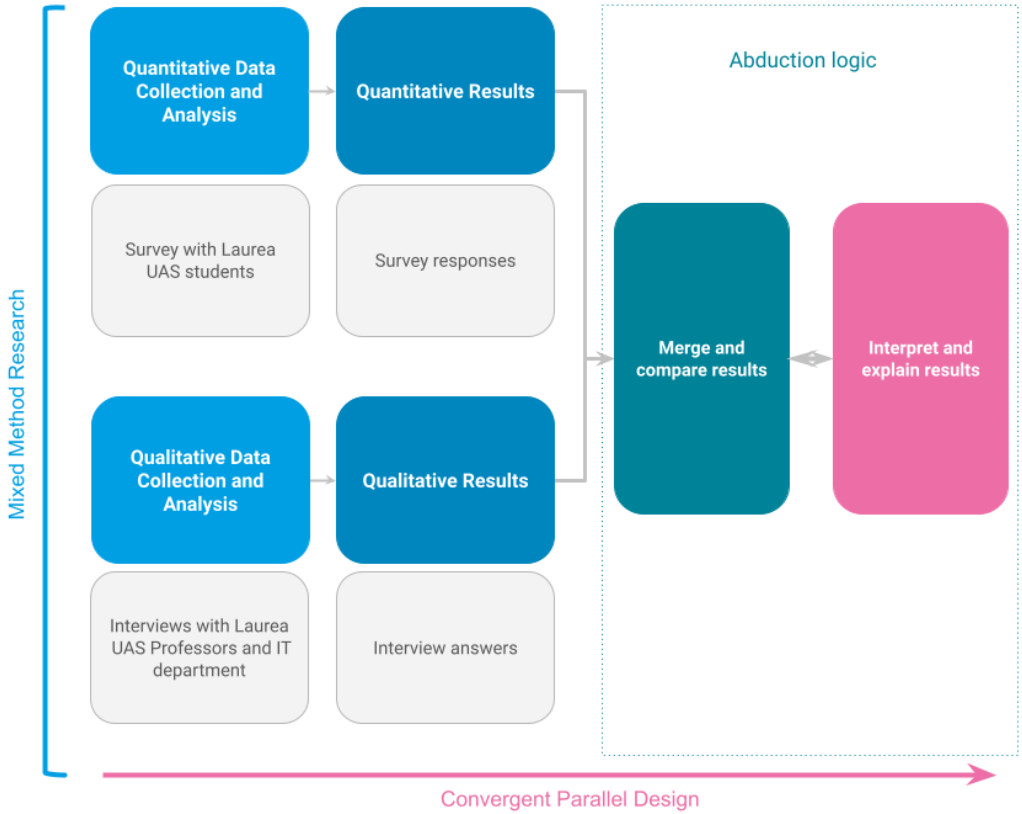


Figure 3: Thesis Research Design

As the investigation progresses, the results collected from qualitative and quantitative data collection are merged and compared. Finally, findings are analyzed by applying logic-abduction reasoning and conclusions are presented in a complementary fashion (Taylor et al. 2015, 63; Franklin 2012). In this context, logic-abduction reasoning, or inference to best explanation, is a method of logic reasoning to draw conclusions from preexisting conditions (Menzies 1996). Logic-based abduction means to derive multiple hypotheses from a set of results and utilizing logic to test proposed hypotheses and define the most probable result.

In practice, the development work design entails qualitative data collection, implemented via interviews with Laurea UAS professors and dCell department, and quantitative data collection from a survey with Laurea UAS students regarding digital learning in the university. The results of both sources are received in parallel and merged to facilitate examination. Abductive reasoning is then applied to extract possible explanations based on the surveys and interviews results. Finally, logic is used to infer a final set of recommendations for Laurea UAS digital learning development.

## 3.3 Research Method

This development research relied on academic literature review for establishment of key concepts and a field research for testing and validation of the thesis assumptions. The definition of the research methods constituted the third stage of the research process. As visible in Figure 4 below, the literature review utilized analysis of available academic studies, journals and peer-reviewed publications about the topic.

| Research type | Research Method | Technique | Source |
|---|---|---|---|
| Library Research | Literature review | Content analysis | Books, journals, academic publications, articles |
| Field Research | Qualitative | Semi-structured Interviews | Laurea UAS teachers and dCell team |
| | Quantitative | Structured Survey | Laurea UAS students |

Figure 4: Thesis research methods and techniques

The field research portion, on the other hand, utilized both qualitative and quantitative research methods and techniques to collect and examine data. Therefore this thesis research applied a complementary mixed method research based on primary data collection. Mixed Method Research is a methodology that combines the use of qualitative and quantitative research approaches (Harris & Brown 2010; Taylor et al. 2015; Franklin 2012; Tashakkori 2006; Bazeley 2008; Schoonenboom & Johnson 2017). Primary data collection refers to the process used to gather information through interviews, questionnaires and surveys directly from the source .

A qualitative methodology is a form of research method focused on qualitative phenomena (Kothari 2004, 3; Franklin 2012). A qualitative phenomenon pertains to how individuals or groups *feel, think and behave* (Taylor et al. 2015; Franklin 2012). A qualitative method of research, henceforth, investigates an individual's or group's personal opinions, attitudes and observations subjectively, and produces descriptive data with focus on the quality/content of the data, without emphasis on quantities (Taylor et al. 2015; Franklin 2012). The qualitative portion of this thesis development work comprises primary data from semi-structured open-ended personal interviews carried out with professors and the dCell department personnel of Laurea UAS.

A quantitative data collection method, on the other hand, is a form of research method focused on measuring quantities or amounts to assess a phenomenon (Kothari 2004; Franklin 2012). Quantitative research concerns numbers and measures quantities, amounts and

variables to examine a larger group's opinions, verify hypotheses, identify trends and make predictions, hence producing prescriptive data (Apuke 2017; Franklin 2012). The quantitative segment of this research work encompassess primary data from a structured survey carried out with Laurea UAS higher education students.

A complementary mixed method research was selected for this research development work as a result of the complexity of the research problem and the limited opportunities for experimentation. By drawing observations from multiple data sources, the researcher sought to examine the Laurea digital learning scenario from two (2) of the main stakeholders involved in digital learning experiences at Laurea UAS: teachers and students . Other key stakeholders, such as the institutions management and governmental organizations were excluded from the research work due to the limitations of the research timeline, and limited impact of potential research results on ingrained institutional and governmental structures.

## 3.4 Data Collection Phase

The third step in this thesis research was the practical collection of data utilizing the research methods and techniques defined in the previous steps. As previously mentioned, a literature review of established academic studies, books, journals, articles and peer-reviewed publications provided the information required to delineate key concepts that determined the research theoretical framework. Once the theoretical framework and key concepts were established, the development work progressed to the field research phase. The field research combined qualitative and quantitative research methods to gather empirical and quantitative data, respectively, to draw conclusions from different data strands and to test the thesis assumptions. Each strand of data collection is further described in the sections below.

### 3.4.1 Qualitative Data Collection: Interviews

The qualitative data collected in this research was gathered via semi-structured open-ended personal interviews carried out with professors and the dCell department personnel of Laurea UAS. The dCell department is especialized in developing digital learning at Laurea UAS, hence the reason it was included in this data collection phase. A semi-structured interview means questions are predefined and all interviewees respond to essentially the same questions, with some room for variations depending on interview progression. The open ended questions also allow interviewees to elaborate on ideas and expand on key topics and experiences (Harris & Brown 2010; Taylor et al. 2015; Young et al. 2018; Franklin 2012). The interviewing tasks followed the process detailed in Figure 5 below:

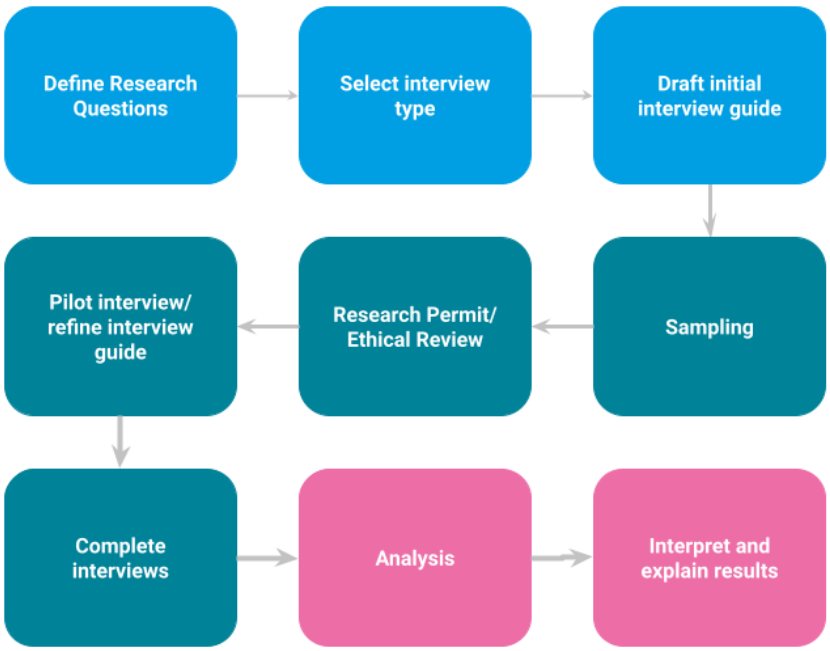


Figure 5: Thesis interview process (Young et al. 2018)

Firstly, the research question was defined as part of the thesis development work and the type of interview was selected as the most efficient to gather empirical data regarding Laurea's digital learning framework and to test the proposed hypotheses. Secondly, an initial interview guide was pre-developed to cover a variety of subthemes linked to the research main topic: digital learning at Laurea UAS. The subthemes of the interviews were defined based on the thesis author's personal digital learning experience, on key concepts prescribed by theoretical framework and existing academic research results. The subthemes that constituted the interview guide were:

- Laurea UAS digital learning offering
- Laurea UAS digital learning flexibility
- Laurea UAS digital learning efficiency
- Laurea UAS digital learning quality
- Laurea UAS digital learning tools
- Student engagement in digital learning
- Learning assessment in digital learning
- Connection and Group work in digital learning
- Well-being in digital learning
- Laurea UAS digital learning challenges
- Laurea UAS digital learning successes

In the interview sampling phase, Laurea UAS lecturers were identified, already in the conceptual phase of the thesis work, as the key interviewees due to their close proximity and frequent experience with digital learning at Laurea UAS. A secondary group of interviewees - Laurea UAS dCell personnel - was further outlined after feedback provided by Laurea UAS Research, Development and Innovation (RDI) department during research permit application.

Following the definition of the interviews' sample group, the thesis development work sought Laurea UAS research permit, which commits the research work to the highest ethical principles, such as ethical handling of information, confidentiality and privacy protection. In addition to that, the research permit required all material collected during the research phase be destroyed in an appropriate manner after the conclusion of the research (Laurea UAS 2022a).

Once the research permit was granted, an initial interview guide was developed containing open-ended questions covering the proposed subthemes. Furthermore, the potential interviewees were contacted via email by the thesis author, using the lecturers and dCell personnel contact details provided by Laurea UAS Planner, after the research permit was granted by Laurea UAS RDI department. Thirty-three (333) lecturers and eleven (11) dCell personnel were contacted and invited to participate in the thesis research interviews.

In total, twenty-one (21) lecturers and two (2) dCell personnel were successfully interviewed and provided the empirical data required in the thesis qualitative research phase. The interviews were carried out by the thesis author via Zoom, Microsoft teams and Google Meet video conference, within a period of 2 weeks. Each interview duration was between forty-five (45) minutes to one (1) hour. An initial pilot interview was carried out with a Laurea UAS lecturer to test the interview guide. Based on the pilot interview, the interview guide was slightly modified: some questions were combined and some irrelevant questions were removed from the final interview script detailed in Appendix 1. The thesis author followed the final interview guide to cover all necessary subthemes and probed responses when interviewed individuals did not spontaneously volunteer the necessary information.

The interviewed lecturers and dCell personnel were asked to share their personal experiences and perceptions related to each subtheme. The interview responses were audio-recorded and saved in mp4 format in the thesis author's Google Cloud Storage, along with automatically generated audio transcripts. General notes were also captured in field notes during each interview, to highlight key concepts and key words used by the interviewees and facilitate the later analysis of the interview results. All field notes were compiled in written Google doc format and also stored in the thesis author's Google Cloud Storage.

All interview answers were collected after Laurea UAS granted a research permit for this thesis work. Answers were kept confidential and stored in a confidential drive for the duration of the thesis research. All responses were disposed of at the end of the research process. No personal data was collected or published as part of this thesis work. The process of analyzing the qualitative data collected during the interviews is further detailed in the section 3.5.1 of this development work

### 3.4.2 Quantitative Data Collection: Survey

The quantitative segment of this research work encompassess primary data from a structured survey carried out with Laurea UAS higher education students. A structured survey means questions were pre-defined, definite and standard for all survey respondents, with fixed alternative answers that drastically limit descriptive responses to selected subthemes. The use of structured survey research method allows the collection of quantitative data and facilitates measurement of results (Kothari 2004; Apuke 2017; Franklin 2012). The survey tasks followed the process detailed in Figure 6 below.

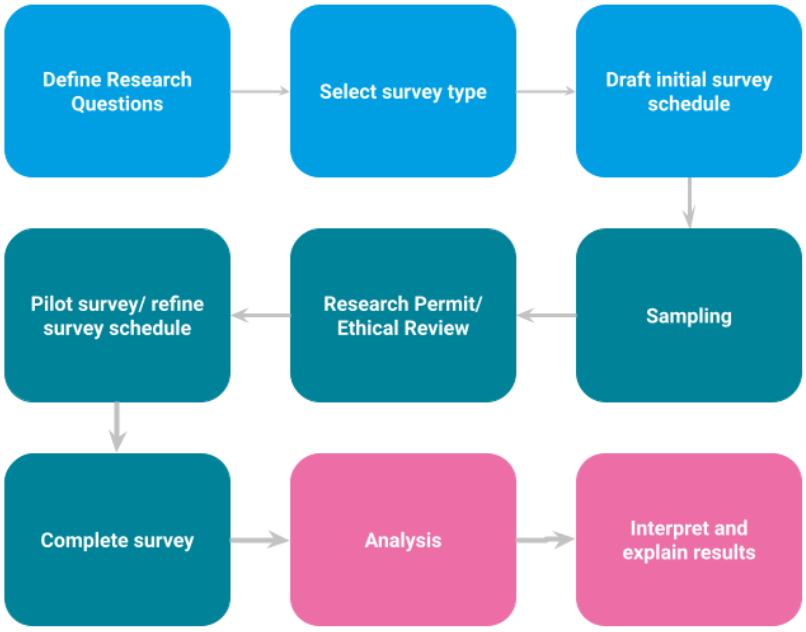


Figure 6: Thesis survey process

Firstly, the research question was defined as part of the thesis development work and the type of survey was selected as the most efficient to gather quantitative data regarding Laurea's digital learning framework and to test the thesis questions. Secondly, an initial survey template was pre-developed to cover a variety of subthemes linked to the research

main topic: digital learning at Laurea UAS. The survey template was conceptualized using Google Sheets, which resulted in a finalized survey schedule in Google Forms format.

The subthemes of the survey mirrored the thesis interviews' subthemes and, hence, were also outlined from the thesis author's personal digital learning experience, and from key theoretical concepts. The subthemes that constituted the survey template were:

- Laurea UAS digital learning offering
- Laurea UAS digital learning flexibility
- Laurea UAS digital learning efficiency
- Laurea UAS digital learning quality
- Laurea UAS digital learning tools
- Student engagement in digital learning
- Learning assessment in digital learning
- Connection and Group work in digital learning
- Well-being in digital learning
- Laurea UAS digital learning challenges
- Laurea UAS digital learning successes

Laurea UAS higher education students were selected as the sampling target population for the quantitative data collection portion of the thesis development work. Once the aforementioned steps were completed, the thesis development work acquired Laurea UAS research permit, ensuring the survey followed the highest ethical principles in the handling of information, confidentiality and privacy protection. Also as a requirement from the research permit, all information collected during the research phase was destroyed after the conclusion of the development work (Laurea UAS 2022a).

Upon the receipt of the research permit, the thesis author acquired the mailing lists for students' groups of each Laurea UAS campus - Tikkurila, Porvoo, Otaniemi, Lohja, Leppävaara, Hyvinkää and online campus - from Laurea UAS service desk. Rights to use the mailing lists containing students' emails were granted by Laurea UAS for a seven day period, in which the survey had to be sent to students. Access to individual students' emails were not granted, only to emailing groups for each campus.

The Google Form survey was linked to an email and sent to all Laurea UAS students through the aforementioned emailing lists. The thesis author included general information about the thesis project objectives, survey goals and thesis author contact details in the email communication that accompanied the link to the survey.

The survey originally contained only predefined questions about digital learning at Laurea UAS within the aforementioned subthemes. The majority of the survey questions included possible answers on a numerical scale between 1-5, in which number one (1) represented the most negative response (lower satisfaction level with the theme in question) and number five (5) represented the most positive response (highest satisfaction level with the theme in question). Upon feedback from students, an additional open text field was added to the Google Form to allow any further clarification. The survey template is visible in Appendix 2.

In total, 226 Laurea UAS students responded to the survey. Out of the total of respondents, 85.8% were Bachelor level students, 12.3% were Masters level students and less than 2% were Open University students. The survey also reached students completing different learning modes: 52.6% were studying in blended learning implementations, 27.4% were studying fully online and 19.9% were attending mostly face-to-face lectures on campus. The survey form only allowed one (1) response submission per student and was open for a period of 2 weeks, after which the form was closed for responses.

The survey responses were automatically collected in a Google sheet, which was stored in the thesis author's Google Cloud Storage. The results were also statistically visualized in Google Form charts automatically created based on survey results.

All survey answers were collected after Laurea UAS granted a research permit for this thesis work, answers were kept confidential and stored in a confidential drive for the duration of the thesis research. All responses were disposed of at the end of the research process. No personal data was collected or published as part of this thesis work. The process of analysis of the quantitative survey data is further explained in the next section of this development work.

### 3.5 Data Analysis Phase

The data collected from the qualitative and quantitative research was processed and examined in a structured manner to guarantee the integrity of data comparison and findings. The qualitative data resulting from the interviews was analyzed using a thematic analysis method with an abductive approach. The quantitative data, on the other hand, was analyzed using descriptive statistics and a cross tabulation approach.

The qualitative findings from interviews with professors and the dCell department of Laurea was analyzed separately from quantitative data resulting from the survey with Laurea UAS students. This analysis allowed the thesis author to identify meaningful concepts and themes from the qualitative data using abduction logic. Finally, both sets of data were merged,

compared, cross-examined and interpreted to generate a more comprehensive view of the different facets of the research phenomenon. The detailed data analysis process is further described below (Hesse-Biber & Johnson 2015; Kothari 2004; Apuke 2017; Franklin 2012).

### 3.5.1 Qualitative Data Analysis: Thematic analysis

The qualitative data collected during the research was analyzed using a thematic analysis method with an abductive approach. Thematic analysis is a data analysis method which systematically organizes and identifies patterns in a dataset, categorizing those patterns into themes, which are used by the researcher to draw meaning. Thematic analysis is commonly used in qualitative research due to its rich and flexible method to interpret research topics and extract meaning (Majumdar 2018; Braun & Clarke 2006; Braun & Clarke 2012; Bazeley 2009).

The abduction approach, on the other hand, is a form of reasoning used to form and evaluate hypotheses from observations, to infer the best explanation for the observed phenomena. When combined with thematic analysis, the abduction logic takes advantage of the themes identified in the thematic analysis to infer the best explanations and recommendations from the patterns observed (Braun & Clarke 2012; Beirlaen & Aliseda 2014; Flach & Kakas 2000). In the context of this thesis development work, the thematic analysis was carried out in four (4) stages, depicted in Figure 7 below.

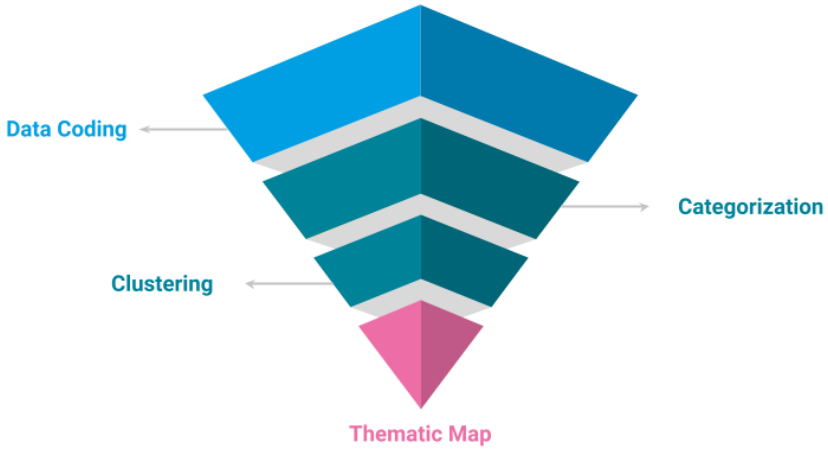


Figure 7: Qualitative analysis phases

As visible in Figure 7, firstly, after each interview session, the written interview field notes and audio recordings were analyzed and the key concepts and experiences associated with participants' responses were preliminarily coded. "Coding" is the process of assigning keywords or labels to represent the descriptive and inferential data gathered from the

interviews (Young et al. 2018; Taylor et al. 2015; Franklin 2012). Open coded was used right after each interview to record key terms and ideas raised by the interview participants in relation to the interview topics. During this stage, despite the pre-defined set of questions presented to all interview participants, the responses were varied and provided multiple perspectives on each interview topic. This was due mainly to the participants' personal perspectives and experiences with Laurea's digital learning.

Secondly, once all interviews were completed, the researcher attempted to identify key patterns by categorizing the codes. In this stage, all interviews' preliminary codes and interview transcripts were revisited, merged and cross examined to identify common patterns and key ideas that represented meaningful categories of data representative of the interviews' responses. The number of times a key idea was mentioned by any respondent was also recorded next to each code within the main categories. The main categories and codes produced in this phase are available in the code card depicted in Figure 8 below.

| Digital learning | | Teachers | | Pioneering/ Leading change | | Technology | | Learning Design | | Engagement | | Quality | | Expectations | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Varied teaching method | 6 | Teachers competence digital learning IT and pedagogical level | 29 | Covid-19 | 1 | Covid-19 | 10 | Lesson design: content, assessments | 29 | Human interaction/ Visual queue | 68 | Student profile/ attitude | 29 | Blended learning | 29 |
| Flexibility & dynamism | 27 | Teachers collaboration | 10 | Laurea UAS stratery | 2 | Tools/software functionality/suitability | 58 | Canvas Master Courses | 15 | Concentration/ Commitment | 28 | Self-pace learning | 3 | Approach to Teachers | 42 |
| Self-pace learning | 3 | Teachers bandwidth | 19 | Finnish Education larger scenario | 1 | Technology support | 27 | Laurea UAS strategy | 2 | Student profile/ attitude | 26 | Time management | 4 | Approach to Students | 28 |
| Student leveling | 1 | *lesson design* | | Study offering | 19 | Cost | 1 | Quality assurance/ audit | 5 | Activation tools | 100 | Knowledge retention | 14 | Quality assurance | 16 |
| Content freedom | 3 | *learn tools* | | *F2f opportunitities* | | Digital noise | 8 | Content noise | 2 | *Break out rooms* | | Learning design | 37 | Intentional digital strategy | 38 |
| Blended learning | 13 | *general* | | *Blended learning* | | Systematic training | 1 | Structure | 1 | *Assignments* | | *MOOCs* | | *Roles and responsibilities* | |
| Cost effective | 1 | Teachers attitude | 6 | *MOOCs* | | | | Feedback loop: Student feedback, teacher feedback | 13 | *Lectures* | | *Fully online* | | *Streamlined Study offering* | |
| Time efficient | 7 | Laurea UAS strategy for teachers | 2 | *Online learning* | | | | | | *Project work* | | *Blended* | | *Digital learning framework* | |
| Logistically easier | 5 | Teachers autonomy | 2 | *Communication* | | | | | | *Group work* | | *Learning topic* | | *Resource planning: personnel and tools* | |
| Wellbeing | 15 | | | *Coordination* | | | | | | *Discussions* | | Knowledge sharing | 34 | | |
| Social aspects: networking, community, peer support | 34 | | | Target groups | 8 | | | | | *Other tools: Miro, reaction buttons, safe space* | | Teachers role | 14 | | |
| Target groups | 44 | | | Efficiency | 1 | | | | | Reward | 2 | Repetition | 1 | | |
| | | | | | | | | | | Lesson design (topic and lesson) | 17 | Practical learning | 18 | | |
| | | | | | | | | | | Teachers role | 22 | Cross UAS collaboration | 1 | | |
| | | | | | | | | | | Peer pressure | 7 | Feedback loop: Student feedback, teacher feedback | 13 | | |
| | | | | | | | | | | | | Quality assurance/ audit | 5 | | |
| | | | | | | | | | | | | Peer assessment | 4 | | |
| | | | | | | | | | | | | Assessment methods | 16 | | |

Figure 8: Thematic categories

Thirdly, the thesis author used abduction reasoning to further group similar categories and codes into meaningful data clusters that would best represent the data collected, by achieving a concise set of clusters that characterize the main gaps in Laurea UAS digital learning from teachers' perspective. In this stage, some codes and categories were renamed to better represent the data clusters. This effort resulted in 5 main clusters of key concepts, arranged in a change matrix and measured along 2 axes (x and y). The x-axis represents a scale of Laurea UAS' ability to influence changes associated with each cluster from lowest, on the left side of the axis, to highest, on the right-most side of the axis, ability to influence

change. The y-axis represents the potential impact a change to each cluster can have on the institution's digital learning framework. The change matrix with the thematic clusters is depicted in Figure 9 below.

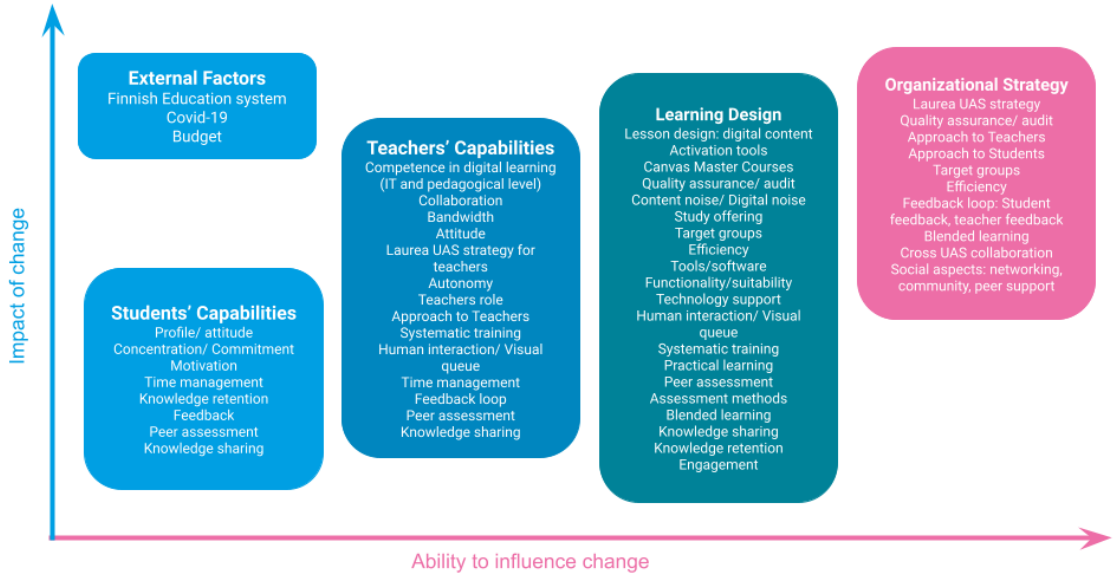


Figure 9: Change matrix: thematic clusters by impact of cluster change and Laurea UAS ability to influence change

As represented in the change matrix above, the clusters of key concepts extracted from the interview responses received a title that best captured the core nature of each cluster of ideas, which set the base for the final themes. The five (5) clusters observed were:

1. External factors, such as the Finnish education system dynamics and regulations, COVID-19 and educational budgets;
2. Students' capabilities, including student's profile, levels of motivation and commitment to their studies, time management skills, ability to retain knowledge and provide feedback to peers, teachers and the organization, and ability to share knowledge with peers.
3. Teachers' capabilities, which encompasses teachers' digital learning competence on a technological and pedagogical level, bandwidth, autonomy to impact digital learning, attitude towards digital learning, ability to collaborate with other teachers, understanding of their role and Laureas' approach towards teachers, access to digital learning systematic training, approach to human interactions and visual elements in digital learning, time management skills, capacity to provide and process feedback from students, peers and the organization, and ability to share knowledge with peers.

4. Learning design, which covers Laurea UAS digital lessons and content design, use of activation tools, maturity level of Canvas Master Courses, quality assurance and audit processes for digital learning, approach to digital noise or content noise, digital learning study offering portfolio and adaptability to target groups, digital learning efficiencies, tools, functionalities and efficiency, approach to human interactions and visual elements in digital learning, availability of digital learning systematic training for teachers, the importance of practical learning, peer assessments and mixed assessment methods to ensure knowledge retention, the significance of blended learning in digital learning, the value of knowledge sharing between amongst students and teachers, and the challenge of student engagement in digital learning models.
5. Organizational strategy, including Laurea's digital learning quality assurance, approach to teachers, students and main target groups, finding efficiencies in digital learning, ensuring a constructive and effective feedback loop between students, teachers and organization, approach to blended learning, collaboration with other educational institutions, and securing social aspects of learning (such as networking and peer support).

The 5 concept clusters represented potential improvement areas in Laurea UAS' digital learning framework. It is important to note, however, that, at this stage, the themes were not yet finalized nor defined and there was still some overlap in the concepts that began to emerge across different clusters. The results of the thematic analysis and final thematic map are further described in section 4 of this research work.

### 3.5.2 Quantitative Data Analysis: Descriptive Statistics & Cross Tabulation

The quantitative data collected during the research was analyzed using descriptive statistics and a cross tabulation approach. Descriptive statistics is a method used to describe, organize, and summarize observations from samples or populations (Holcomb 1998; Conner & Johnson 2017; Nicholas 2010; Salkind 2017). The selected descriptive statistics technique was cross tabulation, which uses contingency tables to visualize datasets and test hypotheses (White 2003). The process of analysis of the quantitative data was carried out in three (3) main stages depicted in Figure 10 below.


Figure 10: Quantitative analysis phases

As summarized in Figure 10, the three (3) stages of this research quantitative data analysis were (1) data clean-up, (2) cross tabulation, and (3) data Interpretation. In the first stage - data clean-up - the survey responses sheet, which was automatically generated by the Google survey form and containing all respondents' answers to the surveyed subthemes outlined in section 3.4 of this thesis work, was reviewed for any deviations, corruptions or duplicates. All corrupted or duplicate responses were removed from the sample. In addition to that, all responses that were left blank were coded as “not applicable” (NA) in order to facilitate visualization in the cross tabulation phase.

Once the data was deemed clean and complete, the quantitative analysis entered its most effort intensive phase - the cross tabulation phase. The cross tabulation began with the creation of pivot tables in Google sheet format. The pivot tables were created by pulling data from the aforementioned survey responses sheet. Respondents' age groups, study level and mode of learning were cross compared with all survey questions within each subtheme, with the purpose of identifying patterns and relationships.

Finally, once all data was cross tabulated and categorized into main concepts, the thesis author reviewed all contingency tables for patterns and relations, interpreting main experiences from Laurea UAS students with the university’s digital learning capabilities. As clarified in section 3.4 of the research, the majority of the survey questions included possible answers on a numerical scale between 1-5, in which number one (1) represented the most negative response (lower satisfaction level with the theme in question) and number five (5) represented the most positive response (highest satisfaction level with the theme in question). During the data interpretation phase, for all responses on the aforementioned numerical scale, a response equivalent to 4 or 5 was considered a positive response, a score of 3 was considered neutral-negative and a score of 1 or 2 was considered negative.

Despite the extensive amount of data, the thesis author identified common focus areas. The final three (3) main focus areas used to draw the final results are summarized below.

1. Overall experience, such as students' overall opinions regarding advantages and disadvantages in Laurea UAS digital learning.
2. Digital Learning Design, including Laurea UAS portfolio of tools, software and platforms used in digital learning, students' accessibility to technical support to troubleshoot digital learning issues, and students' opinions regarding design of digital lessons or courses at Laurea UAS.
3. Study quality, which encompasses key concepts that affect the quality of education in digital learning opportunities, such as students' engagement, information retention, study progress, digital assessments, and digital learning teaching quality.

The results from the quantitative data analysis were summarized in a final set of cross tables. The author also made use of graphics to facilitate the visualization of cross tabulated data findings. The findings of the quantitative data analysis are further described in section 4 of this thesis work.

### 3.5.3 Complementary analysis

The analysis of the qualitative and quantitative data collected during the research was done in a complementary manner. Thus, the qualitative and quantitative results were examined separately and merged and juxtaposed to provide complementary observations that provide a bigger picture of Laurea's digital learning scenario (Hesse-Biber & Johnson 2015; Bazeley 2008).

The thesis author juxtaposed the final thematic map resulting from the qualitative data analysis with the results, in the three focus areas, from the quantitative data analysis. The overlapping concepts and ideas set the base for the thesis final recommendations. Discrepant or minority opinions were, consequently, excluded from the final set of recommended changes to Laurea UAS digital learning framework.

# 4 Results

This chapter of the research work presents the results produced by the qualitative and quantitative analysis aforementioned. The qualitative analysis, carried out through a thematic analysis of Laurea UAS teachers' interviews responses, resulted in a thematic map, which suggested three (3) main themes highlighting development areas for Laurea's digital

learning framework. The quantitative analysis, on the other hand, utilized cross tabulation and abduction logic to draw findings from Laurea UAS students' survey responses. Such efforts resulted in the identification of three (3) focus areas of development in Laurea's digital learning framework.

Furthermore, the qualitative results were compared to the qualitative findings in order to produce the final set of recommendations for improvement of Laurea UAS' digital learning framework. This process is further detailed below.

## 4.1 Qualitative Data Results

The findings of this thesis qualitative research describe Laurea UAS teachers' experiences and challenges with the university's current digital learning framework and its main shortcomings from teachers' perspective. Through this approach, the research work aims to recognise teachers' impact on transforming Laura UAS digital learning whilst identifying key focus areas for further development of Laurea UAS digital learning.

The thematic analysis of Laurea UAS teachers' interview responses uncovered five (5) clusters of key concepts, which represent potential improvement areas in Laurea UAS' digital learning framework. After further examination, the clusters of external factors and student capabilities were excluded from the scope of this research work because Laurea has little to no ability to influence changes in both factors on a short-term scale. In addition to that, the extensiveness of content and variety of research possibilities exceeded the timeframe and resource level of this research work, causing the researcher to opt to exclude such clusters of factors and concepts from this development work. Nonetheless, external factors and students' capabilities are valuable areas that deserve further examination, due to their significant impact on the Finnish educational institutions' digital learning future.

The remaining clusters of concepts – teachers' capabilities, learning design and organizational strategy - determined the final thematic map of this research. The final thematic map highlighted the three (3) main critical areas of improvement - main themes - in Laurea UAS digital learning framework: Teachers' capabilities (theme 1), Learning Design (theme 2) and Laurea UAS strategy (theme 3), which are further described below:

1. Theme 1 - Teachers' capabilities: Within the teachers' digital learning capabilities, the following subthemes were identified as potential shortcomings in Laurea's digital learning: (1) teachers' digital education pedagogical and technological competence level, (2) teachers' bandwidth and levels of collaboration, and (3) teachers' autonomy within Laurea UAS digital learning framework.

2. Theme 2 - Learning design: encompassed an additional three (3) subthemes: (1) digital content design,(2) portfolio of tools and software, and (3) Laurea UAS digital study offering.
3. Theme 3 - Laurea's Digital learning strategy: included subthemes: (1) quality assurance, and (2) customer focus.

Finally, the final set of main themes and respective subthemes was recorded in a thematic map visible in Figure 11 below. The thematic map was used to compare qualitative findings to the quantitative results drawn from survey results and generate a final set of recommendations for Laurea UAS' digital learning framework development.


Figure 11: Thematic map

As detailed in the Thematic Map in Figure 11, the qualitative analysis highlighted how teachers' capabilities (theme 1), Laurea UAS' digital learning design (theme 2) and digital learning strategy (theme 3) represent the main development areas in Laurea's digital learning framework. Each theme and its subthemes are further described below and exemplified utilizing quotes from the interviews with teachers.

**Theme 1 - Teachers' capabilities**

Teachers' capabilities are amongst the main factors that affect Laurea UAS teachers' digital learning proficiency and that represent potential obstacles to evolution of Laurea's digital learning framework. These factors and examples from the analyzed data are summarized in the 4 subthemes below:

1. Subtheme 1 - Digital Competence: Laurea UAS teachers' digital education pedagogical and technological competence level varies and teachers often feel they are not fully

aware of all pedagogical and technological possibilities when designing and implementing digital learning opportunities. Teachers also have difficulties to improve their digital competence due to lack of time, lack of support from the UAS or even lack of personal interest in developing digital competencies. The direct quotes below exemplify this subtheme's main ideas.

(About general teachers' capabilities)

*"So Laurea is a very, very strong digital university. What I do you feel about that? It's confusing because that's a totally different kind of business. If you are teaching in a classroom, you need a different kind of knowledge and competence. And the issue of teaching all in Canvas or in digital learning platforms is that you (the teachers) need a different kind of knowledge and technical competencies."*

(About general teacher training)

*"And I do know there is a price tag for this sort of stuff (training teachers), you know, it's an outside company. We are buying this service from an outside company. So, I'm not saying it's bad, but I would say that we do have internal experts we can use."*

(About Canvas learning platform)

"*But I think it's a very complicated environment and we don't have the time to learn it and all the properties there*."

"*I've only used a limited amount of all the possibilities."*

*"I think there's a lot of the teachers still getting familiarized with the whole kind of and all the possibilities there (Canvas)"*

*"I assume that there are still a lot of things I could use. But I think especially, that the ones that have been used to the previous system, that they are not there (in Canvas) and I am using really the basic functionalities."*

"*And then there is an ambition to go even further. But in some areas there might be that there's no skills yet to have all the things that we would want to have*."

"*I only know a fraction of the capabilities of this Canvas platform*."

2. Subtheme 2 - Bandwidth and collaboration: teachers' overall capabilities are strongly affected by their bandwidth. Bandwidth can be defined as an individual's capacity to take on more work. Laurea's teachers often believe they do not have enough time and resources to successfully and efficiently tackle the digital learning workload without significant changes to how things are being currently done at Laurea US. The direct quotes below demonstrate this subtheme.

   *"So most of the time, like if you (the teacher) really want to do a decent course, you have to use your own free time to do it, and some teachers are ready to use their own free time and others are not."*

   *"So I think that there's one big question: should one person be able to do everything? So I think that there should be more teamwork. (For example) That one (teacher) is very, very good in the technical part and then one (teacher) is very competent in Canvas. And then there is someone who is coming with the substance. So this kind of teamwork could be very, very innovative and it could be nice to be working in teams."*

   *"It's about teamwork. I think that we need to have teamwork. One teacher can't do everything."*

   *"So the problem is that we (Laurea) should allocate some hours so that we can build this kind of master workspace within different teachers. But because we don't have that time or the hours, nobody is doing anything."*

   *"The work and teachers would learn from a collaborative experience, do the designing at the marketing of courses in a better way and combine efforts. (...) So instead of pushing the loser (course) in the marketing competition out of the game, I will combine them (different implementations) and put them into a collaborative effort."*

   (When asked about whether Laurea provided support in designing digital lessons, Canvas learning platforms and other digital learning coaching opportunities at Laurea UAS)

   "*(...) at the moment, I have so much work that even if they arranged something I wouldn't find any time to go to these lessons.*"

   *"I know that education or some coaching is available but we have so much work that it is difficult to join."*

"*There are nice coaching sessions, but I am teaching then, so it doesn't work. And I think they need to give us some time to join these sessions. We can't tell the students that: 'Sorry I'm having some education here and that I have to leave you alone'.*"

"*I need to take advantage of what is available today. And because there are a lot of things, you know, that are kind of for educational purposes, which we can use and we can take as part of our teaching. But finding those and learning those first, as a teacher, takes a lot of time.*"

(When asked about using Canvas learning platform)

"*So I know there's a lot of education on canvas, which we can join, but I have to check the schedules, whether I can join them or not. So it's not all so easy. And also we are supposed to join some other sessions. Like, we are doing a lot of research in Laurea and we should be aware of what's going on in our area programs*."

*"(...) we have so much work that it is not possible to join all the meetings and you don't have the time to read and even if there are some recordings, you don't have to watch them. And sometimes it's hard to find everything on our intranet."*

*"And we have to be given time to learn. Our schedules are too tight. And if some education is given, we don't necessarily plan to join them because we have so much to teach. So all changes need some time. But if our schedules are too full, we don't have the attitude to learn any new things."*

3. Subtheme 3 - Autonomy: teachers' capabilities are strongly affected by the level of teachers' autonomy within Laurea UAS digital learning framework. Teachers wish more freedom and control over their courses' instructional materials and study offering portfolio, often highlighting the use of collaboration between different units of the university as a potentially unexplored area teachers would explore should they have more autonomy.

   *"I do care about how I can organize my course. And this spring there will be online but I hope that next autumn we will have classroom teaching."*

   *"I think that trend is that we're going more or more to digital courses. That's not something teachers can choose. I think the trend is that we go to a lot of no-contact digital courses. So they (Laurea UAS) just tell you, you know, the teacher cannot influence that at all really."*

*“We (Laurea) need clear framework and nominated persons who take responsibility to develop basically learning and platforms.”*

**Theme 2 - Digital Learning Design**

Laurea UAS’ digital learning design is a critical factor that affects the institution's digital learning performance and represents one of the main areas of improvement in the development and successful future of Laurea’s digital learning framework. Within the university’s digital learning design theme, 3 main subthemes were identified as the most paramount:

1. Subtheme 1 - Content Design: digital courses design is the process of developing quality digital learning environments for students. It encompasses the use of appropriate pedagogical methods, creation of instructional materials and facilitation of knowledge sharing and networking with the goals of supporting students develop knowledge, practice and acquire skills desired in their intellectual and professional development (Capital University, 2022). Laurea UAS’ teachers have highlighted the design of digital courses as a development area for the university’s digital learning future. They often feel the organization’s expectations for quality digital courses is not equivalent to the time and effort teachers are allowed in the development of digital instructional material. The quotes below illustrate the main ideas surrounding this subtheme.

   *“We (Laurea) need to be able to design learning paths, courses, and communication to allow students to learn smoothly, without bigger breaks.”*

   *“So, I think it's mainly for saving reasons, and this is one of the challenges for the teacher, because the preparing, a very good material for online course, it's like a digital product, you know, it's not something you do very quickly, but like, the working time you get is half from on the Canvas courses.”*

   *“There should be enough working time for the digital courses. This assumption that digital always takes less time because you can just copy paste material online into the canvas, is not the right attitude.”*

   *“Laurea UAS can cut teachers’ working time in half when the teacher conducts an online course. I think it's mainly for saving reasons. And this is one of the challenges for the teacher, because preparing a very good material for an online course…it's like a digital product, you know, it's not something you do very quickly, but like, the working time the teacher gets is half from the on-campus courses.”*

*“We could use more resources online. Workshops and reflections and discussions. I think the students need more to reflect upon what they have learned.”*

*“Now we have been developing Canvas master content and having support to develop this design. One problem is that when you have a master workspace that is designed for a certain study unit, and we do have quite many implementations of the study unit, and with different student groups, they have a lot of different modes of studying. And then you have the same master workspace that usually has been designed for online learning. Then when you have like an implementation where you are actually meeting the students the master work space doesn't work that well.”*

*“We had a very productive workshop and we were quite unanimous about the fact that it wouldn't be a good idea to do this master workspace, so that it would be like an implementation that you should carry out the way that it is. But rather to make a workspace where you would have pieces that people could then sort of take and then construct their own implementation. So that you would just have all of that available, all the materials and assignments, and all kinds of things. So that you could choose the ones that you feel that would feel best for the implementation that you have.”*

*“The biggest challenge is the learning by development process. Some things require lots of teamwork, lots of interaction, co-creation. You can do it online, but there's something missing. So in those 100% online courses it is difficult. So I'm okay with having, you know, most of the lectures online, but I think that we should still have some sometimes to meet face to face as well.”*

*“We went around asking, which master framework should we be using, please? What do I download on Canvas? Where is this master course? After two or three questions, I did get the general agreement that I didn't know what the master course was. Then together with my fellow colleague, we had a look at the master course and noted that there are three ways to teach every point on the curriculum. And should I teach everything which was on the master course? It would be not five credits but twenty credits. And then a further question was ‘Do I know how to teach all of these things?’”*

*“So that was the idea of these master platforms, that you just copy the content and start using it. We found that we could not use it as such.”*

2. Subtheme 2 - Tools & Softwares: Laurea UAS teachers believe Canvas learning platform is a step in the right direction. However, they feel more support is needed in developing Canvas instructional materials. In addition to that, teachers often struggle with "digital noise", caused by the use of multiple different platforms for course management and communications with students, and feel more integration between tools and software would be more than welcomed. The interviews' extracts that follow demonstrate this subtheme.

   *"Well, if I have very many environments to check daily what kind of messages have I got there, it's impossible! You don't have the time. So the connection from the platform to your email would be nice."*

   *"I don't check each one of these (platforms) every single day. I don't have time for that. So the integration with emails, I think it's already overdue."*

   *"We should also have some other systems, perhaps supporting each other, which would be more flexible."*

   *"Yeah, because sometimes I wonder… it's to have a lot of tools on your table that you can utilize. But what is too much?"*

   *"I hope the tools that we use are constructed in a way that they are very easy to use and user friendly."*

   *"(...)better network solutions. (...)I tried to have an online learning lesson and it's really difficult because the Wi-Fi network on campus is really bad."*

   *"Who is responsible for collecting the feedback from teachers about the potential tools or platforms teachers want to use and then kind of coordinating the implementation of those tools or platforms?"*

   *"Then there are some problems with the requirement or the integration of different systems in Laurea."*

   *"I just stopped tracking the communications because they were coming from all directions. I would have to open five different platforms to look at the five different communication sources, plus teams plus email. At one point, I was just like enough, I'm going to just ignore all of these different tools and focus on what I need to get done. It was too much, it's digital noise."*

*“The challenge is that tools are not integrated very well.”*

(About IT support to tools & software)

*“But to fix them (issues) immediately. I'm not confident that I could get immediate help. Or yes, maybe I could call the service desk. I mainly email them.”*

*“We have quite good support. (...)these past two years has boosted the availability of that because there's been so much that has been organized. There's been all kinds of help clinics and stuff like that. So I feel that although maybe I'm not the person who needs the most help with these things, I feel that it's very practical that when I have something I can always post a message to a certain team theme, for example,and someone will answer it quite quickly.”*

*“I've been using these kinds of clinics that have been offered to us sometimes. Just go there and then explain about maybe some challenges that I've had. And then we've thought with the support person who's there and we've reflected on, okay, so well, what would be the best way to do this? And so on, I have found this to be a very good service to us and I don't know how this is going to be, when, you know, we continue. Because, for sure, this has been likely boosted now because of the remote work circumstances.”*

*“It's not very efficient to go there (IT help clinics) all the time, but I would watch the recordings sometimes. They started this at the start of the pandemic. They compiled this very useful list of all the recordings that they had done with the contents of the recordings and it was super useful for me because then I just looked at that.”*

*“I would like this feature (that enables me to) go and look for that part of the reporting that is really really useful. I know where recordings are but I cannot find anywhere a good compilation of the subjects of the recordings. They are in this one chain in teams and it's just the recordings and there's no explanations or anything. So I would really, really like to at least have a place to have the contents of the recording. So I would always find the help that I need.”*

*“I mean those recordings (of IT help clinics) are excellent. I mean, that's excellent material, but we can't really access it. We don't know which recording is for what! So somebody should just sit down and think about how to organize this and then move all those recordings to maybe one place.”*

*“The information is in intra, but I'm not really sure where. And again, I don't have the extra time to, you know, do that kind of searching. So often, I'll just try to solve this by myself.”*

*“The information, the training, is available but they (teachers) have no idea how to find it and how to find a specific issue. It takes too long, so they end up giving up and just asking another peer, a colleague, or just trying by themselves.”*

*“The main issue here now, and I think throughout the time, has been that you have to be able to know. Not only how but more to know who to contact.”*

3. Subtheme 3 - Study Offering: The interviews highlighted teacher’s concerns with Laurea UAS portfolio of digital learning offering and inefficiencies found in the portfolio of courses. Teachers expect more collaboration and joint efforts to roll-out digital learning implementation to maximize Laurea UAS’ offering according to students seeking higher education. The interviews’ excerpt below illustrate this subtheme.

*“I think that there should be more blended courses and online (courses) and I think that it should also be utilized in a more diverse way.”*

“*(...) and what I do think about this offering and the whole digital products is that we should really think about where we want to be.”*

*“So I would say that we need to offer them (students) this kind of face-to-face experience, and not all fully online.”*

*“It would be great to have face-to-face lectures and extra content and digital tools to support that.”*

*“There should be a lot more blended (studies). And I think, of course this is offered but the problem is, that we have to have enough students on those courses.”*

*“I also have the opinion that we should offer the students possibilities to choose from three different types of studies: those who are all digital online, those who are blended and those who are at campuses because we have different students.”*

*“I certainly hope that we will keep this (some learning) face-to-face. I still think that we're not moving sort of into the direction of having everything online because that*

*would be a terrible nightmare vision for me at least. And I don't think it's good for humans or for the society as a whole either."*

*"I think that we should increase the number of courses we offer online because that is what the students want. I know that they need to have some face-to-face courses and so the availability of courses can't be only composed of online courses."*

*"One challenge that we teachers are having is that what we are teaching today might be old after one year. So how do we keep ourselves up to date on what's needed today? And secondly, how do we convey that to our students and making sure that they have prepared for the working life."*

*"I feel that we have too many different options. We could reduce some of our offerings and then focus and do it in a way that we would offer the study options more regularly. So that the students wouldn't need to go so much on Campus Online (Finnish online courses central open to anyone)."*

*"I expect this kind of careful thinking on those tasks and courses, which are nice to have as MOOCs (Massive open online course), but not all. And if you are making the MOOCs, thinking how good they are on the quality level will be good."*

*"So sophisticated MOCC, massive open online courses, that are available to almost everyone, no matter the place, no matter the time, no matter if it's full. That is something that we need to develop and look carefully so that we are able to be some kind of forerunner in this market, that we are able to fit a lot of them and deliver."*

*"It's good that we have a lot of online content that is being offered, but when you look at it from the students' point of view, they should have the possibility to choose, and they don't always do."*

*"Let's hope we get more international courses in the next five years."*

*"I think that there should be more online opportunities for the students that are working."*

**Theme 3 - Digital Learning Strategy**

The UAS' digital learning strategy is the final factor impacting the institution's digital learning efficiency and efficacy. A strategy can be defined as a long-term plan for achieving success (Cambridge dictionary 2022). Laurea's UAS strategy for digital learning development was

identified as an important area the university should focus its efforts in order to compete in the Finnish and global higher education market. Within Laurea's digital learning strategy theme, two (2) main subthemes were identified as the most relevant improvement areas:

a. Subtheme 1 - Quality Assurance: interview participants called attention to a lack of clear, structured and common quality assurance process for the development of digital learning long-term strategies, creation of instructional materials in Canvas learning platform and audit process to identify gaps and revise plans. As a result, Laurea UAS as an organization and teachers have taken a reactive approach to developing digital learning, instead of using a standardized process with intentional and proactive behaviors. Some of the responses this can be found below:

   *"There's no audits. There are no quality checks. The only quality checks it's feedback, which we don't get. So I think that's a lot of balance and with the quality of all like origins as well and updating also.*

   *"(...) there's no audit. It's very hard to keep them (digital courses) up to date. Yeah, I mean, there's no process, you know, keeping up to date, so there could be some process.*"

   *"Besides the fact that there is not enough time to prepare for the material, in addition to lack of time, I think that there's a lack of evaluation, like quality evaluation."*

   *"Some online courses don't get updated. Yeah, I mean there's no process, you know, for keeping them up-to-date. So there could be some process…(i.e.) you're supposed to update your course every two years and you get working time for that. But there's no process like that. So it's really up to the teacher if they use their time to update it (digital course materials)."*

   *"The first part of the quality would be to inform students that feedback really matters, that it's super important, that it influences many things. (...) A second would be that we should assess the quality of the courses. Somebody should go through all course materials and grade teachers as well, maybe an external assessment or peer review. And third, there should be some quality evaluation, like what students have learned from the course."*

*“We have some dedicated people who can basically help us (teachers) create this kind of master content. But still, we don't have a full understanding of how this approach should go. So the process is unclear.”*

*“And how to maintain them (digital courses) later as well? Because nobody is auditing them and checking if they're working or not based on the students' feedback…”*

*“And we don't have a full peer review to build a content and then to audit the content and keep it up today so it's like everybody's complementing each other.”*

b. Subtheme 2 - Customer Focus: this subtheme is directly linked to subtheme 3 - Study offering of Theme 2 - Digital Learning design. Many teachers highlighted that Laurea is not as efficient as it should be in catering to the needs and expectations of the higher education demand in Finland. This is often due to an institutional focus, instead of a customer focus organizational strategy that places students' needs as the main driver for change. The quotes from the interviews with Laurea’s teachers exemplify this.

*“Now, we are standing in this two kind of businesses (situations). One is digital business and one is the traditional learning business and those businesses are potentially different kinds of businesses. And we need different kinds of competencies to do the digital world.”*

*“And I would say that we really need to think about how we differentiate in the master's degree, in the university of applied science masters degree programs.”*

*“Of course, one factor is that our master's programs need to be relevant and they need to have a pool of interested students. I mean, students are interested in our master's programs. But really, I would think that we need to have mixed teachings. To provide only online master's degree programs is not the way to go.”*

“*I don't know because one of those real challenges is that you don't get that many very few students give feedback on the courses.”*

*“We have this formal feedback form and it actually has a huge impact on the teaching. It has a huge impact inside Laurea. Many students don't realize that. Every teacher has to, you know, go through the feedback, walk through it with their manager. But the problem is that a super marginal part of the students ever fills this feedback.”*

*“I feel it's a very big problem. That there's a very small minority of a hundred people on the course and maybe you have less than five people giving the feedback and they are not representative of the whole class, but they have a really big impact. So, somehow all the teachings start to be, you know, changing because this minority will give feedback and they have over influenced the courses.”*

*“Students' feedback has a huge impact and this should be better communicated to students.”*

*“I'm not sure how we asked for any feedback from the students about how they liked/used Canvas. So I would say that maybe we should ask for some feedback.”*

*“But so far, what I seem to notice is that contact lessons in the beginning when you're setting up the course are very important and then some kind of contact throughout the course is, you know, not necessarily every month.”*

*“I do hope that's where we do see the value in the classrooms as well. So that we could also somehow compile the best mixture (of learning modes), making sure some bits are online but having sufficient meetings on campus so that people actually get some networking.”*

*“There has to be buildings and offices that are built in a way that will begin motivating people to come back. So we have to create possibilities to meet and say also.”*

*“I would like to see that we could increase the communication and cooperation between students and teachers.”*

*“I believe that students are in that central position that we (Laurea) should be focusing on. It does not matter if it's online or not, we need to invest and develop all the time to make better learning experiences for the students.”*

It is important to emphasize that, despite the thematic categorization depicted in the thematic map above, many interviewees’ experiences are observable across different themes. For example, interviewees highlighted the teacher’s bandwidth strongly limits the development of high quality digital learning content. The level of digital learning content design, on the other hand, is strongly dependent on Laureas’ strategy for planning of resources and process of quality assurance. Nonetheless, the thesis author chose to simplify the data visualization by clustering subthemes according to the most closely related main theme.

## 4.2 Quantitative Data Results

The findings of this thesis' quantitative research describe Laurea UAS students' experiences and challenges with the university's current digital learning framework and its main shortcomings from students' perspective. The results from the quantitative analysis aim to identify key focus areas for further development of Laurea UAS digital learning, in order to better cater to student's needs and expectations. The quantitative analysis of Laurea UAS student survey responses uncovered Laurea UAS digital learning student profiles and identified potential improvement areas in Laurea UAS' digital learning framework.

**Sample profile**

As depicted in Table 1 below, the profile of the survey respondents showed that 85.8% of respondents were completing their bachelor degree at Laurea UAS during the survey, 12.39% were studying at master's degree level and only 1.77% were open university students (students not admitted through standard admission process).

| Respondent study level | Measure | Fully digital learning | Blended learning | Mostly F2F learning | Total |
|---|---|---|---|---|---|
| Bachelor Degree | Number of responses | 49 | 103 | 42 | 194 |
| | % of study level | 25.26% | 53.09% | 21.65% | **100.00%** |
| | % of learning mode | 79.03% | 86.55% | 93.33% | **85.84%** |
| | **% of total respondents** | **21.68%** | **45.58%** | **18.58%** | **85.84%** |
| Master's Degree | Number of responses | 12 | 15 | 1 | 28 |
| | % of study level | 42.86% | 53.57% | 3.57% | **100.00%** |
| | % of learning mode | 19.35% | 12.61% | 2.22% | **12.39%** |
| | **% of total respondents** | **5.31%** | **6.64%** | **0.44%** | **12.39%** |
| Open university | Number of responses | 1 | 1 | 2 | 4 |
| | % of study level | 25.00% | 25.00% | 50.00% | **100.00%** |
| | % of learning mode | 1.61% | 0.84% | 4.44% | **1.77%** |
| | **% of total respondents** | **0.44%** | **0.44%** | **0.88%** | **1.77%** |
| **Grand Total** | **Number of responses** | **62** | **119** | **45** | **226** |

| | | | | | |
|---|---|---|---|---|---|
| | **% of total respondents** | **27.43%** | **52.65%** | **19.91%** | **100.00%** |

Table 1: Survey respondents' profile per study level and mode of learning

In the group of respondents studying at a Bachelor degree level, the majority of students (53.09%) were attending blended learning courses, whilst 25.26% were attending fully digital courses and 21.65% were attending face-to-face (F2F) courses. In the group of respondents studying at a Master's degree level, the same patterns occurred, with the majority of students (53.57%) attending blended learning courses, whilst 42.86% were attending fully digital courses and only 3.57% were attending face-to-face (F2F) courses. Amongst open university students, the majority of respondents were attending mostly F2F courses. The survey results also showed that more than 80% of the respondents were attending blended or fully online courses, in comparison to only 19.91% who were attending mostly F2F courses.

Furthermore, the survey respondents' profile showed the majority of respondents (57.1%) were over 30 years old and 38.5% were between 20 and 25 years old. In addition to that, as depicted in Figure 12 below, the survey results showed a shift in primary mode of learning for age groups over 30 years-old towards more fully digital and blended learning. In contrast, younger age groups showed higher interest in blended learning and F2F learning. This is an expected outcome, since younger age groups prioritize networking and have the availability to attend F2F courses which are often carried out during working hours. The older student groups tend to gravitate towards more flexible learning to cater to the demands of working and family life.

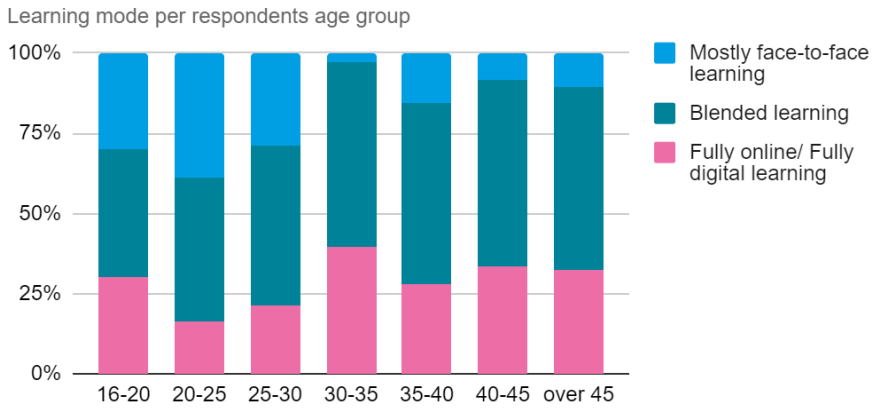


Figure 12: Graph depicting survey respondents' learning mode per age group

After the profile of respondents was identified, the data analysis led to the findings described in the following subsection.

**Summary of Findings**

With regards to overall experience, such as students' overall opinions regarding advantages and disadvantages in Laurea UAS digital learning and desired changes to Laurea UAS digital learning, the research identified that:

a. The majority of respondents rated their overall experience with Laurea's fully digital learning or blended learning positively. Over 55% and 50% of all respondents are content with their overall experience with digital learning and blended learning at Laurea, respectively.
b. Fully digital learning and blended students are overall pleased with Laurea's digital learning, with over 66% and 52%, respectively, rating it 4 or 5.
c. The rate of positive overall experience with Laurea's fully digital learning is slightly higher amongst Master students (57%), compared to Bachelor students (53%).
d. The age group of 20-25 years old are the proportionally least content with their overall experience with Laurea's digital learning, with more than 20% of the age group's respondents rating their overall experience a score 1 or 2 and another 32% rating it a 3 for fully digital learning experience. The same age group also demonstrated the highest discontent with Laurea's blended learning, with more than 18% of respondents giving it a scope 1 or 2 and almost 35% rating it a 3. Both trends are visible in the Figures 13 and 14 below:

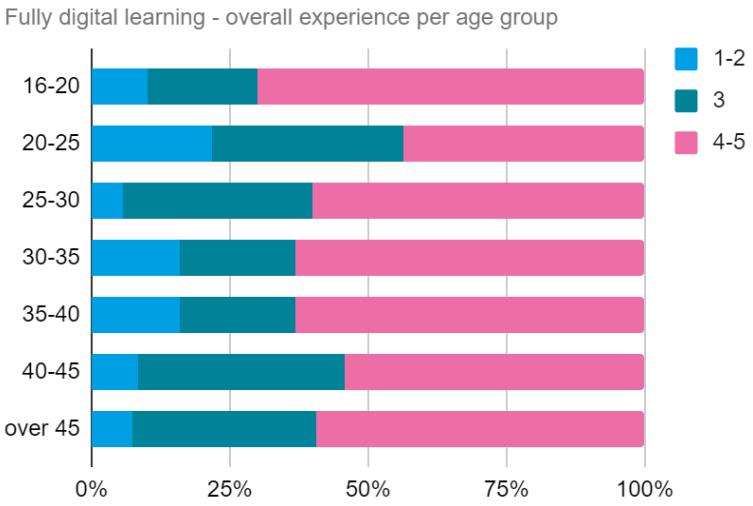


Figure 13: Graph depicting fully digital learning students' overall experience per age group

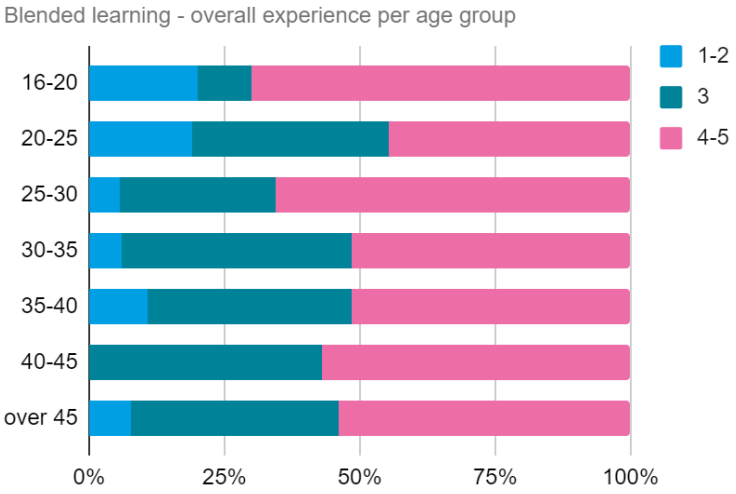


Figure 14: Graph depicting blended learning students' overall experience per age group

e. The respondents highlighted the three (3) main advantages of digital learning as: (1) flexibility (85% of total respondents), (2) own-pace learning (57% of total respondents), and (3) accessibility (52.6% of total respondents). The main advantages were true for all students' degree levels and learning modes, with slight change in ranking, as depicted in Figure 15 below.

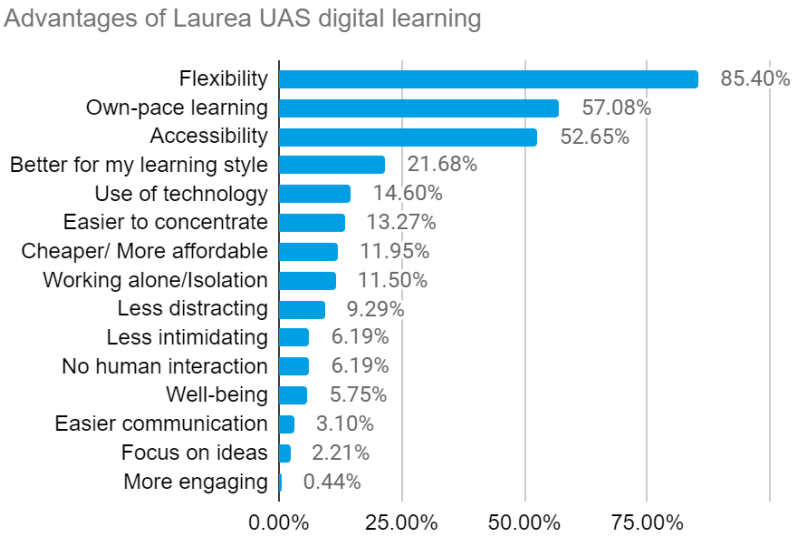


Figure 15: Graph depicting respondents' opinions on main advantages of Laurea UAS digital learning

f. When analyzed based on respondents' degree level (excluding open university students), students at a bachelor level favor (1) flexibility (85.57% of total bachelor degree respondents), (2) own-pace learning (57.73% of total bachelor degree respondents), and (3) accessibility (51.55% of total bachelor degree respondents). Master's degree students, on the other hand, highlighted (1) flexibility (85.71% of total master's degree respondents), (2) accessibility (64.29% of total master's degree respondents), and (3) own-pace learning (53.57% of total master's degree respondents) as main advantages of Laurea UAS digital learning, as detailed in Figure 16 below.

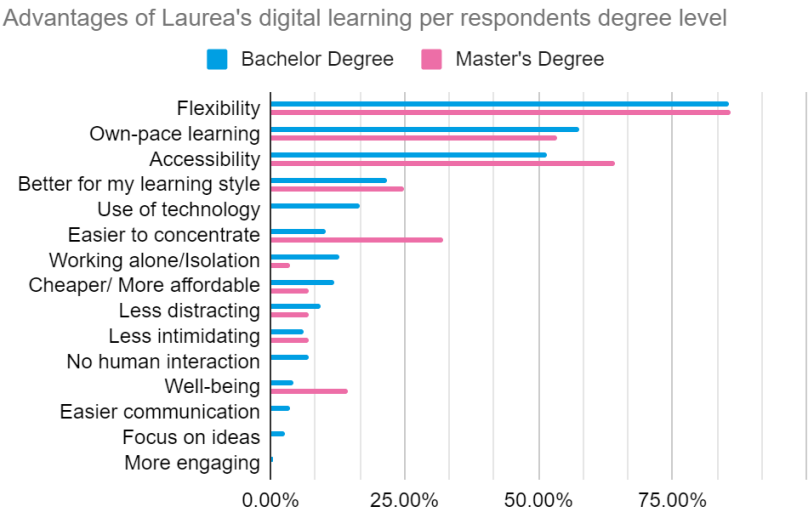


Figure 16: Graph depicting respondents' opinions on main advantages of Laurea UAS digital learning per degree level

g. When analyzing the results based on respondents' mode of learning (excluding open university students), students in fully digital learning modes and in mostly face-to-face learning modes pointed (1) flexibility (79.03% and 88.89% of respondents respectively), (2) own-pace learning (67.74% and 57.78% of respondents respectively), and (3) accessibility (51.61% and 46.67%of respondents respectively) as the main advantages of Laurea UAS digital learning. Blended learning mode students, on the other hand, highlighted (1) flexibility (87.39% of respondents), (2) accessibility (55.46%% of respondents), and (3) own-pace learning (51.26% of respondents) as main advantages of Laurea UAS digital learning, as detailed in Figure 17 below.

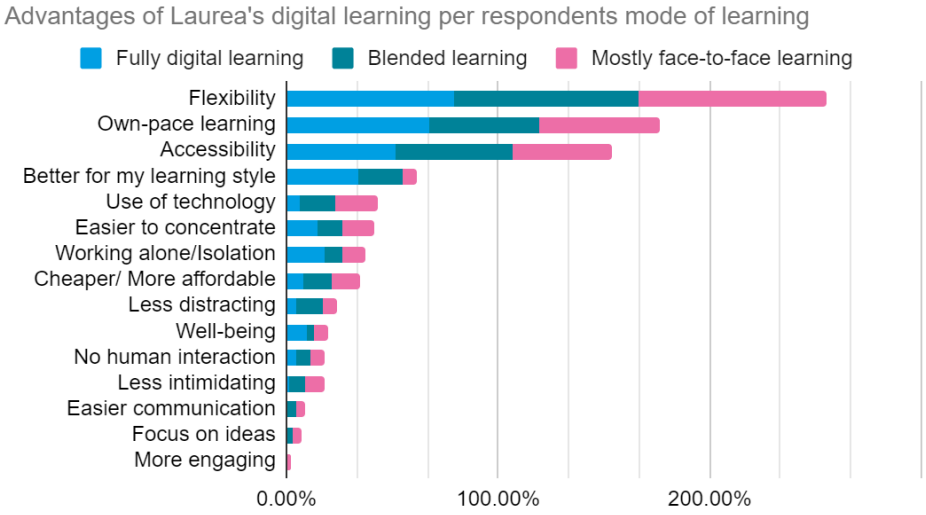


Figure 17: Graph depicting respondents' opinions on main advantages of Laurea UAS digital learning per mode of learning

h. The respondents highlighted the three (3) main disadvantages of digital learning as: (1) difficulty connecting with people (56.6% of total respondents), (2) lack of human interaction (50% of total respondents), and (3) challenges to stay engaged (42% of total respondents). The main disadvantages were true for all students' degree levels and learning modes, with slight change in ranking, as depicted in Figure 18 below.

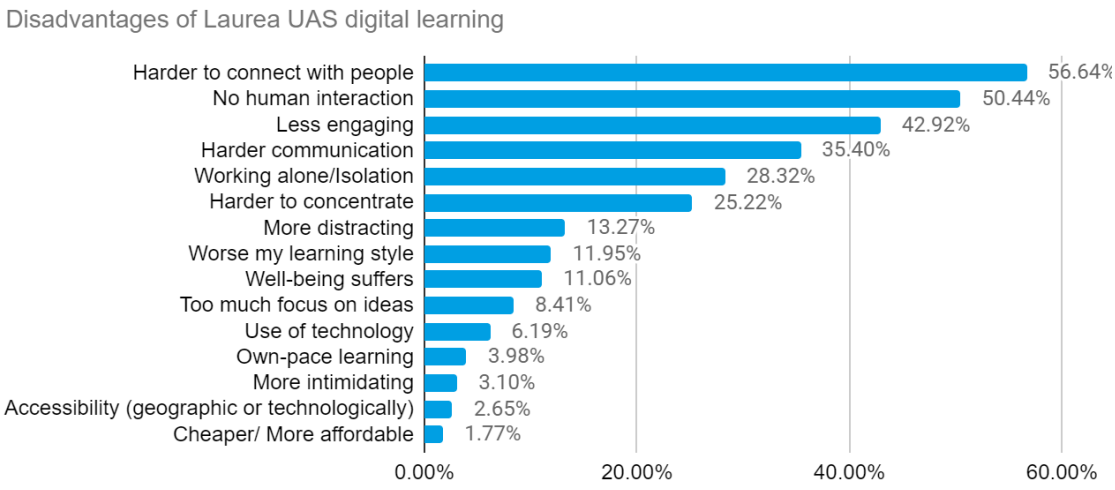


Figure 18: Graph depicting respondents' opinions on main disadvantages of Laurea UAS digital learning

i. When analyzed based on respondents' degree level (excluding open university students), students at a bachelor level struggle the most with (1) the difficulty to connect to people (57.22% of total bachelor degree respondents), (2) the lack of human interaction (48.45% of total bachelor degree respondents), and (3) the lack of engagement (43.3% of total bachelor degree respondents) in Laurea UAS digital learning. Master's degree students, on the other hand, highlighted (1) lack of human interaction (60.72%% of total master's degree respondents), (2) difficulty to connect with people (53.57% of total master's degree respondents), and (3) difficulty to stay engaged and communicate (42.86% of total master's degree respondents) as main disadvantages of Laurea UAS digital learning, as detailed in Figure 19 below.

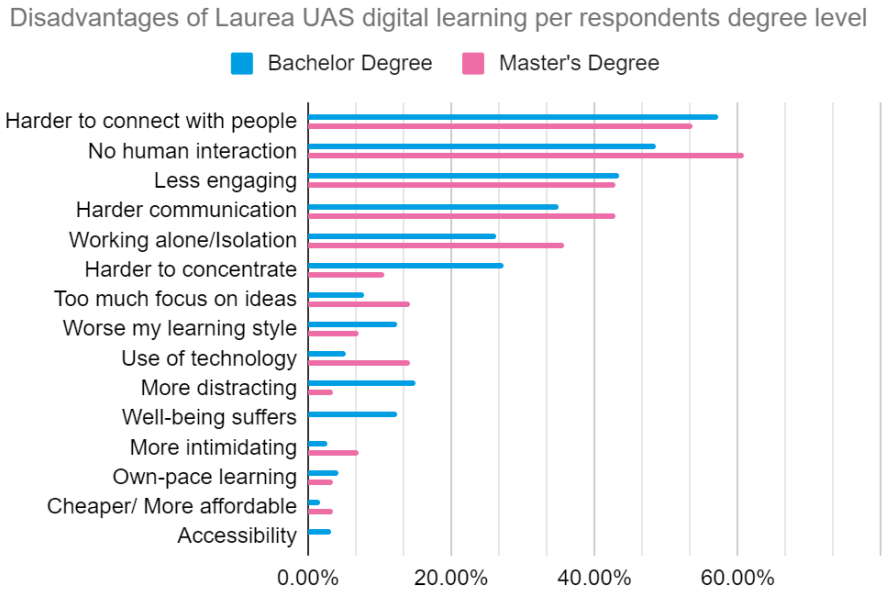


Figure 19: Graph depicting respondents' opinions on main disadvantages of Laurea UAS digital learning per degree level

j. When analyzing the results based on respondents' mode of learning (excluding open university students), students in fully digital learning modes and in blended learning modes pointed (1) difficulty to connect to people (100% and 33.61%% of respondents respectively), (2) lack of human interaction (95.16% and 27.73% of respondents respectively), and (3) difficulty engaging (79.03% and 24.37% of respondents respectively) as the main disadvantages of Laurea UAS digital learning. Students in mostly face-to-face learning modes, on the other hand, highlighted (1) lack of human interaction (48.89% of respondents), (2) difficulty to connect (46.67% of respondents),

and (3) difficulty engaging (42.22% of respondents) as main disadvantages of Laurea UAS digital learning, as detailed in Figure 20 below.

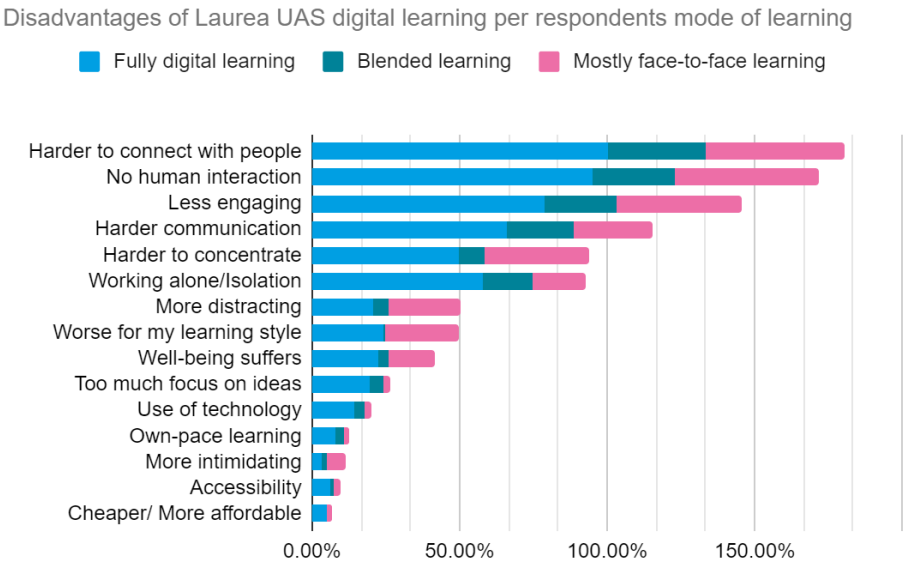


Figure 20: Graph depicting respondents' opinions on main disadvantages of Laurea UAS digital learning mode of learning

k. The respondents highlighted the five (5) main changes students desire to Laurea's digital learning as: (1) unified digital learning tools (65.49% of total respondents), (2) better preparation from teachers (63.72%% of total respondents), (3) more online courses (48.23% of total respondents), (4) better tools, software and apps (44.69% of total respondents), and (5) more practical learning (40.27% of total respondents) as detailed in Figure 21 below.

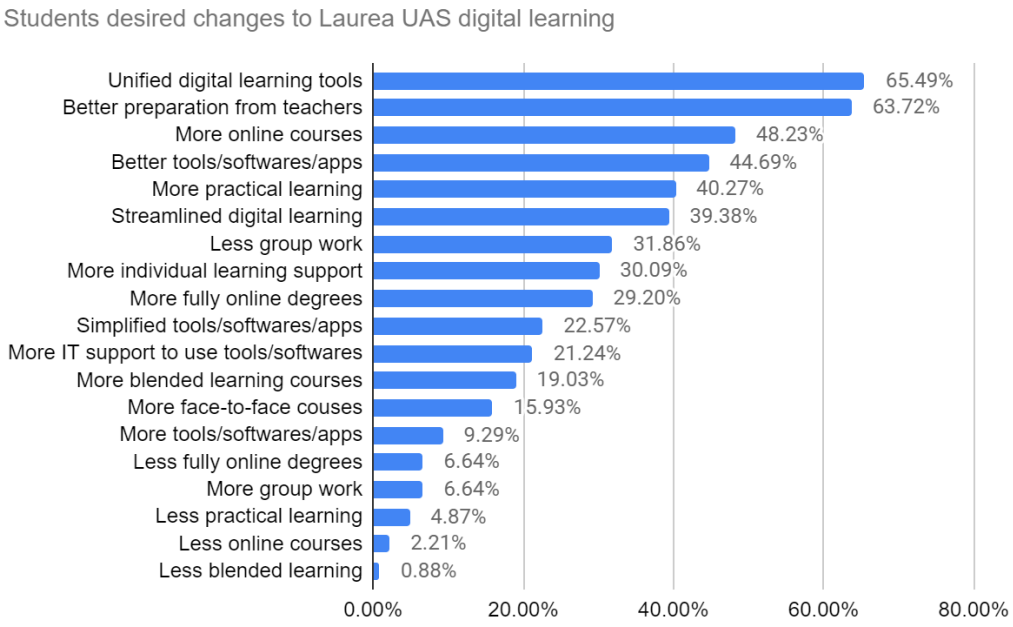


Figure 21: Graph depicting respondents' desired changes to Laurea UAS digital learning

l. When assessing respondents desired changes per degree level, it was found that Bachelor degree students seek (1) unified digital learning tools (64.43% of bachelor degree respondents), (2) better preparation from teachers (63.92% of bachelor degree respondents), (3) more online courses (46.39% of bachelor degree respondents), (4) more practical learning (44.33% of bachelor degree respondents), and (5) better softwares, tools and apps to support digital learning (43.30% ot bachelor degree respondents). Master's degree students, however, prioritize (1) better preparation from teachers (71.43% of master's degree respondents), (2) unified digital learning tools (67.86% of master's degree respondents), (3) more online courses, (60.71% of master's degree respondents), and (4 and 5) better tools, software and apps and more streamlined digital learning (53.57% of master's degree respondents), as detailed in Figure 22 below.

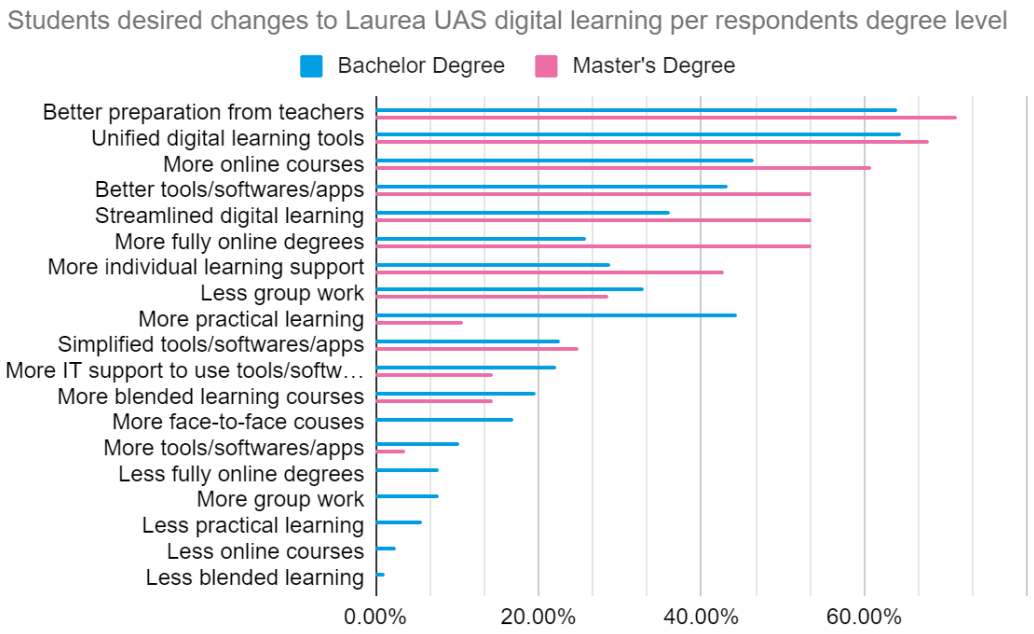


Figure 22: Graph depicting respondents' desired changes to Laurea UAS digital learning per degree level

m. The analysis of respondents desired changes per mode of learning identified that fully digital learning students seek mainly (1) unified digital learning tools (100% of respondents), (2) better preparation from teachers (100% of respondents), (3) better tools, softwares and apps (100% of respondents), (4) more online courses (98.39% of respondents), and (5) more practical learning (87.10% of respondents). Blended learning mode students, on the other hand, wish for (1) unified digital learning tools (42.02% of respondents), (2) better preparation from teachers (42.02% of respondents), (3) more online courses (28.57% of respondents), (4) streamlined digital learning (24.37% of respondents), and (5) less group work (21.01% of respondents). Students in mostly face-to-face learning mode desire (1) better preparation from teachers (71.11% of respondents), (2) unified digital learning tools (51.11% of respondents), (3) more practical learning (46.67% of respondents), (4) better softwares, tools and apps (44.44% of respondents), and (5) more streamlined digital learning and face-to-face courses (37.78% of respondents). The results according to respondents main learning mode is detailed in Figure 23 below.

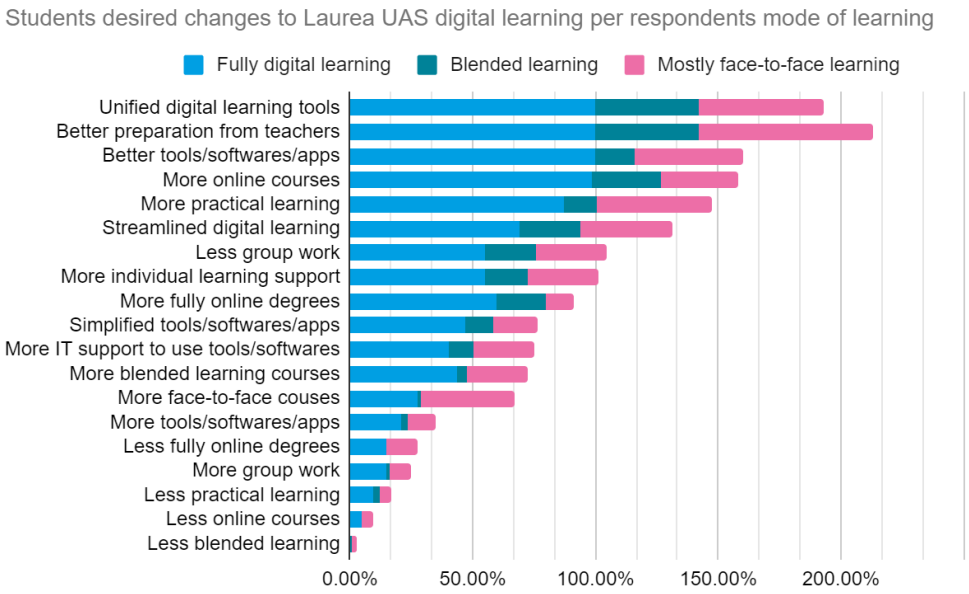


Figure 23: Graph depicting respondents' desired changes to Laurea UAS digital learning per mode of learning

With regards to Digital Learning Design, including Laurea UAS portfolio of tools, softwares and platforms used in digital learning, students' accessibility to technical support to troubleshoot digital learning issues, and students' opinions regarding design of digital lessons or courses at Laurea UAS, the research found that:

a. The most common tools and softwares used at Laurea's digital learning are, according to the survey respondents, Canvas, Zoom, Teams, Office 365 and Padlet, as detailed in the Figure 24 below.

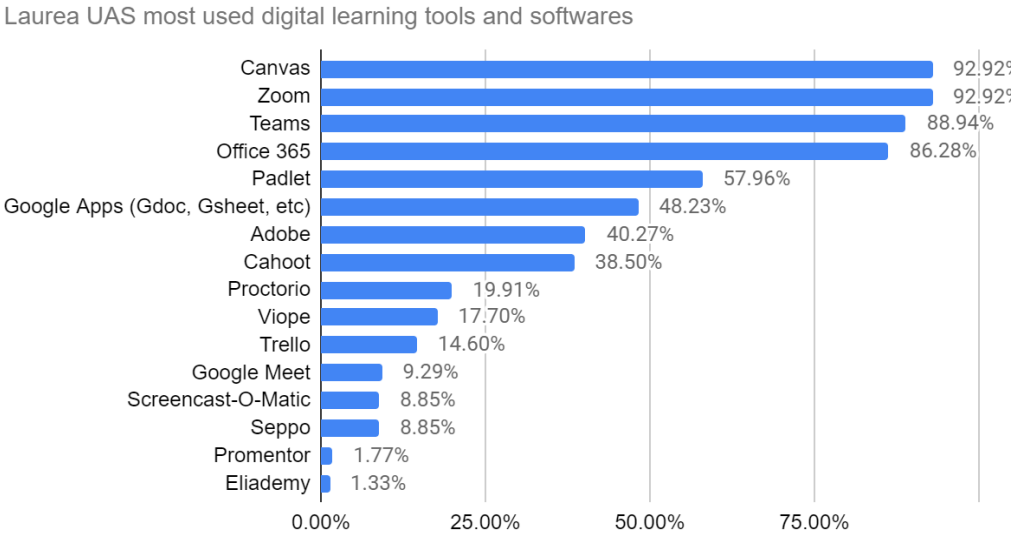


Figure 24: Graph depicting most used digital learning tools and softwares at Laurea UAS digital learning

b. The majority of students (37.17% of all respondents) who responded to the survey feel Laurea UAS digital learning has too many different tools, softwares and apps. Despite this, most students characterized the university's softwares and tools as functional (32.74% of respondents), simple (26.99% of respondents) and good (26.11% of respondents). These results are visible in Figure 25 below.

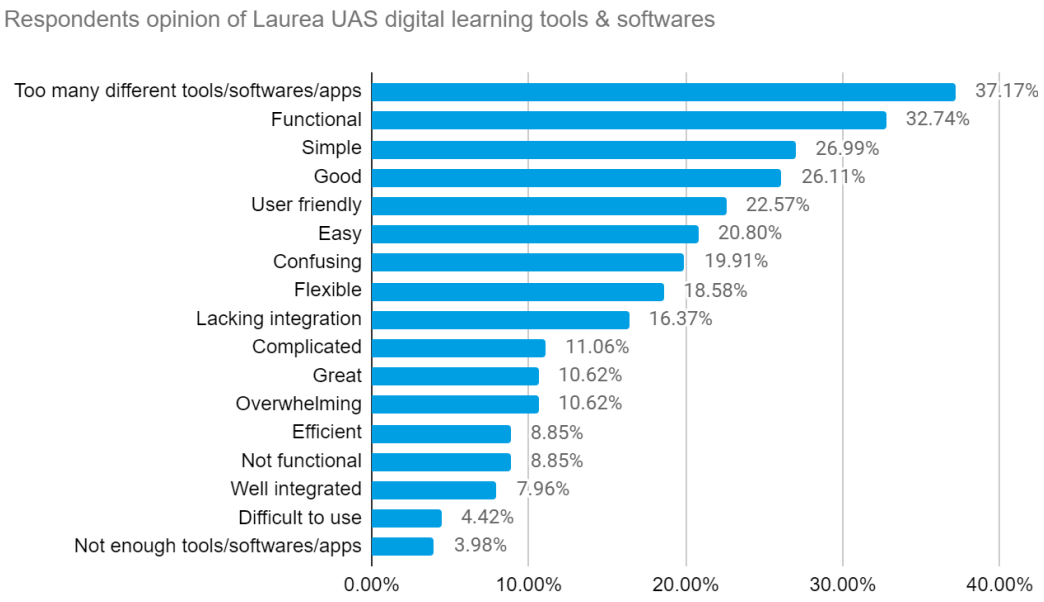


Figure 25: Graph depicting respondents' opinions of digital learning tools and softwares at Laurea UAS digital learning

c. The majority of students (40.71% of all respondents) gave a score 3 (neutral-negative) to Laurea UAS IT support for its digital learning tools and softwares, whilst 40.26% of respondents gave Laurea UAS IT support a score of 4 or higher, and 19.09% of respondents scored the university's IT support a 2 or less. These results are visible in Figure 26 below.

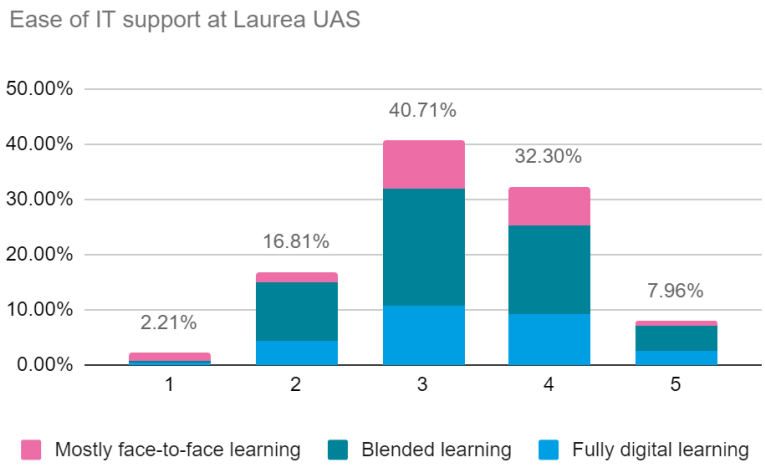


Figure 26: Graph depicting respondents' opinions on how easy it is to have IT support Laurea UAS digital learning, per mode of learning

With regards to study quality, which encompasses key concepts that affect the quality of education in digital learning opportunities, such as digital learning teaching quality, students' information retention, group work, engagement with studies and staying connected to peers and lectures, the research identified that:

a. Only 43.75% students in fully digital or blended learning modes gave the institution's digital teaching quality a score of 4 or higher. Amongst blended learning students, the satisfaction level was significantly higher, with 72.30% of students rating Laurea's quality of teaching in blended learning a score of 4 or higher, as visible in Figure 27.

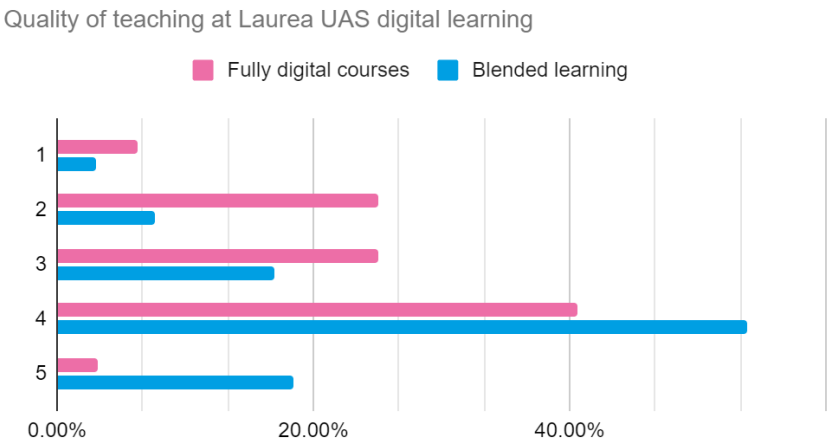


Figure 27: Graph depicting respondents' opinions Laurea UAS digital learning, per mode of learning

b. Amongst blended learning students, 77.30% feel they retain the lectures information better in blended learning versus other modes of learning. Amongst fully digital learning students, 74.19% feel they retain information better in fully digital study mode, as depicted in the Figure 28 below.

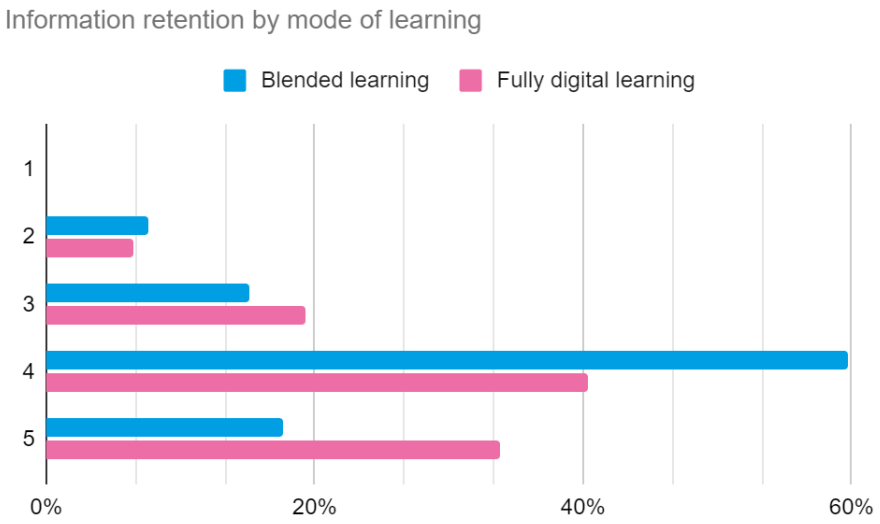


Figure 28: Graph depicting respondents' opinions on how well they retain information learned at Laurea UAS digital learning, per mode of learning

c. When asked about their overall experience with group work in each study mode, 56.45% of fully digital learning students rated their group work experiences as positive (scores 4-5). Amongst blended learning students, on the other hand, 58.82% considered their overall experience with group work positive, as visible in Figure 29.

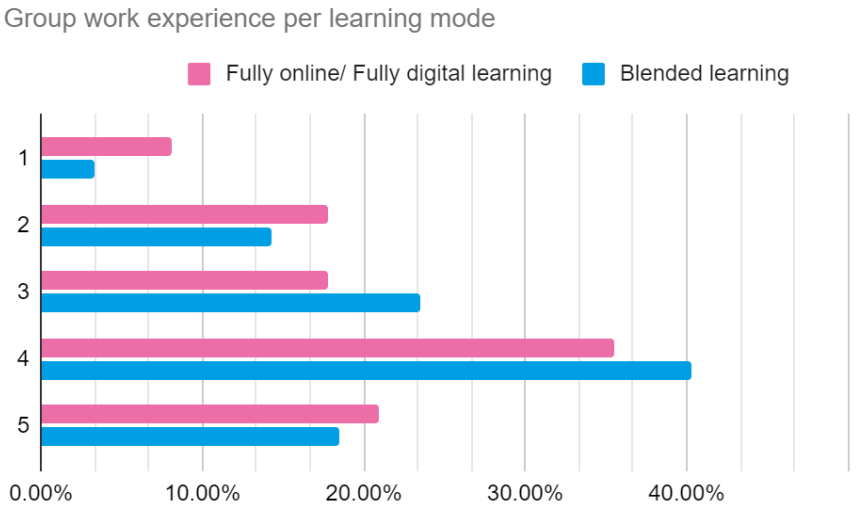


Figure 29: Graph depicting respondents' experience with group work Laurea UAS digital learning, per mode of learning

d. The large majority of fully digital learning students (80.65%) feel engaged in the lectures in their mode of learning. In blended learning mode, 73.11% of students feel engaged with their studies. This is depicted in Figure 30 below.

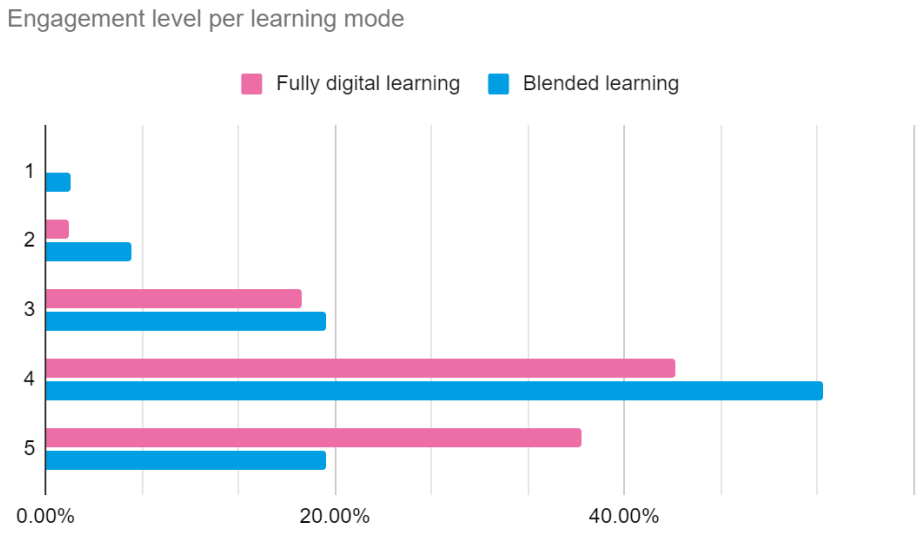


Figure 30: Graph depicting respondents' engagement level at Laurea UAS digital learning, per mode of learning

e. In all surveyed areas, the topic that divided students the most was the difficulty in feeling connected to colleagues and teachers. 56.45% of fully digital learning mode student's felt difficulty feeling connected to peers and lectures. The majority (52.94%) of blended learning students also feel it is hard to stay connected to fellow students and teachers, as depicted in Figure 31.

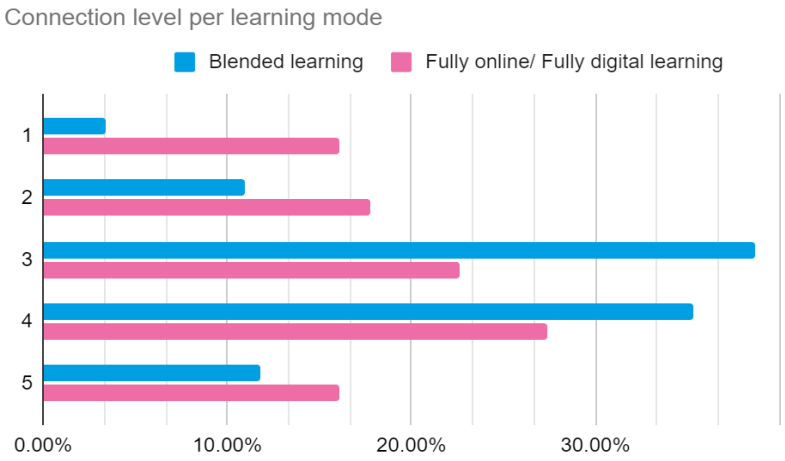


Figure 31: Graph depicting respondents' feeling of connection at Laurea UAS digital learning, per mode of learning

It is relevant to highlight that, whilst survey results provided an overview of main focus areas of development in Laurea UAS digital learning framework, they did not provide comprehensive analysis of students' responses and student's personal interpretation of survey questions could also have impacted student's scoring. Hence, the survey findings were used as a thermometer to measure the current waters of the institution's digital learning performance and by no means exhausted all possible streams of research in the area of digital learning at Laurea UAS.

Nonetheless, the qualitative results were compared to the qualitative findings in order to produce the final set of recommendations for improvement of Laurea UAS' digital learning framework. The overlapping findings were utilized to shape the change framework for Laurea UAS digital learning. The detailed change framework is further detailed in the next section of this development work.

## 5 Digital Learning Framework

The comparative analysis of the research qualitative and quantitative findings resulted in the framework of proposed changes to Laurea UAS digital learning detailed in Figure 32 below. This digital learning change framework aims to provide recommendations for the institution to further develop its digital learning model to successfully become a forerunner of digital learning in the Finnish and global higher education scenarios.

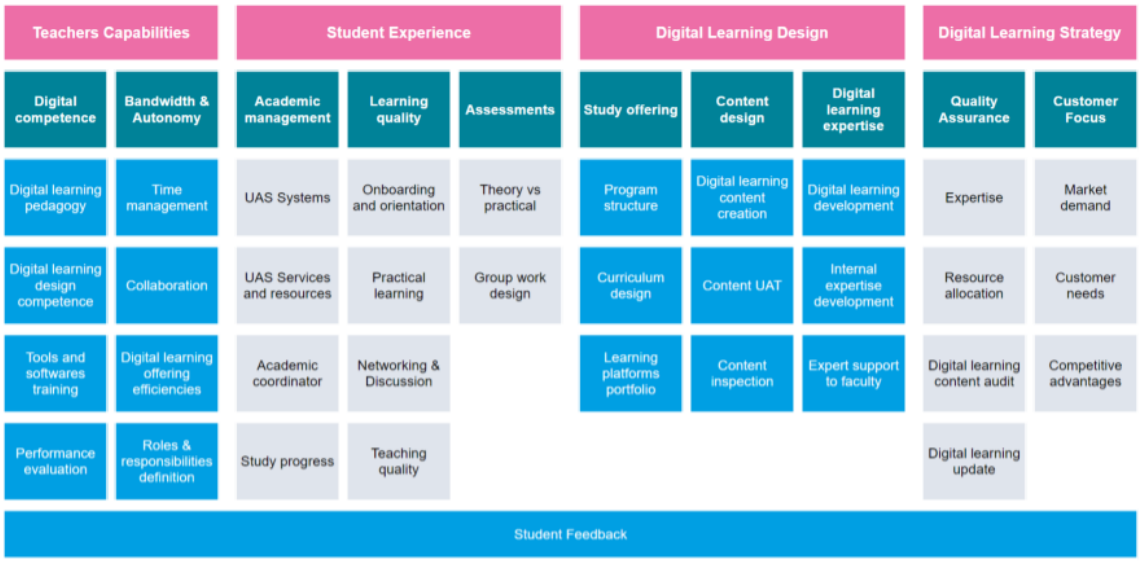


Figure 32: Digital learning change framework at Laurea UAS

The resulting digital learning change framework identified four (4) areas of Laurea UAS digital learning existing framework that require further attention and development. The areas are: (1) Teachers' capabilities, (2) Students' experiences, (3) Digital learning design, and (4) Digital learning strategy. As mentioned previously, external factors such as the Finnish educational system, the global scenario, financial aspects and students' attitude were excluded from the change framework due the limitations of the research resources and time and to Laurea UAS inability to implement changes in those areas.

Each digital framework change area covers multiple change dimensions, resulting in a total of ten (10) change dimensions. The dimensions are: (1) digital competence of teachers, (2) bandwidth and autonomy of teachers, (3) students' academic management, (4) students' learning quality, (5) students' assessments, (6) study offering, (7) content design, (8) digital learning expertise, (9) quality assurance, and (10) customer focus. Within each dimension, the digital learning change framework highlights target tasks that require the institution's focus to further develop its digital learning model. The areas, domains and target tasks are further explained below.

## 5.1 Teachers' Capabilities

This research's findings identified teachers' capabilities as an important area of required changes to Laurea UAS digital learning model. The results of the qualitative and quantitative research highlighted that Laurea's teachers' digital competence, bandwidth and autonomy are critical dimensions that represent potential obstacles to evolution of Laurea's digital learning framework, as summarized in Figure 33 below.

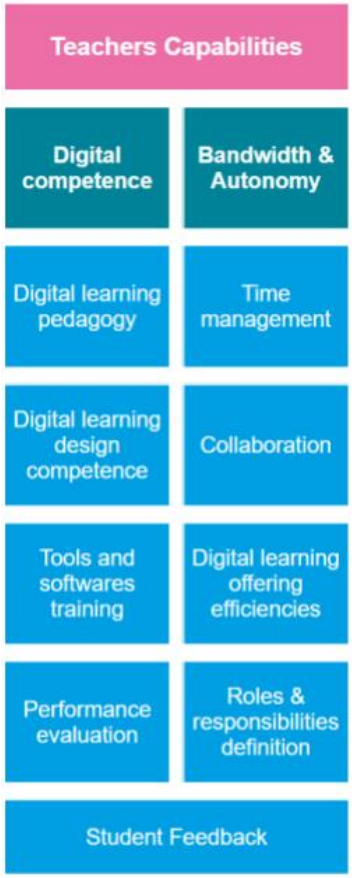


Figure 33: Teachers' capabilities change area and dimensions

Consequently, the research recommends target tasks to be considered and implemented at Laurea UAS to further the level of digital competence amongst teachers. Firstly, Laurea UAS must focus on the development of teachers' digital learning pedagogical and digital learning design competences through systematic and structured training, workshops and work groups. This learning process could be carried out through cooperation with other higher education institutions.

Secondly, teachers require a systematic and structured training of teachers in the use of digital learning platforms, softwares and tools. This could be executed on a large scale through annual mandatory educational programs and quarterly refresh training for all teachers in digital learning implementations. It could also be implemented on a smaller scale, with a better catalog of recorded training sessions, with clear content categorization and title, and published in a central location for fast and easy access to faculty members.

Thirdly, the research findings highlight the need for a change to the teachers' performance evaluation model to include assessment of digital learning capabilities and competence based

on students' and faculty's feedback. And finally, Laurea UAS must focus on increasing and improving students' awareness of the importance of course feedback for the development of, not only the course implementation, but also of the entire Laurea digital learning framework. This can be achieved through information disclosed to students at course orientation, with examples of feedback impact on Laurea's digital learning model, and inclusion of students' feedback in course completion criteria. Furthermore, the creation of a single landing page for students to provide feedback to all courses completed in the semester, instead of different and multiple feedback requests via email, would increase students' engagement in giving feedback by removing some obstacles.

In addition to the changes to teachers' capabilities, the university must also focus on the bandwidth and autonomy area of change. Firstly, the institution requires a strategic and scalable time management approach to teachers' workload allocation through use of collaboration across units, teams and universities. Secondly, the UAS would highly benefit from resource planning expertise for the systematic assessment and allocation of faculty human resources, elimination of resource bottlenecks and periodic identification of teachers' bandwidth challenges for constant improvement. Thirdly, Laurea UAS could leverage digital learning efficiencies through combined study offerings across university units and even across universities, with collaborative teaching and assessment approaches. And finally, clear definition and communication of faculty's and institution's roles and responsibilities, defining teachers' level of autonomy, could reduce confusion amongst faculty members, increase responsibility awareness, teachers' motivation and teachers' freedom to develop better digital learning design and practices.

## 5.2 Students' Experiences

The results of the qualitative and quantitative research identified academic management, learning quality and assessments as main dimensions of proposed changes to students' experiences with Laurea UAS digital learning. Within each dimension of change, the development work findings emphasized related target tasks to be addressed in order to improve students' digital learning experiences at the institution, as summarized in Figure 34 below.

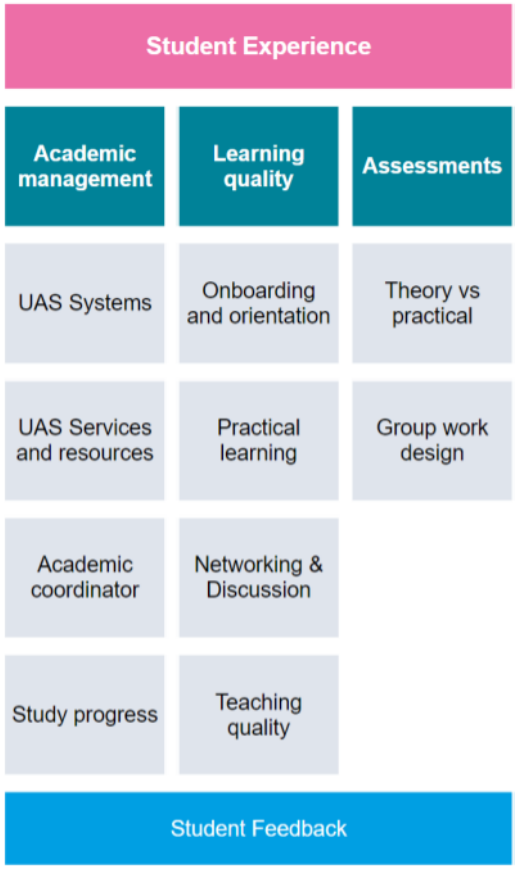


Figure 34: Students' experiences change area and dimensions

The first proposed dimension of change is students' academic management in digital learning. Academic management pertains to the day-to-day running of students' education and covers a set of target tasks required to improve Laurea's digital learning framework. Firstly, the university's academic systems, such as student portals, learning platforms and communication channels are often confusing to users, who find it difficult to find the required information. The academic management systems of Laurea could be simplified and centralized. Laurea has already moved in the right direction with the selection of Canvas as its main digital learning platform. However, it still requires efforts to facilitate students' and teachers' use of learning systems. Initiatives such as an improved student intranet with better catalogs and search options and published updates, and accurate instructions on how to use the learning systems are small steps to simplify academic management for students.

Secondly, the institution's learning services and resources, such as libraries, health services, office hours, are often suited to traditional learning models and do not cater to digital learning models. For example, the portfolio of Laurea UAS digital library services is drastically smaller than its physical library portfolio, especially in regards to books. This could be

improved with a larger effort to acquire licenses to academic publications and build a digital library. Furthermore, all the available digital learning supporting resources and services should be systematically communicated to digital learning students at the orientation phase and throughout their academic life via automated periodic reminders.

And finally, academic coordinators should engage with students more effectively through periodic check-up points to ensure study progress and support of students. The academic coordinators could also enable networking on-campus or hybrid opportunities for students to meet and network, motivating the progress of studies and peer connections.

The second proposed dimension of change is the quality of learning in digital learning. Firstly, digital learning students highly benefit from an intensive orientation and onboarding phase to set them up for success. This orientation should be done on-campus whenever possible to enable initial peer support and networking, which can support the students' academic cycle. During the onboarding phase, the importance of student feedback should be clearly communicated, and the standard digital learning systems and communication mode should be agreed to avoid digital noise and confusion amongst teachers and students.

Secondly, digital learning students should have the opportunity to carry out practical learning. Such opportunities could be created on campus and driven by the academic coordinators. However, since the majority of digital learning students are often already inserted in the worklife, Laurea UAS should make better use of practical learning recognition for working students, if the area of studies is the same as the area of professional experience. Such opportunities for practical learning and professional experience recognition should also be clearly communicated not only at the orientation phase, but also throughout the academic course in the aforementioned check-up points with academic coordinators.

Thirdly, digital learning students tend to struggle to network, participate in discussions and share knowledge. Laurea UAS could develop networking opportunities for these students through the creation of networking events on-campus and online and through inclusion of knowledge sharing in assessment criteria.

And finally, as already previously mentioned, the importance of student feedback should be clearly communicated to students and should be done in a more simplified and automated manner. The provided feedback should be used in the development of teachers' competences to improve digital learning teaching quality, but results should also be communicated to students. Often students who provide feedback are not fully aware of the main objective nor the impact of their feedback, which demotivates students to provide any feedback whatsoever.

The third and final proposed dimension of change is the assessment model in digital learning. Firstly, digital learning assessment methods should be diverse, flexible and efficient to measure students' learning progress and must have a balance between theoretical and practical assessments. Digital learning students often struggle with the practical side of assessments, since digital environments are not yet fully developed to facilitate practical learning assessment. The practical learning opportunities, as already mentioned, should be created on campus or recognized for students already in the working life. Nonetheless, theoretical learning cannot be oversought, since it creates the baseline for students' life-long implementation of knowledge.

And finally, group work assessments should be carefully used in digital learning. Due to the nature of the learning mode, cooperation in groups is a challenge in digital learning. Laurea UAS digital learning design must design group work assessments with intentional and carefully considered purpose and structure. Unstructured group work often leads to wasted learning opportunities and demotivation in students.

## 5.3 Digital Learning Design

The research results highlighted digital learning design as a key area of change in Laurea UAS digital learning framework. Within this area, three main dimensions of change were identified - study offering, content design and digital learning expertise. Within each dimension, several target tasks are highlighted to support the development of the university's digital learning. This area of change, its dimensions and target tasks are detailed in Figure 35 and further explained below.

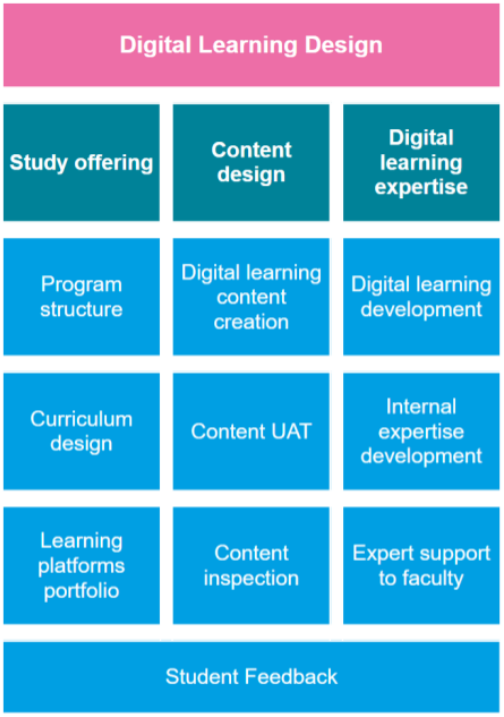


Figure 35: Digital learning design change area and dimensions

In the study offering dimension of change, the research findings pointed out that Laurea UAS requires a more strategic and efficient higher education program offering's structure. Firstly, the institution must assess the market demand and design its program structure based on the demand, not the other way around. The research findings identified that Masters' students struggle with the limited online study offering, whilst bachelor students highlighted the need for more blended learning courses to allow networking and facilitate practical learning. As a consequence of COVID-19, the university implemented emergency digital learning initiatives, but those were mostly reactive and not strategic. A dynamic and strategic higher education program structure is required to ensure Laurea is anticipating the higher education needs not only in the Finnish market, but also globally.

Secondly, Laurea should leverage efficiencies using cross-unit collaboration and implementations to cater to the demand in a more effective way. This can be done through an intentional and collaborative curriculum design model. For example, two similar course implementations from different study units can have very different demands. And, often, one course implementation might receive too many enrollments whilst the other receives insufficient enrollments and is canceled. A more efficient scenario would have a collaborative single implementation where two teachers, even from different study units, work together to lead the course and allow more enrollment rates to cater to the demand.

Thirdly, the university should simplify its learning platforms portfolio, by reducing the amount of digital learning tools and softwares in use and concentrating on developing a central learning environment. Laurea has already initiated this process with the Canvas learning platform, but further development is required to ensure Canvas is being effectively and systematically used as a central digital learning environment for all Laurea UAS digital learning and that the amount of supporting tools and softwares is simplified.

A second important dimension of change is the digital learning content design. The research findings pointed out that, first of all, digital learning content creation is challenging, and quality is often highly dependent on teachers' capabilities. The implementation of Canvas master courses, which are template courses in Laurea's main learning environment Canvas that can be used as a baseline for teachers to create digital learning content, provided a step to facilitate digital content creation. However, Laurea must focus on improving the process of content creation by developing teachers' capabilities, driving collaboration in content creation, providing training and expert support to develop content creation.

Secondly, the content of courses should be tested either via user acceptance testing (UAT) process or via peer review. And finally, all content created should go through an inspection or check to ensure minimal quality criteria are met.

The development of the quality criteria, on the other hand, could be addressed by the third and final dimension of change under digital learning design proposed changes - digital learning expertise. Laurea UAS counts with the dCell team, a team of experts responsible for developing Laurea UAS digital learning capabilities, supporting the organizational strategy and providing support to faculty and students. The development of the dCell team would provide the base required to the implementation of any proposed changes to Laurea UAS digital learning framework and the overall development of the university's digital learning.

Laurea could also develop groups of superusers in each study unit. The superusers would be highly trained groups of faculty members outside of the dCell expert team, who could become additional experts to support learning design content creation, peer reviews and troubleshooting. Combined with the dCell team, the superusers should develop the minimal quality criteria for inspection of all created digital learning content before its implementation.

Furthermore, the group of experts composed of dCell and superusers would ensure the resources are allocated for the development of the last proposed dimension of change - Laurea' digital learning strategy - as described in the following subsection of this development work.

## 5.4 Digital Learning Strategy

The research findings pointed to a need for changes in Laurea's digital learning strategy, specifically in two target dimensions: quality assurance and customer focus. Currently, the institution is trailing behind in the digital learning global scenario due to gaps in its strategy that miss the importance of quality content and a customer-centralled approach. The digital learning strategy area, its dimensions and target tasks are depicted in Figure 36.


Figure 36: Digital learning strategy change area and dimensions

Firstly, Laurea UAS should develop a collaborative quality assurance program. This quality assurance program's scope would consist of, not only new content review and approval, but also of periodic digital learning content audits, followed by concrete actions to ensure continuous improvement and update of courses digital learning content. The quality assurance program should also include periodic digital learning students' surveys, to gather primary data from Laurea's students' overall experience with the institution's digital learning processes, content and quality. Based on students' feedback, the team of experts responsible for quality assurance could draw concrete plans for further development.

Finally, the Laurea digital learning strategy must shift towards a more customer focused approach that, as mentioned previously, forecasts the demands and needs of the Finnish and global higher education market. The university must develop an intentional digital learning 5-10-year plan with concrete actions, main objectives and expected results. Moreover, Laurea should view the development of its digital learning framework as a potential competitive advantage to differentiate it in the Finnish and global educational system. By implementing a more structured, collaborative, and efficient digital learning framework, Laurea UAS can become a leader in digital education in Finland.

# 6 Conclusions and Reflection

Laurea University of Applied Science responded to the challenges of the COVID-19 pandemic by quickly adapting its learning processes and platforms to adjust to the global restrictions. The emergency response was, however, reactive and unplanned. This development work attempted to assess the university's digital learning framework and propose development recommendations to transform Laurea's digital learning into a leader in the Finnish higher education digital learning scenario.

The research work utilized disruptive innovation theory to support the development of recommended changes to Laurea's digital learning framework. The disruption innovation theory applied to higher education shifts the traditional model of higher education to a student-centered model. This principle was applied in the review of research results and development of proposed recommendations to change Laurea's digital learning framework.

The research results outlined four main focus areas of proposed change to Laurea's digital learning framework: (1) teachers' capabilities, (2) students' experiences, (3) digital learning design, (4) digital learning strategy. Each focus area encompassed dimensions of change, totaling ten (10) dimensions of change. And each dimension of change covered a variety of target tasks to be executed to achieve the proposed objective. In the area of "teachers' capabilities", the development work identified two (2) dimensions of change – teachers' digital competence and teachers' bandwidth and autonomy. In the area of "students' experiences", the research highlighted three (3) dimensions of change - academic management, learning quality, and assessment. In the area of "digital learning design", three (3) dimensions of change were pinpointed - study offering, content design and digital learning expertise. And finally, the final focus area - digital learning strategy - covered two (2) dimensions of change - quality assurance and customer focus. The research provided a set of recommended improvements in each of the dimensions and areas with a goal of developing

Laurea digital learning framework and supporting its long-term growth into a leader in the digital learning higher education scenario.

The development work drew findings from qualitative data collected from interviews with the institution's teachers and dCell team personnel, and from quantitative data gathered from students' responses to a digital learning survey issued by the thesis author, in what is considered a mixed method research. In addition to that, the research applied abduction logic to compare qualitative and quantitative results and interpret the findings.

The research faced challenges with the mixed methodology research design. The process of collecting and analyzing the data was significantly more time consuming than anticipated by the thesis author. In addition to that, comparing and aligning mixed method data demonstrated to be challenging for a single and inexperienced researcher. Besides that, the review of teachers' interview transcripts and thematic analysis was an exhaustive and time-consuming process. It, nonetheless, resulted in a concise a thematic map that was compared to the quantitative findings. Furthermore, the cross tabulation of students' survey results and summarization of findings was a large effort for a single person. With proper resources and time allocation, a similar effort could have produced more in-depth analysis and findings. Moreover, all data interpretation by a single researcher leaves room for bias. This development work is no different and the researcher's personal digital learning subconscious biases, preferences and preconceptions could have interfered with the data interpretation.

Nevertheless, the development work results call for attention to the significant changes required to, not only Laurea UAS, but Finnish higher education learning model. The research findings point out important factors required for Finnish universities to embrace disruptive innovation in higher education and lead the way in the digital learning scenario, as opposed to the trail behind the global education changes, drastically affected by the COVID-19 pandemic.

## 6.1 Areas for further development

The topic of digital learning provides an extensive field for research and development. Due to the time and resource limitations, this development work focused on immediate changes that could be implemented by Laurea university to improve its digital learning framework.

Further development is required to investigate the organization's leadership and management structure and assess if the management model in place is coherent with a competitive and modern higher education model. The leadership of Laurea UAS is an important factor to define Laurea's approach to digital learning, which will define the university's future position

in the global higher education scenario. Due to time and resource limitations, this area of research was excluded from the scope of this thesis. It is, however, a valuable topic for additional investigation.

In addition to the leadership structure, the structure and regulations of the Finnish educational system were not in the scope of this development work. Despite that, the Finnish education policies and model are a significant player in the definition of the future of digital learning in Finland. The current structure of the Finnish higher education national structure drives competition, instead of collaboration between institutions, and digital learning regulatory policies are close to non-existent. Due to this, the digital learning framework on a national level could be a valuable research area to be further explored.

Finally, the impact of digital learning on students' wellbeing are also excluded from the scope of this work, but deserve more investigation. Multiple studies are already being developed to assess the impact the fully digital learning model forced by the pandemic had on students' wellbeing (Besser et al 2020). The difficulties students face with digital learning, such as staying engaged, connecting with peers, mental wellbeing and development of social and collaborative skills, especially amongst bachelor or foreign students. is worthy of further analysis.

## 6.2 Ethical issues and privacy protection

This research work gathered Laurea UAS teachers, dCell team and students' feedback through interviews and surveys. A thorough research permit application was approved by Laurea UAS RDI department. In compliance with Laurea UAS research permit process and privacy protection policy, the thesis research work followed the highest ethical principles. No personal data was disclosed as part of the thesis development work and all personal data and responses were handled with utmost confidentiality.

The data collected was stored in the thesis author's secure and confidential Google Cloud Storage for the duration of the research. Access to the Google Cloud Storage was exclusive to the thesis author and no personal information was shared during or after this development work. Finally, all personal data was disposed of at the completion of the thesis work.

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Figures

Tables

Appendices

Appendix 1 – Interview script

**Master's Thesis - Interview # XX**

Name:

Area of Teaching:

**Questions:**

**General**

1. What is your overall experience with Laurea's digital learning?
    a. [Follow-up question] What courses do you teach using fully digital learning (all online, network platforms, digital assessment, etc)?
    b. [Follow-up question] What courses do you teach using partial digital learning (blended learning, F2F, but with use of some online platform)?
    c. [Follow-up question] What do you believe are the advantages and challenges of digital learning at Laurea UAS? For professors and students.

**Digital learning design**

2. What is your opinion of Laurea's current digital learning design (tools, platforms used)?

**Study offering**

3. What is your opinion of Laurea's current digital learning offering? Are there enough digital learning offerings, courses, degrees?

**Student engagement**

4. What is your opinion of student engagement in fully digital learning at Laurea UAS?

**Information Retention**

5. What do you believe is the impact of digital learning on students learning and retaining information at Laurea UAS? What challenges and advantages do you see with learning information retention for digital learning students?

**Learning Quality**

6. What do you believe is the impact of digital learning on students' quality of learning at Laurea UAS? What challenges and advantages do you see in the quality of digital

**Study progress**

7. What is your opinion of student engagement in fully digital learning at Laurea UAS?

**Engagement**

8. How do you track your students' progress in fully digital learning models at Laurea UAS? What challenges and advantages do you see in tracking digital learning students' progress?

**Connection and Group work**

9. What is your opinion of student engagement in fully digital learning at Laurea UAS?
10. How do you stay connected to students in fully digital learning models at Laurea UAS? What challenges and advantages do you see in connecting with digital learning students' progress?
11. What do you believe is the impact of digital learning on students' group work and practical knowledge at Laurea UAS?

**[Optional] Assessing Students**

12. What is your opinion of assessing students via digital learning at Laurea UAS?

**[Optional] Well-being**

13. What do you believe is the impact of digital learning on students' and teachers well-being at Laurea UAS?

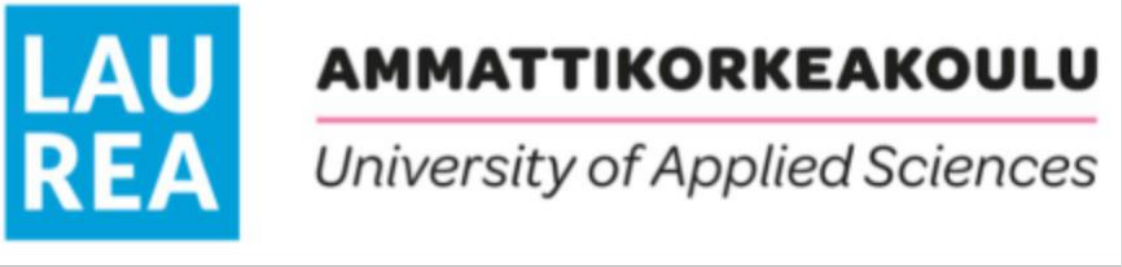
**Who should use digital learning**

14. Who could benefit from digital learning vs traditional learning model?

**Future**

15. What is your vision/ expectations for Laurea’s digital learning in the next 5 years?

Appendix 2: Student Survey Script




# Laurea UAS - Digital Learning Student Survey

| Section 1 | | |
|---|---|---|
| **Introduction** | The purpose of this survey is to gather data about students' experiences with Laurea's digital learning methods, courses, challenges and successes.<br><br>The data of this survey is solely gathered for a Master's thesis project. Personal information, such as name or address, is not collected. Participation in the survey is voluntary.<br><br>All the answers are anonymous and will be treated confidentially. The research permit has been obtained from Laurea UAS.<br><br>Please provide a response by [DD, Month, Year.]<br><br>Thank you for your participation! | |
| **Basic Definitions** | Face-to-face learning = contact learning<br>Blended learning = contact learning and some digital learning<br>Fully digital learning = fully online learning, no or extremely reduced contact learning | |
| **Question 1** | Select your age group: | **Select one of possible answers:** |
| | | 16-20 |
| | | 20-25 |
| | | 25-30 |
| | | 30-35 |
| | | 35-40 |
| | | 40-45 |
| | | over 45 |
| **Question 2** | Select the degree level you are currently studying at Laurea UAS | **Select one of possible answers:** |
| | | Bachelor Degree |
| | | Masters Degree |

| | | |
|---|---|---|
| | | Open university |
| **Question 3** | Select the primary mode of learning of your Laurea UAS degree: | **Select one of possible answers:** |
| | | Fully online/ Fully digital learning |
| | | Blended learning |
| | | Mostly face-to-face learning |
| **Question 4** | How would you rate Laurea UAS digital learning study offering: | **Select one of possible answers:** |
| | | Scale of 1 to 5, being 1 - Insufficient and 5 - Outstanding |
| **Question 5** | How would you rate your overall experience with Laurea UAS fully digital learning: | **Select one of possible answers:** |
| | | Scale of 1 to 5, being 1 - Very negative and 5 - Very Positive |
| **Question 6** | How would you rate your overall experience with Laurea UAS blended learning: | **Select one of possible answers:** |
| | | Scale of 1 to 5, being 1 - Very negative and 5 - Very Positive |
| **Question 7** | How would you rate your overall experience with Laurea UAS face-to-face learning: | **Select one of possible answers:** |
| | | Scale of 1 to 5, being 1 - Very negative and 5 - Very Positive |
| **Question 8** | What do you feel are the 3 main advantages of digital learning: | **Select 3 of possible answers:** |
| | | Flexibility |
| | | Own-pace learning |
| | | Well-being |
| | | No human interaction |
| | | Less intimidating |
| | | Cheaper/ More affordable |
| | | Focus on ideas |
| | | Less distracting |
| | | Better for my learning style |
| | | Accessibility (geographic or technologically) |
| | | More engaging |
| | | Easier communication |
| | | Easier to connect with people |
| | | Use of technology |
| | | Working alone/Isolation |
| | | Easier to concentrate |
| **Question 9** | | **Select 3 of possible answers:** |
| | | Flexibility |

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| | What do you feel are the 3 main disadvantages of digital learning: | Own-pace learning |
| | | Well-being suffers |
| | | No human interaction |
| | | More intimidating |
| | | Cheaper/ More affordable |
| | | Too much focus on ideas |
| | | More distracting |
| | | Worse for my learning style |
| | | Accessibility (geographic or technologically) |
| | | Less engaging |
| | | Harder communication |
| | | Harder to connect with people |
| | | Use of technology |
| | | Working alone/Isolation |
| | | Harder to concentrate |
| **Question 10** | What are the 5 main changes you want in Laurea UAS digital learning framework? | **Select 5 of possible answers:** |
| | | More fully online degrees |
| | | More online courses |
| | | More blended learning courses |
| | | More face-to-face couses |
| | | More IT support to use tools, softwares |
| | | More tools, softwares, apps |
| | | Simplified tools, softwares, apps |
| | | Less fully online degrees |
| | | Less online courses |
| | | Less blended learning |
| | | More individual learning support |
| | | More group work |
| | | Less group work |
| | | More practical learning |
| | | Less practical learning |
| | | Streamlined digital learning: simpler and more efficient |
| | | Better tools, softwares, apps |
| | | Unified digital learning tools: same tools for all courses |

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| | | Better preparation/qualitivation from teachers |
| **Section 2 - Laurea UAS - Digital Learning Tools** | | |
| **Question 11** | Select all digital tools, softwares, apps you have used during your studies at Laurea UAS: | **Select all that apply:** |
| | | Adobe |
| | | Cahoot |
| | | Canvas |
| | | Eliademy |
| | | Google Apps (Gdoc, Gsheet, etc) |
| | | Google Meet |
| | | Office 365 |
| | | Padlet |
| | | Promentor |
| | | Proctorio |
| | | Viope |
| | | Screencast-O-Matic |
| | | Seppo |
| | | Teams |
| | | Trello |
| | | Zoom |
| | | None of the options above |
| **Question 12** | How would you characterise the digital tools, softwares, apps you've used during your Laurea UAS studies: | **Select all that apply:** |
| | | Difficult to use |
| | | Not functional |
| | | Complicated |
| | | Too many different tools, softwares, apps |
| | | Not enough tools, softwares, apps |
| | | Great |
| | | User friendly |
| | | Functional |
| | | Flexible |
| | | Simple |
| | | Easy |
| | | Well integrated |
| | | Lacking integration |

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| | | Good |
| | | Overwhelming |
| | | Confusing |
| | | Efficient |
| **Question 13** | How easily can you find the necessary help at Laurea UAS to utilise digital learning tools, softwares, apps? | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - I can never find the help I need<br>5 - I can very easily find the help I need |
| **Section 3 - Laurea UAS - Student engagement** | | |
| How engaged do you feel with the study modes below? | | |
| **Question 14** | Fully digital courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not engaged at all<br>5 - Super engaged |
| **Question 15** | Blended learning courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not engaged at all<br>5 - Super engaged |
| **Question 16** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not engaged at all<br>5 - Super engaged |
| **Section 4 - Laurea UAS - Information retention** | | |
| How well do you retain information from lessons in each study mode below? | | |
| **Question 17** | Fully digital courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Question 18** | Blended learning courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Question 19** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Section 5 - Laurea UAS - Study progress** | | |
| How well do you stay on track with your studies in each study mode below? | | |
| **Question 20** | Fully digital courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |

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| **Question 21** | Blended learning courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Question 22** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Section 6 - Laurea UAS - Group Work** | | |
| How would you rate your overall experience with group work in each study mode below? | | |
| **Question 23** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Question 24** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Question 25** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Section 7 - Laurea UAS - Staying connected** | | |
| How well do you stay connected to your colleagues and teachers in each study mode below? | | |
| **Question 26** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Question 27** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Question 28** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Not well<br>5 - Very well |
| **Section 8 - Laurea UAS - Study Assessment** | | |
| How would you rate your overall experience with study assessments (assignments, exams, group work) in each study mode below? | | |
| **Question 29** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Question 30** | Face-to-face courses | **Select one of possible answers:** |

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| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Question 31** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Very negative<br>5 - Very positive |
| **Section 9 - Laurea UAS - Well-being** | | |
| How would you rate your overall well-being when studying each of the study modes below? | | |
| **Question 32** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Question 33** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Question 34** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Section 10 - Laurea UAS - Teaching quality** | | |
| How would you rate overall quality of teaching in digital learning? | | |
| **Question 35** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Question 36** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Question 37** | Face-to-face courses | **Select one of possible answers:** |
| | | Scale of 1 to 5, being:<br>1 - Poor<br>5 - Excellent |
| **Question 38** | Optional - Open feedback | Please use this field to provide any additional feedback about Laurea UAS digital learning or about this survey. |