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A study of the digital transformation process in a vocational education and training company

Ana Rita Lopes Sousa

Master in Management of Services and Technology

Supervisor:
PhD, Irene Dobarrio Machado Ciccarino, Assistant Professor,
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Department of Marketing, Strategy and Operations

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Resumo

A transformação digital é cada vez mais crítica na educação vocacional, que deve preparar os alunos com competências digitais. Este projeto desenvolve uma estratégia de transformação digital para a ETAcademy, uma instituição de formação vocacional. Começa por avaliar a sua maturidade digital e práticas existentes, para depois propor recomendações. O diagnóstico da maturidade digital baseou-se na ferramenta SELFIE da Comissão Europeia. Um inquérito online foi preenchido por líderes, professores e estudantes da instituição, e a informação foi analisada juntamente com relatórios internos e reuniões de trabalho. Os resultados mostram que a ETAcademy possui uma infraestrutura técnica robusta e uma adoção entusiástica de ferramentas digitais, mas carece de uma estratégia estruturada e uma visão de liderança coesa para com a tecnologia. Foram identificadas as lacunas mais significativas nas áreas de planeamento estratégico e de desenvolvimento profissional. Estes resultados foram validados com a direção da empresa através de email e discutidos numa reunião de apresentação dos resultados. O projeto propõe então recomendações práticas para estabelecer uma liderança digital clara, desenvolvimento de estratégias inclusivas e iniciativas de formação estruturadas para facilitar a transformação digital. Esta estratégia aproveita os pontos fortes e aborda as fraquezas, de modo a alinhar as iniciativas digitais com os objetivos educacionais da ETAcademy. A proposta foi validada pela diretora da empresa. Este projeto mostra como o modelo de maturidade digital pode ser operacionalizado com base nos contributos das partes interessadas, informando a estratégia educacional e contribuindo para a literatura existente neste tema da transformação digital de uma forma prática.

Palavras-chave: Transformação Digital, Ensino e Formação Profissional, Tecnologia Educacional, Maturidade Digital, Gestão da Qualidade

Classificação JEL: (I21) Análise da Educação; (M15) Gestão de Tecnologias de Informação

Abstract

Digital transformation is increasingly critical in vocational education, which must prepare students with digital skills. This project develops a digital transformation strategy for ETAcademy, a vocational training institution. It begins by assessing its digital maturity and existing practices and then proposes recommendations. The digital maturity diagnosis was based on the European Commission's SELFIE tool. An online survey was completed by leaders, teachers, and students at the institution, and the information was analyzed alongside internal reports and working meetings. The results show that ETAcademy has a robust technical infrastructure and enthusiastic adoption of digital tools but lacks a structured strategy and cohesive leadership vision for technology. The most significant gaps were identified in the areas of strategic planning and professional development. These results were validated with the company's management via email and discussed at a meeting to present the results. The project then proposes practical recommendations to establish clear digital leadership, develop inclusive strategies, and structured training initiatives to facilitate digital transformation. This strategy leverages strengths and addresses weaknesses in order to align digital initiatives with ETAcademy's educational goals. The proposal was validated by the company's director. This project shows how the digital maturity model can be operationalized based on stakeholder contributions, informing educational strategy and contributing to the existing literature on digital transformation in a practical way.

Keywords: Digital Transformation, Vocational Education and Training, Strategy Design, Educational Technology, Digital Maturity, Quality Management

JEL Classification: (I21) Analysis of Education; (M15) IT Management

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Glossary of Acronyms

VET – Vocational Education and Training

TVET – Technical and Vocational Education and Training

DT – Digital Transformation

KPI – Key Performance Indicator

AI - Artificial Intelligence

IoT - Internet of Things

BM – Business Model

QM – Quality Management

TQM – Total Quality Management

CPD - Continuing Professional Development

IT – Information Technology

M – Mean

SD – Standard Deviation

CHAPTER I

Introduction

This chapter aims to present and contextualize the topic that was addressed during this research project.

This study is an in-company project. I adopted the view of an outsider, much like a consultant. However, I had the full support of the board to develop this project. The project was developed in an educational business, with the help of the Portuguese Institution of vocational education and training (VET) called ETAcademy.

This project aims to contribute to the existing literature on the subject, as well as to inspire other organizations that are dealing with the same strategic challenge of digital transformation. From the research conducted, the existing information available was not that extensive or concise, making this project a valuable example of digital transformation in the education industry. From a practical point of view, it is also interesting considering that it's a trending approach among companies in today's society.

1.1. Background

In the context of Industry 4.0, leaders need to accept that digital transformation is an essential aspect for the well-being of processes, services and experiences among stakeholders (McCarthy et al., 2023). Industry 4.0 refers to the integration of cyber-physical systems, the Internet of Things (IoT), and data analytics into industrial processes, enabling smarter, more autonomous, and interconnected production environments (Lasi et al., 2014). Its significance extends beyond manufacturing, impacting sectors such as education, health, and services by redefining how organizations operate and innovate. As emphasized by Hermann et al. (2016), Industry 4.0 serves as a driving force for innovation, competitiveness, and long-term sustainability, making digital transformation not only relevant but essential. With knowledge being such a big and important sector in today's world, organizations need to accept and work on the digital transformation of their businesses (Khilji et al., 2024).

As said by Oliveira & Souza (2022), there is a need for educational systems to adapt in order to present students with skills that will translate into productivity for the working environments and for society in general.

The problem that this project aims to address is the need for a strong digital transformation strategy in ETAcademy. Digital transformation, as seen by Rachinger et al.

(2018), is an enhancing factor for companies to achieve good outcomes such as optimized resource utilization, cost reduction and improved productivity, which then lead to customer satisfaction and, overall, a competitive advantage.

With this problem being acknowledged, ETAcademy is looking forward to entering this movement of digital transformation with the goal of improving and modernizing their processes. This project aims to renovate and innovate the business in order to offer their stakeholders appropriate services that align with the market demand.

1.2. Objectives and Research Questions

Based on the information presented in the previous topic, the research question is: *"How to develop digital transformation in a vocational education and training institution embedded in the Leiria region in Portugal?"*

In order to support the main research question and to guide the whole project, some specific objectives must be accomplished:

- Analysis of the conditions of the vocational education and training institution for the digital transformation of their processes, following a digital maturity framework.
- Understanding the perception of stakeholders regarding needs, expectations and challenges.
- Identifying key drivers and barriers for digital transformation in this context.
- Proposal of recommendations to guide the digital transformation process in the institution.
- Establishing quality management (QM) mechanisms.

1.3. Scope

ETAcademy is a vocational education and training institution located in the Leiria region, in Portugal. It descends from the private higher education institution in Portugal - Instituto Superior de Línguas e Administração (ISLA) - which was founded in 1962 and belonged to the Lusófona Group since 2012.

In 2021, there was a change in strategy with the closing of the higher education services of the institution and they became known as ETAcademy (Executive Training Academy). The focus since then is to provide adults and young adults with continuous education and to provide specialized training for the professionals of the Leiria region.

Its offer has diversified over the years from bachelor's and master's degrees to what it now offers: Technological Specialization Courses (CET), Postgraduate and Specialization Courses, Adult Education and Training Courses (EFA), training and retraining for local and regional public administration employees, funded modular training, and recently, the provision of Apprenticeship Courses. Besides these training modalities, the company has also promoted and organized several events, seminars and workshops with the goal of contributing to the community. They are also expanding their services to incorporate a consulting segment accompanied by customized training directed to companies.

ETAcademy's mission is to contribute to the employability of professionals and the modernization of the business fabric by providing innovative, specialized training tailored to the needs of professionals. Its vision is to improve employability conditions, boost educational and professional qualifications, and promote the development of lifelong skills.

They are located in Leiria, and their offices consist of eight classrooms, a documentation center, a computer center, administrative spaces, two meeting/workspaces, a student lounge, a cafeteria and a WC. As of now, ETAcademy employs 6 people on the executive board, 1 member for information technology (IT) support and another responsible for the maintenance of the building. They also have an "almost permanent" portfolio of trainers with various skills who are experienced and have the appropriate training for their area of expertise.

ETAcademy holds collaboration protocols with Higher Education Institutions, which are essential for promoting specialized training for professionals in the region and other training and research projects, namely with Universidade Lusófona and ISLA Gaia, whose IT team supports ETAcademy's technical processes and platforms. Beyond these partnerships, the institution also participates in national initiatives such as *Pessoas 2030* and *Emprego + Digital 2025*, aimed at expanding modular and digital training opportunities, and contributes to the *Líder + Digital* program under the *Recovery and Resilience Plan*. Internationally, it is engaged in several *Erasmus KA2* projects, including *Finances4Youth* and others, which promote collaboration and innovation in VET.

ETAcademy operates in a competitive context in the Leiria region, where several entities provide vocational education and skills development services. NERLEI (Business Association of the Leiria Region) stands out for supporting the qualification of companies and employees through training activities tailored to the local business landscape. ACILIS also promotes courses in areas such as commerce and technology, contributing to local

employability. ATAR, LDA offers hands-on training, especially in technical fields like automotive mechatronics, supported by digital learning platforms. SA Formação, with national coverage, provides a wide range of in-person and online courses in areas such as healthcare, education, and accounting, and is considered one of the most digitally mature players in the sector. Lastly, Fator H combines training with human resources consulting, focusing on leadership and organizational development.

This analysis highlights that, in order to remain competitive, ETAcademy should continue to strengthen its value proposition through continuous innovation, strategic use of digital technologies, and alignment with market needs and stakeholder expectations.

1.4. Structure of the document

This thesis is divided into 6 parts: Introduction, Literature Review, Methodology, Results, Recommendations and Conclusion.

Starting with the Introduction, this segment presents the context of the problem to be addressed, as well as the research questions and objectives, followed by the methodology and scope.

For the Literature Review, it provides some theoretical support for the whole project, enabling the readers and myself to understand which studies have already been made and which insights their authors were able to provide to the problem in our hands. This project relies on digital transformation strategies and tools, evolution and importance of VET and QM practices.

The Methodology section is a key component of any research project, as it defines how the study was conducted and justifies the methods used. According to Saunders et al. (2019), it allows others to evaluate the validity and reliability of the study, ensuring transparency.

The Results section presents the main findings of the research, offering insights into the institution's current situation and digital maturity. The Recommendations section builds upon these findings to propose a structured strategy for digital transformation, outlining priorities and directions for improvement.

Lastly, we have the Conclusion, which synthesizes the findings and reinforces possible research contributions. It serves as an opportunity to give a clear answer to the research questions and to appoint further research points.

CHAPTER II

Literature Review

In order to provide theoretical support to this project, research was done on the topics of digital transformation, vocational education and training (VET), quality management (QM) and organizational challenges.

The literature review was partly based on relevant books in the area of management and technology and also on research articles available on research platforms. These platforms where the research was conducted were mainly B-ON, Scopus, Google Scholar, Publish or Perish and Research Gate, with preference for articles published from 2015 onward with the exception of essential articles in certain topics.

The main keywords used to filter the research were digital transformation, industry 4.0, vocational education and training, education, quality management, which were chosen to ensure alignment with the core themes of the study. Digital transformation and Industry 4.0 reflect the technological and strategic changes taking place across organizations and educational systems. The following two were included to focus the search on the correct context and finally, QM was used to explore how organizations can go through change while ensuring sustainability.

2.1. Digital Transformation

Hanelt et al. (2020), define digital transformation as change in the organization, initiated and outlined by the diffusion of digital technologies in society. From the perspective of Norton et al. (2020), it consists of a change in the organization motivated by new and improved digital technologies and also emerging innovative business models. It involves more than implementing an appropriate digital tool or technology, the success of the project needs close agreement between the business processes and the technology systems. The changes can be made not only in the organization but also in their strategy, IT and areas like marketing or supply chain, for example, customers may become co-creators of new products and services, competitors may become collaborators, and suppliers may be acquired through vertical integration. (Verhoef et al., 2021).

In the view of Feliciano-Cestero et al. (2023), DT allows companies to attain flexible, efficient and optimized processes while also generating value propositions that contribute to an ecosystem of innovation. With the process of digital transformation comes the immensity of

access to information and, as said by Elliot et al. (2016), information is power and when available at all hours of the day across several channels, said power is amplified exponentially.

Verhoef (2021) identified three external factors that are driving the need for digital transformation: digital technology (AI, blockchain, IoT, robotics, etc.), digital competition (the capabilities of competitors are increasing and driving the need to step up) and digital customer behavior (as a response to the digital revolution, customers are shifting their preferences to digital channels). In this project we focused on digital competition and digital customer factors since digital technology is out of our scope.

The same author also tells us about three main stages for the digital transformation process, them being Digitization, Digitalization and finally Digital Transformation and, although they seem similar, it is important to see the differences between them. Digitization can be described as the encoding of analog information into a digital format like zeros and ones (binary numbers). Digitalization, on the other hand, is the way that digital technologies can modify and improve the existing business processes (e.g., creation of new online communication channels), the IT being a key enabler to find the new possibilities. Lastly, and as mentioned above, digital transformation involves a company-wide change that has as a goal the development of new business models.

A digital strategy can take several forms and Ponsignon et al. (2019) have exposed some of them: raising customer engagement and improving their experience, improving efficiency, refining decision-making, growing innovation or transforming the business model, which are all relevant to this project.

Focusing now on the concept of Business Model (BM), Teece (2018), tells us that it describes the framework for how a company can create and deliver value for their customers while also retaining some of that value for the company itself, with the help for example of a thorough analysis of the value chain. A business model can also represent relationships between activities with the goal of improving communication and planning (Rachinger et al., 2018).

According to Rachinger et al. (2018), the growing number of opportunities related to digitalization are putting pressure on businesses to reflect it rapidly in their strategies while also constantly pushing them to find new business opportunities. However, there is still an understanding that business model innovation takes time and is very dependent on the resources and capabilities available to the firms. In the eyes of Appio et al. (2021), most companies do not really know or are not ready to apply those opportunities in a way that would give them

added value. According to Rachinger et al. (2018), there are three different ways on how the business models inside a company can change: optimization of the BM currently practiced, transformations on the current BM or the creation of a completely new BM. It is likely that ETAcademy aims to optimize the existing business model.

Introducing the concept of capabilities, Ponsignon et al. (2019) identified two types when talking about implementation of a new strategy: exploitation and exploration capabilities. The first ones refer to the ability to control and regulate the way of doing things to improve efficiency, emphasizing the needs of the stakeholders. On the other hand, exploration capabilities represent the capacity to center on radical innovation and generating new ideas into unknown situations, while engaging the organization in the process of change. The goal is for both capabilities to coexist.

2.2. Vocational Education and Training (VET)

Vocational Education and Training is considered a significant part of the educational sector who specializes in supplying the market with competent workers (Kovalchuk et al., 2022). It is a type of education in which the goal is to help individuals develop creativity and skills for the benefit of society, while also eliminating illiteracy and ignorance among the population (Zaharah et al., 2018). Knowing that one of the main goals of VET is to prepare students for the job market, it is crucial that institutions merge educational activities with examples of real work life situations and practical content (Dobricki et al., 2020).

In 2021, the European Union set a target to have at least 45% of young adults (25 to 34 years old) with a tertiary education attainment by 2030 and, a year later, half of the member states had already reached it (Hazelkorn, 2024).

In order to keep up to date with the technological progressions and with the new requirements of the job market, institutions will suffer pressure to offer a greater variety of content, especially focused on technical, knowledge-based and digital skills, alongside new and improved teaching approaches (Akour & Alenezi, 2022). Schools must promote digital transformation by actively making use of the added value of technology (Cattaneo et al., 2021).

Knowing that nowadays the access to information is everywhere and no longer restricted to educational institutions, it is crucial that the existing institutions face this challenge by providing the necessary content and by giving students experience that other sources cannot (Alenezi, 2021).

For the teachers of these institutions, there is also a big step needed in order to move on with the digital transformation. Not only do they need to have the usual soft skills to teach, but now more than ever they need to be able to use digital technologies appropriately in their day-to-day tasks (Kovalchuk et al., 2022).

Beyond the challenges faced by teachers, institutions themselves also operate in increasingly competitive environments. The OECD (2022) shows that in many countries, both public and private VET providers offer similar services to the same group of learners, which leads to crowded markets. This situation creates strong pressure on institutions to stand out in order to attract and retain students.

Another big stakeholder in this process, the students, is also the subject of analysis. The term “digital natives” is being used to describe this modern generation of students who grew up in the digital age and have dealt with technology for a long time. In comparison, the teachers can be described as “digital immigrants”, considering that they only had contact with the existing technologies much later in life, however, it is essential that they are digitally literate (Kovalchuk et al., 2022).

Contrary to the findings above, Findeisen & Wild (2022) think that the young generation being digital natives is a myth. Based on studies conducted in a European country, young students are reflecting a lack of digital competence, it being defined as the creative and critical use of information and communication technologies to produce results in society. In some sense, this can be an opportunity for training companies.

As the demand for digitally competent citizens continues to grow, VET systems must align with global trends in digital skills training. According to UNESCO-UNEVOC (n.d.), technical and vocational education and training (TVET) provision is being pressured to use digital tools to be more accessible and affordable while also being tailored to individual needs. It refers not only to the implementation of new tools but also to a significant investment in the upskilling and reskilling of teachers and trainers. These professionals play a significant role in digital transformation, both as facilitators of modern technologies and as learners adapting to digital demands themselves.

UNESCO-UNEVOC (n.d.) emphasizes that the success of DT relies on the readiness and quality of TVET educators. As stated in their global recommendation, there should be development of policies and frameworks that ensure qualified TVET staff including teachers, instructors, trainers, tutors, managers and administrators. This makes clear that teacher training

and professional development are not side concerns, but essential pillars of effective transformation. The inclusion of simulation tools, gamified platforms and adaptive learning technologies is only effective when teachers are empowered and supported to integrate meaningfully into pedagogical practice.

2.3. Digital Transformation in Vocational Education and Training

It was believed that a substantial portion of professions would disappear or be completely modified because of digitalization, automation, and robotization processes. However, instead of being a cause for insecurity among workers, digitalization has become a welcome challenge and a world of opportunities that will eventually lead to more competitive advantages for those who make use of it (Cattaneo et al., 2021). According to the World Economic Forum (WEF, 2020), by 2025 there would be a loss of 85 million jobs, but there would also be 97 million new roles to satisfy the market needs and the joining of human and machine workflows.

This perspective is supported by Manyika et al. (2017), which found that while automation may initially displace workers, the net impact could still be positive, especially in areas such as healthcare, technology and education, where demand is expected to grow. Their analysis emphasized the importance of re-skilling and adapting to evolving job requirements, estimating that up to 375 million workers worldwide may need to transition to new occupational categories. Similarly, Hötte et al. (2022) highlight that technological change does not automatically reduce employment in the long term and instead it often shifts the labor market toward new types of tasks and roles.

The rapid pace of technological change is reshaping the expectations for both students and employers, placing intense pressure on educational institutions to innovate. According to the World Economic Forum's *Future of Jobs Report 2025*, 39% of workers' core skills are expected to change by 2030, with digitalization and automation identified as the most transformative labor market forces (WEF, 2025). For VET providers, this means curricula must be continuously updated and closely aligned with industry needs to ensure learners remain prepared for rapidly evolving occupations.

Gussek et al. (2021) show that the fast-moving nature of technology frequently leads to the obsolescence of tools and practices. As new methods and systems emerge, previously acquired competences can quickly lose relevance, creating difficulties for both learners and educators. Their study stresses that continuous learning and systematic updating are necessary to maintain the value of competences and resources in such rapidly evolving environments.

Kovalchuk et al. (2022) believe that the process of digitalization is inevitable and that the education sector is not an exception to this movement. They consider that it is now almost impossible to perform the usual teaching processes without digital devices. Now, when assessing the quality of the services provided by education institutions, one of the most relevant aspects is the technology used, more specifically, innovative methods, pedagogical technologies and digital tools.

This process, as called “Education 4.0” by Oliveira & Souza (2022), has as a goal equipping the students with cognitive, social, interpersonal and technical skills in the face of the needs and challenges of the market around us, where the fourth industrial revolution is currently happening. This revolution refers to the current phase of technological advancement characterized by the widespread integration of digital technologies such as AI, robotics, and cloud computing, into all areas of society and industry. It represents a shift towards smarter, automated, and interconnected systems (Schwab, 2017).

For institutions, this organizational change implies that some actions need to take place regarding the content exposed to students: not only do they need to update the promotion of existing jobs to their new characteristics, but they also need to bring in new content regarding the most recent professions appearing in the market (Cattaneo et al., 2021).

At the same time, it is essential to rethink how instructional content is created and delivered in digital environments. As Wintersberg & Pittich (2025) highlight, it is crucial to have a well-planned instructional design because it improves learner motivations and overall satisfaction. However, the authors also reveal that instructional quality often suffers when trainers lack the ability to transfer their in-person expertise into digital formats.

The current education systems are of significant importance in guiding the values of students, and a way to do this effectively is by working not only on their hard skills, such as technology design and data analysis, but also on human-centric skills like social awareness, cooperation, empathy, and so many others (WEF, 2020). To justify this necessity, OECD (2018) says that students who are better prepared and have more useful skills will have the possibility to be agents of change and consequently be able to influence the world around them in some way.

Considering the swelled dependence on online platforms (e.g.: content management, video conferencing, etc.), it is of extreme importance that these systems are as seamless and advanced as possible, in order to provide a robust environment that is of at least the same quality

as the face-to-face systems (Bygstad et al., 2022), especially when the organization started by using a face-to-face model and eventually made the integration of online platforms (García-Peñalvo, 2021).

Despite growing access to these platforms, Wintersberg & Pittich (2025) found that many learners, particularly in technical training contexts, resist change due to negative experiences and perceive digital learning as overwhelming. This suggests that digital competence alone is not enough, as emotional readiness and prior exposure also play a key role.

A recent bibliometric study confirms a sustained and growing demand for blended learning models in education and training. Panday et al. (2025) highlight that scholarly and institutional engagement with blended learning has expanded significantly in recent years, reflecting its recognition as a strategic response to the need for flexibility, learner diversity, and digital integration. In particular, the COVID-19 pandemic accelerated this adoption at scale, underscoring the importance of blended learning as a trending educational approach rather than a peripheral practice, as institutions continue to adapt to changing learner expectations and technological opportunities.

According to the WEF (2020) report, the improvement of skills and capabilities through either education or work are the main drivers of economic success, individual well-being and social cohesion. Some motivations for digital transformation in this sector can be the desire for growth in their perceived reputation and the ability to acquire more students in order to remain competitive in the market (Elliot et al., 2016).

The duality within the digital transformation process in education consists of the digital education stream and the digital subject stream. As for the first one, it is considered a process-oriented vision that deals with digital classrooms, Learning Management Systems, digital materials (powerpoints and platforms for interactive content), assignments and so on. Regarding the second stream, it is more of a knowledge-oriented vision that works with digitized domain knowledge (programming and visualization of data and information, for example) (Bygstad et al., 2022).

European job markets are changing mostly because of technology and social shifts. As of now, Industry 4.0 consists of automation and the incorporation of the modern technologies, however, Europe is already changing its' focus to Society 5.0, which mainly prioritizes well-being in a digital world. Herrero et al. (2024) then conclude that VET institutions are the key

enablers of this movement, mostly by preparing the population for the current labor market with digital, technical and social skills.

National and European policy frameworks also play a decisive role in shaping digital transformation in education. In Portugal, the *Portugal Digital* agenda defines priorities for promoting digital skills and supporting institutions in adopting innovative practices (Governo de Portugal, 2020). At an European level, the *Digital Education Action Plan 2021-2027* sets out a strategy to strengthen digital education across member states, emphasizing both the development of digital competences and the effective use of technologies in teaching and learning (European Commission, 2020). Complementing this broader policy, the *DigCompEdu* framework provides detailed guidance on the digital competences educators should develop, offering a reference for training and professional development (Redecker & Punie, 2017).

2.4. Quality Management in Digital Transformation

According to Ponsignon et al. (2019), quality management is able to support an organization's digitalization mostly because it is very present in strategic-level activities and it has the ability to support the exploration of the practices surrounding digital transformation while helping the management of change.

The same author tells us that QM is a tool to develop and implement key performance indicators (KPIs) and scorecards to assess the impact of digital transformation, in this case, against the defined criteria. This approach guided by QM will then help companies ensure that the transformation process runs smoothly and that the goals are achieved. In this sense, Carvalho et al. (2020) argue that technology should not be the most important driver of digital transformation and claim that a quality-driven perspective is critical to ensure evolution in an organization while also meeting its goals.

A term that has been circulating for several years now is Quality 4.0, which refers to the blending of the traditional QM practices with more modern and recent technologies like Artificial Intelligence (AI), cloud computing, big data and so many more, that enable improving performance and innovation of processes inside companies (Alrabadi et al., 2023). It serves as a driver for DT in the sense that it integrates data and analytics to, for example, improve efficiency or customer value, which in the long term add growth to the company.

Quality recently had changed from being an optional process to being an essential one (Alrabadi et al., 2023), however, many organizations do not yet benefit from its potential. This

transition to Industry 4.0, as said by Carvalho et al. (2020), needs a defined QM approach in order to not have isolated processes but a system of organizational management. Leadership of companies also plays an important role in enabling quality into their practices and goals (Alrabadi et al., 2023).

Total Quality Management (TQM) is the main approach that guides QM in general. It can be defined as an approach in which the main goal is to maximize the competitiveness of organizations by continuously improving the quality of products, services and processes (Pambreni et al., 2019).

Some crucial elements to this approach are customer focus, continuous improvement, strategically based management and total employee involvement. As for the first one, it refers to the focus on identifying customers' needs (both current and future) in order to address the expectations of the biggest stakeholder. Continuous improvement is essential in the way that it creates competitive advantages for the company while improving efficiency at the same time. Strategically based management consists of having a plan to map out the processes in a sustainable way that drives growth. Lastly, employee participation is critical for reaching the predetermined goals while also driving raising individual performance. (Pambreni et al., 2019).

2.5. Organizational Challenges

Although it is now popular to implement digital transformation strategies, it does not mean that it is easy. Organizations face several challenges in this process, mostly because it needs an environment where digital culture is welcomed (Henriette et al., 2016). Any process involving transformation is complicated and requires acceptability to change not only in processes but also in people's behavior (Mahmood et al., 2019). Additionally, this change is also sometimes associated with the replacement or disappearance of jobs, leading to even more resistance from employees in companies (Henriette et al., 2016).

Another challenge when committing to a digital transformation process is the pressure to show results and in a short period of time, not realizing that it demands a lot of resources and an alignment of strategy (Henrietta et al., 2016). Having an effective strategy is one of the most relevant challenges for a successful digital transformation and it needs to align IT with the business, keeping in mind a change management mentality (Mahmood et al., 2019).

The COVID-19 pandemic marked a critical turning point for digital transformation efforts in TVET institutions, exposing long-standing disparities in digital readiness and forcing

institutions to rapidly adapt. Before to the pandemic, more than 75% of TVET teaching staff had limited access to training on digital tools (UNESCO-UNEVOC, 2022), and only 5% of providers in Africa had integrated online or offline distance learning (International Labour Organization et al., 2021). These barriers were particularly evident in low and lower-middle income countries, where systemic issues such as a lack of digital infrastructure, insufficiently trained staff, and the absence of policy frameworks constrained progress. In contrast, high-income countries faced challenges related to teacher confidence, pedagogical adaptation, and inconsistent institutional strategies. During the pandemic, these divides became more evident as only 18% of low-income country providers were able to deliver fully remote training, compared to 75% in high-income countries. Although some progress was made, especially in OECD countries through public-private partnerships, the global response highlighted the urgent need for coherent institutional strategies, comprehensive teacher training, and equitable access to technology to sustain long-term digital transformation in TVET.

To address the complexity and resistance associated with implementing digital transformation, especially in times of rapid change, it becomes essential to adopt structured approaches such as change management. Change Management is the implementation of an organized process accompanied by defined tools for leading the people part of change in order to achieve the company's goals (Galli, 2018). It implies moving from an initial state to the requested state while using the existing resources and, most importantly, a team. There is still some inevitable resistance to these kinds of business models and strategies, sometimes derived from poor leadership, inadequate training, or even from lack of resources.

While DT offers significant opportunities for TVET institutions, global disparities in infrastructure and access still pose major challenges. Data from UNESCO-UNEVOC (2022) shows that while regions like Europe and Northen America have nearly universal access to electricity, internet and computers in public school, other regions such as Sub-Saharan Africa lag significantly with only 29% of schools having electricity and just 14% equipped with computers. These discrepancies are further reflected in household access to the internet (30%) in comparison to Western Europe and North America (80%). In response to these constraints, countries are prioritizing different strategies to expand digital learning. High-income countries focus more on interactive tools such as videoconferencing, virtual learning environments and simulation-based learning, while lower-income countries frequently rely on printed resources, TV, and radio. This demonstrates not only the unequal starting point for digitalization in VET

globally, but also the need for context-sensitive digital strategies that account for local infrastructure, income levels, and learner accessibility.

This strategy of change management starts with the identification of the need for change and its consequences for the company, followed by the determination of roles, responsibilities, and resources to be used. Next, it is important to engage stakeholders with personalized communication plans with attention to their needs, followed by the actual implementation of the predefined plan. Similarly to the majority of implementations, it's finished by some monitoring and control where errors are identified and annotated for future iterations. (Galli, 2018).

2.6. Conclusion

The literature review in this chapter makes clear that digital transformation in education goes far beyond the adoption of technology. It requires an integrated approach that brings together strategy, governance, infrastructure and organizational culture. For VET, this transformation has particular weight since these institutions are expected to prepare learners with the technical and digital skills required by the labor market.

Several key themes emerged as central to this process. The first concerns the role of educators, as teacher training is essential to ensure that technologies are used in a meaningful way and that innovative methods such as blended learning can be implemented effectively. A second theme related to organizational challenges, including resistance to change, resource limitations and the risk of fragmented initiatives that fail to become sustainable. Another topic is the importance of QM, which provided the mechanisms to monitor, evaluate and continuously improve digital strategies, turning them into long-term institutional practices.

Taken together, these discussions highlight that digital transformation in VET is a complex but necessary journey. This research aims to contribute to the existing literature by exploring how digital transformation can enhance educational outcomes and institutional efficiency.

CHAPTER III

Methodology

3.1. Research Design

This in-company project is a qualitative study aimed at analyzing the digital maturity of a vocational education and training (VET) institution through the lens of digital transformation. It is framed as diagnostic research, characterized as an applied and descriptive investigation aimed at systematically evaluating the situation of an organizational phenomenon, identifying problems and potentialities, and providing recommendations to support decision-making (Diehl & Tatim, 2004; Creswell & Plano Clark, 2013).

According to Diehl and Tatim (2004), diagnostic research constitutes a variant of applied descriptive research, particularly suitable when the aim is to analyze the organizational or project context systematically, providing a foundation for strategic decisions. Creswell and Plano Clark (2013), in their approach on mixed methods, reinforce this perspective by highlighting that this type of research can combine multiple sources of information and analysis techniques, thereby producing evidence-based recommendations that integrate both primary and secondary data.

In this study, the institution's participation was partial, as the elaboration of the research tools involved the strategic management level during three online meetings that happened from 05/2025 to 07/2025. The results were also presented and evaluated in a final meeting on 25/09/2025. The researcher's freedom was ensured from the beginning of the study, and the results were discussed but not altered.

This design is appropriate given the contextual nature of digital maturity, which is shaped by the institution's internal strategies, stakeholder practices, and external environment. Results were generated based on in-depth, contextualized insights and identify strategic improvement opportunities tailored to the specific setting of the participating organization.

The study relied primarily on a survey as the main tool for gathering stakeholder perceptions, complemented by triangulation with secondary data. Triangulation, as described in the literature above, enhances validity by combining different sources of evidence and allowing convergent interpretations of the same phenomenon (Creswell & Plano Clark, 2013). In addition to the primary data sources, this study incorporates a digital maturity assessment

report previously completed by the institution in 2025. The report was developed using the IDC framework, which categorizes organizations into five maturity stages, from Ad-hoc (lowest) to Optimized (highest), and facilitated through a national digital transformation initiative. It evaluates the organization across six dimensions: Strategy and Innovation, Clients, Capital and Finances, Cybersecurity and Privacy, Processes and Operations, and Partnerships. This report was analyzed as a secondary data source and used to triangulate findings from the questionnaire and interview data. It provides an additional layer of insight into the institution's organizational-level digital maturity and supports a more holistic evaluation.

Additionally, there were also considered internal planning documents shared by the institution that reflect their current state, mission, goals and future achievements. The use of these complementary sources ensured that the analysis did not rely solely on perceptions of the survey, but were also validated and compared with other data, thereby increasing the robustness of the recommendations.

3.2. Research Context and Participants

The main research follows the SELFIE methodology (European Commission, 2018) to assess the digital transformation process in a vocational education and training (VET) institution. This institution, located in Leiria, Portugal, provides professional training across several technical domains and has expressed an interest in understanding its digital maturity and improving its digital capabilities.

The SELFIE tool, developed by the European Commission in 2018, aims to evaluate the use of digital technologies in schools and improve digital practices across various institutional levels. The tool is publicly available and offers multiple usage options, including an online survey platform for self-assessment.

However, due to technical difficulties in accessing the official SELFIE platform, the survey protocol was adapted for this study. Despite this adjustment, the same three key stakeholder groups recommended by the SELFIE methodology were selected to participate in this study. The groups involved are school leaders, teachers, and students and were chosen because they represent unique and complementary perspectives on the institution's digital transformation journey and their combined insights provide a comprehensive understanding of the current state of digital maturity of the institution. They represent the key levels needed in this context, which are strategic leadership, teaching practices and student experience.

3.3. Instruments and Data Collection Methods

3.3.1. Adapted SELFIE Framework Questionnaire

As mentioned above, due to technical constraints from the company, the official SELFIE tool could not be used. Instead, an alternative digital maturity questionnaire was developed based on the SELFIE framework. This adapted tool replicates the structure and core dimensions of SELFIE, including Leadership, Collaboration, Infrastructure, Professional Development, Pedagogy, Assessment, Student Digital Competence, and Strategic Planning. The difference is that data was collected by an online survey using the Google Forms tool, where each participant group had a separate survey with the respective questions.

Question items were drawn from the official SELFIE question repository, where there were available versions in both English and Portuguese with the exact same content. The surveys were distributed in Portuguese to accommodate the participants' language proficiency. The majority of the questions followed a 5-point Likert scale format, ranging from "Strongly disagree" to "Strongly agree", designed to assess stakeholder perceptions across key digital maturity dimensions. In addition to these core items, each survey concluded with a small set of demographic questions. A complete version of the adapted surveys for each stakeholder group is available in Annex A, B and C. The existence of both Likert-style and multiple-choice questions combined with the digital maturity report ensured that the strategy recommendations were grounded in the actual perceptions and needs of the institution's stakeholders, rather than abstract ideals.

The three online surveys were discussed in an online meeting by Zoom with the VET institutions' representative for a duration of one hour, one week before the launch of the surveys, where there were adjustments made such as erasing some of the questions that were not applicable to this context and also detailing some of the questions for a better understanding from the participants.

The versions of each survey were pre-tested by 2 volunteers outside of this context in the beginning of July 2025, right before they were launched. From that test, the feedback was some feelings of uncertainty with not knowing how many questions it contained from the start and the fact that they were not numbered so participants could keep track of their progress. The feedback was taken into account, changing the survey. Also, the test made it possible to determine the expected duration of each survey to include in the message to participants.

The online survey was then distributed separately to leaders, teachers, and students. Data collected was anonymized, and confidentiality was maintained. The researcher oversaw the distribution of surveys, provided clear instructions, and ensured completion within the agreed-upon timeframe.

3.3.2. SWOT Analysis

To complement the insights provided by the questionnaire data, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was selected as a diagnostic tool to perform the systematic evaluation of the organizational situation. It enables the identification of problems and potentialities to help the development of recommendations (Diehl & Tatim, 2004; Creswell & Plano Clark, 2013).

The SWOT framework is a widely used strategic tool that supports organizational self-assessment and strategic planning by evaluating internal and external factors (Benzaghta et al., 2021). Strengths and weaknesses are derived from internal feedback collected through stakeholder surveys and institutional documentation, while opportunities and threats were identified based on sectoral trends and the competitor analysis presented in the first chapter.

According to Benzaghta et al. (2021), the SWOT analysis can be effectively integrated with qualitative and quantitative methods and is particularly valuable in educational contexts for identifying development strategies and aligning institutional goals with environmental demands. The resulting SWOT analysis serves as a practical tool to contextualize the institution's digital maturity and strategic positioning, and to support the co-creation of actionable recommendations.

3.4. Data Analysis Plan

The analysis of the survey data relies primarily on descriptive statistics, which was used to summarize and interpret the responses across different stakeholder groups (leaders, teachers, students). Measures such as means and standard deviations were computed to provide a comprehensive overview of perceptions regarding digital maturity. This method is supported by Saunders et al. (2019), when it comes to analyzing survey data.

The SWOT analysis was constructed as a synthesis of the key findings from the descriptive data, such as recurrent strengths or weaknesses identified across stakeholder groups, institutional documents and qualitative input from interviews.

Additionally, the survey findings were triangulated with the Digital Maturity Report, in order to serve as a complementary data source and to compare internal stakeholder perceptions with broader strategic indicators.

3.5. Ethical Considerations

Participation in the study was voluntary. All participants were informed of the study's purpose, the nature of their involvement, and their right to withdraw at any time. No personal or identifying data were collected, and responses remained anonymous. Data was used solely for academic purposes and shared only in aggregated form. Where applicable, institutional approval and participant consent were formally obtained prior to data collection. ETAcademy has access to the database with anonymous information. Data collection and analysis comply with the General Data Protection Regulation (GDPR) applicable in the European Union, in force since May 25, 2018, and with Order No. 198/2018 of ISCTE - Instituto Universitário de Lisboa. More information can be found at https://www.iscte-iul.pt/assets/files/2022/06/22/1655919702381_Politica_de_protecao_de_dados_do_iscte.pdf

CHAPTER IV

Results and Data Analysis

4.1. Introduction

This section focuses on presenting, analyzing and interpreting the results of the data collected in the survey to the stakeholders of the institution, complemented by a report given to us that also contains a digital maturity analysis.

The results of the survey are divided into eight categories, according to the SELFIE tool, which are Leadership, Collaboration and Networking, Infrastructure and Equipment, Continuing Professional Development, Pedagogy: Supports and Resources, Pedagogy: Implementation in the Classroom, Assessment Practices and Student Digital Competency.

The results are presented dimension by dimension, following the SELFIE framework order. For each dimension, mean scores and standard deviations are provided for each stakeholder group, accompanied by descriptive analysis and visual representations. In addition to survey data, relevant findings from the institutional Digital Maturity Report are integrated into the analysis to provide a broader organizational perspective.

4.2. Sample Description

The sample acquired was not statistically representative, which is not a problem in qualitative studies. This study explores the analytical potential of the SELFIE tool. It is worth noting that all answers were voluntary, and they still provide valuable indicative insights into stakeholder perceptions. In total, there were 43 answers to all the surveys: 31 answers from students, 7 answers from teachers, and 5 answers from leaders. These numbers represent 14% of the universe, composed of 6 leaders, 22 teachers and 284 students. The number of leadership members suggests that they fully supported the study.

The surveyed students were predominantly female (77.4%), a distribution that closely reflects the overall student population, where 68% are female (SD=0.05). Their ages ranged from 27 to 61 (M=43), reflecting an adult learner profile consistent with lifelong learning and professional reskilling rather than initial vocational training. Teachers showed a balanced gender distribution (3 male, 3 female and 1 preferred not to say) and were aged 42-51 (M= 46.7). With an average of 15 years of teaching experience, this group brings considerable

stability and expertise, though such seniority may also represent challenges in adopting newer digital pedagogies without continuous professional development. Leadership respondents were mostly female (60%), aged 26-57 (M=47.2) and with an average of 16 years of experience in teaching. Their elevated level of formal qualification, most commonly doctorates, underlines the institution's academic strength and technical credibility, though it may also contribute to a leadership profile that is somewhat distanced from the digital realities of younger generations. Among students, the most common qualification was Secondary School, while teachers most frequently held a Bachelor's degree and leaders typically held Doctorates. This distribution suggests that ETAcademy serves a diverse but predominantly adult community, where staff qualifications are well aligned with the institution's mission of delivering specialized vocational and lifelong learning.

Regarding class modality, among teachers, 4 (57%) reported teaching both online and in-person, while 3 (43%) taught only in-person. Among students, 16 (51.6%) attended only in-person classes, 9 (29%) only online and 6 (19.4%) both modalities. This distribution suggest that while many teachers already operate in hybrid mode, students' experiences are more diversified, with many attending exclusively in-person or exclusively online. This imbalance helps explain some of the barriers identified later regarding blended learning, particularly across student access and consistency of experience.

4.3. SELFIE's Dimensions' Analysis

4.3.1. Leadership

Regarding the existence of a digital strategy at ETAcademy, teachers reported an average rating of M=4.00 (SD=1.53), whereas school leaders reported M=3.40 (SD=0.55). This suggests that teachers are somewhat more positive about the school's digital strategy than leaders. Similarly, when asked whether leadership involves teachers in developing the digital strategy, teacher's responses averaged M=4.14 (SD=1.46), compared to M=3.20 (SD=0.84) from leaders. Again, teachers showed a higher mean score on this item.

In terms of leadership support for trying new teaching methods with technology, teachers' mean was M=4.14 (SD=1.46) versus M=3.80 (SD=0.45) from leaders, indicating a similar pattern of teachers reporting more support and stronger leadership towards digital transformation than leaders themselves believe exists, considering that leaders maintain a more critical self-assessment.

In sum, the Leadership dimension shows a perception gap between teachers and leaders, which is noteworthy as leadership is often a driver of coherent digital transformation strategies. Such a gap may also signal an opportunity to make innovation support more visible and formally embedded in strategic priorities.

4.3.2. Collaboration and Networking

For the question about whether the school reviews its progress in teaching and learning with digital technologies, teachers averaged M=4.14 (SD=1.46), whereas leaders averaged only M=2.80 (SD=0.84). Here, the gap is larger, with teachers again more positive (and more variable) than leaders, which shows that teachers may not be as aware of the internal processes, thus the leaders' scores are more reflective of the reality.

On discussing the advantages and disadvantages of using digital technologies, students reported M=4.48 (SD=0.89), teachers M=4.0 (SD=1.41), and leaders M=3.40 (SD=0.55). In other words, students and teachers gave relatively high average scores, whereas leaders keep the more critical side. It is possible that, in this case, the leaders' scores are further from reality due to the lack of proximity to the students, which may not allow them to know the existence of these discussions.

Regarding the use of digital technologies in partnerships, teachers' average response was M=4.29 (SD=1.11) and leaders' average was M=3.80 (SD=0.45). Once again, the leaders give a lower score while teachers have a more positive perception.

Overall, this dimension highlights a marked contrast between the perceptions of teachers and students, who generally report active and positive discussions, and leaders, who evaluate these practices far more cautiously. This divergence suggests that while collaboration on digital technologies are happening at the classroom level, they may not yet be sufficiently formalized or visible from a strategic standpoint.

4.3.3. Infrastructure and Equipment

When asked about the effectiveness of the school's digital infrastructure for teaching and learning, the teachers average score was M=4.43 (SD=0.79), and leaders' average was M=4.2 (SD=0.45). Then, on the question about whether digital devices are available for teachers to use, teachers averaged M=4.57 (SD=0.79) and leaders M=4.20 (SD=0.45), showing a more cohesive perspective but still having the leaders' scores a bit lower.

Access to the internet was rated by all three groups, with students average score as M=4.42 (SD=1.03), teachers with M=4.71 (SD=0.76) and leaders with M=4.40 (SD=0.55). All means are high, indicating strong agreement that internet access is provided. Technical support availability was also rated by all groups with students averaging M=4.55 (SD=0.62), teachers with M=3.86 (SD=1.46) and leaders with M=3.00 (SD=1.00), suggesting leaders perceived much lower technical support availability, probably due to the increased contact with this issue.

For data protection systems at the school, teachers averaged M=4.43 (SD=0.79) and leaders M=3.80 (SD=0.84), highlighting a strategic concern that may not be as visible to the teachers. On the question of whether school-managed devices are available for students to use, students reported M=3.94 (SD=1.03), teachers M=4.43 (SD=0.79), and leaders M=3.40 (SD=0.55), representing a satisfactory level of availability for each group, with the leaders, as seen before, with a more cautious assessment.

Finally, on access to a careers/employment database, students gave it an average of M=3.84 (SD=1.04), teachers with M=4.14 (SD=0.69) and leaders with M=3.40 (SD=1.52), reflecting the existence of these databases but with possible room for improvement.

In sum, this dimension demonstrates that the basic technological foundations of ETAcademy are strong, particularly in terms of internet access and device availability for teaching. However, differences in perception between leaders and other groups regarding technical support and data protection points to areas where operational fragilities may undermine sustainability.

4.3.4. Continuing Professional Development

When asked if leaders discuss with teachers their continuing professional development (CPD) needs for teaching with digital technologies, teachers averaged M=4.29 (SD=0.76) versus leaders with M=3.40 (SD=1.34). For having opportunities to participate in school-provided CPD activities, teachers reported M=4.43 (SD=0.79) and leaders M=3.00 (SD=1.22). Both of these questions tell us that leaders may be aware of improvements to be made and possibilities to consider, while teachers are somewhat satisfied with the level of communication and opportunities provided.

For the question about support for teachers to share experiences within the school, teachers averaged M=4.29 (SD=0.76) while leaders averaged M=3.60 (SD=0.89), both around

the same perspective. Finally, on whether teachers have CPD opportunities specifically related to the digital technologies used in their courses, teachers' mean was M=4.00 (SD=0.82) compared to M=2.80 (SD=1.10) from leaders.

Besides the four Likert-style questions for this dimension, there was also a multiple choice question presented to the Teachers that asked whether they had participated in any professional development activities in the last year, offering options such as in-person courses/seminars/conferences outside the school, online courses/webinars/conferences, learning from other teachers at the school through collaborations, learning from other teachers through teacher networks/communities; internal tutoring/mentoring as part of a school plan or other internal training sessions organized by the school.

The majority of teachers (4 out of 7) selected "none of the above", suggesting they had not engaged in any formal CPD activities over the past year. Two reported attending online courses, webinars or conferences, with one of these also participating in internal training sessions organized by the school. Only one teacher attended both face-to-face and online external events This pattern suggest a possible discrepancy between teachers' high ratings of CPD opportunities in the Likert-scale section and their actual participation, pointing to potential barriers. During the validation meeting with the school leader, it was explained that this lack of presence in CPD is associated with the lack of offerings from the institution itself. The director explained that this is due to some internal restructuration that happened until the beginning of this school year and from now on aims to correct this lack of availability in training opportunities directed towards the teachers.

Taken together, the results reveal a consistent perception gap between teachers and leaders. Teachers express satisfaction with the opportunities available, yet their reported participation remains limited, while leaders view provision and alignment far more critically. This discrepancy indicates that while CPD structures exist, their scope, accessibility and relevance may not fully meet institutional needs.

4.3.5. Pedagogy: Supports and Resources

On whether teachers search online for digital educational resources, teachers' mean was M=4.14 (SD=1.21) and leaders' mean was M=3.40 (SD=1.34). On whether teachers create their own digital resources to support instruction, teachers gave M=4.71 (SD=0.76) and leaders M=4.20 (SD=0.45). In both cases teachers rated the behaviors quite positively, with especially

high agreement on creating resources. Leaders were somewhat lower, particularly on searching online, but closer to teachers on the second question.

On teachers' use of virtual learning environments to support student learning, students reported M=4.61 (SD=0.56), teachers M=4.14 (SD=0.75) and leaders M=3.20 (SD=1.10). For the use of digital communication for school-related purposes, teachers averaged M=4.43 (SD=0.79) and leaders M=3.80 (SD=0.84). The leaders' lower score in both questions may be related to a distance from the classroom and the practices performed by the teachers.

In conclusion, this dimension shows that teachers and students generally benefit from all the criteria, however, leaders' consistently lower evaluations suggest that these practices may lack institutional consistency or formal recognition.

4.3.6. Pedagogy: Implementation in the Classroom

When asked whether teachers use technology to tailor instruction to individual student needs, students reported M=4.52 (SD=0.57), teachers M=4.00 (SD=1.53) and leaders M=3.40 (SD=0.55), which seems a satisfactory qualification from the two parts most involved (students and teachers), while leaders may once again not have such a clear idea.

With respect to classroom activities, on fostering student creativity with technology, students' mean was M=4.32 (SD=0.83) and teachers' mean was M=4.00 (SD=1.53). On setting digital learning activities that engage students, students gave M=4.23 (SD=1.09) and teachers M=4.00 (SD=1.53). In both of these questions, students seemed satisfied with the teachers' methods, while teachers gave a slightly lower score, indicating room for improvement.

For using technology to facilitate collaboration among students, students reported M=4.55 (SD=0.62) and teachers M=4.00 (SD=1.53). Finally, on involving students in interdisciplinary projects using technology, students' mean was M=4.55 (SD=0.68) and teachers' M=4.00 (SD=0.82). Overall, these two questions have considerably good scored that reflect a well-established environment in the classroom.

Overall, this dimension confirms that digital technologies are actively used to support personalization, creativity, collaboration and cross-curricular projects. Students report especially elevated levels of satisfaction, while teachers provide slightly lower ratings that may reflect the practical challenges of integrating these practices. Leaders again maintain a more reserved perspective, likely due to their limited proximity to classroom activities.

4.3.7. Assessment Practices

For using digital technologies to assess student abilities, students' average was M=4.61 (SD=0.62) and teachers' was M=4.14 (SD=1.38). On providing timely feedback via technology, students gave M=4.58 (SD=0.56) and teachers M=4.00 (SD=1.15).

For using technology to help students understand their own strengths and weaknesses, students' mean was M=4.48 (SD=0.72) and teachers' M=4.00 (SD=0.82). Finally, on enabling students to give feedback to peers using digital tools, students reported M=4.45 (SD=0.77) and teachers M=4.14 (SD=1.27). In all of the four questions, results showed that students are very satisfied with the practices put in place by the teachers, while teachers score the questions slightly lower but still with a satisfactory rate, representing some room for improvement.

In summary, this reveals a strong satisfaction level from students, who rate these topics highly. Teachers, while still positive, are more moderate in their evaluations, highlighting implementation challenges and inconsistencies in applying these tools across different contexts.

4.3.8. Student Digital Competency

When asked about teaching students to navigate safely online, students' mean was M=4.71 (SD=0.53), teachers' M=4.29 (SD=0.76), and leaders' M=3.40 (SD=0.55). On teaching responsible online behavior, students averaged M=4.65 (SD=0.55), teachers M=4.43 (SD=0.79) and leaders M=3.40 (SD=0.55). As speculated before, the leaders' lower score indicates that distance from what actually happens in the classrooms, while teachers and students seem satisfied in these areas.

Regarding checking the reliability of online information, students' mean was M=4.65 (SD=0.61), teachers' M=4.29 (SD=0.76) and leaders' M=3.40 (SD=0.55). For giving credit to sources, students reported M=4.42 (SD=0.76), teachers M=4.00 (SD=0.58) and leaders M=3.60 (SD=0.55). In these two questions we see positive perspectives from the main stakeholders in these situations, which are students and teachers, while leaders maintain a more cautious evaluation.

On teaching students to create digital content, students' average was M=4.55 (SD=0.62), teachers M=4.14 (SD=0.69), and leaders M=3.20 (SD=0.45). Finally, for teaching digital communication skills, students' mean was M=4.68 (SD=0.54), teachers M=4.29

(SD=0.76), and leaders M=3.60 (SD=0.55). This reflects the high confidence in the teachers' methods regarding both digital content and communication skills.

Altogether, this dimension demonstrates an elevated level of confidence from both students and teachers in the development of essential digital skills. Leaders' more reserved evaluations suggest they may lack visibility into how these competencies are developed in practice or may believe further formalization is required. Nonetheless, the consistency of high ratings from students and teachers points to digital literacy as one of ETAcademy's strong areas.

4.4. Additional Survey Results

At the end of the 36 Likert-style questions, there were three additional questions in the SELFIE guide, which were included in the survey to both Teachers and Leaders.

The first question referred to their approach to using digital technologies for teaching and learning, with closed options to choose from, ranging from adopting later than most colleagues, keeping pace with the majority, adopting early when clear benefits are visible, to being among the first innovators to try new tools.

Among leaders, all respondents chose "early adopter when benefits are clear", suggesting a uniform, pragmatic approach to innovation that balances openness with caution. Among teachers, responses were more varied: only one teacher chose the same option as the leaders, while others were distributed across "at the pace of the majority", "later than most colleagues", and "innovator", reflecting a more diverse set of attitudes towards digital technology adoption. This variability may indicate differences in confidence, digital skills, or subject-specific needs within the teaching staff.

The second question explored factors negatively affecting teaching and learning with digital technologies. Options included lack of funding, insufficient digital equipment, unreliable internet connection, school space restrictions, limited technical support, lack of time from teachers, low digital competence of teachers and low digital competence of students.

Among teachers, the most common response was "none of the above", indicating that many do not perceive substantial barriers in their own teaching practice. However, a smaller number did select certain issues, particularly low student digital competence, internet instability, school space restrictions, and lack of time from the teachers. Among leaders, responses concentrated more heavily on systemic constraints such as a lack of funding,

insufficient digital equipment and limited technical support. This difference in focus may indicate that while teachers tend to see barriers as occasional and classroom-specific, leaders are more aware of persistent structural and budgetary limitations that can affect the institution.

The last question examined factors negatively impacting blended learning (i.e.: a mix of both in-person and online learning), providing the following options: limited student access to digital devices, limited student access to a reliable internet connection, low digital competencies of families, teachers lacking time to develop materials, teacher lacking time to provide feedback to students, difficulties in engaging students and difficulties in supporting families in helping students with blended learning.

Among teachers, responses clustered around limited student access to devices and reliable internet, time constraints on the teacher side, both for developing materials and providing feedback. This pattern suggests that, from a classroom perspective, blended learning challenges are primarily operational: uneven student access and the additional workload required to sustain certain practices. Leaders emphasized family-related factors such as low digital competencies of families and difficulties in supporting them, alongside persistent access issues to both devices and connectivity. This indicates a broader, systemic view in which home context and family readiness are seen as key constraints on the success of blended learning, beyond what can be addressed solely through classroom practices.

4.5. Comparison with Digital Maturity Report

The institution's overall digital maturity score was 2.89, placing it in the Repetitive stage, where digital technologies are in use but not yet fully embedded into strategic and operational processes. This secondary data was triangulated with the SELFIE's results and considered together with the institutional documents for the next chapter.

Bringing here the literature of Verhoef (2021), it is possible to say that, from the 3 possible stages discussed by the author (Digitization, Digitalization and Digital Transformation), ETAcademy is currently in the Digitalization stage, where digital technologies are present and can improve the business model, but there isn't yet a company-wide change.

The report evaluated six dimensions. The institution achieved its highest score in Strategy and Innovation (4.33), reflecting openness to change, initial strategic planning for

digital transformation, and some capacity to foster innovation. Partnerships (3.22) and Capital & Finance (3.07) also performed above the overall mean, indicating a relatively developed partner network and a baseline of financial management processes to support digitalization. Lower-scoring areas included Cybersecurity & Privacy (2.50), Clients (2.26) and, most notably, Processes and Operations (1.95), suggesting that customer engagement, operational digitalization and data protection practices remain underdeveloped.

Compared with the SELFIE survey, students and teachers rated pedagogical practices and student competencies much higher (e.g., Implementation in the Classroom M=4.16, Student Digital Competencies M=4.09), suggesting that day-to-day teaching uses of digital tools is strong. However, the national report's lower operational and cybersecurity scores align with some leadership perceptions in the SELFIE, such as lower ratings for infrastructure maintenance, data protection and CPD provision. While the Digital Maturity Report indicates a clear strategic vision, the moderate SELFIE Leadership score (M=3.78) suggests that this vision may not be equally visible or consistently experienced by all stakeholders. Overall, the national assessment highlights structural and strategic gaps, particularly in operations, data protection and external engagement, which are less evident in classroom-focused perceptions.

CHAPTER V

Recommendations for a Digital Transformation Strategy

5.1. Introduction

The purpose of this chapter is to translate the findings of the data analysis into actionable recommendations that can guide ETAcademy in strengthening its digital transformation journey. While the results presented in the previous chapter reveal both solid foundations and notable challenges across leadership, infrastructure, pedagogy, professional development and student competencies, they also highlight the absence of a structured and strategic approach to digitalization. In particular, the SELFIE-based survey exposed perceptual gaps among stakeholder groups, with students and teachers reporting positive experiences in day-to-day practices. On the other hand, leaders are more cautious in their assessments, reflecting their awareness of broader systemic and strategic constraints. Similarly, the national Digital Maturity Report positioned the institution at the "Repetitive" stage of maturity, signaling that there are digital technologies, but they are not yet fully integrated into core operations and long-term planning.

The recommendations are not limited to isolated actions but are instead articulated as a comprehensive strategy designed to consolidate strengths, address weaknesses, and seize opportunities emerging in the wider educational and technological landscape.

The chapter presents a SWOT analysis, which condenses the main findings into an institutional diagnostic report. Alongside this, a vision and set of guiding principles are proposed to define the direction and values of digital transformation. These principles are then operationalized into strategic axes, each covering critical domains such as governance, professional development, pedagogy, and infrastructure. The chapter also outlines a practical roadmap, including short-, medium- and long-term priorities, and concludes with governance mechanisms to ensure monitoring and accountability.

5.2. SWOT Analysis

To support the formulation of a coherent digital transformation strategy, a SWOT analysis was conducted to summarize the institution's internal strengths and weaknesses, as well as the external opportunities and threats shaping its digital journey.

5.2.1. Strengths

ETAcademy's strengths are grounded in its vocational identity and strong alignment with labor market needs, which ensures the sustained relevance of its training offer, in line with their mission and vision statements. The institution also benefits from a well-developed network of community and partnership relations, including collaborations with higher education institutions, as mentioned in the introduction, and connections with local businesses in order to provide their students with a portal of job opportunities, as proven by question 13 of the survey and also with verbal confirmation from the director. These connections demonstrate an openness to alliances, suggesting an advantageous position within a wider educational ecosystem.

Another important strength lies in the experience and qualifications of its staff, considering that both teachers and leaders bring long years of service to the education sector, contributing to stability, institutional memory and knowledge transfer. The elements that answered the last question of the survey regarding their academic qualifications, as most ranged from having bachelor's degrees to doctorates, support this analysis.

ETAcademy also benefits from a diversified portfolio that includes vocational training, consulting services and postgraduate courses, while also being involved in international projects, as mentioned in the introduction.

At the operational level, a positive culture of digital adoption is already visible in classrooms, where digital practices are increasingly integrated into teaching and learning. In the survey dimensions regarding classroom processes, the students gave consistently high ratings (mostly around a 4.5/5 score), supporting this conclusion of positive culture in the adoption of digital technologies. This is a particularly important topic, considering that in the vision of Henriette et al. (2016), having an environment that supports digital culture may be a strong step in order to avoid organizational challenges.

There are also investment plans for the digital infrastructure, such as adaptation to hybrid classrooms, distance learning equipment and new pedagogical methods like AI and gamification, which is a strength if accompanied by a long-term strategy.

Finally, ETAcademy has strategically engaged with national initiatives, as demonstrated by its participation in Portugal Digital's maturity assessment, which enhances visibility,

provides benchmarking opportunities, and integrates the school into broader digital transformation efforts.

5.2.2. Weaknesses

The institution faces some weaknesses that may obstruct its digital development. The most critical is the absence of a formal digital transformation strategy, since some initiatives exist but remain fragmented and are not embedded into a coherent roadmap. It corroborates literature by Mahmood et al. (2019). This weakness also serves as a barrier to effective Total Quality Management (TQM). It can jeopardize competitiveness by hindering the continuous improvement of process, product and service quality (Pambreni et al., 2019).

Operational fragility is another concern, particularly in areas such as technical support, data protection and funding for digital infrastructure, which leaders highlighted as systemic challenges, and reinforced by Norton et al. (2020) by saying that the processes need to be aligned with the technology systems. It can be explained by gaps in process continuous improvement according to TQM (Pambreni et al., 2019). Another point worth highlighting is that to some extent there is dependency on their outsourced IT services. This dependency may limit institutional capacity for sustained information.

Professional development represents an additional weakness. Despite reporting satisfaction with CPD opportunities, survey results reveal very low actual participation among teachers, which we know is due to constraints from the leadership side where there were actually no options provided recently. Internal alignment also appears uneven since leaders, teachers, and students provided divergent ratings of digital maturity, reflecting communication gaps and inconsistencies in strategic messaging. Pambreni et al. (2019) highlight the importance of employee involvement in supporting strategic changes and being committed to quality processes. Teachers' optimistic opinions are a good indicator of this convergence. However, their weak participation in the survey, despite reinforcements from leaders, suggests otherwise. This study cannot delve into this relationship and does not consider the opinions of other employees, only pointing out that this should be considered for future evaluation.

Finally, ETAcademy suffers from a limited digital presence with underdeveloped online visibility and digital offerings, all of which reduce its attractiveness to external stakeholders. This assertion is supported by a review of public digital platforms, comparing ETAcademy's website and social media, as well as its regional competitors, who seem to maintain active and visually prominent social media outreach and an investment in advertising. Notably, the

institution has confirmed the hiring of a marketing and social media manager, which might rectify this deficiency. This action must also help TQM by improving the identification of customer's needs (both current and future) to address the expectations of the biggest stakeholder (Pambreni et al., 2019).

5.2.3. Opportunities

The institution has several opportunities to leverage its digital transformation. The results of both Portugal Digital and SELFIE-based assessments provide valuable evidence that can inform the creation of a structured digital roadmap and governance system.

Growing demand for blended learning, as seen in the literature by Panday et al. (2025), also presents an opportunity to diversify training models, offering flexible pathways that appeal to new learner groups. Moreover, national and EU funding streams for digitalization and skills development can be mobilized to strengthen infrastructure and professional development provision.

Another promising avenue lies in differentiation, as ETAcademy can build on students' existing digital literacy and position digital competence as a defining outcome of its training portfolio. This digital literacy can be corroborated with the survey results, specifically in the dimension "Student Digital Competencies", where students gave positive scores in most areas related to the learning and use of digital tools. The growing demand for consulting services and tailor-made corporate training, which ETAcademy currently does, is a reality and can be digitally scaled to expand its reach. Organizations increasingly seek external partners to help them navigate digital adoption, reskilling and strategic change, as the consulting sector continues to expand globally with strong emphasis on digital transformation and operational improvement (The Business Research Company, 2023).

Finally, there is room for deeper collaboration with employers to develop digitally enhanced curricula (case studies, guest lectures, or practical projects) would both improve students' employability and reinforce the institution's reputation as a modern, responsive vocational training provider. Survey findings support this opportunity, as although students reported high satisfaction with creative uses of technology, teachers still reported difficulties in sustaining engagement in the classroom. Also, the digital maturity report highlighted weaknesses in the dimension of processes and operations, signaling limited external integration. Therefore, it is an opportunity constrained by weakness that can hinder results from digital transformation and from TQM perspective.

5.2.4. Threats

There are also some external threats that the institution must consider. ETAcademy operates in an increasingly competitive environment where other vocational schools and private training providers are advancing more rapidly in digital maturity, as confirmed by OECD (2022), and indicated as a strong driver for digital transformation by Verhoef (2021). This external pressure may risk diverting prospective students toward institutions that can offer better conditions in flexible or fully digital learning models.

The rapid pace of technological change is another major threat, as it constantly raises the expectations of students and employers, meaning that institutions must continuously innovate and digitalize (Rachinger et al., 2018) or risk being perceived as outdated (WEF, 2025). Broader market saturation, as confirmed by OECD (2022), in vocational and adult education adds to this challenge, making differentiation through digital innovation essential for maintaining and growing student enrollment.

Finally, societal inequalities in access to technology represent an environmental threat beyond the school's control, as students' home contexts such as device and internet access can constrain the effectiveness of digital and blended learning models, as confirmed in question 41 of the survey where leaders and teachers reported this very problem.

5.3. Vision and Guiding Principles

The digital transformation strategy for ETAcademy must be anchored in the institution's overarching mission of improving employability and promoting continuous learning. Digitalization is not an end in itself but rather a catalyst to extend the school's impact, making vocational education more accessible, flexible and aligned with the realities of an increasingly digital labor market. This process can be included in the concept of "Education 4.0", introduced in the literature by Oliveira & Souza (2022).

The vision guiding this process is therefore to strengthen ETAcademy's role as a reference institution in vocational training and lifelong learning, distinguished by the integration of digital technologies into teaching, management and partnerships, while remaining faithful to its identity as a community-oriented and labor-market-driven school.

The guiding principles of this strategy build on the institution's existing commitments and extend them into the digital domain. At the center of this process is the commitment to a learner-centered transformation, in which digital initiatives are designed with the ultimate goal

of improving student learning, engagement and employability. This is aligned with the view of Ponsignon et al. (2019), where one of possible paths of digital strategy is to improve customer experience and engagement. It is also reinforced in TQM literature as a crucial element continuous improvement conducting to a high performance (Pambreni et al., 2019).

Inclusivity is also central, ensuring that all students and staff, regardless of their socio-economic background or prior digital literacy, benefit from opportunities to acquire skills that are essential. This requires ensuring equal access to infrastructure, digital resources and support mechanisms that foster participation and reduce inequalities. At the same time, it must be recognized that digital exclusion is also a broader systemic issue, shaped by social and economic disparities that go beyond the scope of a single institution (UNESCO-UNEVOC, 2022).

Following the literature (Henriette et al., 2016), a culture of collaboration and openness is another guiding value, fostering knowledge exchange between leaders, teachers and external partners so that digital practices are co-created and continuously refined. This is intricately linked to the principle of continuing professional development (CPD), which recognizes that teachers and staff are at the heart of the digital shift and require ongoing training, mentoring and peer learning to sustain innovation.

Another principle is sustainability, recognizing that digital transformation demands more than isolated investments. Technologies evolve rapidly and, without a coherent long-term plan, equipment and methods can quickly become obsolete (Gussek et al., 2021). ETAcademy must therefore adopt an approach that balances innovation with durability, ensuring that resources remain relevant, optimized and integrated into pedagogical practices.

Finally, the strategy must remain aligned with national and European priorities for digital education and skills development, such as the Portugal Digital agenda and the EU's Digital Education Action Plan. This alignment ensures that ETAcademy is not only eligible for external support but also positioned as a relevant actor in broader policy efforts to upskill and reskill citizens for the future of work.

Attention should also be given to the institution's own business model, since DT ultimately requires a framework for how value is created and delivered. As Rachinger et al. (2018) explain, business models can evolve through optimization, transformation or complete reinvention. For ETAcademy, the most realistic path is optimization of its existing model, by embedding digital tools into current activities so that the institution can modernize its services

while staying consistent with its resources and mission. As noted by Ponsignon et al. (2019), implementing a new strategy requires both exploitation and exploration capabilities. ETAcademy currently demonstrates some exploitation capacity through its established processes, but its exploration capabilities remain underdeveloped and need strengthening.

5.4. Strategic Axes

While the guiding principles define the values and commitments that frame ETAcademy's digital transformation, they must be translated into concrete areas of action to become operational. The strategic axes serve this purpose, providing a set of priority domains where the institution should concentrate its efforts in the coming years. Each axis reflects the results of the diagnostic exercises, which include the survey and the existing digital maturity report, the SWOT analysis and the institution's mission. Together, they provide a practical bridge between principles and implementation, ensuring that the strategy remains both ambitious and actionable.

This first axis is Leadership and Governance, and it emphasizes the role of leadership in providing a coherent vision, allocating resources and embedding digitalization into the school's overall strategy. At the moment, leadership initiatives are not always perceived consistently across the community, which points to the need for stronger communication, structured planning and mechanisms to make innovation support more visible. By reinforcing governance structures and integrating digitalization into strategic priorities, ETAcademy can ensure alignment across all stakeholders.

As a second axis we have Teacher Professional Development. While opportunities for training exist, participation remains limited and uneven, suggesting barriers related to time, incentives and alignment with specific teaching needs. To overcome this, professional development must be continuous, flexible and linked to classroom practice. Strengthening mentoring, peer learning and subject-specific digital training will empower teachers to confidently integrate technology and function as drivers of innovation.

The third axis relates to Infrastructure, Cybersecurity and Support. The school benefits from adequate access to devices and connectivity, but technical assistance, system resilience and data protection seem to remain fragile. Without addressing these aspects, digital initiatives risk being unsustainable. A stronger focus on infrastructure reliability, user support and compliance with privacy standards is therefore essential to building trust in digital processes and ensuring long-term stability.

The fourth axis relates to Pedagogy, Assessment and Student Competencies. Digital tools are already present in teaching and learning, but their use is not yet systematic or balanced across subjects. By connecting pedagogy, assessment methods and transversal digital competences into a unified approach, ETAcademy can guarantee that learners not only experience engaging activities but also develop the skills demanded by the labor market.

Finally, the fifth axis builds on Partnerships and Visibility, regarding ETAcademy's strong community orientation and intention to expand its external visibility. Partnerships with employers and local institutions are already a strength, but digitalization offers an opportunity to deepen collaboration, co-develop curricula and enhance communication channels. At the same time, strengthening the school's online presence and reputation will make it more attractive to students and partners, positioning ETAcademy as a competitive and innovative vocational training provider.

Together, these five strategic axes, which were verified and approved by the director of the institution, create the backbone of ETAcademy's digital transformation, linking internal improvements with external opportunities and ensuring that innovation serves its community.

5.5. Roadmap and Implementation Priorities

The digital transformation strategy must be translated into a phased roadmap that balances ambition with feasibility. Short-, medium- and long-term priorities provide the institution with a structured path forward, ensuring that urgent gaps are addressed while laying the foundations for sustainable innovation.

In the short term, the focus is on establishing a governance structure and addressing urgent needs. This may include creating a dedicated digital transformation team or coordinator to lead and monitor initiatives, drafting a comprehensive digital strategy document aligned with ETAcademy's mission and with its broader strategic objectives. This strategy should be informed by the results section and should set clear goals, KPIs, and establish mechanisms for regular progress review.

Practical actions involve auditing existing digital tools and practices, ensuring reliable infrastructure (internet, up-to-date software, and adequate devices for staff and learners). Quick improvements are prioritized such as upgrading the institutional website and learning platform to be more user-friendly and interactive. At the same time, professional development for staff must begin in the short term through workshops or short courses on digital pedagogy and tools.

That being said, within the next year, ETAcademy should organize initial training sessions on topics like interactive teaching methods or data analytics in education, while leaders should actively communicate the digital vision across the institution.

Additionally, ETAcademy can capitalize on existing partnerships in the short term to support its internal transformation, for instance, drawing on the *Líder + Digital* initiative under the national Recovery and Resilience Plan, in which ETAcademy collaborates with ISLA. Another useful initiative would be to host a roundtable with local industry partners specifically to discuss digital skill needs in the workforce and identify opportunities to tailor ETAcademy's programs accordingly.

By the end of this initial phase, the institution should have in place the basic governance structure, a clear roadmap document, improved baseline infrastructure, and an engaged faculty starting to develop their digital competencies. These steps set the stage for structured growth rather than temporary efforts.

In the medium term (2–3 years), the priority shifts to scaling up and integration. One priority here is consolidating a culture of CPD and pedagogical innovation. Professional development involves structured annual training, peer-learning circles, or even incentives for obtaining digital teaching certifications. By year 2 or 3, every instructor should have the opportunity to elevate their digital pedagogy skills.

Curricula should be systematically reviewed to incorporate digital tools that add value and update learning outcomes. For example, the institution's newly launched courses in areas like data science and tourism already highlight emerging technologies, with one course focusing on data analysis, artificial intelligence, business intelligence, and digital transformation. Building on this, other training offerings can be refreshed to incorporate relevant digital skills and content, aligning with the competencies of the future.

The medium-term plan calls for continued upgrades such as a more robust e-learning platform, if it serves the institution's needs at that time, and implementing tools for analytics such as learning analytics dashboards to track student progress and engagement. By introducing data-informed decision-making, teachers and administrators can proactively identify where students struggle and tailor interventions. Additionally, ensuring adequate technical support is critical during this scale-up and ETAcademy might need to formalize its IT support arrangements, if not already formalized, to guarantee timely assistance and maintenance as digital usage grows.

Governance and quality assurance also take on an expanded role in the medium term. ETAcademy should, by now, have instituted regular monitoring of its digital strategy implementation. Concretely, this means that the digital transformation committee meets periodically to review key indicators such as the percentage of courses using the learning platform effectively, student and teacher satisfaction levels with digital resources, and progress on staff training targets and to recommend adjustments. If certain initiatives are not yielding the expected results, the strategy can be refined by providing additional support.

It is in this period that ETAcademy should also start seeing improved alignment with external benchmarks of digital maturity. Moving from the initial "Repetitive" (as said in the digital maturity report) stage towards a more "Managed" stage will be evidenced by more consistent, school-wide practices replacing isolated individual efforts. In fact, the institution can introduce dedicated digital skills modules or micro-courses as part of its offerings. These might range from basic information and communication technologies literacy for adult learners to more advanced workshops.

Partnerships and collaborations become especially fruitful in the medium term as well. Having solidified local credibility, ETAcademy can seek out partnerships with technological companies and industry associations in the region, for example, co-developing specialized training modules with companies (a local software firm could co-create a short course on cybersecurity or data analytics for ETAcademy's catalog).

All these partnership efforts increase ETAcademy's visibility and reputation as a forward-looking academy, which is crucial in an increasingly competitive environment where other training providers are also innovating. By around 2028, the institution should be recognized in its region not just for the content of its courses but for the modern, tech-enabled learning experience it provides.

In the long term (towards 2029–2031 and beyond), ETAcademy's roadmap envisions a fully mature digital ecosystem that is both sustainable and continuously innovative. In this phase, digital transformation is no longer an isolated project but an ingrained aspect of the institution's identity and operations. The governance structure should evolve from steering initial changes to cultivating an ongoing culture of innovation. The institution's leaders will need to refresh the digital strategy periodically to align with new technological trends and educational needs, ensuring the strategy remains a "living document."

By 2031, new waves of technology such as more advanced AI applications, immersive learning via augmented/virtual reality, or whatever next emerges will likely influence training methods. ETAcademy should position itself to adopt and experiment with these innovations where they add value. One concrete long-term goal could be to implement personalized and adaptive learning systems, for instance, using AI-driven platforms that adapt to each learner's pace and style, which could enhance the learning experience in adult education settings.

Another goal might be to digitize and streamline all administrative processes from enrollment to certification to be more efficient and user centric. Over the long run, the infrastructure will likewise reach a state of optimization where servers, networks, and digital services should be scalable and secure. Cybersecurity, privacy, and accessibility should be top-of-mind in all digital initiatives, in line with the national guidelines for digital maturity.

Crucially, the long-term horizon is about solidifying ETAcademy's role and reputation at both national and European levels. By executing the short- and medium-term steps, the institution should be well on its way to reaching a managed and optimized digital maturity, which opens the door to formal recognition or certification.

Likewise, ETAcademy can strive to become a reference point in the vocational training sector, for instance, being cited in national case studies or invited to share its experience at conferences on digital education. The alignment with European priorities will also come to full fruition in this stage. The European Union's Digital Decade vision calls for "almost total" digital transformation across education by 2030, including targets such as having at least 80% of adults with basic digital skills (European Parliament, 2025).

Through its programs and community reach, ETAcademy will be contributing to this collective goal by equipping its learners with essential and advanced digital competences. Moreover, by embracing EU frameworks (such as the Digital Education Action Plan and the DigCompEdu framework for educators), the academy ensures its practices remain at the forefront of European pedagogical standards.

In practical terms, long-term initiatives may include offering new learning formats like micro-credentials or online modular courses that can attract learners nationally and even internationally, thus extending ETAcademy's impact and visibility beyond its immediate region. These offerings would cater to the growing demand for flexible, lifelong learning and are strongly encouraged by European education policies.

Throughout this long-term evolution, the role of governance is to sustain momentum and prevent complacency. Digital transformation is characterized as a continuous process of adaptation, not a one-time project, and by 2031 the institution's leaders should embody this principle. Regular self-assessments will remain important, for example, repeating the digital maturity evaluation every 1–2 years to benchmark progress and identify new areas for improvement. Any new strategic cycle (whether for 2031–2036 or beyond) should therefore include a refresh of the digital roadmap in light of achieved milestones and emerging challenges. By fostering an internal culture that is agile and learning-oriented, ETAcademy can continue to reinvent its services in response to technological evolution and community needs, avoiding the risk of stagnation.

In conclusion, this roadmap charts a path for ETAcademy to transition from laying digital foundations to becoming a digitally mature, innovative academy. The short-term priorities address critical gaps and set up the structures such as governance, infrastructure and basic training that enable success while the medium-term priorities drive widespread adoption, skill development and curricular innovation, leveraging partnerships and ensuring that digital strategies are "managed" and evaluated. The long-term priorities secure sustainability, excellence and alignment with national and European ambitions, positioning ETAcademy as a leader in digital-age vocational training. Each phase of the roadmap is justified by the findings, from the need to formulate a clear strategy, to the importance of teacher professional development, to the imperative of modernizing pedagogical approaches and infrastructure.

By implementing this roadmap, ETAcademy will not only address its current challenges but also enhance its capacity to fulfill its educational mission. It will strengthen governance and leadership in technology use, empower teachers through ongoing development, enrich student learning experiences with digital pedagogies, upgrade infrastructure to support emerging tools, build strategic partnerships for resource sharing and innovation and boost its visibility and attractiveness in a competitive market. Ultimately, the digital transformation journey carefully phased and contextually grounded will enable ETAcademy to offer more accessible, high-quality, and future-ready education, securing its relevance and impact in the years to come.

5.6. Governance and Monitoring

For a digital transformation strategy to succeed, it requires not only a roadmap of actions but also clear governance and monitoring structures to ensure that commitments are implemented and adjusted over time. At ETAcademy, leaders should steer the digital strategy, embedding it

into governance structures and strategic planning cycles. This means defining priorities, allocating resources, and ensuring that digital objectives remain aligned with employability, community integration and lifelong learning.

Supporting this leadership role, contracted IT partners should oversee infrastructure robustness, cybersecurity and daily support. Teachers are key in integrating digital technologies into pedagogy, which requires both CPD and opportunities for sharing experiences. Student input should also be gathered through structured feedback mechanisms such as surveys or focus groups that inform the evaluation of new digital tools and practices.

Monitoring must be systematic and grounded in quality management principles. As Ponsignon et al. (2019) note, QM provides tools such as KPIs and balanced scorecards that can be adapted to ETAcademy. Practical KPIs could include the percentage of teachers completing training, students' satisfaction, the share of courses delivered in blended format, and platform usage rates. These should be reviewed annually and benchmarked against national standards such as the Portugal Digital maturity assessments.

A quality-driven approach also requires involving stakeholders in continuous improvement. As Henriette et al. (2016) argue, DT succeeds only when culture and structures are aligned, meaning monitoring must actively engage staff and leaders. For ETAcademy, this could include a small Digital Quality Committee that review progress twice a year, identify bottlenecks, and propose adjustments.

In line with Carvalho et al. (2020), monitoring should assess not only tool adoption but also whether initiatives contribute to employability and learner outcomes. Linking digital KPIs to broader goals, such as job placement rates or partnerships with employers, reinforces this connection. Finally, adopting elements of Quality 4.0, as introduced by Alrabadi et al. (2023), such as using dashboards, reporting tools and real-time feedback systems would allow ETAcademy to embed monitoring into its quality assurance cycle.

5.7. Conclusion

This chapter has outlined a comprehensive strategy for advancing ETAcademy's digital transformation. Building on the diagnostic evidence gathered through the SELFIE based survey and the Portugal Digital maturity assessment, as well as institutional documents and national and European priorities, the strategy combines internal reflection with external alignment.

It has highlighted ETAcademy's strengths, including its vocational orientation, partnership network and positive classroom culture of digital adoption, while also addressing weaknesses such as the absence of a formal strategy, and low participation in professional development. The proposed vision and guiding principles set a clear direction, while the strategic axes and roadmap translate that vision into phased priorities across governance, professional development, pedagogy, infrastructure and visibility.

What emerges from this strategy is that ETAcademy is well positioned to build on its operational strengths but must now consolidate its efforts into a coherent and sustained framework. Leadership alignment, systematic professional development and the digitalization of processes represent critical levers for change. At the same time, the institution has considerable opportunities to differentiate itself by expanding blended learning, strengthening student digital competencies and leveraging partnerships both nationally and internationally. Importantly, the strategy presented here is not static but a living framework. It is designed to evolve in response to modern technologies, policy directions and local needs, ensuring that ETAcademy remains resilient, relevant and impactful in an increasingly digital education landscape.

CHAPTER VI

Conclusion

6.1. Summary of Objectives and Findings

This research set out to answer the central question: *How to develop digital transformation in a vocational education and training institution?* To address it, five specific objectives were established.

The first objective was to assess ETAcademy's conditions for digital transformation through a maturity framework, which was successfully achieved by adapting the European Commission's SELFIE tool and complementing it with the national digital maturity report, providing a structured diagnosis of the institution's starting point. The findings revealed an institution with a mid-lower level of digital maturity, containing a mix of promising strengths and clear gaps.

Then, we also set as an objective to capture stakeholder perceptions, which we did with the surveys distributed to leaders, teachers and students. While this generated valuable insights into needs and challenges, participation was limited and did not extend to deeper involvement, which restricted the level of engagement achieved.

A third objective was to identify the main drivers and barriers to digital transformation, which was met by combining our results with the literature review. This revealed key strengths such as solid infrastructure and openness to digital tools but also highlighted barriers including the absence of a formal strategy, inconsistent CPD and fragile operational processes.

When all the details of the current status were analyzed, the next goal was to propose recommendations, which was fully accomplished through the design of a comprehensive strategy including a vision, guiding principles, strategic axes and finally, the roadmap. Lastly, it was crucial to establish metrics and quality assurance mechanisms. While these could not be implemented during the project or be based on ETAcademy's actual possibilities in terms of processes, a monitoring framework was outlined, grounded in QM principles, suggested KPIs and benchmarking tools that the institution can use to ensure this company-wide transformation is sustainable and beneficial in the long term.

Taken together, these objectives allowed the study to deliver on its main purpose, which was to provide a clear understanding of ETAcademy's digital maturity and translate it into a practical strategy for transformation.

6.2. Theoretical Contributions

This study adds to the growing discussion on digital transformation in VET by applying concepts and frameworks that are still rarely operationalized in this sector. The first contribution lies in linking stakeholder perceptions to strategic planning. Wintersberg & Pittich (2025) found that learners and staff often perceive digitalization as burdensome or overwhelming, while García-Peñalvo (2021) highlighted the importance of coherent digital platforms to ensure adoption. The findings of this study corroborate these concerns and extend them by embedding them into a SWOT analysis and a set of recommendations, showing how perceptions can inform strategy design rather than remain descriptive.

A further contribution relates to the connection between digitalization and educational quality. Kovalchuk et al. (2022) argued that digitalization is now inevitable and that the quality of educational services is increasingly assessed through the technologies and pedagogical tools employed. The survey findings in our work corroborate this claim, as respondents confirmed the demand for blended learning opportunities, also mentioned by Panday et al. (2025), and pointed to the lack of adequate digital devices as a key barrier. These results provide empirical evidence from a VET setting that confirms how expectations of quality are closely tied to the effective provision of digital technologies.

This study also exemplifies, through a practical case, crucial elements of Total Quality Management as highlighted by Pambreni et al. (2019) and aspects of Industry 4.0 (McCarthy et al., 2023).

6.3. Practical Implications

The most concrete contribution of this study is the production of a structured digital transformation strategy tailored to a VET institution in Portugal. Rather than remaining at the diagnostic stage, the study translated the maturity assessment into a set of applied tools.

A further contribution lies in demonstrating how the SELFIE tool can be applied in a customized way to a VET institution. While the tool was originally designed as a diagnostic instrument, this study shows how it can be embedded into a broader process that links assessment to strategy design. Although the approach is tailored to ETAcademy, it offers a detailed example that can be replicated in other institutions and compared across cases, thereby supporting benchmarking and institutional learning.

The research also illustrates the value of uniting management theory with practice. By applying frameworks from digital transformation, quality management and maturity assessment in a systematic way, the study generated practical recommendations that address challenges such as teacher development, infrastructure, governance and partnerships. This methodological approach demonstrates how academic concepts can be operationalized to guide decision-making in vocational education.

Another key implication is the significance of targeted professional development and capacity building for staff. The gap identified between current CPD offerings and what is actually needed indicates that institutions must invest in their human capital if technology is to be used effectively. This issue was addressed in the proposed Strategy.

Finally, it is important to frame the use of SELFIE with care. The exercise provided a valuable internal diagnostic for ETAcademy, but it does not replace the benchmarking opportunities offered by the official platform. The recommendation is therefore for ETAcademy to integrate its ongoing use of SELFIE within the formal European system, ensuring access to comparative data while still benefiting from the customized insights developed in this thesis.

6.4. Limitations

While this research provided valuable insights, it is important to acknowledge its limitations. Scope and sample size pose the first limitation as the study relies on a single organization, with a finite group of participants. The relatively small sample and specific context mean that the findings are not statistically generalized to all vocational schools or educational settings.

Another limitation is the study's heavy reliance on perception data gathered through surveys and self-reporting, since stakeholder perceptions are inherently subjective and can be influenced by individual experiences, biases or misunderstandings of questions. Although the research tried to mitigate this by including multiple groups and cross-referencing their responses, it still means the data reflects opinions and self-evaluations rather than a direct objective measure of digital competency or usage.

Furthermore, the study did not proceed to an implementation and outcome-measurement phase for the strategy, which is a limitation in understanding real-world impact. As a consequence, we cannot verify through this research whether the suggested actions would produce the desired improvements or whether challenges would emerge during implementation.

The work assumes, based on literature and logical reasoning, that its recommendations will be beneficial, but without a pilot or trial, this remains an assumption to be assessed in future work. Another related limitation is the partial understanding of internal dynamics, as the researcher was external to the organization (an in-company project where the author collaborated with ETAcademy but was not an employee) and there may be internal institutional knowledge, historical context or day-to-day operational details that escaped full consideration.

Lastly, it's worth noting that digital technology and educational contexts evolve quickly and what is a limitation today might be resolved by external advancements tomorrow, with new challenges arising. Thus, any snapshot like this project has a built-in limitation of temporal relevance since its diagnosis and advice are time-bound and should be revisited as conditions change.

6.5. Future Research

Building on this research, there are several avenues for future investigation that can deepen and broaden the understanding of digital transformation in VET institutions. One important direction would be to conduct longitudinal studies that follow ETAcademy (or similar institutions) over an extended period as they implement digital transformation initiatives. Observing changes year over year would allow researchers to capture the dynamic effects of the strategy. For example, tracking whether the digital maturity scores in various dimensions improve after the recommendations are put into practice and whether those improvements are sustained or plateau over time.

Another fruitful area for future research is comparative studies across multiple institutions or educational contexts. While this thesis focused on one institution, a comparative study could involve several vocational academies conducting similar self-assessments and sharing outcomes. Such research could identify common challenges and success factors in DT across the VET sector. Moreover, comparing VET institutions with general secondary schools or higher education institutions could highlight what is unique about the vocational context.

Further research should also consider integrating quantitative educational outcomes and performance metrics with digital maturity assessments. The next step is to correlate the maturity levels with concrete outcomes such as student academic results, skill acquisition levels or job placement rates after graduation. If such correlations are established, it would empirically substantiate the often-theorized claim that digital transformation leads to better educational quality.

CHAPTER VII

Bibliography

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CHAPTER VIII

Annexes

Annex A- List of the Survey Questions for Leaders

1 - At ETAcademy, we have a digital strategy

2 - We develop the digital strategy for our school together with the teachers

3 - We support teachers to try out new ways of teaching with digital technologies

4 - At ETAcademy, we review our progress in teaching and learning with digital technologies

5 - At ETAcademy, we discuss the advantages and disadvantages of teaching and learning with digital technologies

6 - At ETAcademy, we use digital technologies in our partnerships with other organizations

7 - At ETAcademy, the digital infrastructure supports teaching and learning with digital technologies

8 - At ETAcademy, there are digital devices for me to use for teaching

9 - At ETAcademy, there is access to the Internet for teaching and learning

10 - At ETAcademy, technical support is available in case of problems with digital technologies

11 - At ETAcademy, there are data protection systems in place

12 - At ETAcademy, there are school owned/managed digital devices for students to use when they need them

13 - At ETAcademy, students have access to a database of in-company training opportunities

14 - We discuss with our teachers their CPD needs for teaching with digital technologies

15 - Our teachers have opportunities to participate in CPD for teaching and learning with digital technologies

16 - We support our teachers to share experiences within the school community about teaching with digital

17 - Our teachers have CPD opportunities in the use of digital technologies, specific to the courses they teach

18 - Our teachers search online for digital educational resources

19 - Our teachers create digital resources to support their teaching

20 - Our teachers use virtual learning environments with students

21 - Our teachers use digital technologies for school-related communication

22 - Our teachers use digital technologies to tailor their teaching to students' individual needs

23-

24-

25-

26-

27-

28-

29-

30-

31 - At ETAcademy, students learn how to behave safely online

32 - At ETAcademy, students learn how to behave responsibly when they are online

33 - At ETAcademy, students learn how to check that the information they find online is reliable and accurate

34 - At ETAcademy, students learn how to give credit to others' work they have found online

35 - At ETAcademy, students learn to create digital content

36 - At ETAcademy, students learn to communicate using digital technologies

37-

38 - Including this academic year, how many years of work experience do you have in total in the field of education?

39 - Which best describes your approach to using digital technologies for teaching and learning? I tend to use digital technologies after the majority of my colleagues; I tend to use digital technologies at the pace of the majority of my colleagues; I tend to be an early adopter where I see clear benefits; I am usually among the innovators who try out new technologies; Prefer not to say

40 - Is teaching and learning with digital technologies in your school negatively affected by the following factors? Lack of funding; Insufficient digital equipment; Unreliable or slow internet connection; School space restrictions; Limited or no technical support; Lack of time for teachers; Low digital competence of teachers; Low digital competence of students; Other

41 - Is blended learning negatively affected by the following factors? Limited student access to digital devices; Limited student access to reliable internet connection; Low digital competence of families; Teachers lacking time to develop material for blended teaching; Teachers lacking time to provide feedback to students ;Difficulties in engaging students; Difficulties in supporting families and/or guardians in helping students with blended learning; Other

42-

43 - How old are you?

44 - What is your gender? Female, Male, Prefer not to say

45 - What is your academic qualification? Level 1 – 1st cycle of Basic Education (4th grade); Level 2 – 2nd cycle of Basic Education (6th grade); Level 3 – 3rd cycle of Basic Education (9th grade); Level 4 – Secondary Education (12th grade), including vocational courses with internships; Level 5 – Higher Technical Professional Course (CET/TESP) – post-secondary non-higher education; Level 6 – Bachelor's Degree; Level 7 – Master's Degree; Level 8 – Doctorate; I prefer not to say

Annex B – List of the Survey Questions for Teachers

1 - At ETAcademy, we have a digital strategy

2 - Our school leaders involve us teachers in the development of the school's digital strategy

3 - Our school leaders support me in trying out new ways of teaching with digital

4 - At ETAcademy, we review our progress in teaching and learning with digital technologies

5 - At ETAcademy, we discuss the advantages and disadvantages of teaching and learning with digital technologies

6 - At ETAcademy, we use digital technologies in our partnerships with other organizations

7 - At ETAcademy, the digital infrastructure supports teaching and learning with digital technologies

8 - At ETAcademy, there are digital devices for me to use for teaching

9 - At ETAcademy, there is access to the Internet for teaching and learning

10 - At ETAcademy, technical support is available in case of problems with digital technologies

11 - At ETAcademy, there are data protection systems in place

12 - At ETAcademy, there are school owned/managed digital devices for students to use when they need them

13 - At ETAcademy, students have access to a database of in-company training opportunities

14 - Our school leaders discuss with us our CPD (continuing professional development) needs for teaching with digital technologies

15 - I have opportunities to participate in CPD for teaching and learning with digital technologies

16 - Our school leaders support us to share experiences within school about teaching with digital technologies

17 - I have CPD opportunities on the use of digital technologies, specific to the vocational courses I teach

18 - I search online for digital educational resources

19 - I create digital resources to support my teaching

20 - I use virtual learning environments with students

21 - I use digital technologies for school-related communication

22 - I use digital technologies to tailor my teaching to students' individual needs

23 - I use digital technologies to foster students' creativity

24 - I set digital learning activities that engage the students

25 - I use digital technologies to facilitate student collaboration

26 - I engage students in using digital technologies in cross-curricular projects

27 - I use digital technologies to assess students' skills

28 - I use digital technologies to provide timely feedback to the students

29 - I use digital technologies to enable students to reflect on their own learning

30 - I use digital technologies to enable students to provide feedback on other students' work

31 - At ETAcademy, students learn how to behave safely online

32 - At ETAcademy, students learn how to behave responsibly when they are online

33 - At ETAcademy, students learn how to check that the information they find online is reliable and accurate

34 - At ETAcademy, students learn how to give credit to others' work they have found online

35 - At ETAcademy, students learn to create digital content

36 - At ETAcademy, students learn to communicate using digital technologies

37 - Have you participated in any of the following activities in the last year? Face-to-face courses, seminars, or conferences outside of school; Online courses, seminars (webinars), or conferences; Learning from other teachers at your school through online or offline collaboration; Learning from other teachers through teacher networks or online communities of practice; Internal tutoring or mentoring as part of a formal school plan; Other internal training sessions organized by the school; None of the above

38 - Including this academic year, how many years of work experience do you have in total in the field of education?

39 - Which best describes your approach to using digital technologies for teaching and learning? I tend to use digital technologies after the majority of my colleagues; I tend to use digital technologies at the pace of the majority of my colleagues; I tend to be an early adopter where I see clear benefits; I am usually among the innovators who try out new technologies; Prefer not to say

40 - Is teaching and learning with digital technologies in your school negatively affected by the following factors? Lack of funding; Insufficient digital equipment; Unreliable or slow internet connection; School space restrictions; Limited or no technical support; Lack of time for teachers; Low digital competence of teachers; Low digital competence of students; Other

41 - Is blended learning negatively affected by the following factors? Limited student access to digital devices; Limited student access to reliable internet connection; Low digital competence of families; Teachers lacking time to develop material for blended teaching; Teachers lacking time to provide feedback to students ;Difficulties in engaging students; Difficulties in supporting families and/or guardians in helping students with blended learning; Other

42 - What type of teaching do you attend? In-person, Online, Both

43 - How old are you?

44 - What is your gender? Female, Male, Prefer not to say

45 - What is your academic qualification? Level 1 – 1st cycle of Basic Education (4th grade); Level 2 – 2nd cycle of Basic Education (6th grade); Level 3 – 3rd cycle of Basic Education (9th grade); Level 4 – Secondary Education (12th grade), including vocational courses with internships; Level 5 – Higher Technical Professional Course (CET/TESP) – post-secondary non-higher education; Level 6 – Bachelor's Degree; Level 7 – Master's Degree; Level 8 – Doctorate; I prefer not to say

Annex C - List of the Survey Questions for Students

1 -

2 -

3 -

4 -

5 - At ETAcademy, we talk with teachers about the advantages and disadvantages of using technology for learning

6 -

7 -

8 -

9 - At ETAcademy I have access to the Internet for learning

10 - At ETAcademy, technical support is available when I face problems with technology

11 -

12 - At ETAcademy there are computers or tablets for me to use

13 - At ETAcademy I have access to a database of traineeships, apprenticeships and other opportunities

14 -

15 -

16 -

17 -

18 -

19 -

20 - At ETAcademy, our teachers use online platforms to facilitate our learning

21 -

22 - At ETAcademy, teachers give us different activities to do using technology that suit our needs

23 - At ETAcademy, I use technology for creative activities

24 - At ETAcademy, I participate more when we use technology

25 - At ETAcademy, we use technology for group work

26 - At ETAcademy, we use technology for projects that combine different subjects

27 - At ETAcademy, our teachers use digital technologies to assess my skills

28 - At ETAcademy, we use technology to get timely feedback on our learning

29 - At ETAcademy, I use technology to understand my strengths and weaknesses as a learner

30 - At ETAcademy, I use technology to provide feedback to other students

31 - At ETAcademy, I learn how to behave safely online

32 - At ETAcademy, I learn how to behave responsibly and respect others when I am online

33 - At ETAcademy, I learn how to check that the information I find online is reliable and accurate

34 - At ETAcademy, I learn how to use others' work I have found online

35 - At ETAcademy, I learn how to create digital content

36 - At ETAcademy, I learn how to communicate using technology

37 -

38 -

39 -

40 -

41 -

42 - What type of teaching do you attend? In-person, Online, Both

43 - How old are you?

44 - What is your gender? Female, Male, Prefer not to say

45 - What is your academic qualification? Level 1 – 1st cycle of Basic Education (4th grade); Level 2 – 2nd cycle of Basic Education (6th grade); Level 3 – 3rd cycle of Basic Education (9th grade); Level 4 – Secondary Education (12th grade), including vocational courses with internships; Level 5 – Higher Technical Professional Course (CET/TESP) – post-secondary non-higher education; Level 6 – Bachelor's Degree; Level 7 – Master's Degree; Level 8 – Doctorate; I prefer not to say

Annex D- Summary Table of Survey Data

		TEACHERS		STUDENTS		LEADERS		TOTAL	
DIMENSIONS	Q	MEAN	STD DEVIATION	MEAN	STD DEVIATION	MEAN	STD DEVIATION	MEAN	STD DEVIATION
LEADERSHIP	1	4,00	1,53			3,4	0,55	3,70	1,22
	2	4,14	1,46			3,2	0,84	3,67	1,29
	3	4,14	1,46			3,8	0,45	3,97	1,13
COLLABORATION AND NETWORKING	4	4,14	1,46			2,8	0,84	3,47	1,38
	5	4,00	1,41	4,48	0,89	3,4	0,55	3,96	1,01
	6	4,29	1,11			3,8	0,45	4,04	0,90
INFRASTRUCTURE AND EQUIPMENT	7	4,43	0,79			4,2	0,45	4,31	0,65
	8	4,57	0,79			4,2	0,45	4,39	0,67
	9	4,71	0,76	4,42	1,03	4,4	0,55	4,51	0,93
	10	3,86	1,46	4,55	0,62	3	1,00	3,80	0,98
	11	4,43	0,79			3,8	0,84	4,11	0,83
	12	4,43	0,79	3,94	1,03	3,4	0,55	3,92	0,97
	13	4,14	0,69	3,84	1,04	3,4	1,52	3,79	1,04
CONTINUING PROFESSIONAL DEVELOPMENT	14	4,29	0,76			3,4	1,34	3,84	1,08
	15	4,43	0,79			3	1,22	3,71	1,19
	16	4,29	0,76			3,6	0,89	3,94	0,85
	17	4,00	0,82			2,8	1,10	3,40	1,09
PEDAGOGY: SUPPORTS AND RESOURCES	18	4,14	1,21			3,4	1,34	3,77	1,27
	19	4,71	0,76			4,2	0,45	4,46	0,67
	20	3,86	1,46	4,61	0,56	3,2	1,10	3,89	0,94
	21	4,43	0,79			3,8	0,84	4,11	0,83
PEDAGOGY: IMPLEMENTATION IN THE CLASSROOM	22	4,00	1,53	4,52	0,57	3,4	0,55	3,97	0,86
	23	4,00	1,53	4,32	0,83			4,16	0,98
	24	4,00	1,53	4,23	1,09			4,11	1,16
	25	4,00	1,53	4,55	0,62			4,27	0,86
	26	4,00	0,82	4,55	0,68			4,27	0,72
ASSESSMENT PRACTICES	27	3,71	1,38	4,61	0,62			4,16	0,86
	28	4,00	1,15	4,58	0,56			4,29	0,73
	29	4,00	0,82	4,48	0,72			4,24	0,75
	30	3,43	1,27	4,45	0,77			3,94	0,95
STUDENT DIGITAL COMPETENCY	31	4,29	0,76	4,71	0,53	3,4	0,55	4,13	0,70
	32	4,43	0,79	4,65	0,55	3,4	0,55	4,16	0,70
	33	4,29	0,76	4,65	0,61	3,4	0,55	4,11	0,73
	34	4,00	0,58	4,42	0,76	3,6	0,55	4,01	0,76
	35	4,14	0,69	4,55	0,62	3,2	0,45	3,96	0,75
	36	4,29	0,76	4,68	0,54	3,6	0,55	4,19	0,67

Figure 1 - Mean and Standard Deviation Scores by Question of the survey (Q) and by Stakeholder Group (Teachers, Students, Leaders and Total) in a scale of 1-5.